

Tax Incidence

EC313 - Public Economics: Taxation

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Goals of This Section

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- Outline different types of taxes
- Discuss difference between statutory and economic incidence of a tax
- Show how tax incidence depends on elasticities of supply and demand
- Expand on tax incidence in various markets

Types of Taxes

Introduction

- There are many different types of taxes
- Taxes can have different goals
 - Raise revenue for government spending
 - Change behaviour of individuals or firms
 - Redistribute resources
- They can also have different bases, structures, and rates
 - Base: what is being taxed (e.g. income, consumption, property)
 - Structure: how the tax is applied (e.g. progressive, regressive, flat)
 - Rate: how much is being taxed (e.g. percentage, fixed amount)
- Below we cover some of the most common types of taxes

Taxes on Income

- **Income Tax:** tax on income earned during the year
- Can be levied on individuals or corporations
- For individuals, includes but not limited to
 - Labour market earnings
 - Capital gains
 - Investment income (e.g. from dividends, interest, property)
 - Pensions and retirement income (e.g. RRSPs)
 - Some government benefits (e.g. employment insurance)
 - Other taxable benefits (e.g. premiums paid by employer for group life insurance)

Taxes on Income

- For corporations, includes but not limited to
 - Active business income from sales or goods and services
 - Investment income
 - Capital gains
 - Some government grants
 - Depends on the size of your business
 - Small business pay a lower rate

Payroll Taxes

- **Payroll Taxes:** taxes levied on employment income
 - Paid by both employers and employees
- Used to finance social insurance and public pension programs
 - Examples: Employment Insurance (EI), Canada Pension Plan (CPP), worker compensation
- Payroll taxes vary by province
 - Some charge a health tax (e.g. BC Employer Health Tax)
 - Manitoba charges a levy for health and postsecondary education
- These are different from the general income tax

Consumption Taxes

- **Consumption Tax:** a tax paid on consumption of goods and services
- Taxes generally charged by a seller at point of sale
 - They remit these funds to the government
- Examples:
 - Sales tax (e.g. GST, HST, PST)
 - Excise taxes (e.g. gasoline, alcohol, tobacco)
 - Tariffs (tax on imports)

Wealth Taxes

- **Wealth Taxes:** taxes on the value of an asset
- Typical wealth taxes include
 - Property tax (tax on value of land/buildings)
 - Estate tax (tax on value of estate at death)
 - General wealth tax (tax on total value of assets owned)
- Estate taxes and general wealth taxes are not used in Canada
- Property taxes are a major source of revenue for municipal governments

Statutory vs Economic Incidence of a Tax

Introduction

- The question of who “pays” a tax is more complicated than it seems
- Example: in Canada, there is a federal \$0.10/litre tax on gasoline
 - Gasoline stations include this in their price
 - They remit the tax to the government
 - Does the seller or the consumer pay?
- This section will clarify who pays a tax
- Separate between **statutory** and **economic** incidence of a tax
- My view: this is the most important concept we teach in this program

Statutory vs Economic Incidence of a Tax

- **Statutory Incidence:** who is legally responsible for paying the tax to the government
 - In the gasoline tax example, the statutory incidence is on the gasoline station
 - They send a cheque to the government
- **Economic Incidence:** the change in real income brought about by the tax
 - In the gasoline tax example, the economic incidence can be shared between the gasoline station and the consumer
 - The gasoline station may less revenue per litre sold
 - The consumer may pay a higher price per litre purchased

Statutory vs Economic Incidence of a Tax

- Example: \$0.10/litre tax on gasoline
 - Before tax is imposed, suppose price is \$1.00/litre
 - Consumers pay \$1.00/litre, gas station receives \$1.00/litre
 - Then government levies \$0.10/litre tax on gasoline station
 - Suppose gasoline station raises price to \$1.10/litre
 - Consumer pays \$1.10/litre
 - Gas station keeps \$1.00/litre, remits \$0.10/litre to government
 - In this case, the consumer bears the entire economic incidence of the tax
 - Gasoline station receives same revenue per litre as before tax
 - Consumer pays \$0.10/litre more than before tax

Statutory vs Economic Incidence of a Tax

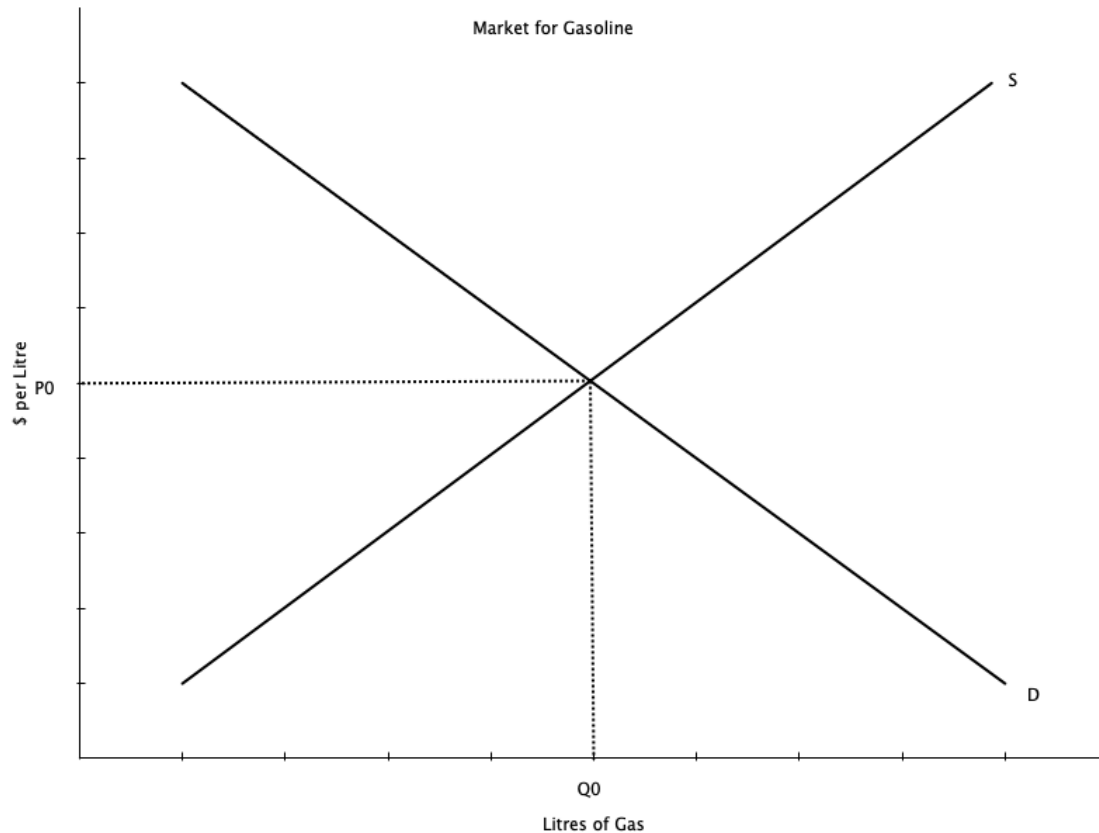
- Example 2: \$0.10/litre tax on gasoline
 - Same \$0.10/litre tax on gas station
 - Suppose gas station raises price to \$1.05/litre
 - Consumer pays \$1.05/litre
 - Gas station keeps \$0.95/litre, remits \$0.10/litre to government
 - In this case, the consumer and gas station share the economic incidence of the tax
 - Gas station receives \$0.05/litre less than before tax
 - Consumer pays \$0.05/litre more than before tax

Statutory vs Economic Incidence of a Tax

- Key lesson is that **statutory incidence does not determine economic incidence**
 - In example, statutory incidence is always on the gas station
 - Economic incidence depends on how much of the tax is passed on to consumers in the form of higher prices
 - Gas station could pass on all, some, or none of the tax to consumers
- Statutory incidence says nothing about economic incidence
- To determine economic incidence, we need to look at underlying economic forces

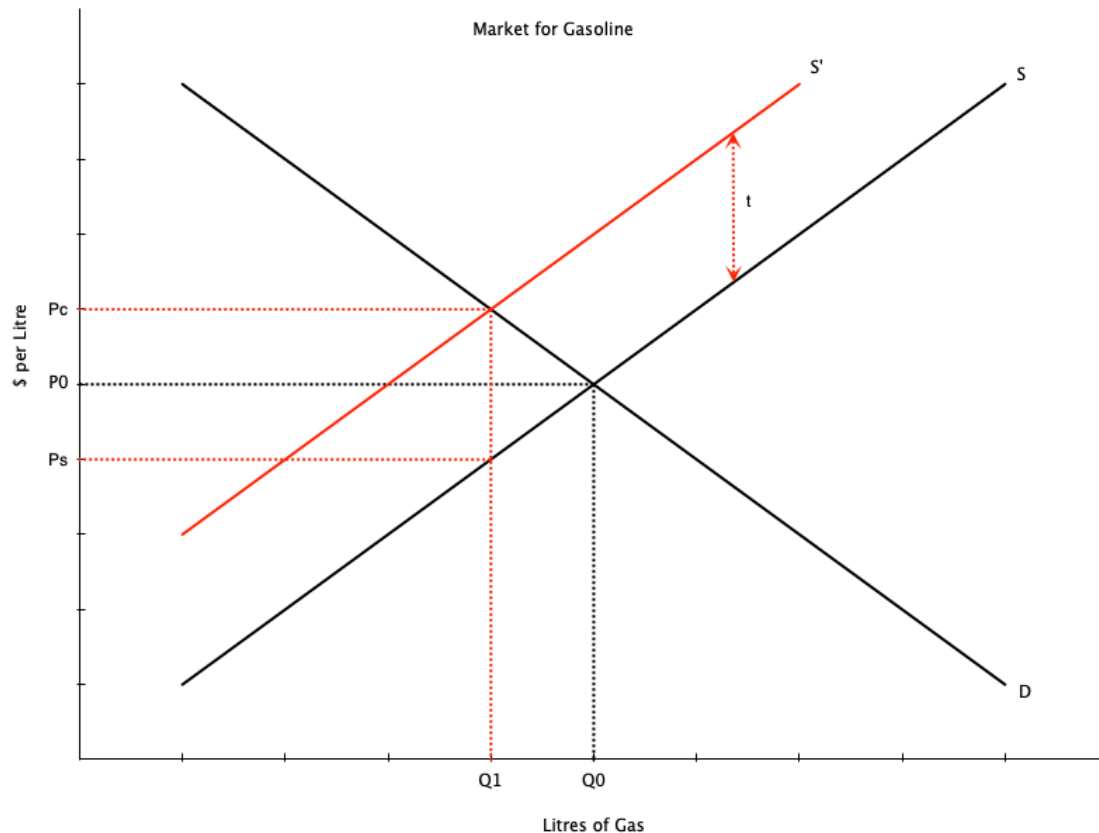
Commodity Taxes in Partial Equilibrium Models

