

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



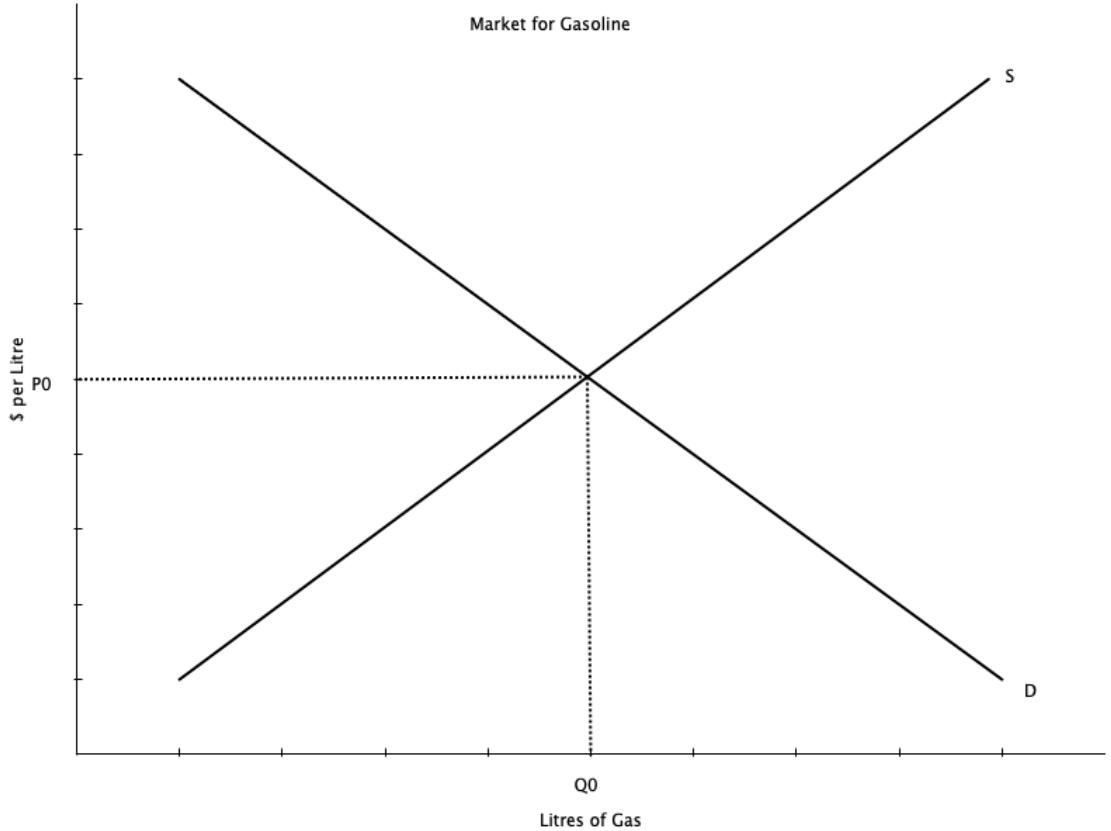
Statutory vs Economic Incidence of a Tax

- 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



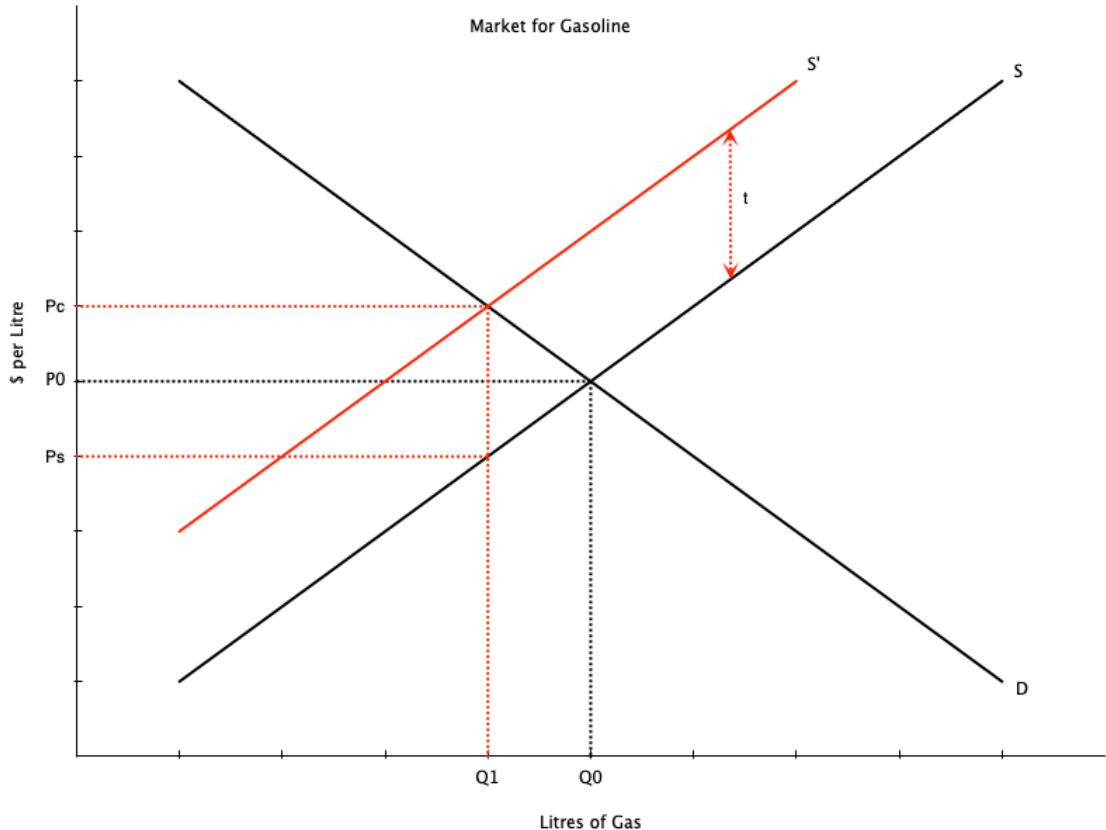
Commodity Taxes in Partial Equilibrium Models

