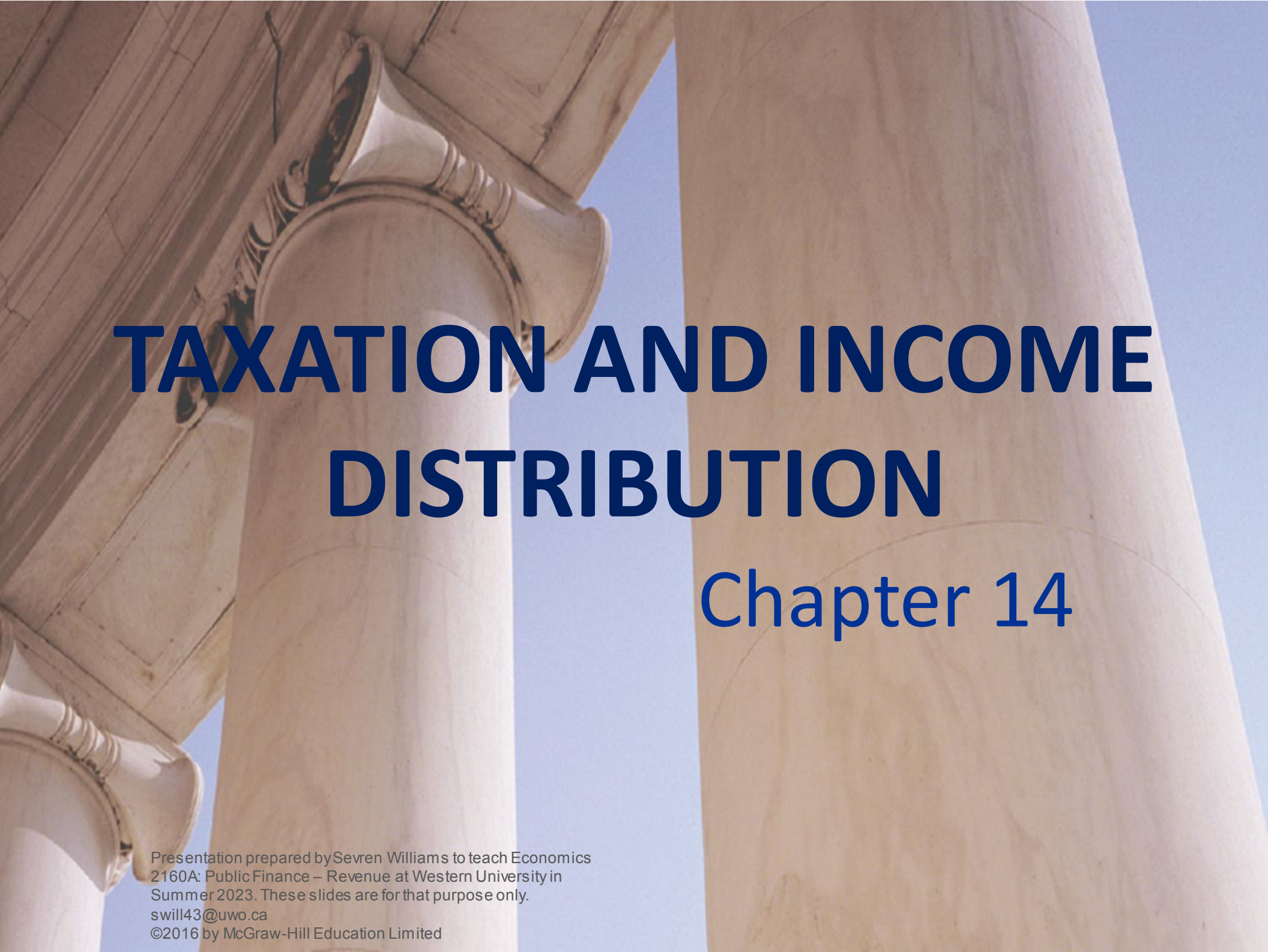

TAXATION AND INCOME DISTRIBUTION

Chapter 14

Presentation prepared by Sevren Williams to teach Economics 2160A: Public Finance – Revenue at Western University in Summer 2023. These slides are for that purpose only.
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Learning Objectives

- Distinguish between the statutory incidence and the economic incidence of tax.
- Illustrate the difference between a marginal tax rate and an average tax rate.
- Describe two ways of measuring tax progressiveness.
- Relate the incidence of tax to the elasticities of supply and demand.
- Explain why a tax on economic profits cannot be shifted onto consumers.
- Give examples of tax equivalence relations in general equilibrium models.
- Analyze the output effect and the substitution effect of a partial factor tax.