Unit Tax on Sellers - Graphical



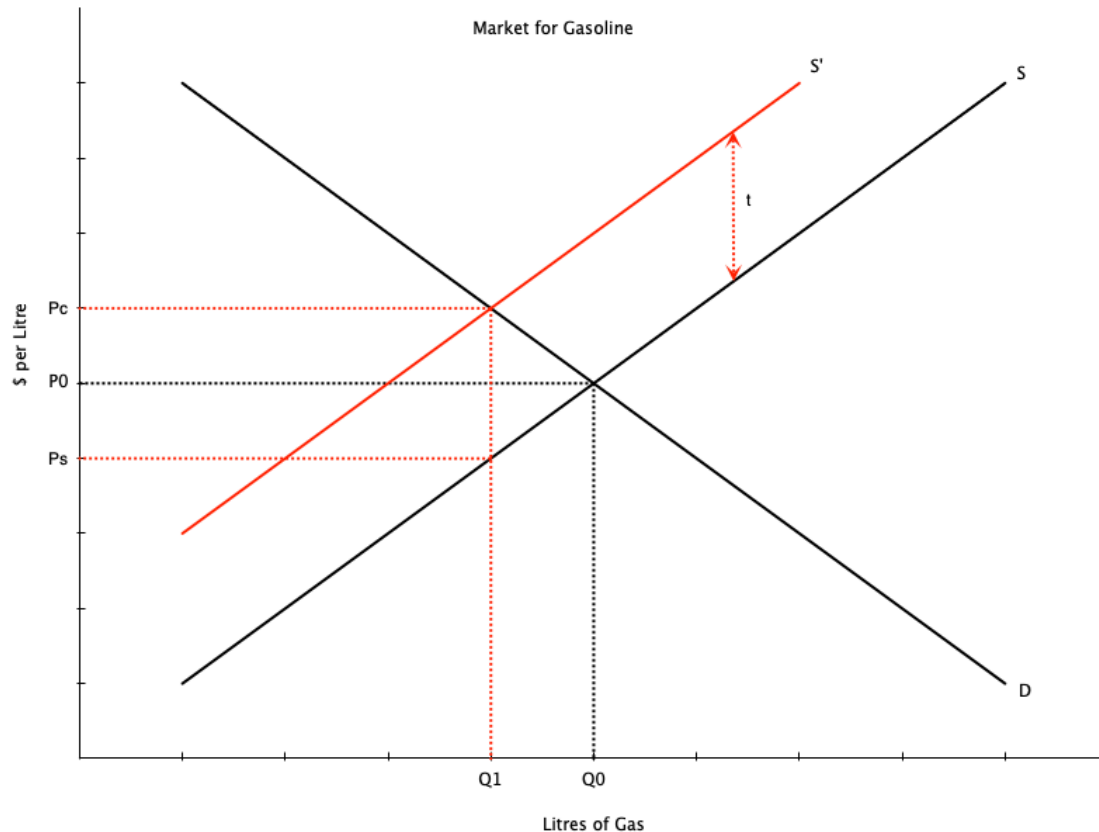
- Take gasoline tax example one more time
- On right is demand and supply of litres of gasoline
- Without tax, price and quantity are determined where demand and supply are equal
 - Price is P_0
 - Quantity is Q_0

Unit Tax on Sellers - Graphical



- Now government levies a per unit tax t (e.g. \$0.10/litre) on gasoline
- Tax is levied on **sellers** (statutory incidence)
- This shifts the supply curve up by the amount of the tax
 - New supply curve is S'
 - At each quantity, sellers want to charge t more to cover the tax
- New equilibrium is where S' intersects D
 - Determines price paid by consumers

Unit Tax on Sellers - Graphical

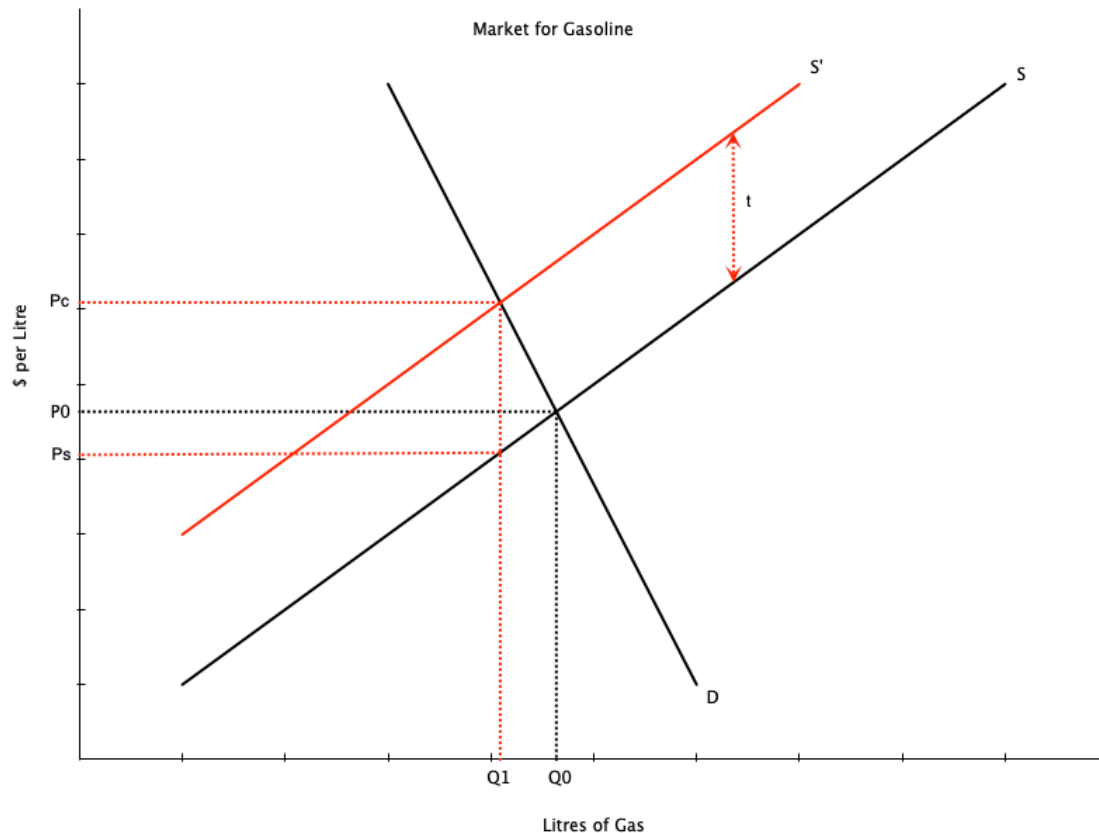


- The tax introduces a **tax wedge**
 - Difference between what consumers pay and what producers receive from a transaction
- Consumers pay the equilibrium price P_c
 - Price includes the tax
- Producers receive $P_s = P_c - t$
 - They remit t for every unit sold
- Quantity falls to Q_1

Unit Tax on Sellers - Graphical

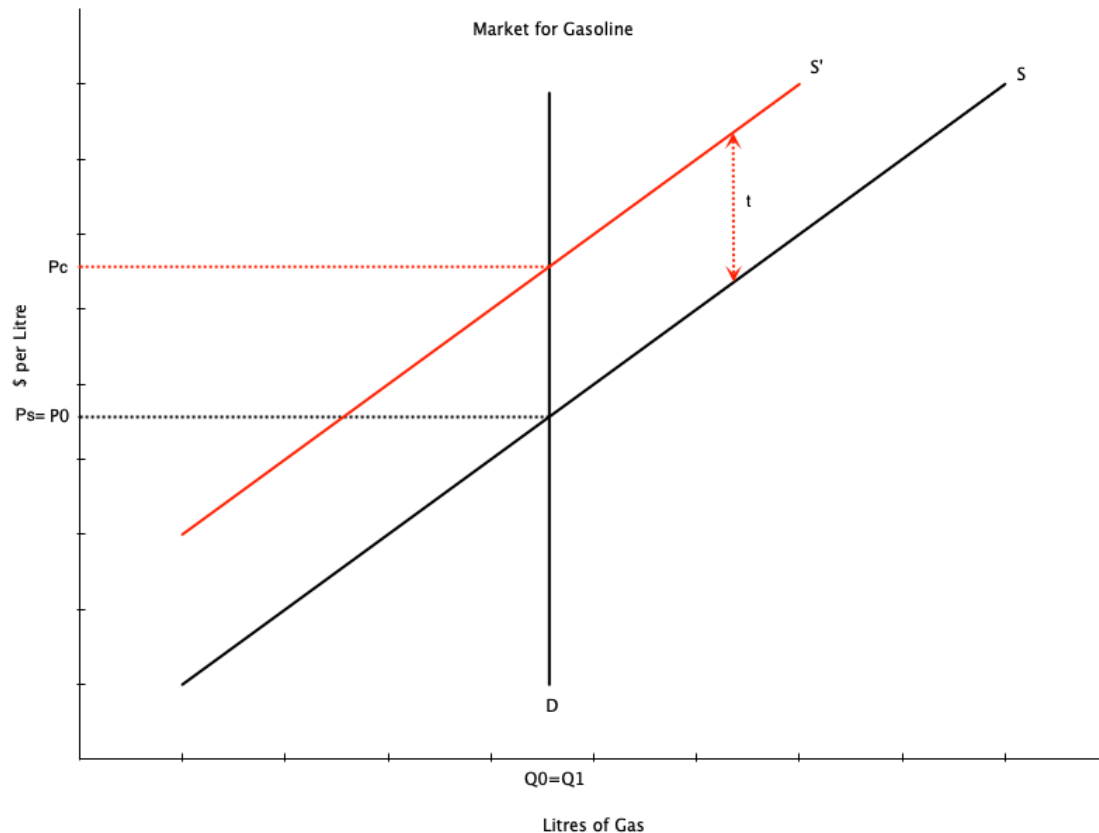
- In example above, economic incidence is shared equally between consumers and producers
 - Consumers pay $P_c - P_0$ more than before tax
 - Producers receive $P_0 - P_s$ less than before tax
 - These amounts are equal
- Equal economic incidence is specific to this example because supply and demand have the same slope
- In general, **economic incidence depends on the elasticities of supply and demand**
 - A more elastic demand curve means consumers bear less of the economic incidence
 - Higher elasticity means consumers can switch to other goods when price changes
 - A more elastic supply curve means producers bear less of the economic incidence
 - A firm with higher elasticity can alter production easily when prices change