Unit Tax on Sellers - Graphical



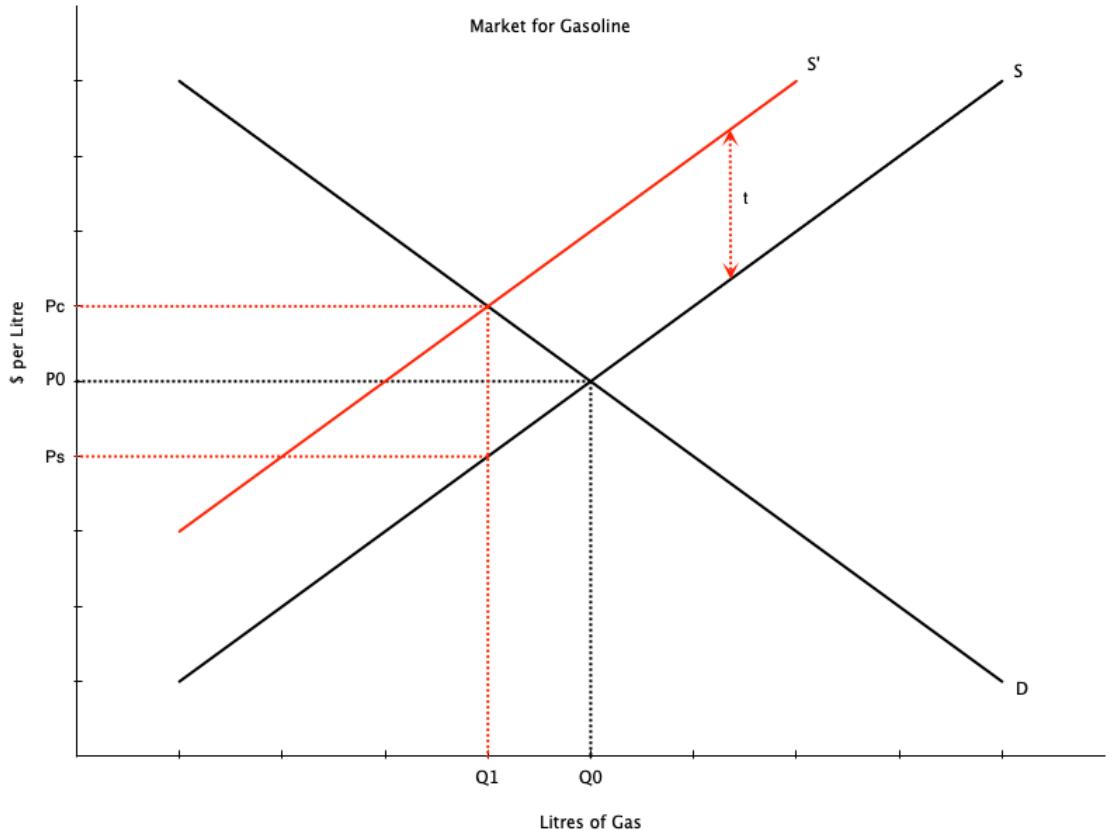
- Take gasoline tax example one more time
- On right is demand and supply of litres of gasoline
- Without tax, price and quantity are determined where demand and supply are equal
 - Price is P_0
 - Quantity is Q_0

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



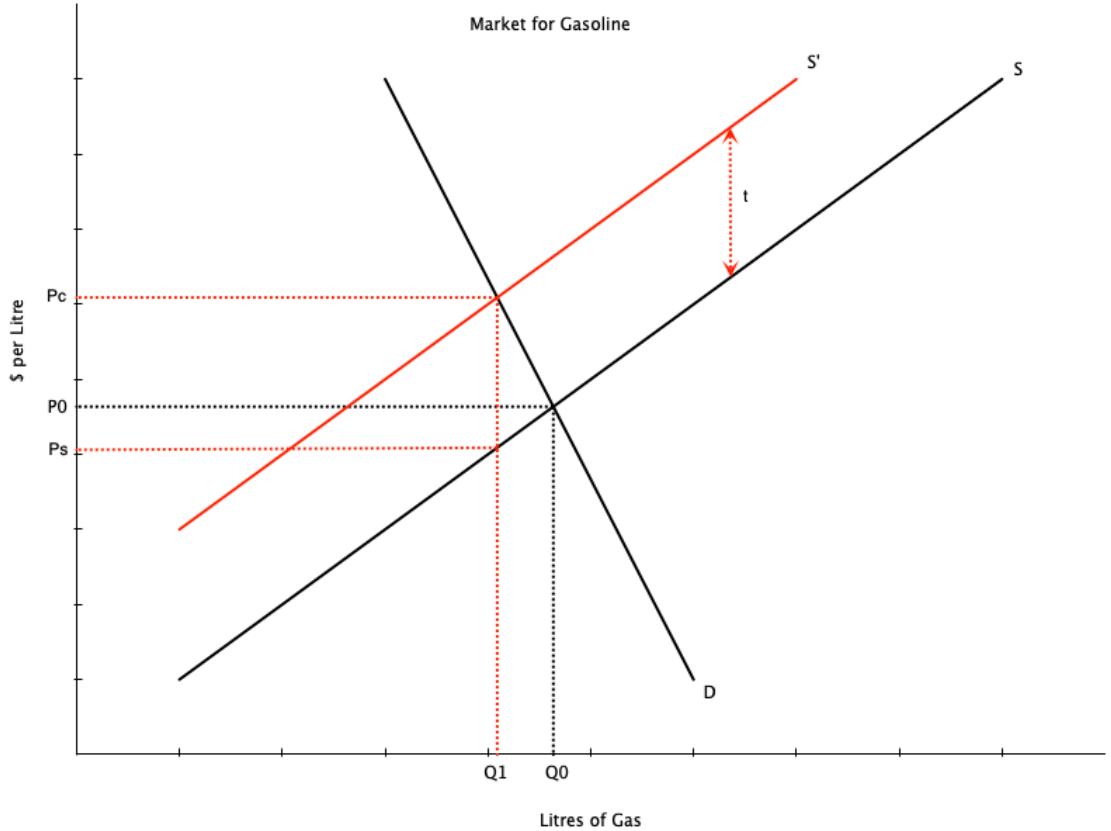
- The tax introduces a **tax wedge**
 - Difference between what consumers pay and what producers receive from a transaction
- Consumers pay the equilibrium price P_c
 - Price includes the tax
- Producers receive $P_s = P_c - t$
 - They remit t for every unit sold
- Quantity falls to Q_1

