

Introduction Many policies center around whether the tax burden is distributed fairly. Not as simple as analyzing how much in taxes each person actually paid, because of tax-induced changes to price.



Tax Incidence: General Remarks

- Only people can bear taxes
 - Business paying their fair share simply shifts the tax burden to different people
 - Can study people whose total income consists of different proportions of labor earnings, capital income, and so on.
 - Sometimes appropriate to study incidence of a tax across regions.

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Tax Incidence: General Remarks

- Incidence depends on how prices are determined
 Industry structure matters
 - Short- versus long-run responses



Tax Incidence: General Remarks

- There are three basic rules for figuring out who ultimately bears the burden of paying a tax.
 - The statutory burden of a tax does not describe who really bears the tax.
 - The side of the market on which the tax is imposed is irrelevant to the distribution of tax burdens.
 - Parties with inelastic supply or demand bear the burden of a tax.

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Tax Incidence: General Remarks

 Statutory incidence is the burden of the tax borne by the party that sends the check to the government.

- For example, the government could impose a 50¢ per litre tax on suppliers of gasoline.
- *Economic incidence* is the burden of taxation measured by the change in resources available to any economic agent as a result of taxation.
 - If gas stations raise gasoline prices by 25¢ per litre as a result, then consumers are bearing half of the tax.

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Tax Incidence: General Remarks

Incidence can be analysed at a number of levels:

- 1. Producer vs. consumer (tax on cigarettes)
- 2. Source of income (labour vs. capital)
- 3. Income level (rich vs. poor)
- 4. Region or country (local property taxes)
- 5. Across generations (social Security reform)

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Partial Equilibrium Incidence: Key Assumptions

Two good economy

- Only one relative price → partial and general equilibrium are same.
- Can be viewed as an approx. of incidence in a multi-good model if
 - the market being taxed is small
 - there are no close substitutes/complements in the utility function
- Tax revenue is not spent on the taxed good
- Tax revenue is used to buy untaxed good or thrown away
 Perfect competition among producers
- Relaxed in some studies of monopolistic or oligopolistic markets

Partial Equilibrium Incidence: Specific tax

- Consider, for ease of exposition, a *specific tax*.
- A specific tax is where the tax is expressed as an amount per unit of the good: e.g. €1 per litre bottle of wine or 20 cents per cigarette.
- The alternative to a specific tax is an *ad valorem tax* where the tax is expressed as a proportion of the price; hence a tax of 20% on a good that costs €2 corresponds to a tax per unit of 40 cents.
- For a specific tax the tax is the difference between the consumer paid by the consumer P_d and that received by the supplier, P_s .

$$\mathbf{P}_{\mathsf{d}} - \mathbf{P}_{\mathsf{s}} = \mathsf{t} \tag{1}$$



















Partial Equilibrium Incidence: Monopoly

- If a market is not perfectly competitive then this analysis does not apply. There are lots of forms of imperfect competition (duopoly, oligopoly, monopolistic competition and so on) so there are no real general results here. We look at perhaps the simplest case, simple monopoly, which shows one interesting possibility. It will be shown that it is possible to have *over-shifting*, that is the degree of tax shifting can be greater than 100%.
- For example, if the government introduced a tax of €1 on a good and the price to buyers rose by €1.20 the degree of shifting is 120%. To see how this happens consider the simplest case of a monopoly, a market with a single firm, that has constant marginal costs and faces a demand curve with a constant elasticity of demand.

Partial Equilibrium Incidence: Monopoly

After tax profits are given by

$$\pi=P.Q-c.Q-T.Q$$

• T is the amount of tax paid per unit and c is the marginal cost (that is of producing one extra unit). We can re-write after-tax profits as:

$$\pi = P.Q - (T+c).Q$$

• The marginal cost to the firm of an extra unit is effectively the marginal cost of production plus the amount it must pay the government.

















