Taxation-Incidence
(Chapter 19)
Taxation-Incidence

• Who bears the burden of a tax?
  – Is it the party that sends the check to the government?
  – Not necessarily.
Taxation-Incidence

• Three rules of tax incidence
  – The statutory burden of a tax does not describe who really bears the tax
    • **Statutory incidence:** the burden of a tax borne by the party that sends the check to the government
    • **Economic incidence:** the burden of taxation measured by the change in the resources available to any economic agent as a result of taxation
Taxation-Incidence

• Three rules of tax incidence
  – The statutory burden of a tax does not describe who really bears the tax

  **Consumer tax burden** = (Post-tax price – Pre-tax price) + Per-unit tax payments by the consumer

  **Producer tax burden** = (Pre-tax price – Post-tax price) + Per-unit tax payments by the producer
Taxation-Incidence

- Three rules of tax incidence
  - Example: 50 cent/per gallon tax on gasoline on producer
Taxation-Incidence

• Three rules of tax incidence
  – The statutory burden of a tax does not describe who really bears the tax

Consumer tax burden = (Post-tax price – Pre-tax price) + Per-unit tax payments by the consumer

Consumer tax burden = ($1.80 – $1.50) + $0
= $0.30
Taxation-Incidence

• Three rules of tax incidence
  – The statutory burden of a tax does not describe who really bears the tax

Producer tax burden = (Pre-tax price – Post-tax price) + Per-unit tax payments by the producer
Producer tax burden = ($1.50 – $1.80) + $0.50 = $0.20
Taxation-Incidence

• Three rules of tax incidence
  – The statutory burden of a tax does not describe who really bears the tax

• **Tax wedge:** The difference between what consumers pay and what producers receive (net of tax) from a transaction.
Taxation-Incidence

• Three rules of tax incidence
  – The side of the market on which the tax is imposed is irrelevant to the distribution of the tax burdens

• Example: 50 cent/per gallon tax on gasoline on consumer
Taxation-Incidence

• Three rules of tax incidence
  – The side of the market on which the tax is imposed is irrelevant to the distribution of the tax burdens
Taxation-Incidence

• Three rules of tax incidence
  – The side of the market on which the tax is imposed is irrelevant to the distribution of the tax burdens
    • Gross price: The price paid by or received by the party not paying the tax to the government (market price)
    • After-tax price: The price paid by or received by the party that is paying the tax to the government
      – Either lower by the tax if producers pay the tax
      – Or higher by the tax if consumers pay the tax
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them
    • Example: 50 cents of tax on gasoline on producers assuming perfectly inelastic demand
    • Assume that consumers do not have any other alternatives but to drive to work.
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them

  Consumer tax burden = \((2 - 1.50) + 0\)  
  = \$0.50

  Producer tax burden = \((1.50 - 2) + 0.50\)  
  = \$0

• Full shifting of the tax burden from the producers to the consumers
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them
    • Example: 50 cents of tax on gasoline on producers assuming perfectly elastic demand
    • Assume that consumers can easily substitute ‘driving’ with public transportation.
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them

  Consumer tax burden = \((1.50 - 1.50) + 0\)
  \[= 0\]

  Producer tax burden = \((1.50 - 1.50) + 0.50\)
  \[= 0.50\]
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them
  • Supply elasticities
    – Steel plant owners versus street vendors
Taxation-Incidence

• Three rules of tax incidence
  – Parties with inelastic supply or demand bear taxes; parties with elastic supply or demand avoid them

(a) Tax on steel producers (inelastic supply)
(b) Tax on sidewalk vendors (elastic supply)
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• Math behind the figures
  – Consider the case where consumers pay the tax
    • Change in price for consumers:
      Total price change = $\Delta P + \tau$
    • Elasticity of demand:
      \[ \eta_d = \frac{\Delta Q}{\Delta P + \tau} \times \frac{P}{Q} \]
      \[ \eta_s = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} \]
    • Solve for $\Delta Q / Q$
Taxation-Incidence

• Math behind the figures
  – Consider the case where consumers pay the tax

\[
\eta_d = \frac{\Delta Q}{Q} = \eta_d \times \frac{((\Delta P + \tau) / P)}{

= \eta_s \times \left(\frac{\Delta P}{P}\right)

\Rightarrow \eta_d \times \frac{((\Delta P + \tau) / P)}{P} = \eta_s \times \left(\frac{\Delta P}{P}\right)

\Rightarrow \Delta P = \left[\frac{\eta_d}{(\eta_s - \eta_d)}\right] \times \tau

– If demand is inelastic \(\eta_d = 0\), then \(\Delta P = 0\).
– If demand is perfectly elastic \(\eta_d = \infty\), then \(\Delta P = -\tau\).
Taxation-Incidence