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

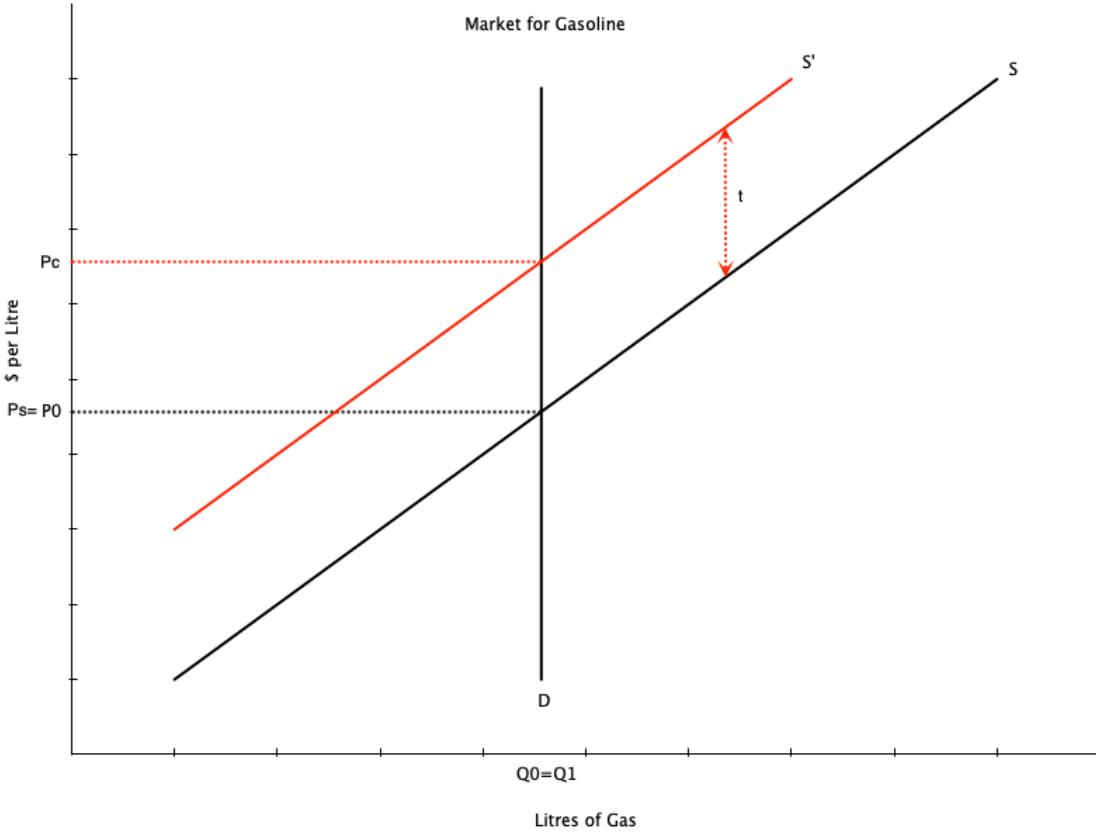


Unit Tax on Sellers - Graphical



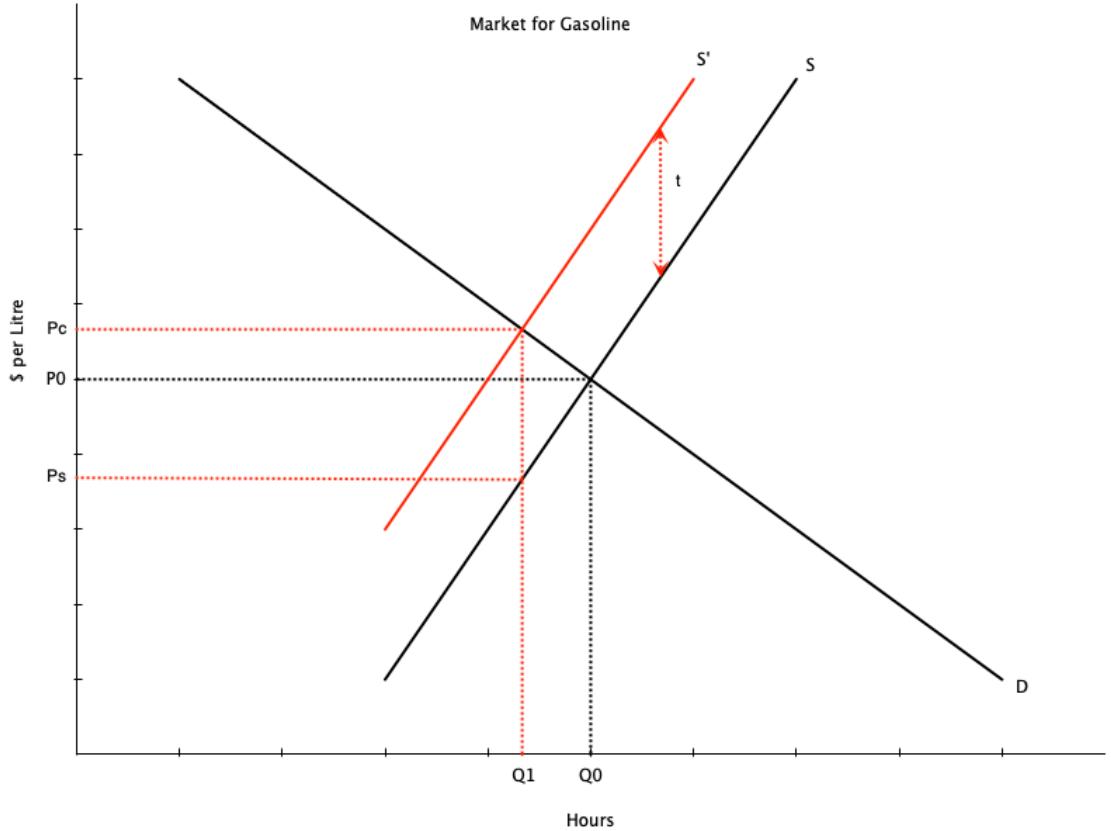
- Graph to the right shows a more inelastic demand curve
 - After tax consumers pay P_c
 - Producers receive $P_s = P_c - t$
 - But $P_c - P_0$ is now larger than $P_0 - P_s$
 - Inelastic demand means consumers less able to substitute
 - They absorb more of the economic incidence

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

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

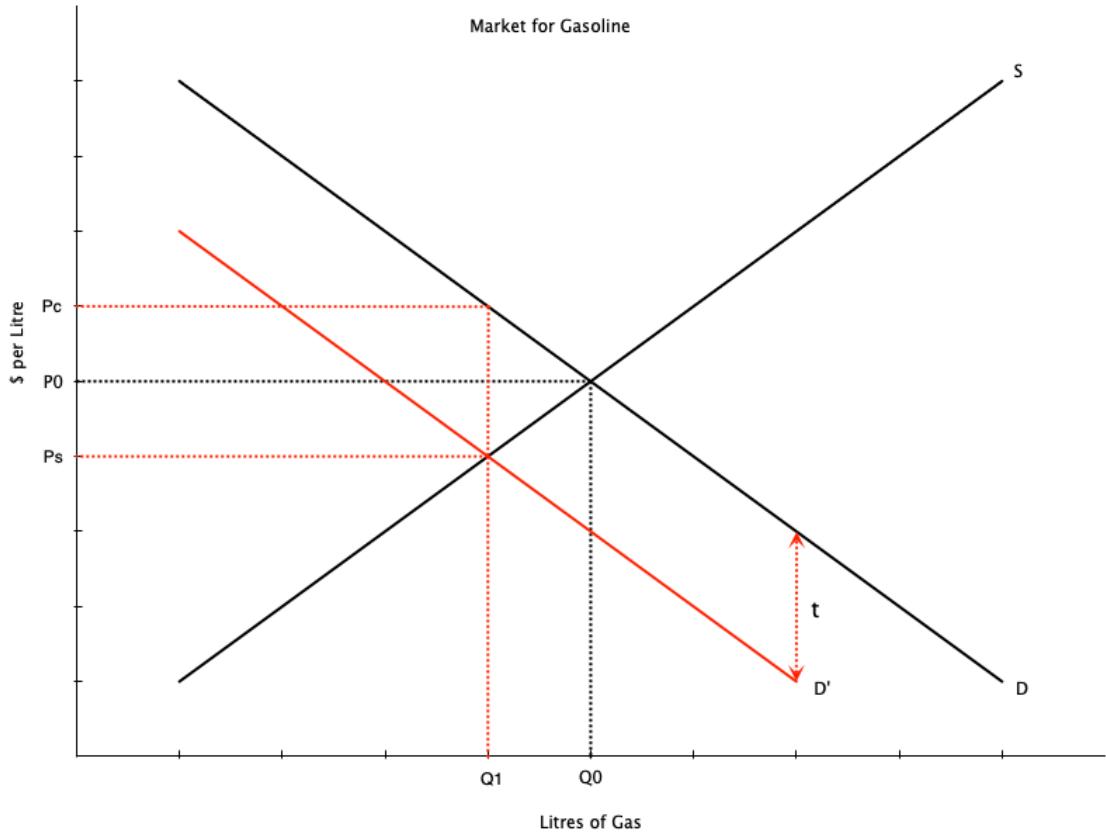
- $\varepsilon_s = \frac{dQ_s}{dP_s} \frac{P}{Q}$ is elasticity of supply and $\varepsilon_d = \frac{dQ_c}{dP_c} \frac{P}{Q}$ is elasticity of demand