Unit Tax on Sellers - Graphical



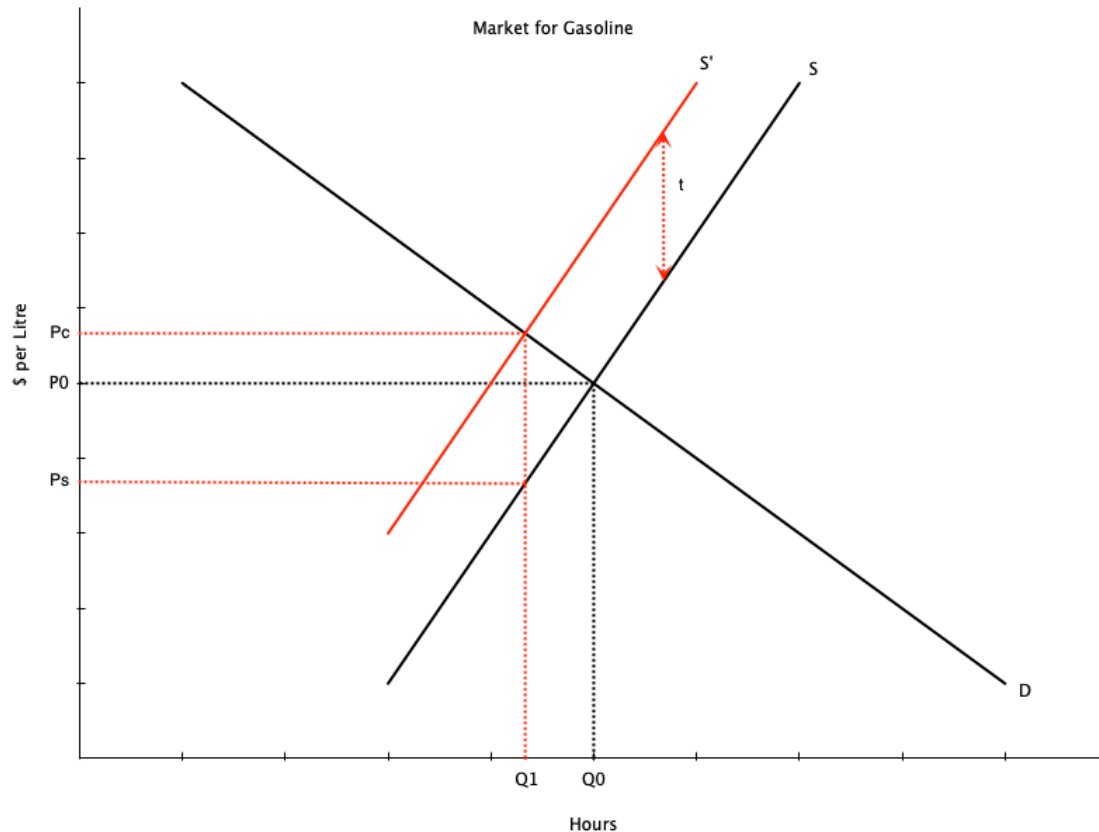
- Graph to the right shows a more inelastic demand curve
- After tax consumers pay P_c
- Producers receive $P_s = P_c - t$
- But $P_c - P_0$ is now larger than $P_0 - P_s$
 - Inelastic demand means consumers less able to substitute
 - They absorb more of the economic incidence

Unit Tax on Sellers - Graphical



- In extreme with perfectly inelastic demand, consumers bear entire economic incidence
 - Perfect inelastic demand means complete inability to substitute
- After tax consumers pay $P_c = P_0 + t$
- Producers receive $P_s = P_c - t = P_0$
- No change in quantity
 - Since consumers demand $Q_0 = Q_1$ at any price

Unit Tax on Sellers - Graphical



- Now imagine a more inelastic supply curve
 - Firms less able to adjust quantities when prices change
- After tax consumers pay P_c'
- Producers receive $P_s' = P_c' - t$
- $P_0 - P_s'$ is larger than $P_c' - P_0$
 - Firms absorb more of the economic incidence
 - They are less able to adjust production to avoid the tax

Unit Tax on Sellers - Math

- We can show the same result mathematically
- Use linear inverse demand and supply curves with clean numbers

$$\text{Demand: } P_c = 14 - Q_c, \quad \text{Supply: } P_s = 2 + Q_s$$

- Equilibrium without tax is where $P_s = P_c = P_0$, $Q_c = Q_s = Q_0$

$$14 - Q_0 = 2 + Q_0$$

$$12 = 2Q_0 \Rightarrow Q_0 = 6$$

- Sub Q_0 into either equation to get P_0

$$P_0 = 14 - 6 = 8$$

Unit Tax on Sellers - Math

- Now introduce a per unit tax $t = 4$ on sellers
- In equilibrium, $P_s + t = P_c$ and $Q_c = Q_s = Q_1$
 - There is a wedge between what consumers pay and what producers receive
- Substituting in the equations for demand and supply

$$14 - Q_1 = 2 + Q_1 + 4$$

$$14 - Q_1 = 6 + Q_1 \Rightarrow Q_1 = 4$$

- Sub Q_1 into either equation to get P_c or P_s

$$P_c = 14 - 4 = 10$$

$$P_s = 2 + 4 = 6$$

Unit Tax on Sellers - Math

- Key things to take away when the tax is introduced
 - Quantity falls from $Q_0 = 6$ to $Q_1 = 4$
 - Consumers pay $P_c = 10$, which is $10 - 8 = 2$ more than before tax
 - Producers receive $P_s = 6$, which is $8 - 6 = 2$ less than before tax
 - Economic incidence is shared equally between consumers and producers
- Example is specific to when demand and supply have the same slope
- In general, economic incidence with linear demand and supply and a unit tax depends on elasticities of supply and demand

$$\Delta P_c = P_c - P_0 = \frac{\varepsilon_s}{\varepsilon_s + |\varepsilon_d|} t, \quad \Delta P_s = P_0 - P_s = \frac{|\varepsilon_d|}{\varepsilon_s + |\varepsilon_d|} t$$

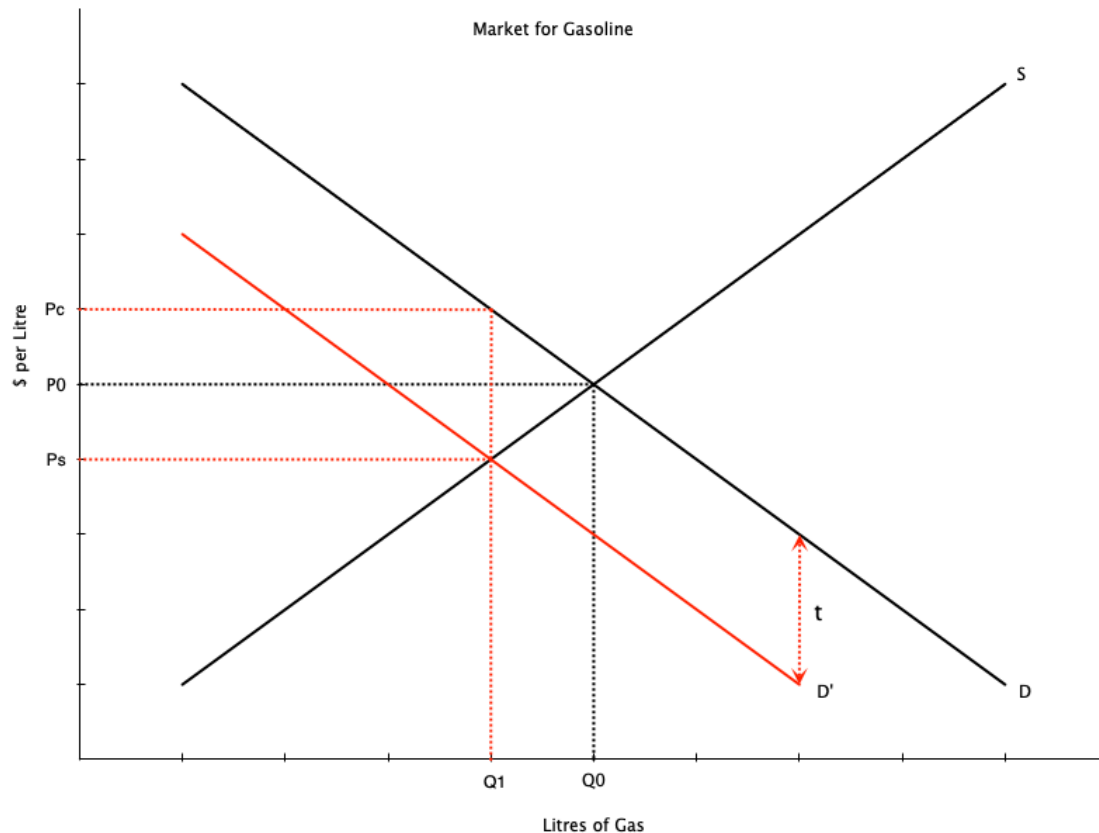
- $\varepsilon_s = \frac{dQ_s}{dP_s} \frac{P}{Q}$ is elasticity of supply and $\varepsilon_d = \frac{dQ_c}{dP_c} \frac{P}{Q}$ is elasticity of demand