Vocabulary

- Statutory Incidence
- Economic Incidence
- Tax Shifting

Tax Incidence: General Remarks

- Only people can bear taxes
  - Functional distribution of income
  - Size distribution of income
- Both sources and uses of income should be considered
- Incidence depends on how prices are determined
- Incidence depends on the disposition of tax revenues
  - Balanced-Budget tax incidence
  - Differential tax incidence
  - Lump-sum tax
  - Absolute tax incidence

Tax Progressiveness Can Be Measured In Several Ways

- Average tax rate versus marginal tax rate
- Proportional tax system
- Progressive tax system
- Regressive tax system

Tax Liabilities under a hypothetical tax system			
Income	Tax Liability	Average Tax Rate	Marginal Tax Rate
$2,000	-$200	-0.10	0.2
3,000	0	0	0.2
5,000	400	0.08	0.2
10,000	1,400	0.14	0.2
30,000	5,400	0.18	0.2

Table 14.1

Measuring The Degree Of A Progressive Tax System

$$v_1 = \frac{\frac{T_1}{I_1} - \frac{T_0}{I_0}}{I_1 - I_0} \qquad v_2 = \frac{\frac{T_1 - T_0}{T_0}}{\frac{I_1 - I_0}{I_0}}$$

Partial Equilibrium Models: Commodity Taxation

How do taxes affect the income distribution?

Partial equilibrium models of price determination:

- Models that look only at the market in which the tax is imposed and ignore the ramifications in other markets.
- This kind of analysis is most appropriate when the market for the taxed commodity is relatively small compared with the economy as a whole.
- The vehicle for our analysis is the supply and demand model of perfect competition.

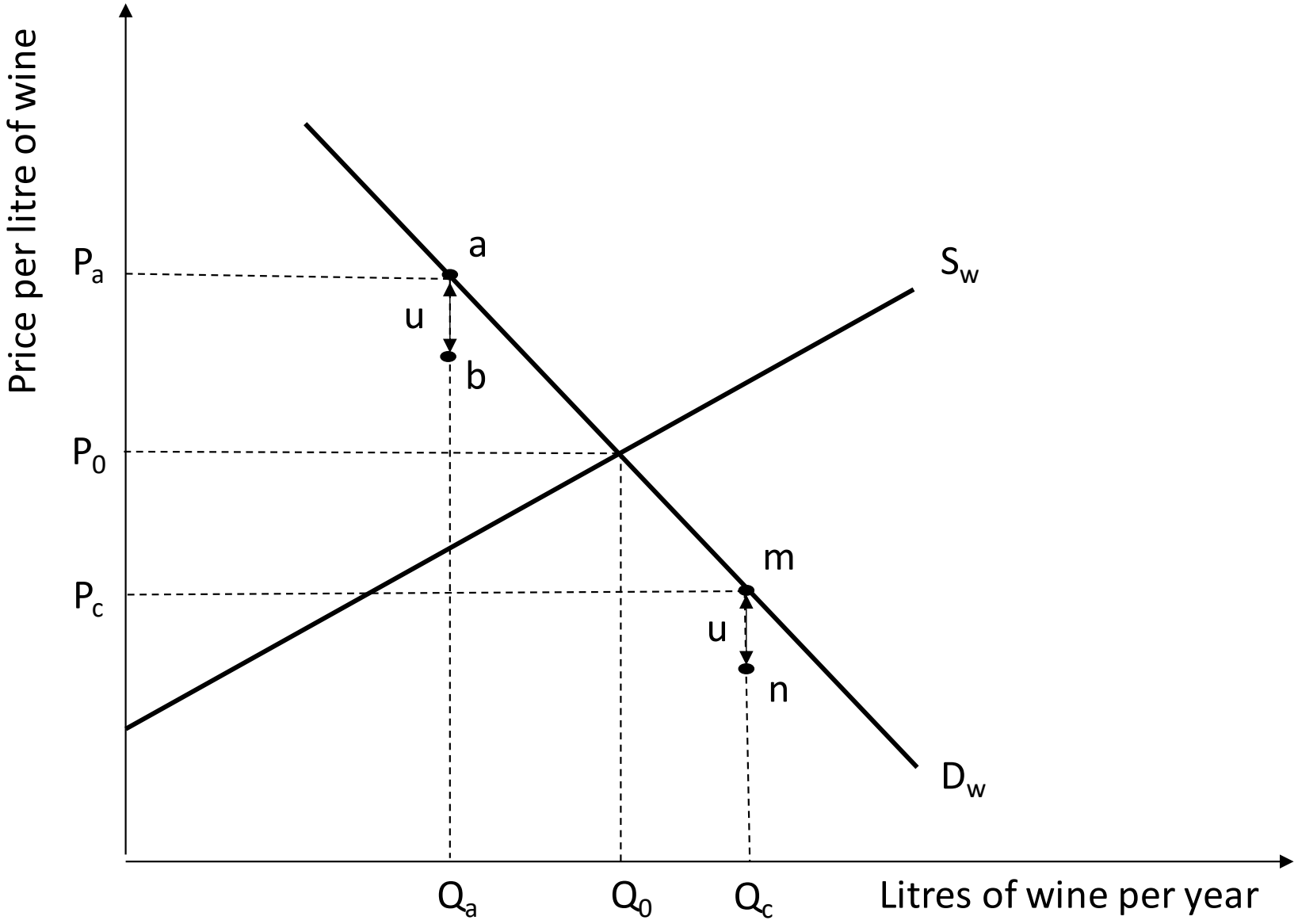
Unit Taxes on Commodities

- We study first the incidence of a ***unit tax:***
  - Named because it is levied as a fixed amount per unit of a commodity sold.