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**

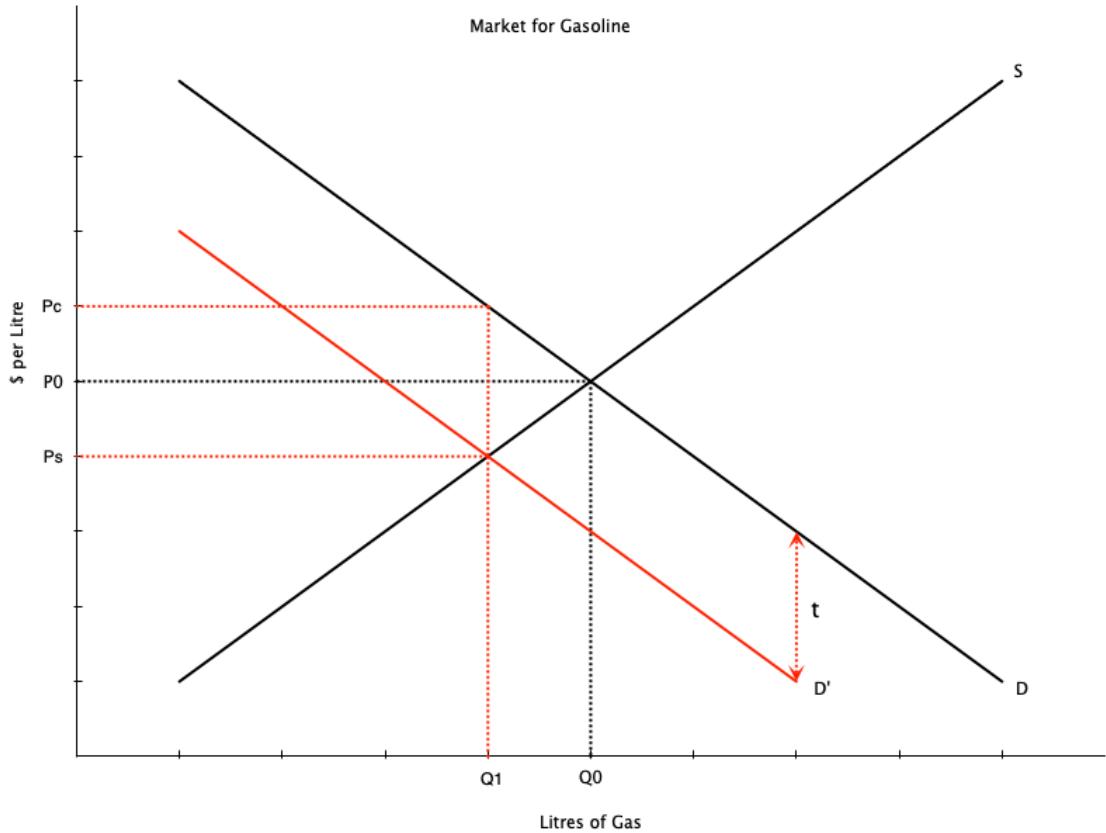


Unit Tax on Buyers - Graphical



- 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

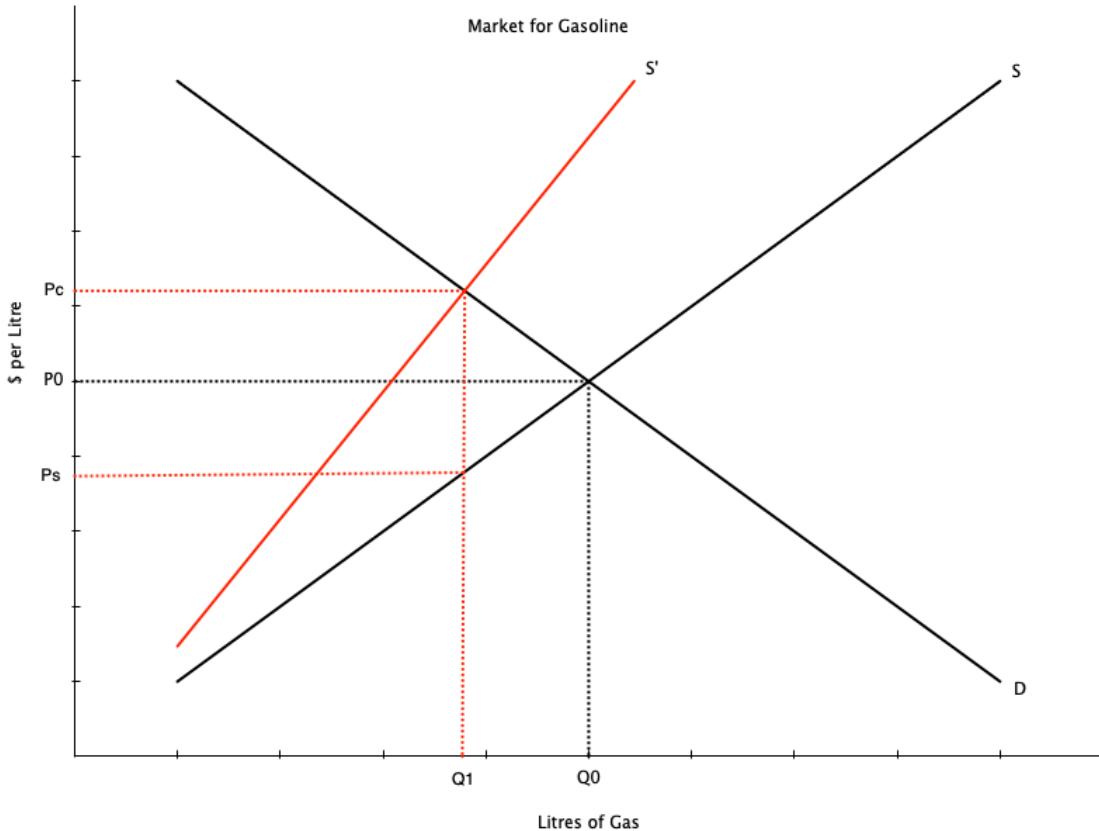


Ad Valorem Taxes

- 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



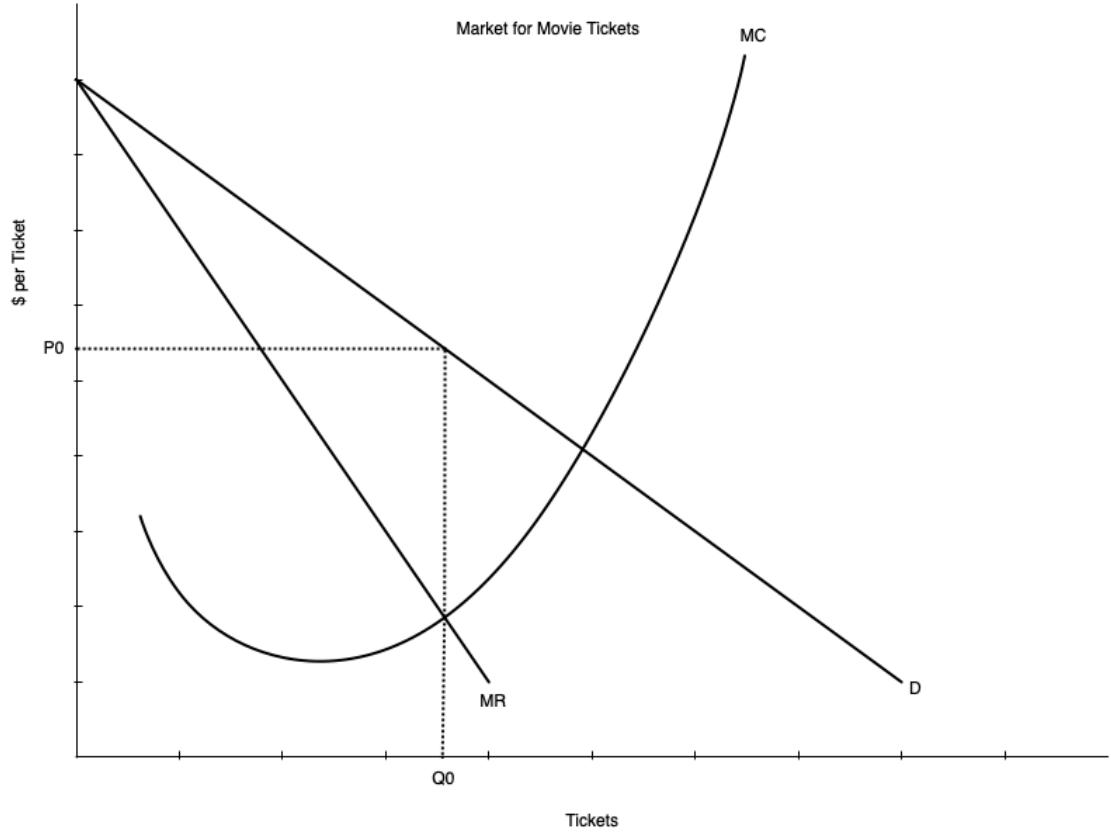
- Analysis is similar to unit tax except supply curve shifts up and becomes steeper
- If tax is levied on buyers, demand curve shifts down and becomes flatter