Extensions of Basic Partial Equilibrium Analysis

- With price floors, incidence can differ
- Consider incidence of social security taxes with minimum wage
- Statutory incidence: 12% on employer and 8% on employee
- Share of each should not matter as long as total is constant because wages will fall to adjust
- But with binding minimum wage, employers cannot cut wage further so statutory incidence determines economic incidence on the margin

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Extensions of Basic Partial Equilibrium Analysis

- Market rigidities
- Imperfect competition
 Overshifting: possible to get an increase in after-tax price >
- level of the taxAd valorem and excise taxation are no longer equivalent
- Effects on other markets:
- Increase in cigarette tax ! substitute cigarettes for cigars, increasing price of cigars and shifting cigarette demand curve
- Revenue effects on other markets: tax increases make agents poorer; less to spend on other markets
- This motivates general equilibrium analysis of incidence

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General Equilibrium Analysis

- Trace out full incidence of taxes back to original owners of factors
- Partial equilibrium: .producer. vs. consumer
- General equilibrium: capital owners vs. labor vs. landlords, etc.
- Two types of models:
- Static: many sectors or many factors of production
- Basic analytical model: Harberger (1962): 2 sector and 2
- factors of production. Also many sectors and factors. • Dynamic
- Dynamic
- Intergenerational incidence: Soc Sec reform
- Asset price effects: capitalization

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Harberger Two Sector Model
1. Fixed total supply of labor L and capital K (short-run,

General Equilibrium Analysis

- closed economy)
 Constant returns to scale in both production sectors
- 3. Full employment of L and K
- 4. Firms are perfectly competitive
- 5. All consumers are identical with homothetic utility functions
- Implicit assumption: no adjustment costs for capital and labor, when the are relocated from one sector to the other

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General Equilibrium Analysis Harberger Two Sector Model: Setup

- Production in sectors 1 (food) and 2 (cars):
- $X_1 = F_1(K_1, L_1) = L_1f(k_1)$ $X_2 = F_2(K_2, L_2) = L_2f(k_2)$
- with full employment conditions $K_1 + K_2 = K$ and $L_1 + L_2 = L$
- Factors w and L fully mobile so returns must be equal:
- $w = p_1F_{1L} = p_2F_{2L}$ $r = p_1F_{1K} = p_2F_{2K}$
- Demand functions for goods 1 and 2:
- X₁ = X₁(p₁/p₂) and X₂ = X₂(p₁/p₂)
- Note: Since all consumers are identical redistribution of incomes via tax system does not affect demand via a feedback effect
- System of ten equations and ten unknowns: K_i , L_i , p_i , X_i , w, r, i=1,2.

General Equilibrium Analysis Harberger Two Sector Model: Setup Introduce small tax *dt* on rental of capital in sector 2 (K₂)

- incroduce smail tax at on rental of capital in sector 2 (K2)
- All eqns the same as above except $r = (1 dt)p_2F_{2K}$
- Linearize the 10 eq'ns around initial equilibrium to compute the effect of *dt on all 10 variables (dw, dr , dL*₁, ...)
- Labor income = wL with L fixed, rK = capital income with K fixed
- Therefore change in prices dw/dt and dr/dt describes how tax is shifted from capital to labor
- Changes in prices dp1/dt, dp2/dt describe how tax is shifted from sector 2 to sector 1.

General Equilibrium Analysis Harberger Two Sector Model: Main Effects

- Substitution effects: capital bears incidence
- Tax on K_2 shifts production in Sector 2 away from K so aggregate demand for K goes down
- Because total K is fixed, r falls so K bears some of the burden

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• Bottom line: taxed factor may bear less than 0 or more than 100% of tax.

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Harberger Two Sector Model Theory not very informative: model mainly used to illustrate negativeresult that "anything goes". More interest now in developing methods to identify what actually happens Original Application of this framework by Harberger: sectors = housing and corporations Capital in these sectors taxed differently because of

General Equilibrium Analysis

- corporate income tax and many tax subsidies to housing
- E.g: Deductions for mortgage interest and
- Harberger made assumptions about elasticities and calculated incidence of corporate tax given potential to substitute into housing

Computable General Equilibrium Models Harberger analyzed two sectors; Subsequent literature expanded analysis to multiple sectors Analytical methods infeasible in multi-sector models Instead, use numerical simulations to investigate tax incidence effects after specifying full model Pioneered by Shoven and Whalley (1972). See Kotlikoff andSummers section 2.3 for a review Produced a voluminous body of research in PF, trade, and development economics

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