Unit Tax on Buyers - Graphical

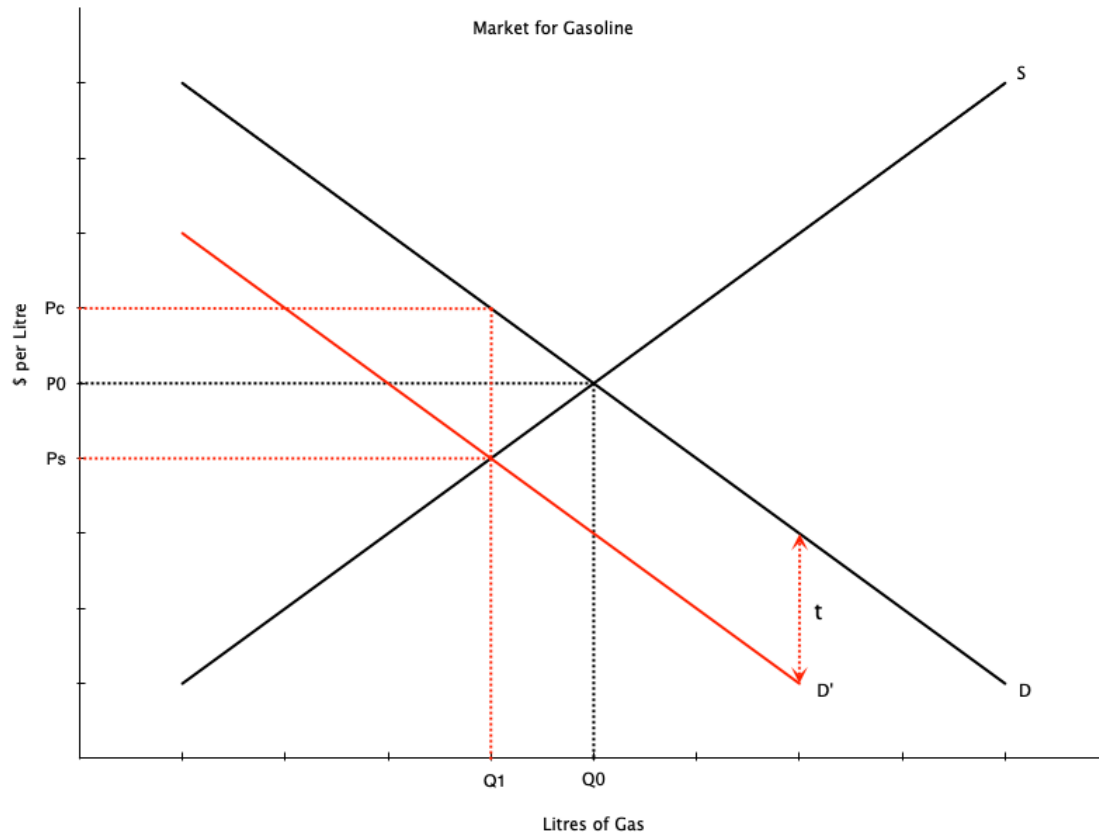
- More rarely, taxes are levied on buyers of goods and services
- We can use the same graphical tools to examine this case
- Key lesson is that **economic incidence does not depend on whether the tax is levied on buyers or sellers**

Unit Tax on Buyers - Graphical



- Now government levies a per unit tax t (e.g. \$0.10/litre) on gasoline
- Assume gas tax is levied on **buyers** (statutory incidence)
- This shifts the demand curve down by the amount of the tax
 - New demand curve is D'
 - At each quantity, buyers want to pay t less to cover the tax
- New equilibrium is where S intersects D'
 - Determines price received by the seller

Unit Tax on Buyers - Graphical



- Notice that P_s and P_c are the same as when the tax was levied on sellers
 - Producers receive P_s
 - Consumers pay $P_c = P_s + t$
 - Quantity falls to Q_1
- In this case, the slopes are equal so the burden is shared
- Changes in elasticities affect economic burden in the same way

Unit Tax on Buyers - Math

- The math is exactly the same as when the tax is levied on sellers

$$\text{Demand: } P_c = 14 - Q_c, \quad \text{Supply: } P_s = 2 + Q_s$$

- Tax is $t = 4$ on buyers
- In equilibrium, $P_s = P_c - t$ and $Q_c = Q_s = Q_1$
- Algebra is same as we did above, so we get the same results

$$P_c = 10$$

$$P_s = 6$$

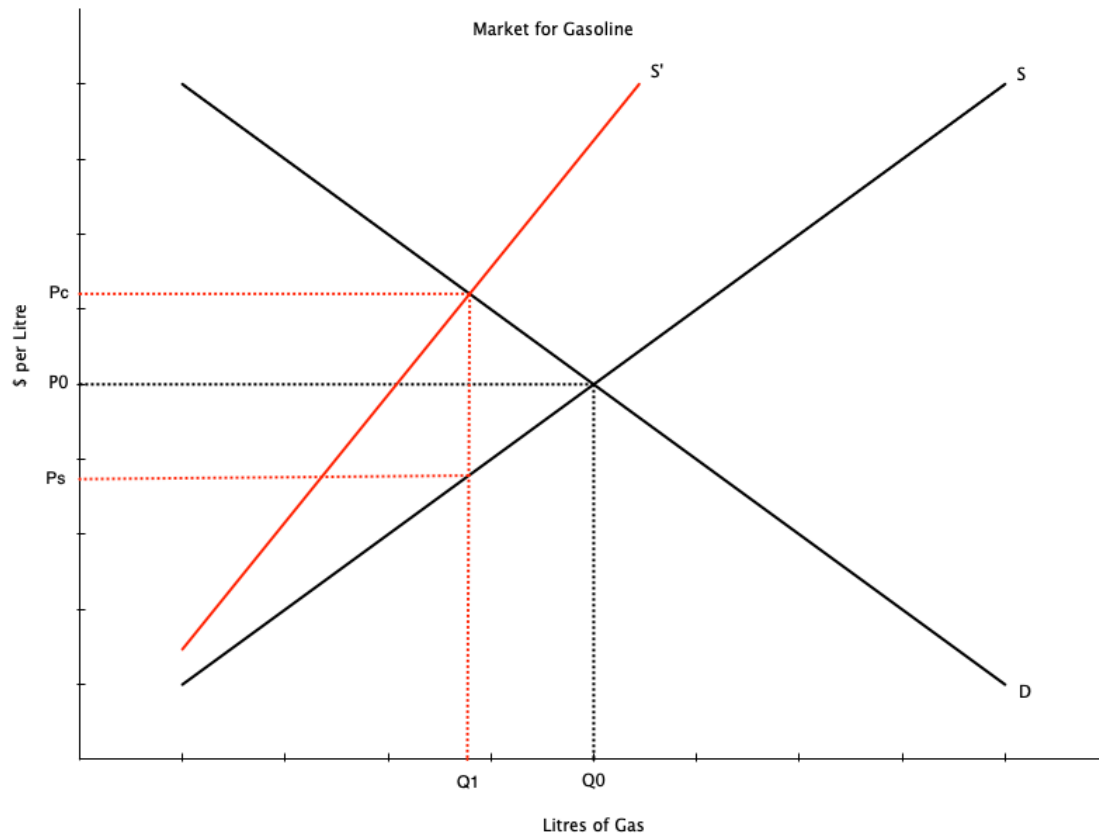
Unit Taxes - Takeaways

- Statutory incidence does not determine economic incidence
- Economic incidence depends on elasticities of supply and demand
 - More elastic demand means consumers bear less of the economic incidence
 - More elastic supply means producers bear less of the economic incidence
- Economic incidence does not depend on whether the tax is levied on buyers or sellers

Ad Valorem Taxes

- So far we have only considered unit taxes
 - A fixed amount per unit sold (e.g. \$0.10/litre)
- More common are **ad valorem taxes**
 - A percentage of the price (e.g. 13% HST on most goods and services)
- Ad valorem taxes create a tax wedge that increases with the price
 - Higher priced goods have a larger tax wedge
- As before
 - Economic incidence depends on elasticities of supply and demand
 - Economic incidence does not depend on whether the tax is levied on buyers or sellers

Ad Valorem Taxes

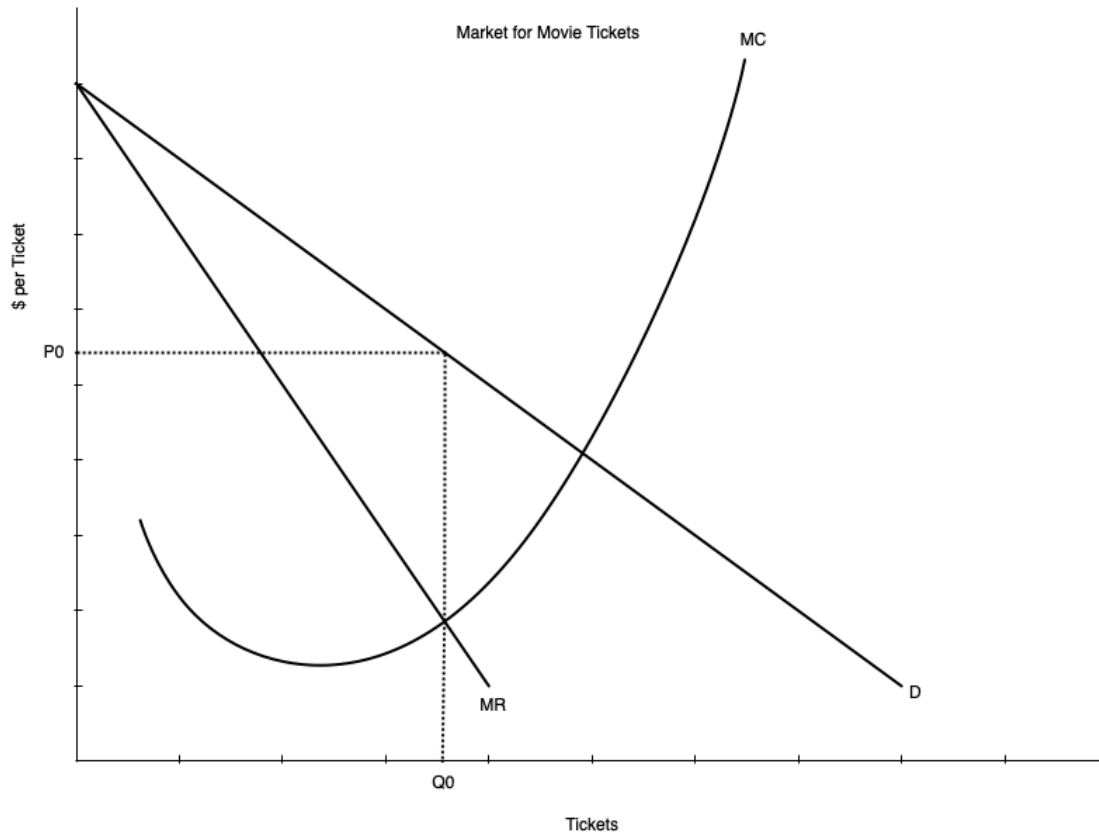


- Analysis is similar to unit tax except supply curve shifts up and becomes steeper
- If tax is levied on buyers, demand curve shifts down and becomes flatter
- Still a wedge between what consumers pay and what producers receive
- Economic burden on sellers decreases with supply elasticity
- Economic burden on buyers decreases with demand elasticity