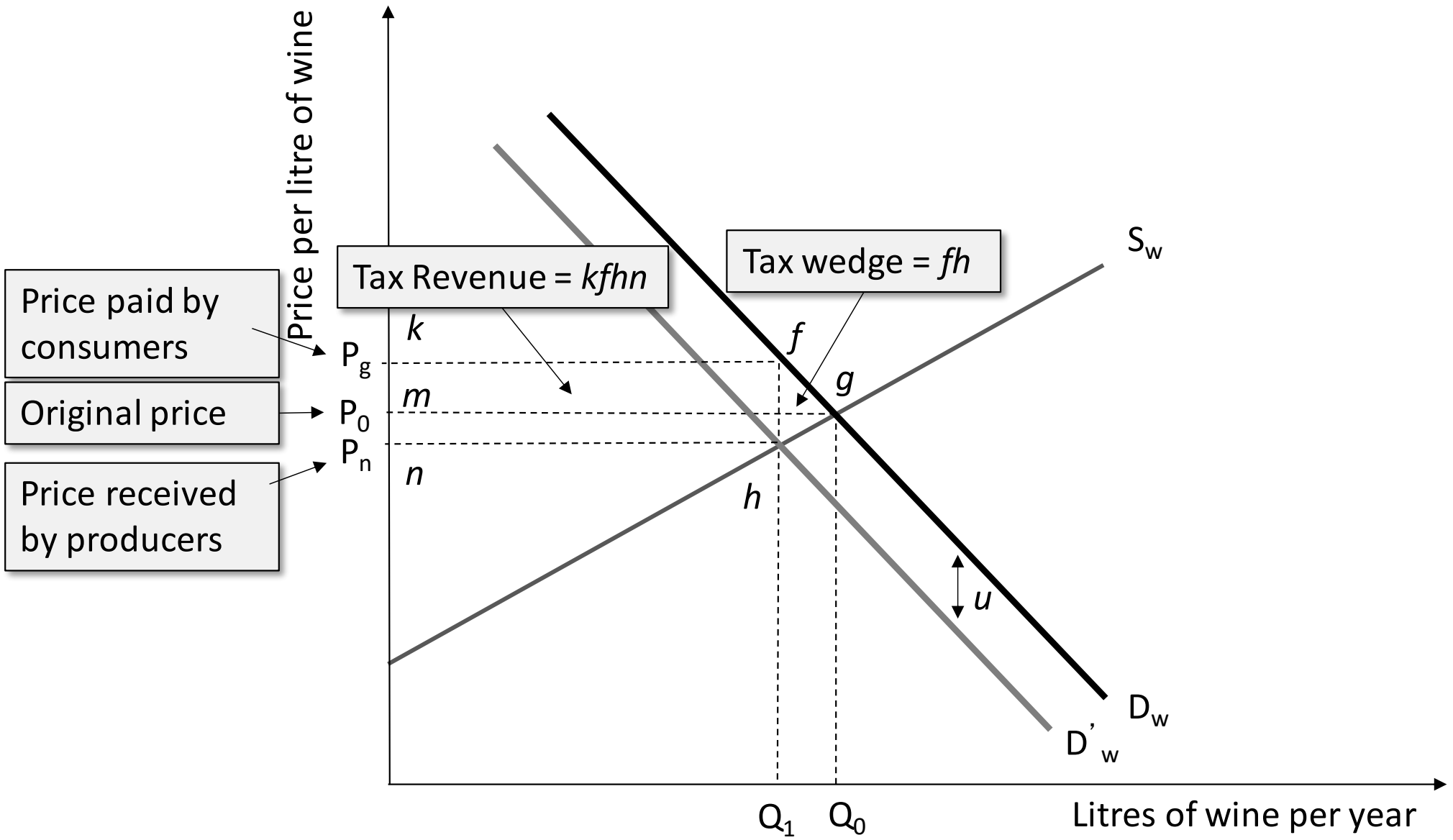
Example:
The federal government imposes a tax on wine of $0.62 per litre and a tax on cigarettes of $2.63 per pack.

- Economic incidence does not depend on whether it is levied on consumers or producers.
- Economic incidence depends on elasticities of supply and demand.