- Still a wedge between what consumers pay and what producers receive
- Economic burden on sellers decreases with supply elasticity
- Economic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

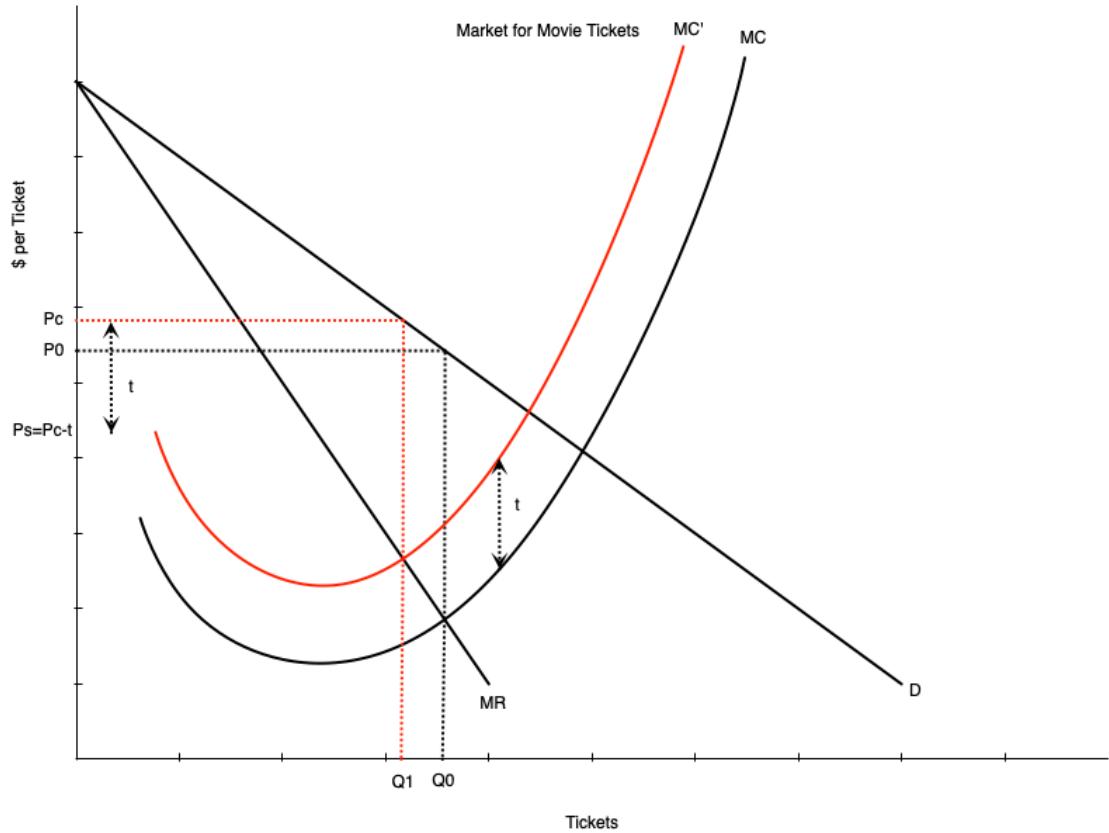


Unit Tax on a Monopolist



- 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
 - New marginal cost is MC'
- This shifts the cost curves up by the amount of the tax
 - 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

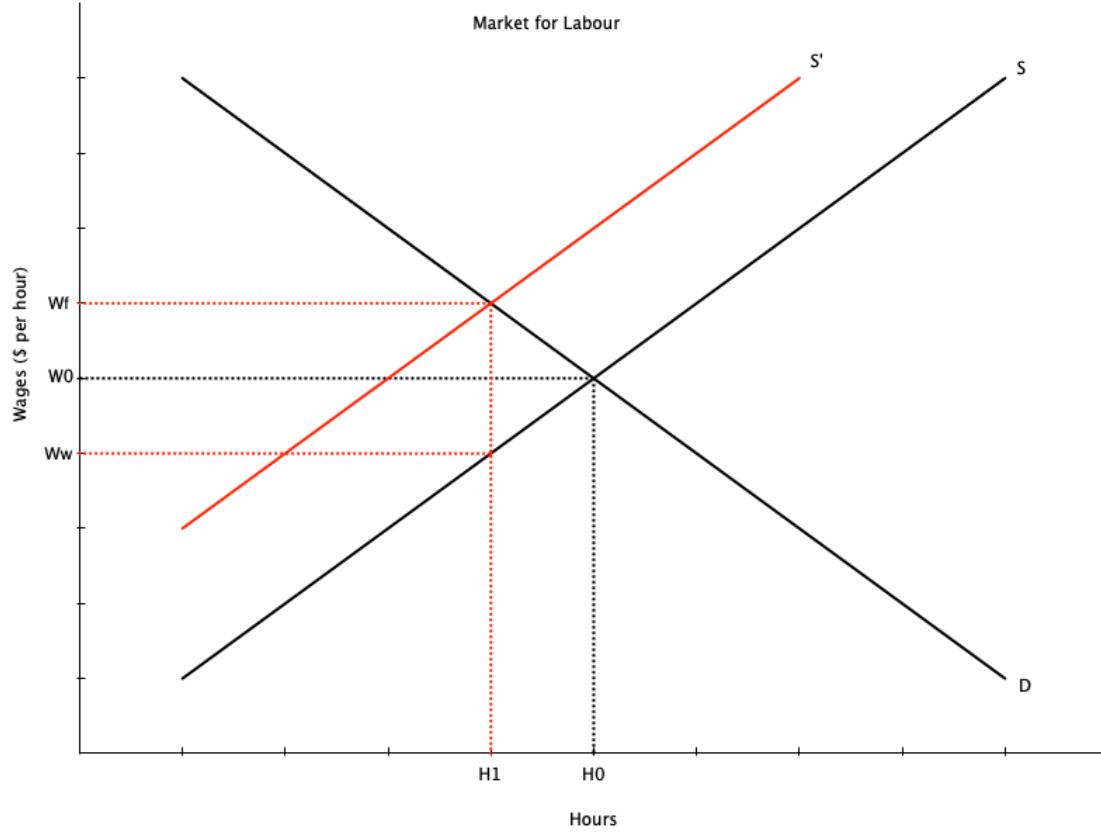
Taxes on Factor Markets in Partial Equilibrium Models