Unit Tax on a Monopolist

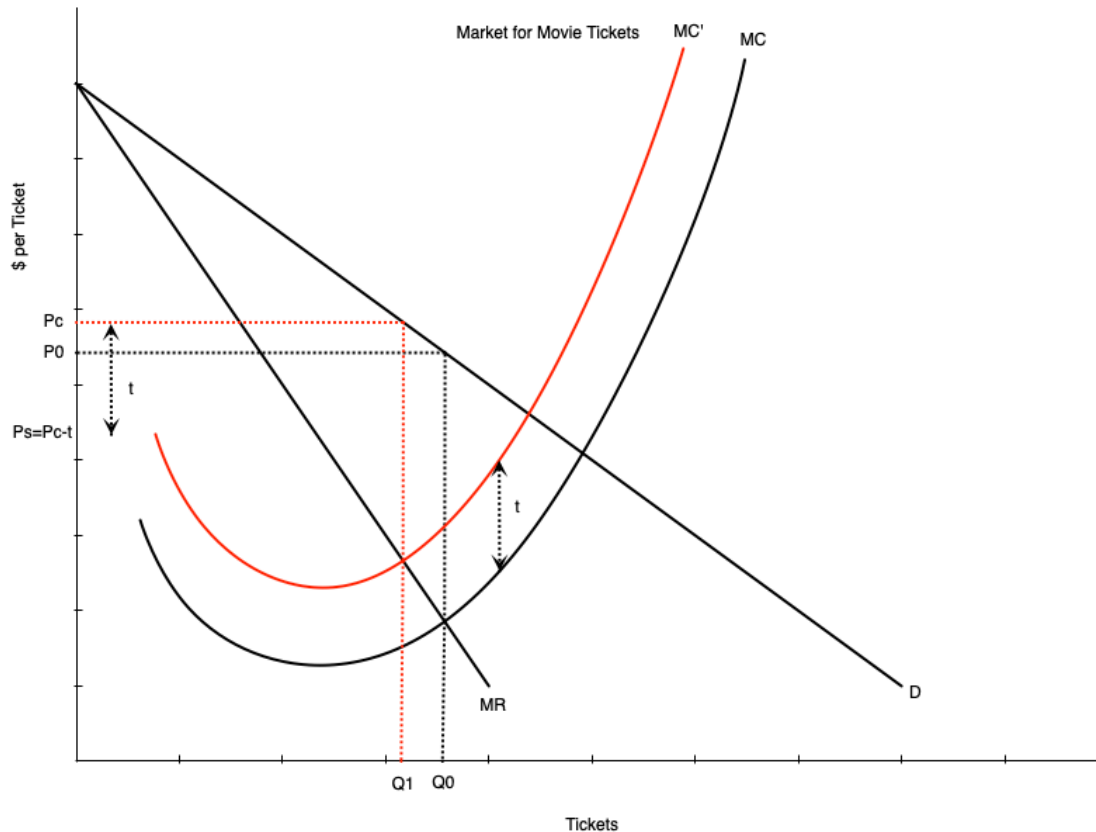
- So far we have only considered perfectly competitive markets
- What happens when there is only one seller in the market?
- A tax increases marginal cost, so the monopolist produces less
- Effects of the tax are potentially different from competitive markets
 - Quantity will fall
 - Price paid by consumers will rise
 - But, price received by the monopolist may rise or fall
 - Depends on cost structure and demand elasticity

Unit Tax on a Monopolist



- Graph shows pre tax equilibrium in a monopoly
- ATC curve omitted for graph clarity
- Example: market for movie tickets
 - Dominated by a couple of firms
 - Not strictly a monopoly but close enough
- Equilibrium is where $MR = MC$
 - Price is P_0
 - Quantity is Q_0

Unit Tax on a Monopolist



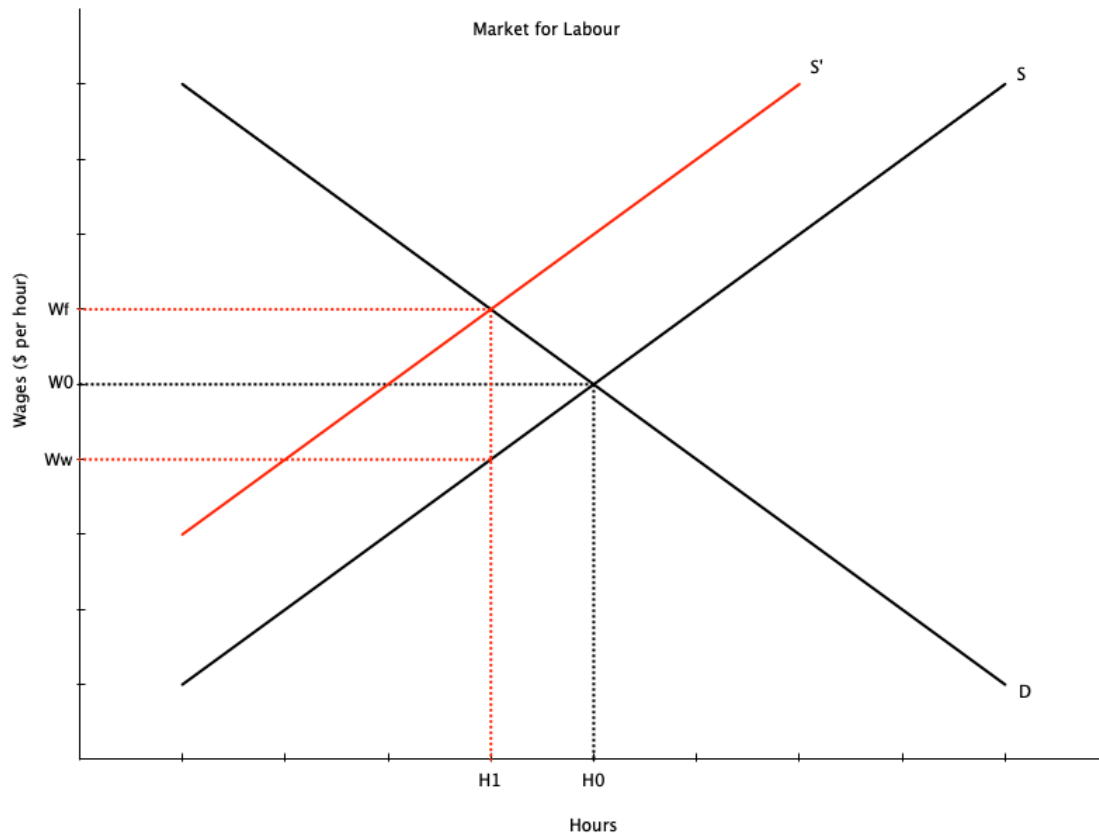
- Government levies a per unit tax t on each ticket sold
- This shifts the cost curves up by the amount of the tax
 - New marginal cost is MC'
- Equilibrium is where $MR = MC'$
 - Price paid by consumers is P_c
 - Price received by monopolist is $P_s = P_c - t$
 - Quantity is lower at Q_1
- Consumers bear more of the tax if
 - Demand is inelastic
 - Marginal cost is relatively flat

Taxes on Factor Markets in Partial Equilibrium Models

Introduction

- So far we have only considered taxes on goods and services
- Taxes can also be levied on factors of production
 - Labour
 - Capital
- Taxes affect prices paid for and received by those factors
 - Example: payroll taxes affect wages paid and received
- Taxes also affect quantities of factors employed
- Analysis is the same as taxes on goods and services
 - Only difference is that firms are buyers and households are sellers

Payroll Tax on Workers



- Suppose government levies a payroll tax t on workers
 - Example: Employment Insurance (EI) premiums paid by employees
- This shifts the supply curve of labour up by the amount of the tax
 - At each quantity, workers want to be paid t more to cover the tax
- Creates wedge between what workers are paid and what they keep
 - Firms now pay W_f
 - Workers receive $W_w = W_f - t$

Payroll Tax on Workers

- Incidence again depends on supply and demand elasticity
- A more inelastic supply curve means workers bear more of the economic incidence
 - They are less able to change work hours when wages change
 - Makes them stuck in a job, so they bear more of the tax
- A more inelastic demand curve means firms bear more of the economic incidence
 - They are less able to substitute between labour and other inputs
 - Makes number of workers inflexible, so they bear more of the tax
- Does not matter if tax is levied on workers or firms
 - In reality payroll taxes are often levied on both

Capital Taxation

- Labour is not the only input into production
- Capital is also used
 - For this analysis, think of capital as the money used to finance machines, factories, etc
- Capital owners earn a return on investments, and that can be taxed
- The analysis of taxing capital is the same as for labour
 - Except that the rate of return (r) is the price
 - Total investment (dollars) is the quantity
 - Firms are the buyers, people with money are the suppliers