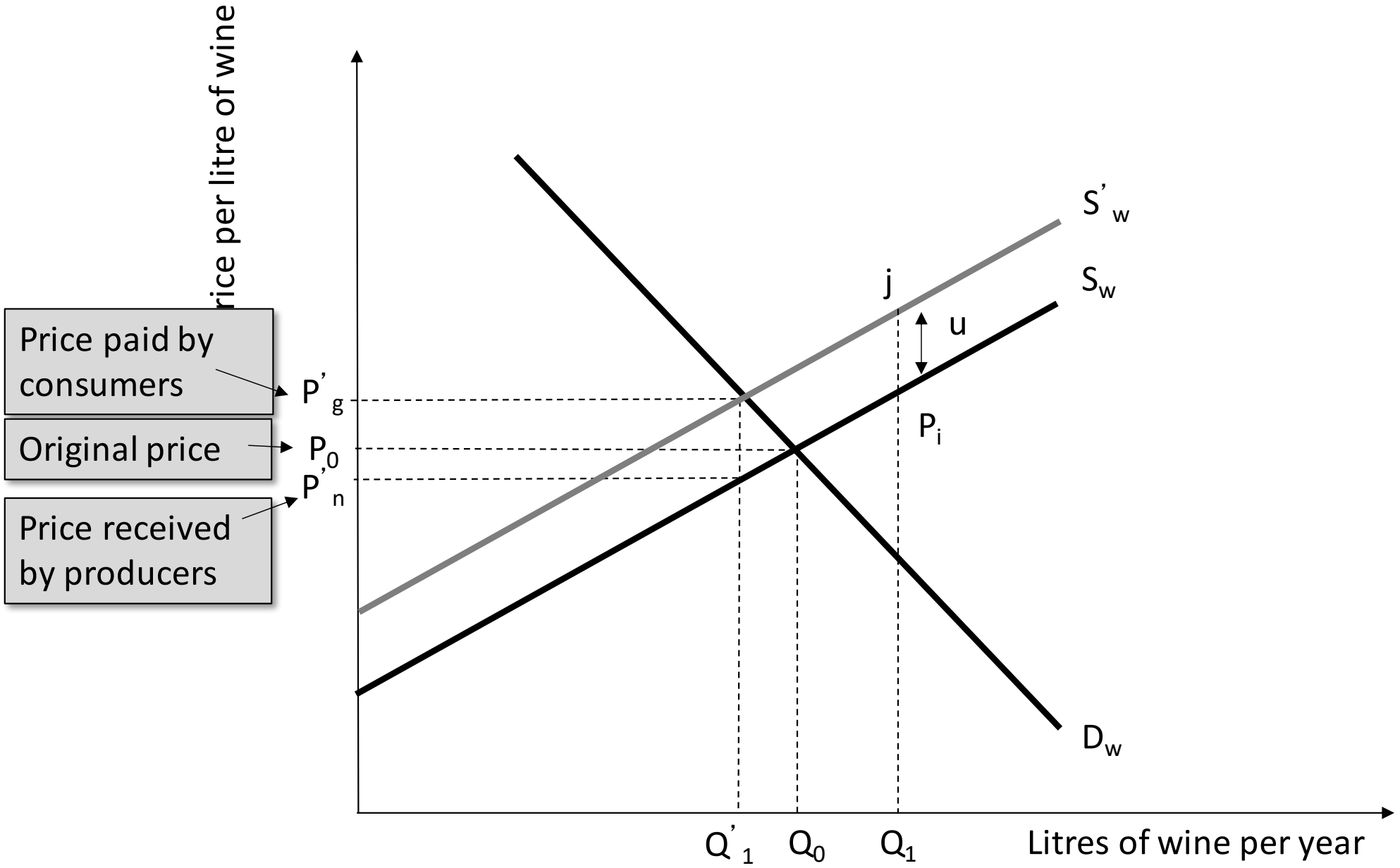
Price and Quantity Before Taxation



Incidence of a Unit Tax Imposed on the Demand Side