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



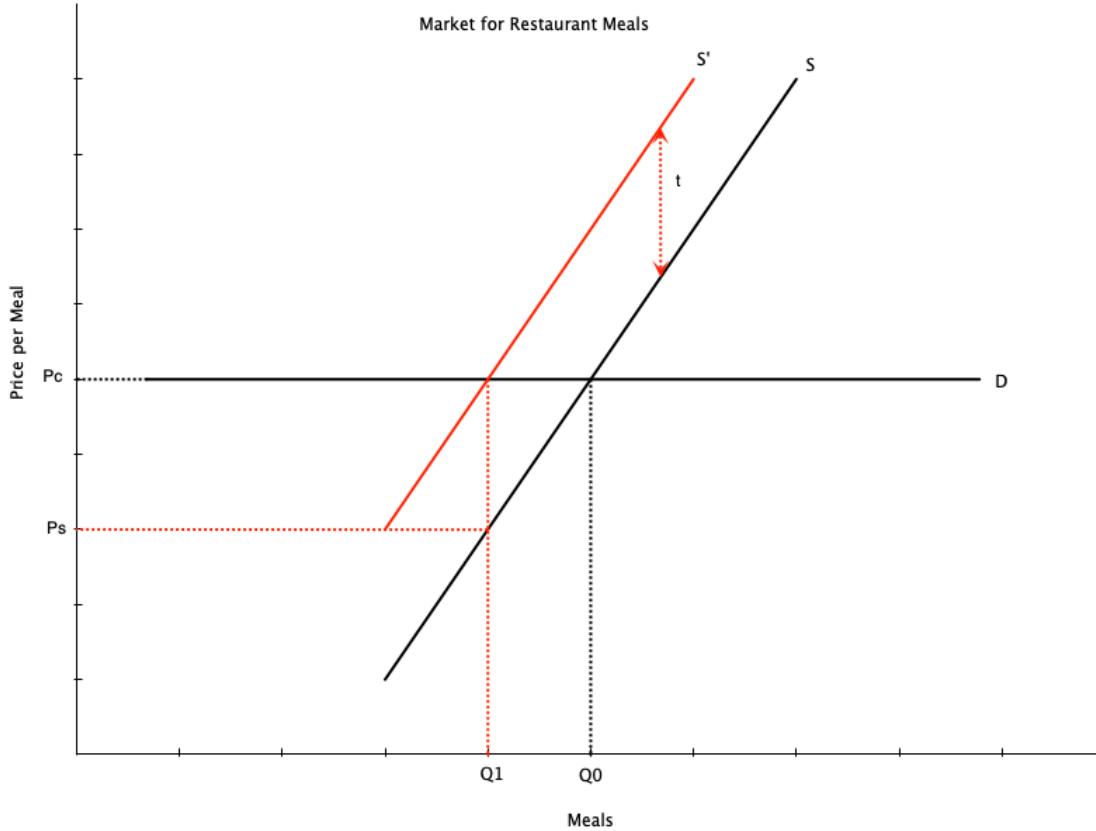
General Equilibrium

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



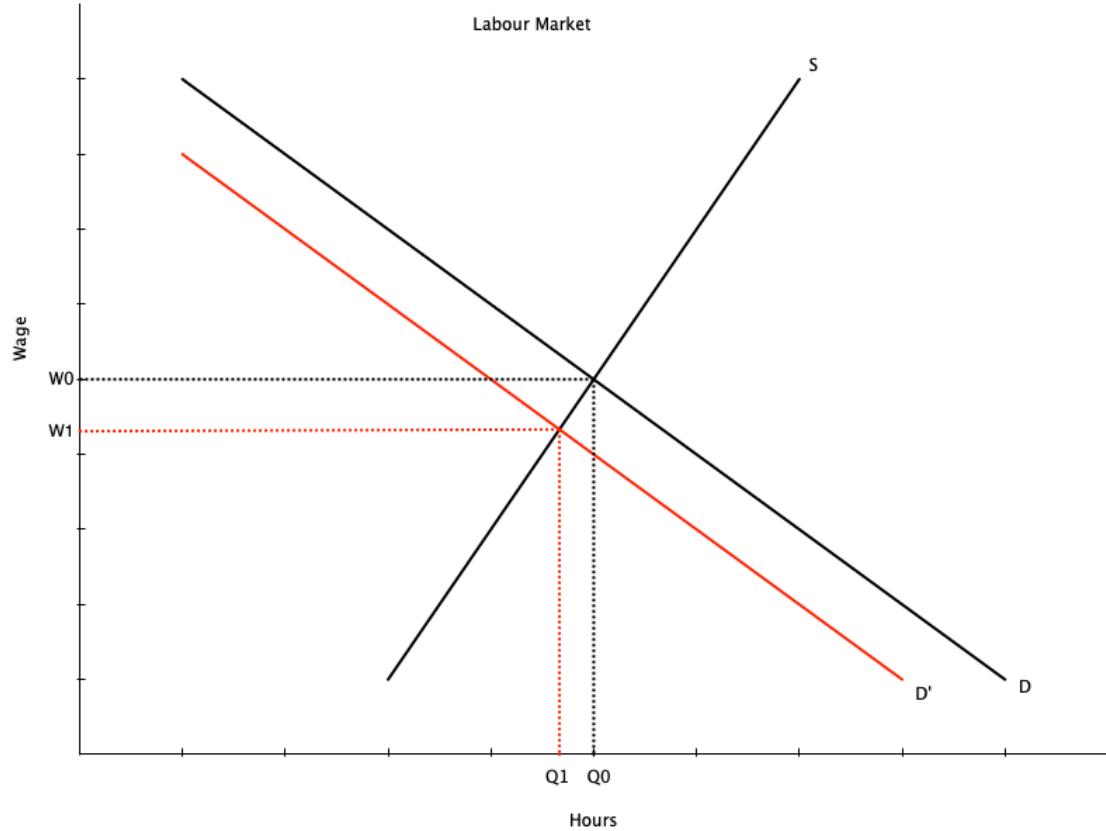
- Consider a unit tax on restaurants
- For simplicity, assume restaurant meals have perfectly elastic demand
 - People are very sensitive to the price and will cook at home if price rises
- The full burden of the tax is on the restaurants
- Quantity of meals falls because of the tax