• Math behind the figures
  – Similarly, when producers pay the tax
    • Change in price for producers:
      Total price change = ΔP + τ
      \[ ΔP = \left[ \frac{η_s}{(η_d - η_s)} \right] \times τ \]

  – If supply is inelastic (η_s = 0), then ΔP = 0
  – If supply is perfectly elastic (η_s = ∞), then ΔP = -τ
Taxation-Incidence

• Tax Incidence – Extensions
  - Tax incidence in factor markets
    • Example: labor market where the consumers of the factors (labor) are the firms and the producers of the factors are individuals (workers).
    • Consider a case where the government imposes a tax of $1/hour on all workers.
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- Tax Incidence – Extensions
  - Tax incidence in factor markets

![Graph showing tax incidence in factor markets](image)
Taxation-Incidence

• Tax Incidence – Extensions
  - Tax incidence in factor markets
    • Consider a case where the government imposes a tax of $1/hour on all workers.
      
      **Firm tax burden** = ($5.65 – $5.15) + $0 
      = $0.50
      
      **Worker tax burden** = ($5.15 - $5.65) + $1 
      = $0.50
Taxation-Incidence

• Tax Incidence – Extensions
  – Tax incidence in factor markets
  • Impediments to wage adjustment: minimum wage
Taxation-Incidence

• Tax Incidence – Extensions
  – Tax incidence in factor markets
    • Case 1: tax on workers
      Firm tax burden = ($5.65 – $5.15) + $0
      = $0.50

      Worker tax burden = ($5.15 - $5.65) + $1
      = $0.50
Taxation-Incidence

• Tax Incidence – Extensions
  – Tax incidence in factor markets
    • Case 2: tax on firms
      \[ \text{Firm tax burden} = (\$5.15 - \$5.15) + \$1 \]
      \[ = \$1 \]
      \[ \text{Worker tax burden} = (\$5.15 - \$5.15) + \$0 \]
      \[ = \$0 \]
Taxation-Incidence

• Tax Incidence – Extensions
  – Tax incidence in monopolies
    • Monopolies are ‘price-makers’ rather than ‘price-takers’.
    • Monopoly maximizes
      total profit = total revenue – total cost
      with respect to quantity \( \Rightarrow MR = MC \)
    • The main difference here is that the monopoly can set any price it wishes.
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- Tax Incidence – Extensions
  - Tax incidence in monopolies
Taxation-Incidence

• Tax Incidence – Extensions
  – Tax incidence in monopolies
    • Even though monopolies have complete market power, they cannot avoid the tax burden, since their revenues depend on the market demand, which changes with taxes.
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• Tax Incidence – Extensions
  – Balanced budget tax incidence
    • So far, when we calculated the tax burdens, we ignored the fact that the government might be using the revenues for the benefit of the firms and the consumers
    • Balanced budget incidence: analysis that accounts for both the tax and the benefit it brings.
Taxation-Incidence

• General equilibrium tax incidence
  – So far, we only looked at the impact of the taxation in partial equilibrium, which considers only the ‘taxed market’ in isolation.
  – However, it is possible that taxation on one market might have spillovers in other markets as well (general equilibrium models).
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• General equilibrium tax incidence
  – **Example:** effects of a restaurant tax
    • (1) On meals sold per day
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• General equilibrium tax incidence
  – Example: effects of a restaurant tax
  • (2) On labor and capital markets
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• General equilibrium tax incidence
  – **Issues to consider in general equilibrium analysis**
    • Short-run versus long-run
      – In the long-run, capital market might be more elastic, since property owners might move their investments elsewhere in the long-run (except land-owners).
      – In that case, capital owners, in the long-run, will not bear as much tax burden.
Taxation-Incidence

• General equilibrium tax incidence
  – **Issues to consider in general equilibrium analysis**
    • Effects of tax scope
      – If the tax is implemented in a larger geographical area,
        » Meals demanded can not be as elastic
        » Labor supply cannot be as elastic
      – The tax burden will be larger on consumers and workers.
Taxation-Incidence

• General equilibrium tax incidence
  – **Issues to consider in general equilibrium analysis**
    • Spillovers between product markets: consider the impact of a meal tax:
      – Consumers have less income and hence will spend less on all goods (income effect)
      – Consumers might substitute away from outside meals to other activities (substitution effect)
      – Consumers might reduce their consumption of goods that are complements to ‘outside meals’ (complementary effect)
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- General equilibrium tax incidence
  - A complete general equilibrium analysis follows the burden of a tax in one market across all other markets.