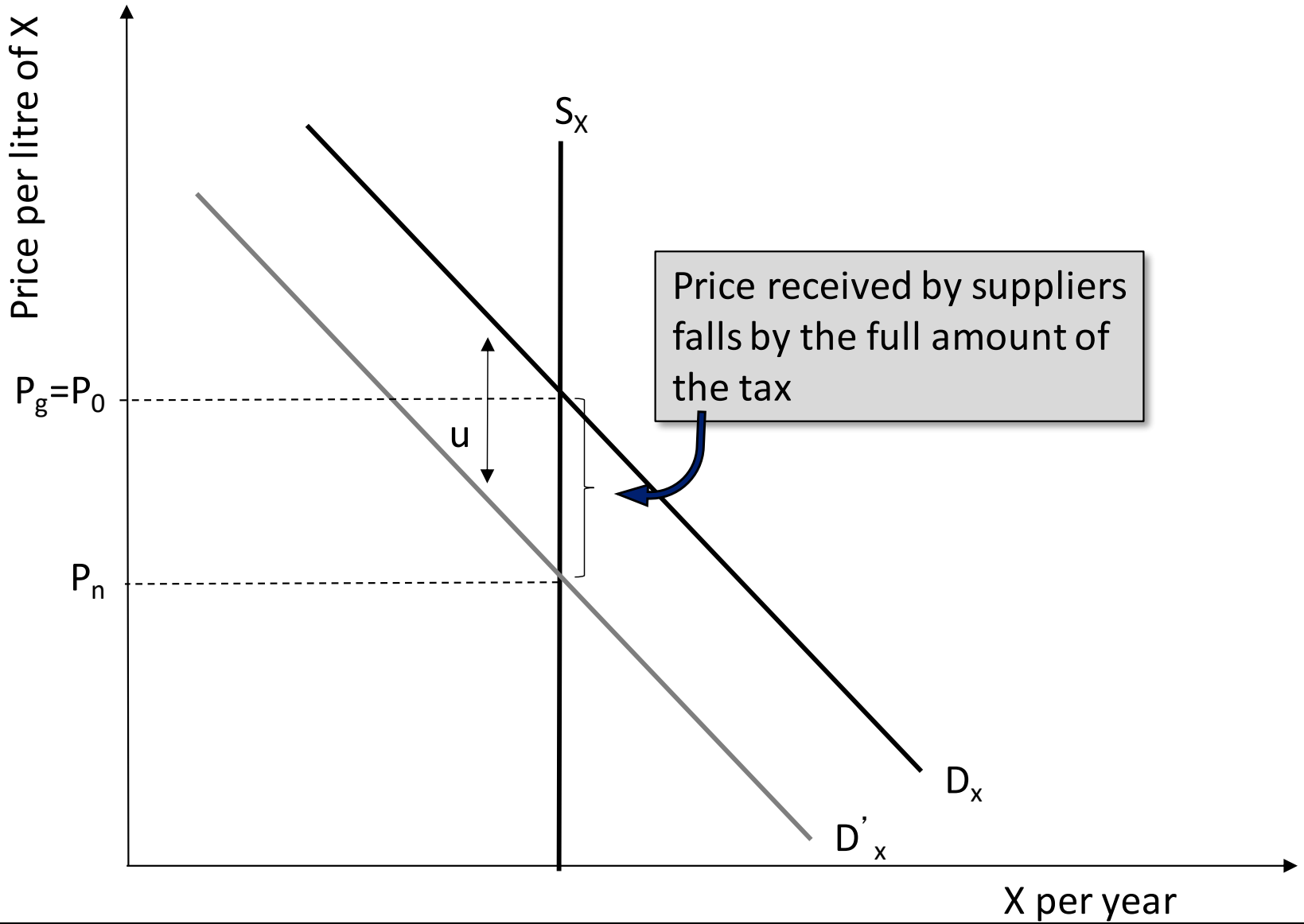


Incidence of a Unit Tax Imposed on the Supply Side



Tax Incidence when Supply is Perfectly Inelastic

(demand is elastic).