Capital Taxation

- A key consideration in the analysis is **capital mobility** across countries
 - The ease with which people can move money and invest around the globe
- If capital is perfectly mobile, the buyers of capital bear the entire burden
 - Perfect mobility means a perfectly elastic supply curve
 - The price is set at the global rate of return
 - When supply is perfectly elastic, buyers bear the whole tax burden
- In reality, capital is mobile but not perfectly
 - Buyers and sellers are likely to bear some of the burden of capital taxation

Taxes on Profits and Land

- Governments can also levy taxes on economic profits
 - **Economic profits:** profits above a normal rate of return
- These types of taxes are borne entirely by firms
 - Maximizing untaxed profits and taxed profits yields the same prices and quantities
- Consider a monopoly (because this would be a market where economic profits happen)
- Without taxes, maximize

$$\Pi(q) = p(q)q - C(q) = (a - bq)q - cq = (a - c)q - bq^2$$

- Take the derivative with respect to q

$$(a - c) - 2bq = 0$$

Taxes on Profits and Land

- Solve for q to get the profit maximizing quantity

$$q^* = \frac{a - c}{2b}$$

- Price is then

$$p^* = a - bq^* = \frac{a + c}{2}$$

- With taxes, maximize

$$(1 - t)\Pi(q) = (1 - t)(p(q)q - C(q)) = (1 - t)((a - c)q - bq^2)$$

Taxes on Profits and Land

- Take the derivative with respect to q

$$(1 - t)((a - c) - 2bq) = 0$$

- Which leads to the same prices and quantities
- Means that the economic incidence of profit taxes is entirely on firms
 - Profits go from $\Pi(q^*)$ to $(1 - t)\Pi(q^*)$
- Problem with these taxes is that they are hard to implement in practice

Taxes on Land

- Historically there were taxes on only land
 - As opposed to modern property taxes that also tax buildings
- When land is taxed the incidence is entirely on current owners
 - The value of the land drops by the amount of the current and future tax obligations
- Can see this by looking at the value for a piece of land
- Without taxes, the value of land is the present value of future rents

$$P_R = \sum_{t=0}^T \frac{R_t}{(1+r)^t}$$

Taxes on Land

- If there is a tax u_t on land, the value becomes

$$P'_R = \sum_{t=0}^T \frac{R_t - u_t}{(1+r)^t} = \sum_{t=0}^T \frac{R_t}{(1+r)^t} - \sum_{t=0}^T \frac{u_t}{(1+r)^t}$$

- The difference between P_R and P'_R is the present value of all future tax obligations

$$P'_R - P_R = - \sum_{t=0}^T \frac{u_t}{(1+r)^t}$$

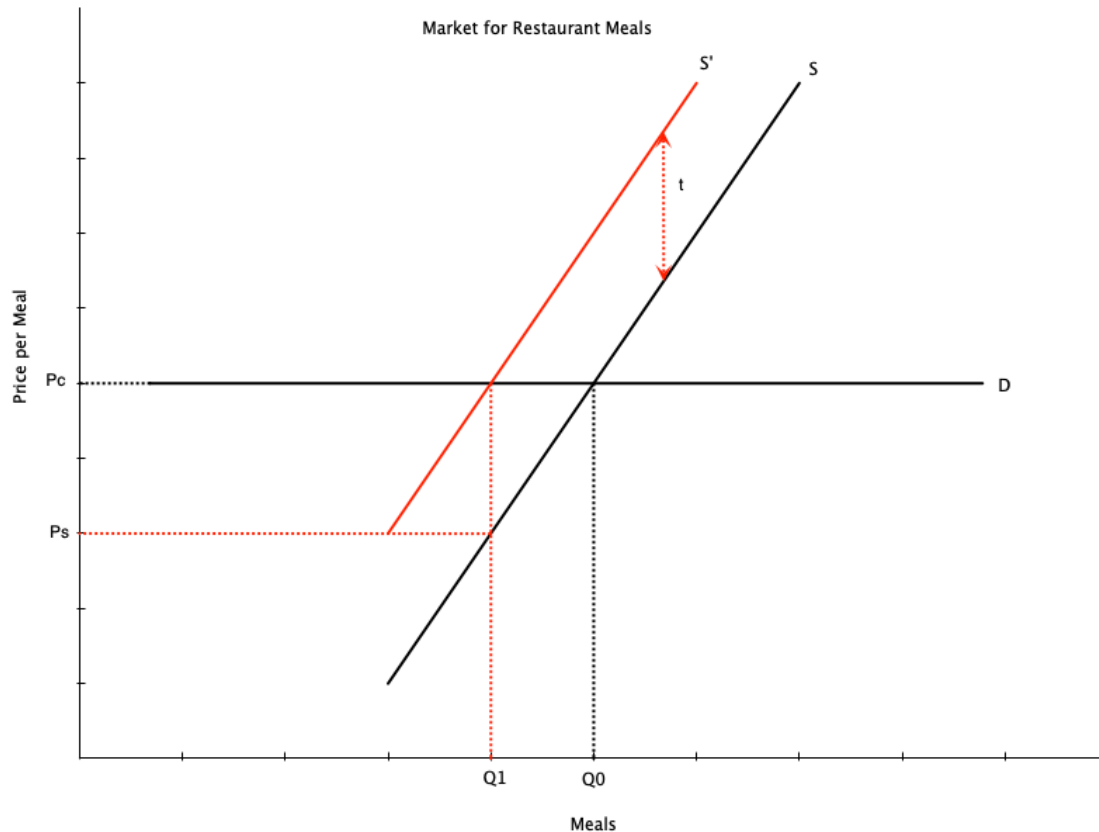
- When the tax is levied, the value of the land immediately drops by the tax obligation
 - So it is borne by the current owner

General Equilibrium

Introduction

- So far we have only considered partial equilibrium models
 - One market at a time
- It is informative, but incomplete
- In reality, markets are interconnected
 - A tax in one market can affect other markets
 - Example: a tax on goods can affect labour market
 - If people buy less, firms produce less
 - Firms hire fewer workers
 - Labour market is affected
- General equilibrium models consider all markets simultaneously

A Tax on Goods and Services

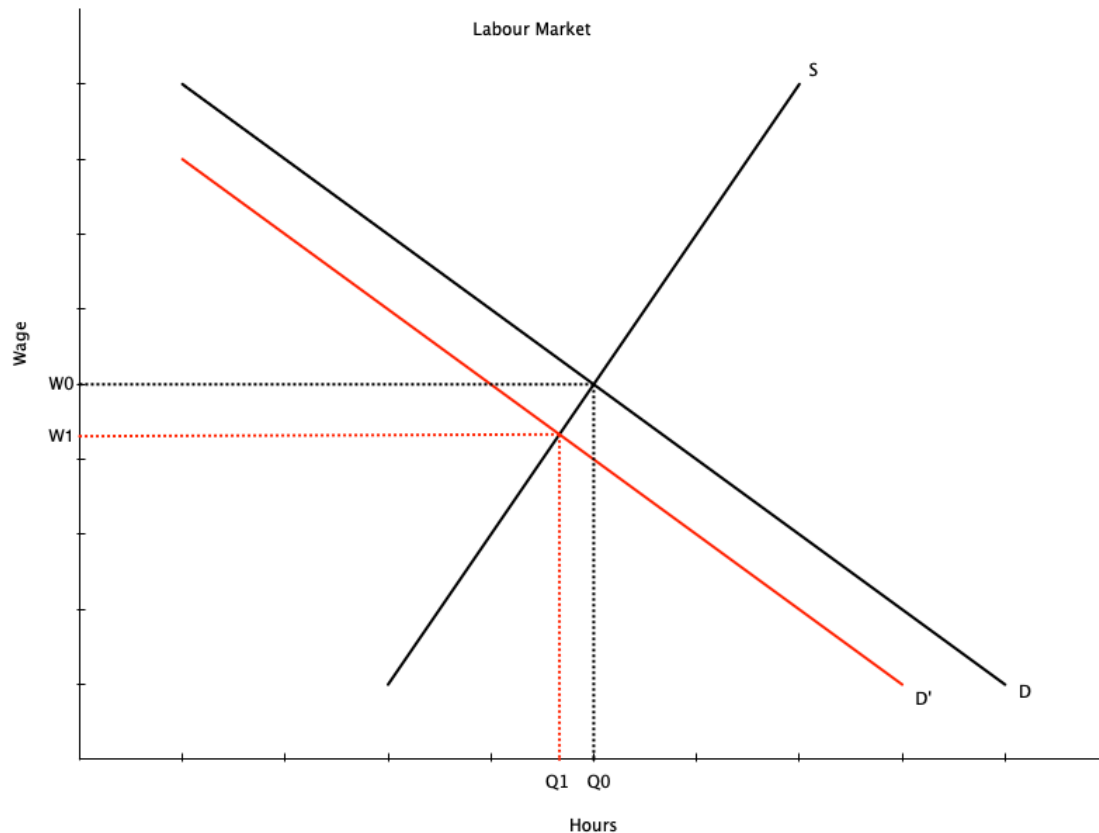


- Consider a unit tax on restaurants
- For simplicity, assume restaurant meals have perfectly elastic demand
 - People are very sensitive to the price and will cook at home if price rises
- The full burden of the tax is on the restaurants
- Quantity of meals falls because of the tax