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

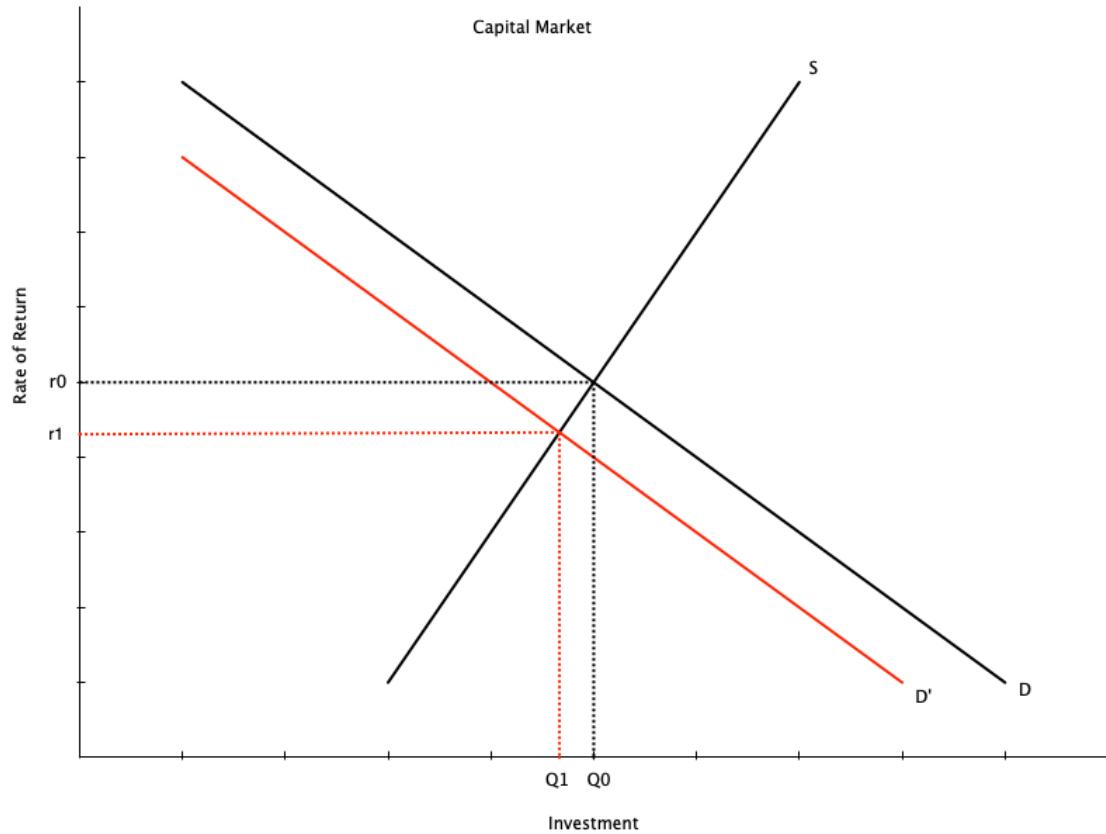


A Tax on Goods and Services



- 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 I4.2

Tax Equivalence Relations

t_{KF}	and	t_{LF}	are equivalent to	t_F
and		t_{LM}	are equivalent to	t_M
t_{KM}	and	are equivalent	are equivalent	are equivalent
are equivalent to t_K	and	to t_L	to t_L	to t

Source: Charles E. McLure, Jr., "The Theory of Tax Incidence with Imperfect Factor Mobility," *Finanzarchiv* 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
 - Price of labour rises
 - Cannot tell what the ultimate effect is on capital or labour prices