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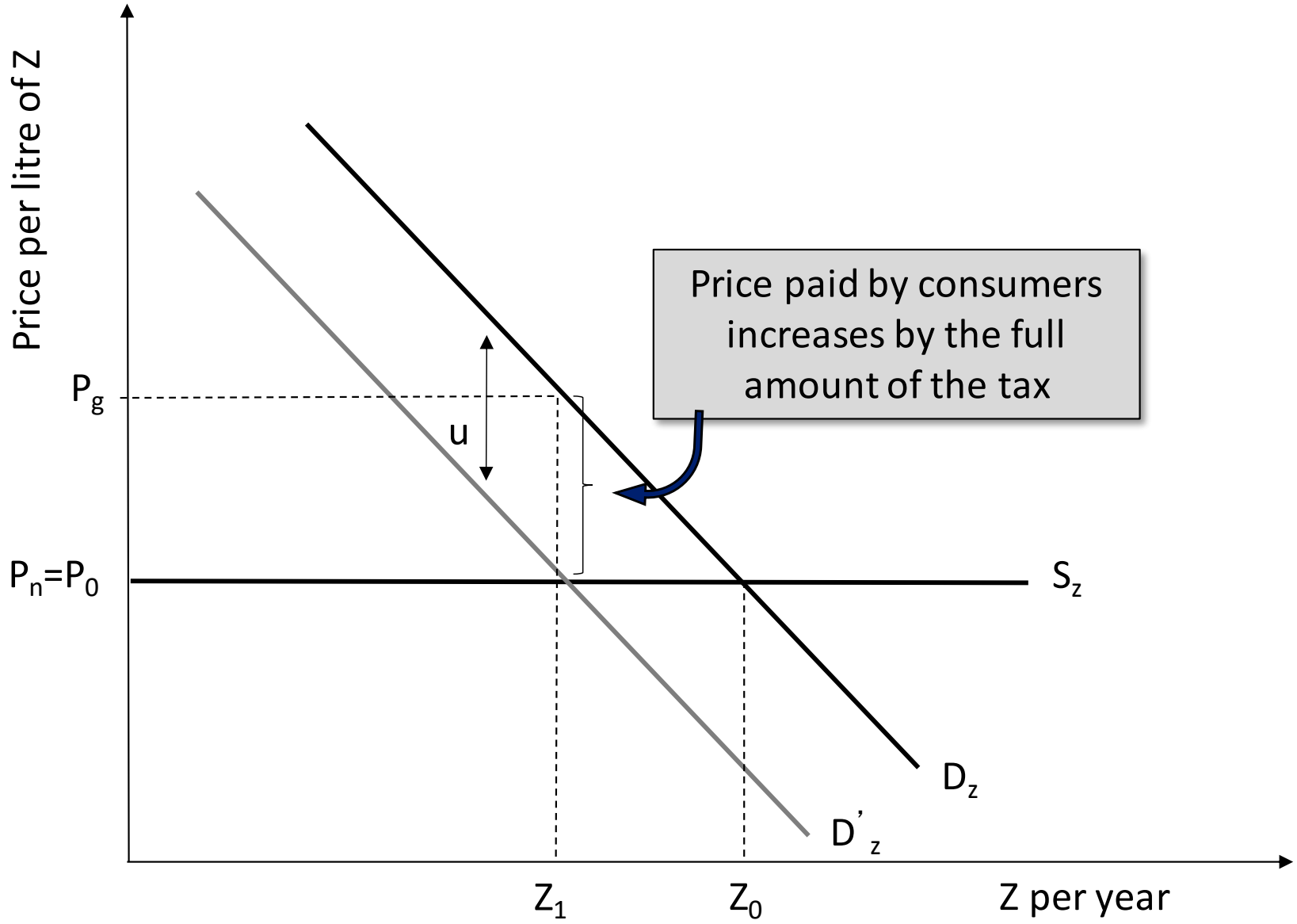