A Tax on Goods and Services

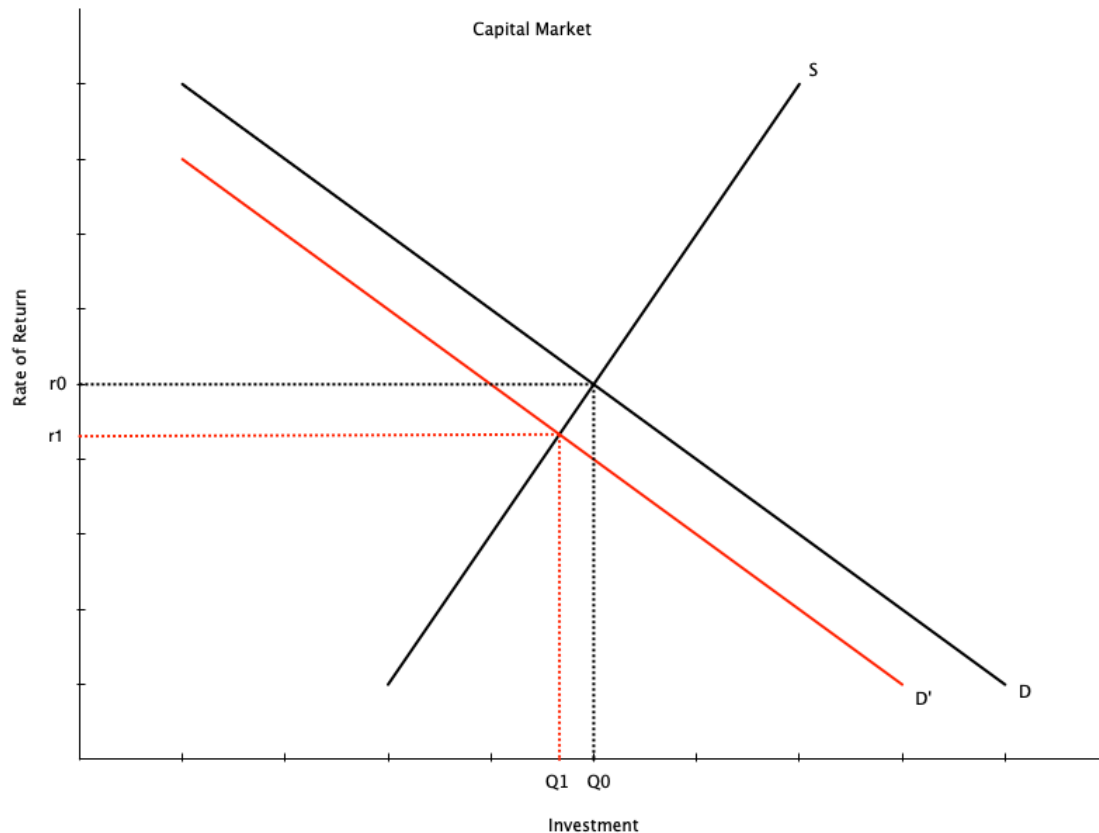
- But a restaurant cannot bear taxes
- A restaurant is really a production process that combines labour and capital
 - A production process cannot pay a tax
- It is ultimately the workers and owners of capital that pay the tax
- The tax on meals will filter down to the labour and capital markets
 - Workers will get paid less
 - Owners of capital will earn less

A Tax on Goods and Services



- Consider the labour market for restaurant workers
- The tax on meals shifts the demand for restaurant workers to the left
 - Labour demand is derived partly from the demand for meals
 - Less demand for meals means less demand for workers
- The equilibrium wage falls and workers are paid less
- Part of the burden falls on workers in the form of lower wages

A Tax on Goods and Services



- Similar things happen in the capital market
- The tax on meals shifts the demand for capital to the left
 - Less demand for meals means less demand for capital
- The equilibrium return to capital falls and owners are paid less
- Part of the burden falls on owners of capital in the form of lower returns

A Tax on Goods and Services

- The degree to which workers and owners of capital bear the burden depends on elasticities
 - More elastic labour supply means workers bear less of the burden
 - More elastic capital supply means owners of capital bear less of the burden
- In our example, we assumed perfectly elastic demand for meals
 - This meant that restaurants bore the entire burden of the tax
- If consumer demand were less elastic
 - Consumers would bear some of the burden
 - Would affect other goods they consume
 - Increase consumption of substitutes
 - Decrease consumption of complements
 - Decrease consumption of all goods via an income effect

A Tax on Goods and Services

- General equilibrium analysis can get very complicated
 - Many interconnected markets
 - Changes in one market affect many others
- Can affect markets vertically and horizontally
 - Vertically: factors of production
 - Horizontally: related goods (e.g. tax on coffee affects tea market)
- Main lesson is still the same: **statutory incidence does not determine economic incidence**

Tax Equivalencies

- In general equilibrium, different types of taxes can have the same economic incidence
 - Example: a tax on labour income and a tax on consumption can have the same economic incidence
- A policy maker would have options when it comes to which tax to levy
- Consider an economy with
 - Two commodities, food (F) and manufacturing (M)
 - Two factors of production, labour (L) and capital (K)

Tax Equivalencies

- A government could levy nine different types of taxes
 - Food: tax on capital (t_{KF}), tax on labour (t_{LF}), tax on consumption (t_F)
 - Manufacturing: tax on capital (t_{KM}), tax on labour (t_{LM}), tax on consumption (t_M)
 - Both: tax on capital (t_K), tax on labour (t_L)
 - An income tax (t)
- Taxes levied on factors of production in one sector are **Partial Factor Taxes**
 - In this case t_{KF} , t_{LF} , t_{KM} , t_{LM}
- Combinations of these taxes can be equivalent to other taxes

Tax Equivalencies

TABLE 14.2		Tax Equivalence Relations		
t_{KF}	and	t_{LF}	are equivalent to	t_F
and		and		and
t_{KM}	and	t_{LM}	are equivalent to	t_M
are		are		are
equivalent		equivalent		equivalent
to		to		to
t_K	and	t_L	are equivalent to	t
Source: Charles E. McLure, Jr., "The Theory of Tax Incidence with Imperfect Factor Mobility," <i>Finanzarchiv</i> 30 (1971): 29.				

List of Equivalent Taxes

Harberger Model

- Arnold Harberger studied tax incidence in general equilibrium
- Basics of his model
 - Technology
 - Capital and labour used in production
 - Constant returns to scale
 - Ease of substitution between capital and labour different between sectors
 - Factor suppliers
 - Capital and labour perfectly mobile
 - Returns to both are the same in both sectors
 - Market structure is perfectly competitive
 - Factors are in fixed supply
 - Consumers are all the same



Harberger Model

- Suppose a tax on food (t_F) is introduced
 - Price of food rises
 - Consumers buy less food, more manufacturing
 - Demand for labour and capital in food sector falls
 - As labour and capital move to manufacturing, their returns fall
- Strength of these effects depend on elasticities
 - If food elasticity is high, consumers shift more to manufacturing
 - Returns to labour and capital fall more for manufacturing to induce movement

Harberger Model

- Suppose an income tax (t) is introduced
 - Use equivalencies table
 - Income tax is equivalent to a combination of taxes on capital and labour
 - Both are in fixed supply (perfectly inelastic) so they bear the whole burden
- A tax on labour (t_L) is introduced
 - Tax on labour in both sectors
 - Labour supply is perfectly inelastic so it bears the whole burden
 - No incentive to switch between sectors

Harberger Model

- Finally, a partial factor tax on capital in manufacturing (t_{KM})
 - Price of manufacturing rises
 - Use less capital and labour
 - As capital and labour leave, changes in their relative prices depend on how much is used
 - Producers of manufactured goods use less capital and more labour
 - Demand for capital falls, and so does relative price
 - Cannot tell what the ultimate effect is on capital prices
 - But labour price rises

Summary

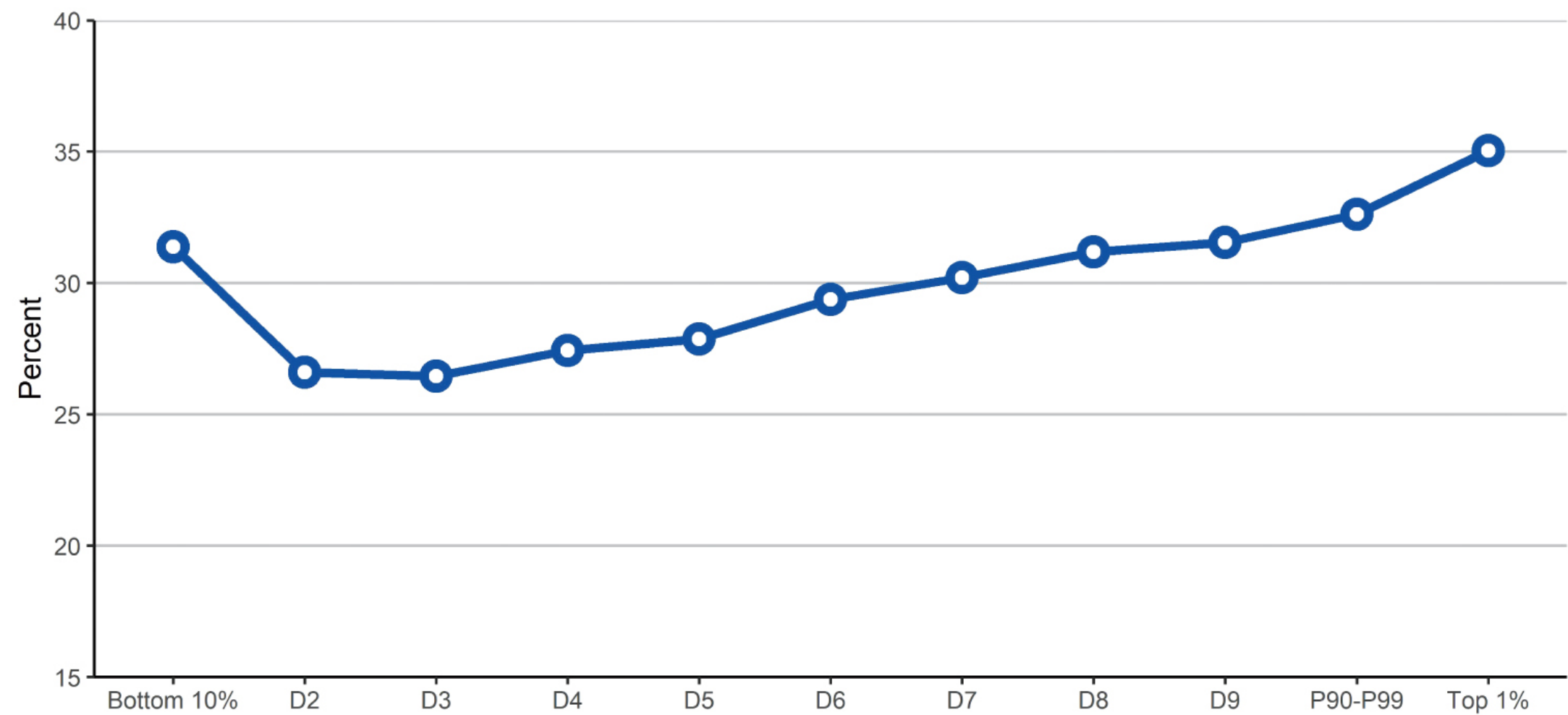
- Tax incidence is not necessarily contained to the market where the tax is levied
- In general equilibrium, taxes can have far reaching effects
 - Both vertically and horizontally
- A full analysis requires consideration of all markets simultaneously
- The key points to remember are
 - Statutory incidence does not determine economic incidence
 - Economic incidence depends on ability to substitute and avoid the tax