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



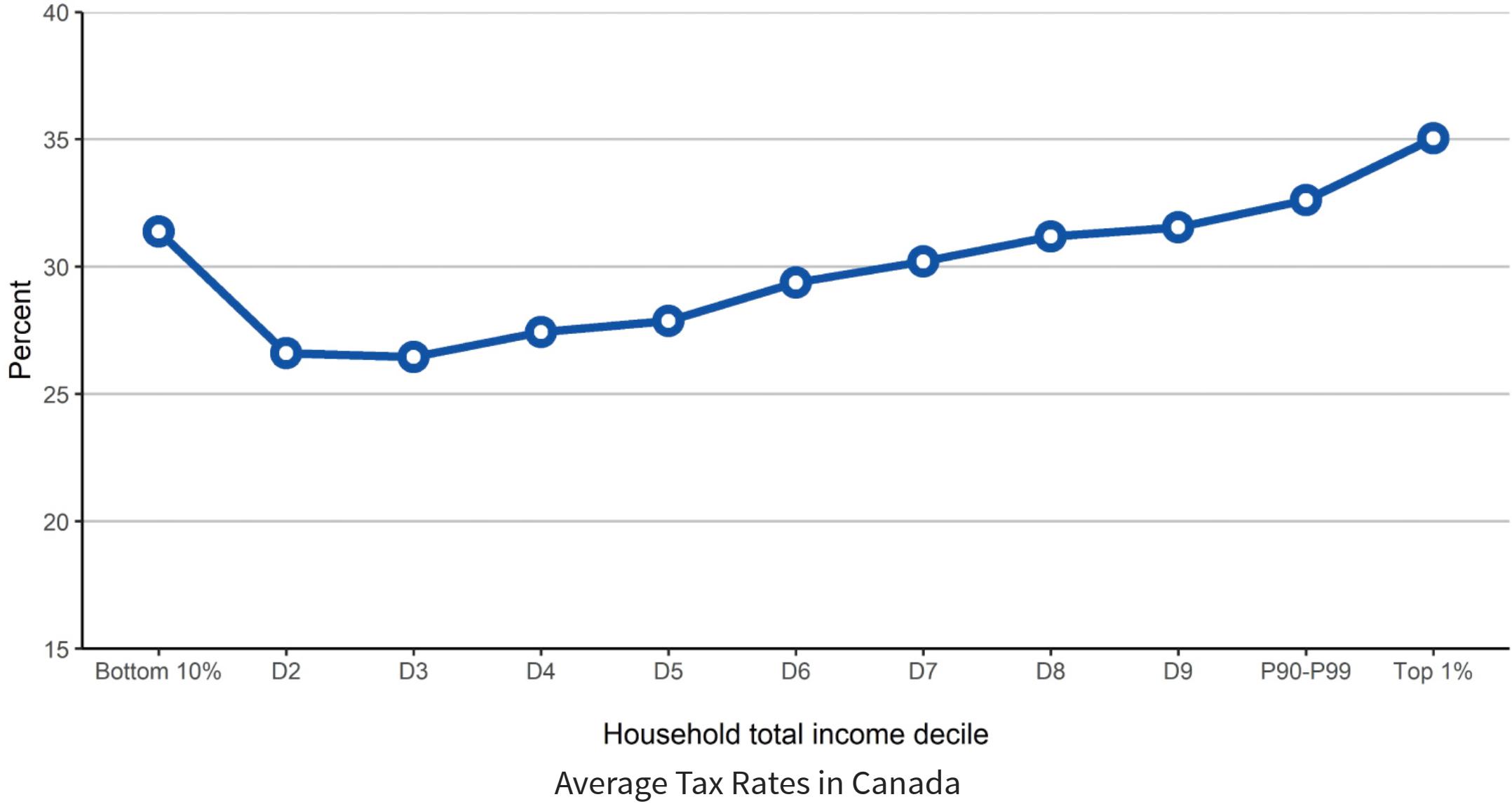
Quantifying Tax Incidence

Introduction

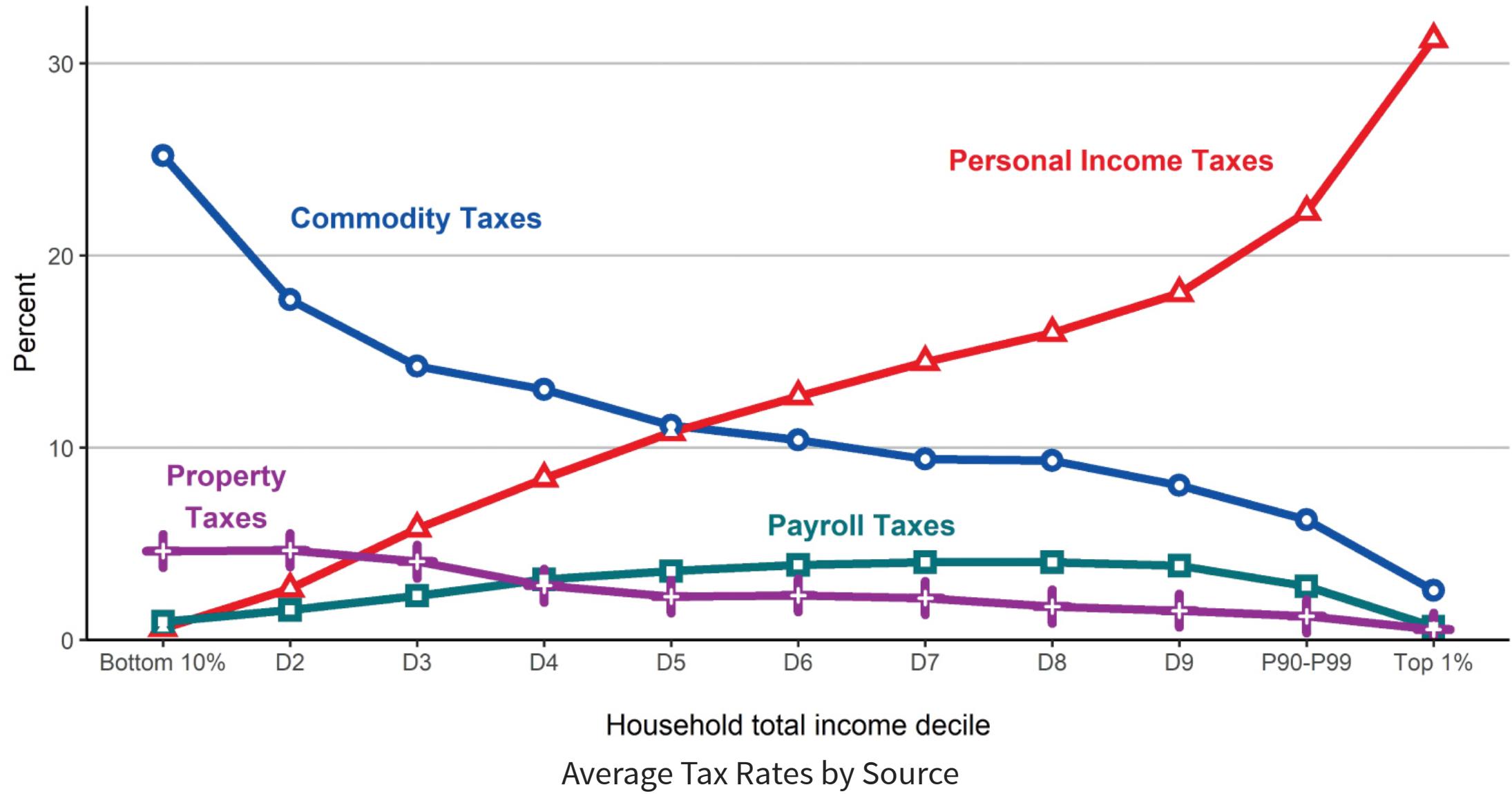
- We have gone through the theory of tax incidence
- Using data we can see who bears the burden of various taxes
- Could do this with tax data
 - Statistics Canada maintains the Longitudinal Administrative Databank (LAD)
 - Not easy to use because it is confidential microdata
- Can also use data from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



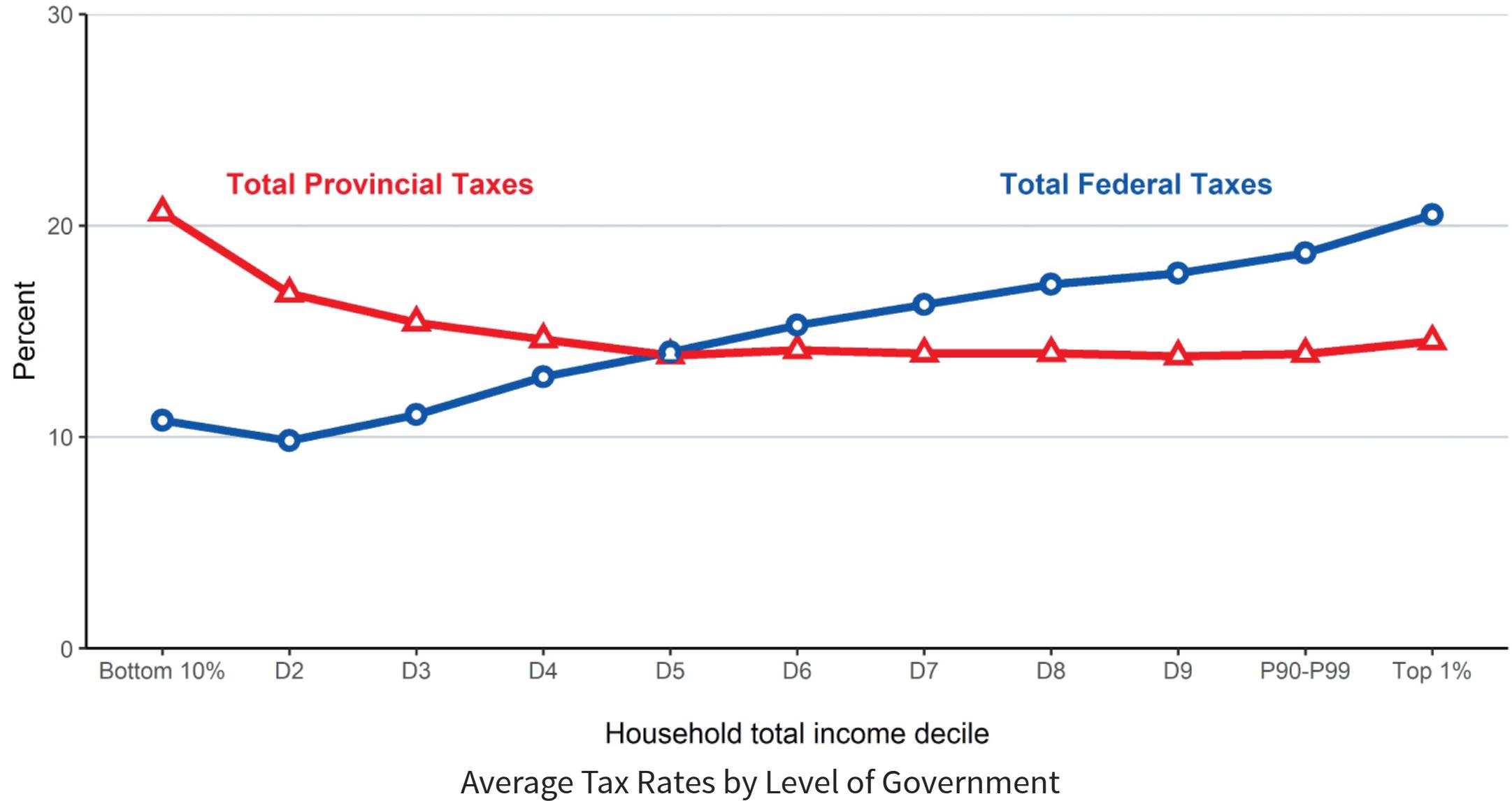
Partial Equilibrium



Partial Equilibrium



Partial Equilibrium



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/>