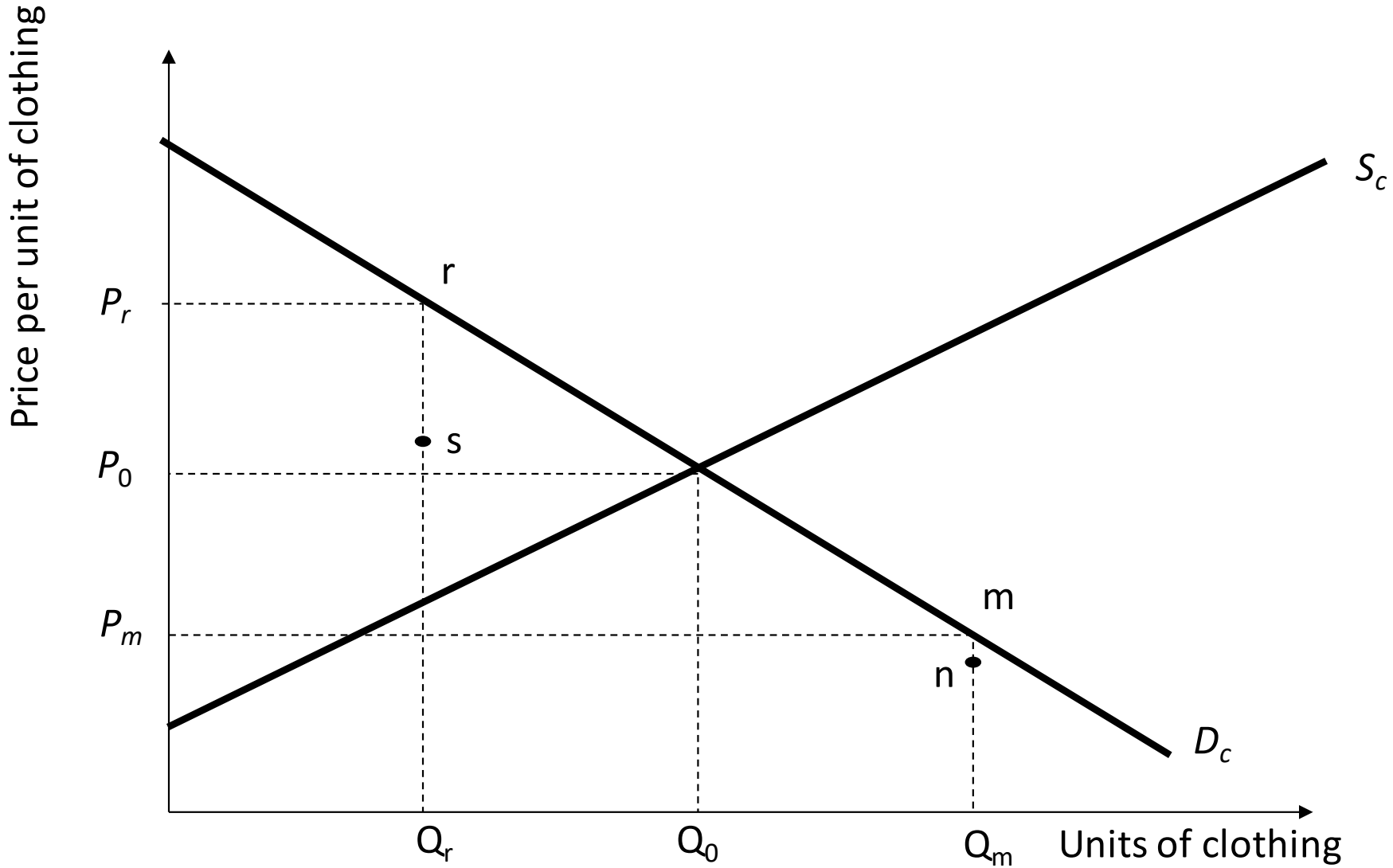
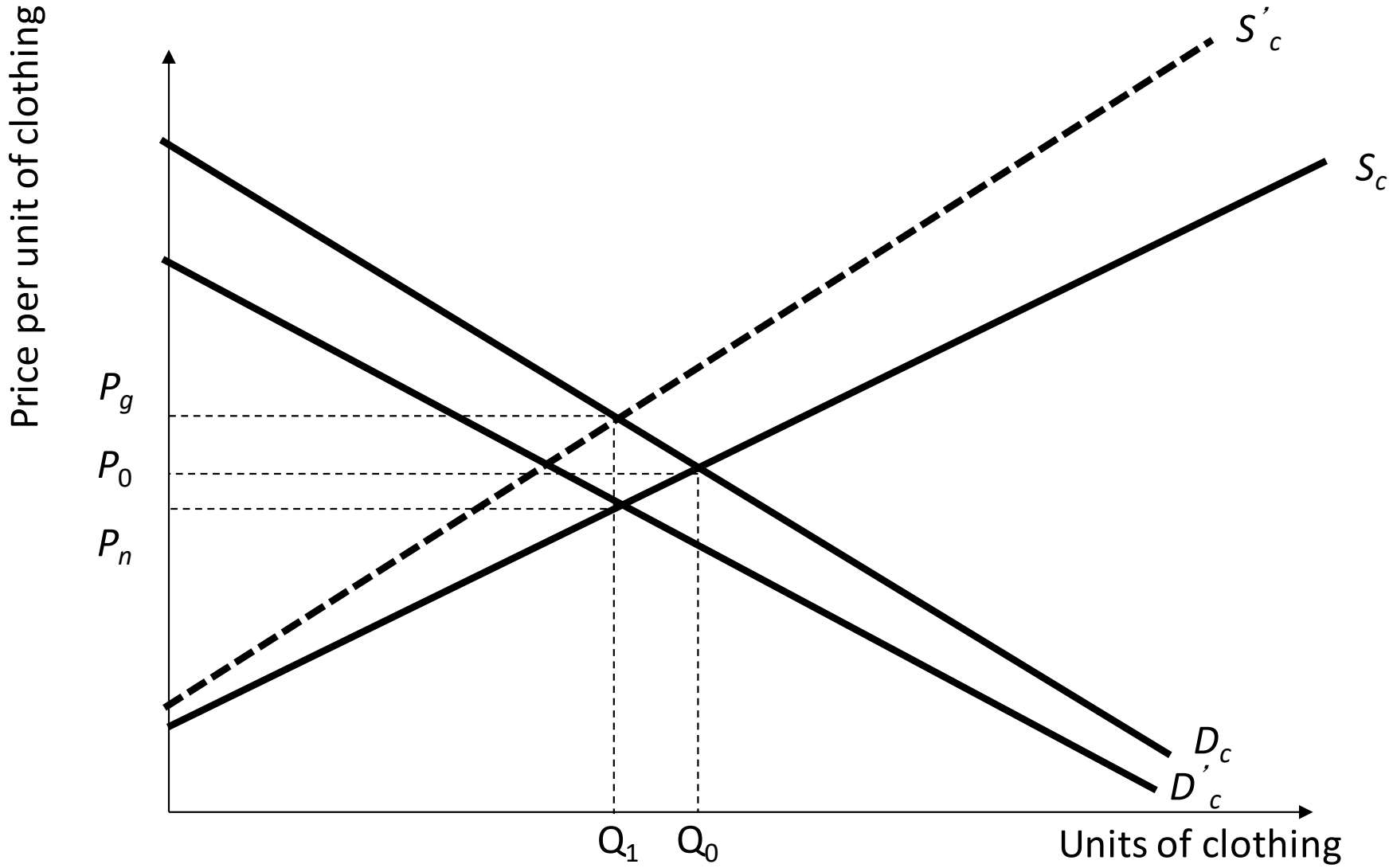