Quantifying Tax Incidence

Introduction

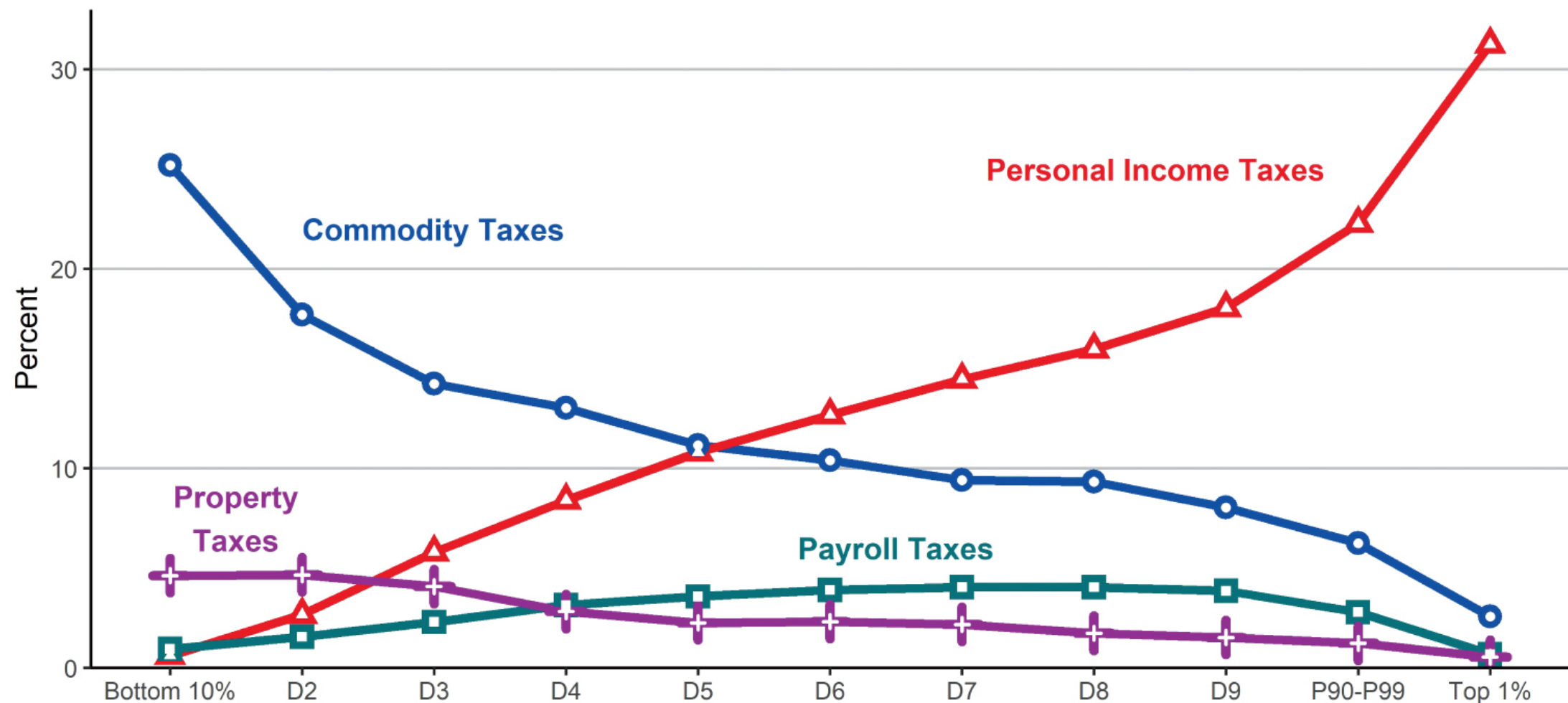
- We have gone through the theory of tax incidence
- Using data we can see who bears the burden of various taxes
- Could do this with tax data
 - Statistics Canada maintains the Longitudinal Administrative Databank (LAD)
 - Not easy to use because it is confidential microdata
- Can also use data from the SPSDM simulator
 - Program maintained by Statistics Canada
 - Snapshot of the Canadian tax and transfer system at a point in time

Partial Equilibrium



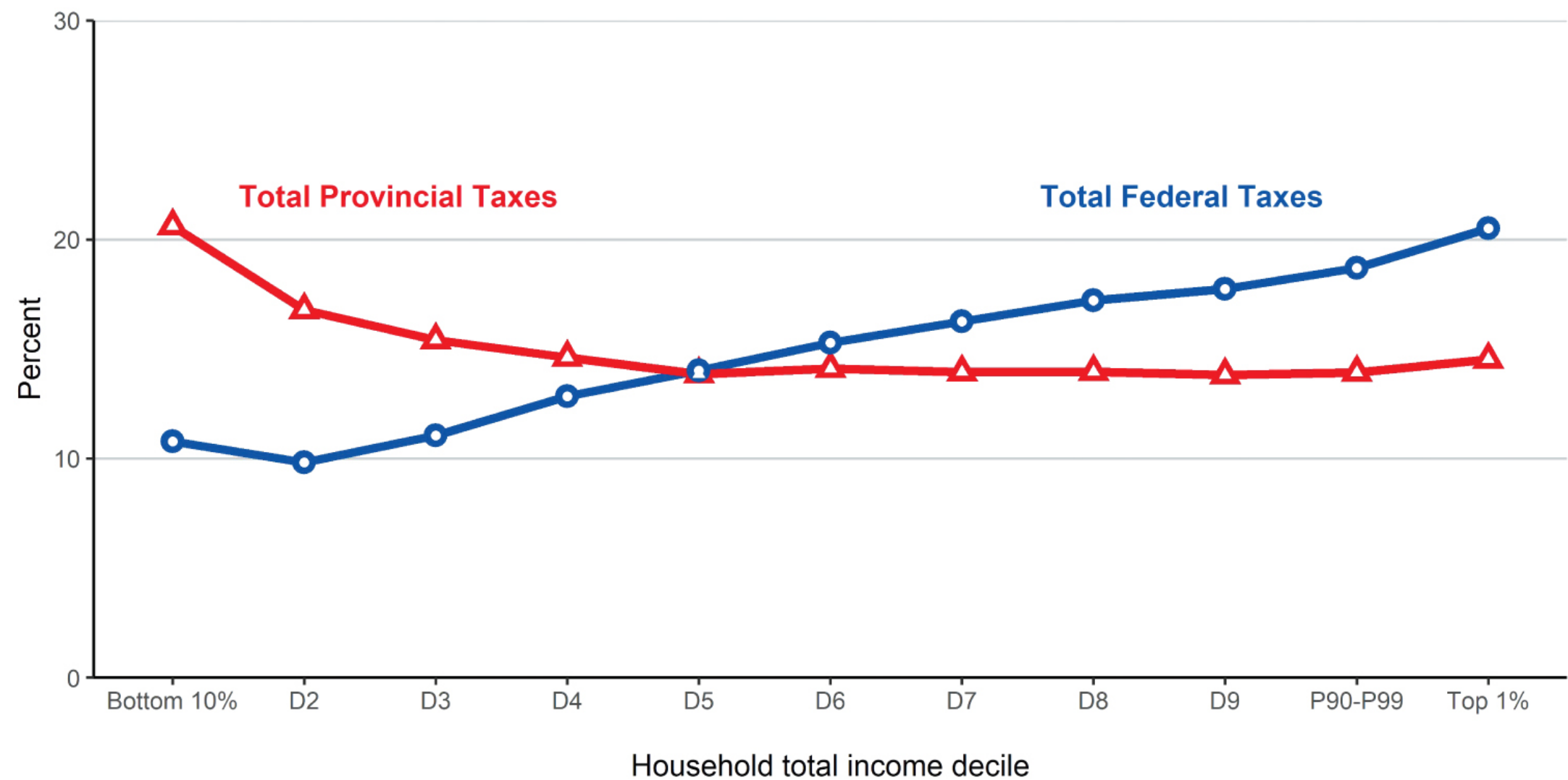
Household total income decile
Average Tax Rates in Canada

Partial Equilibrium



Household total income decile
Average Tax Rates by Source

Partial Equilibrium



Average Tax Rates by Level of Government

Partial Equilibrium

- Canada maintains a progressive personal income tax system
 - So tax rates rise with income
- Commodity and property taxes are *on their own* regressive
 - A regressive tax is one where tax rates fall with income
 - Tax credits help offset the regressivity of these taxes (e.g. HST credit)
- Payroll taxes are initially progressive but turn regressive
- Federal taxes are more progressive than provincial taxes
 - Federal taxes mainly come from personal income taxes
 - Provincial taxes contain more commodity and property taxes

Partial Equilibrium

- Progressivity in these graphs is based on *annual* income
 - Lifetime income might be more appropriate if people consume based on lifetime resources
- Redoing the graphs with lifetime income reduces regressivity

General Equilibrium

- Evidence on the general equilibrium incidence of taxes is more limited
 - Analysis is more difficult
- Canadian researchers have looked at the tax incidence of the carbon tax in BC
 - Use a Computable General Equilibrium (CGE) model
 - A fancy model with many equations you need a computer to solve
- Find that a carbon tax
 - Lowers wages relative to capital income because labour supply is inelastic
 - Labour bears more of the burden than capital
 - Tax is progressive because wages are a higher share of income for higher income households

Summary

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- Taxes are levied across the economy for various reasons
- Who “pays” the tax is determined by economic incidence and is complicated
 - Depends on ability to avoid the tax in both partial and general equilibrium
 - Can be spread widely in a general equilibrium setting
- Statutory incidence does not determine economic incidence

References

References

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- Gruber, Jonathan. Public Finance and Public Policy. 7th edition. Worth Publishers, 2022.
- Finances of the Nation. <https://financesofthenation.ca/>