Introducing an Ad Valorem Tax



Incidence of an Ad Valorem Tax

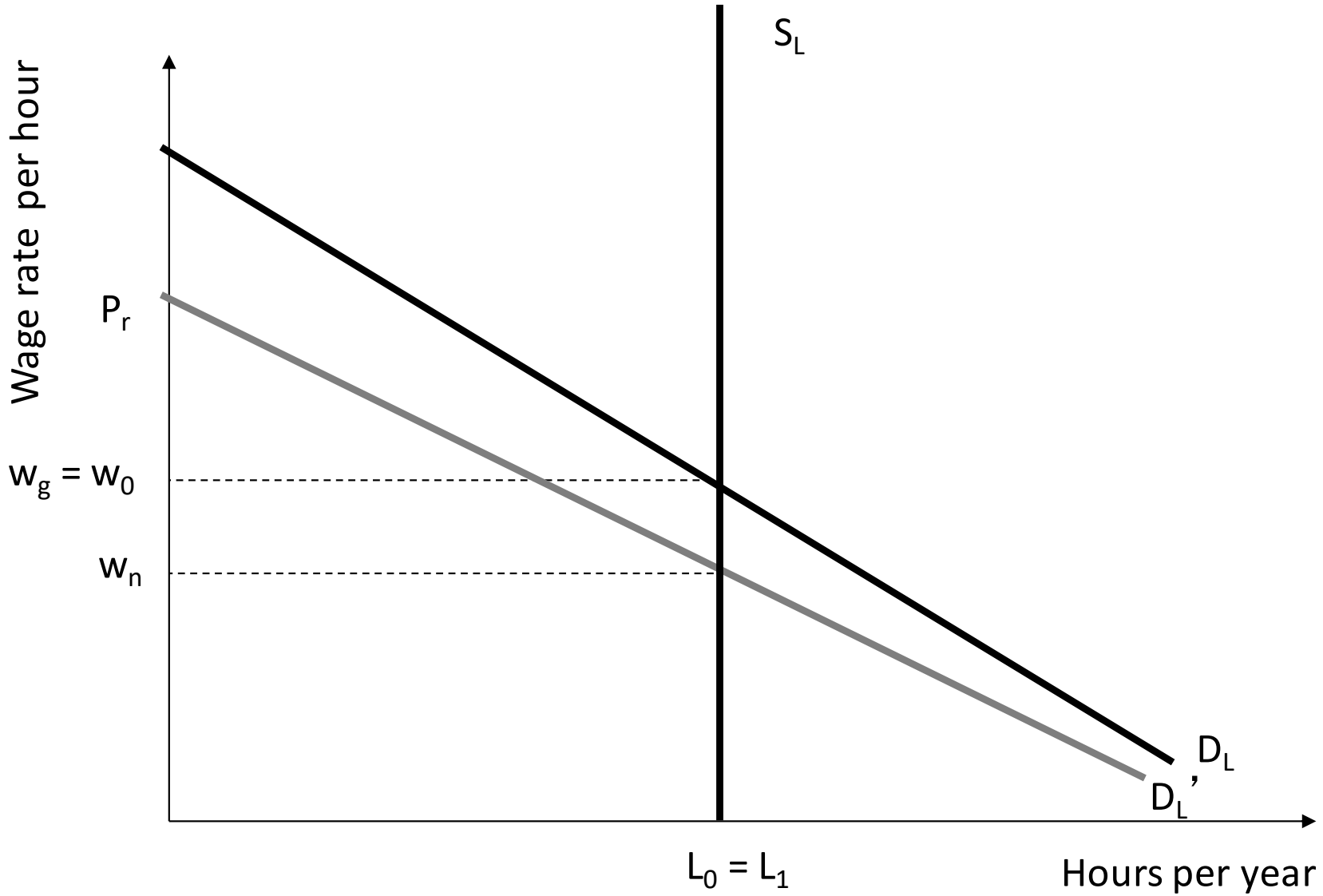


Taxes on Factors

The payroll tax

- So far: taxes on goods.
  - But analysis can also be applied to factors of production, such as labour.
  - E.g., tax on labour used to finance the Canada Pension Plan (CPP).
    - A charge equal to 5.70 percent of workers' pensionable earnings paid equally by employees and employers.
- The statutory distinction between workers and employers is irrelevant.

Incidence of a Payroll Tax with an Inelastic Supply of Labour

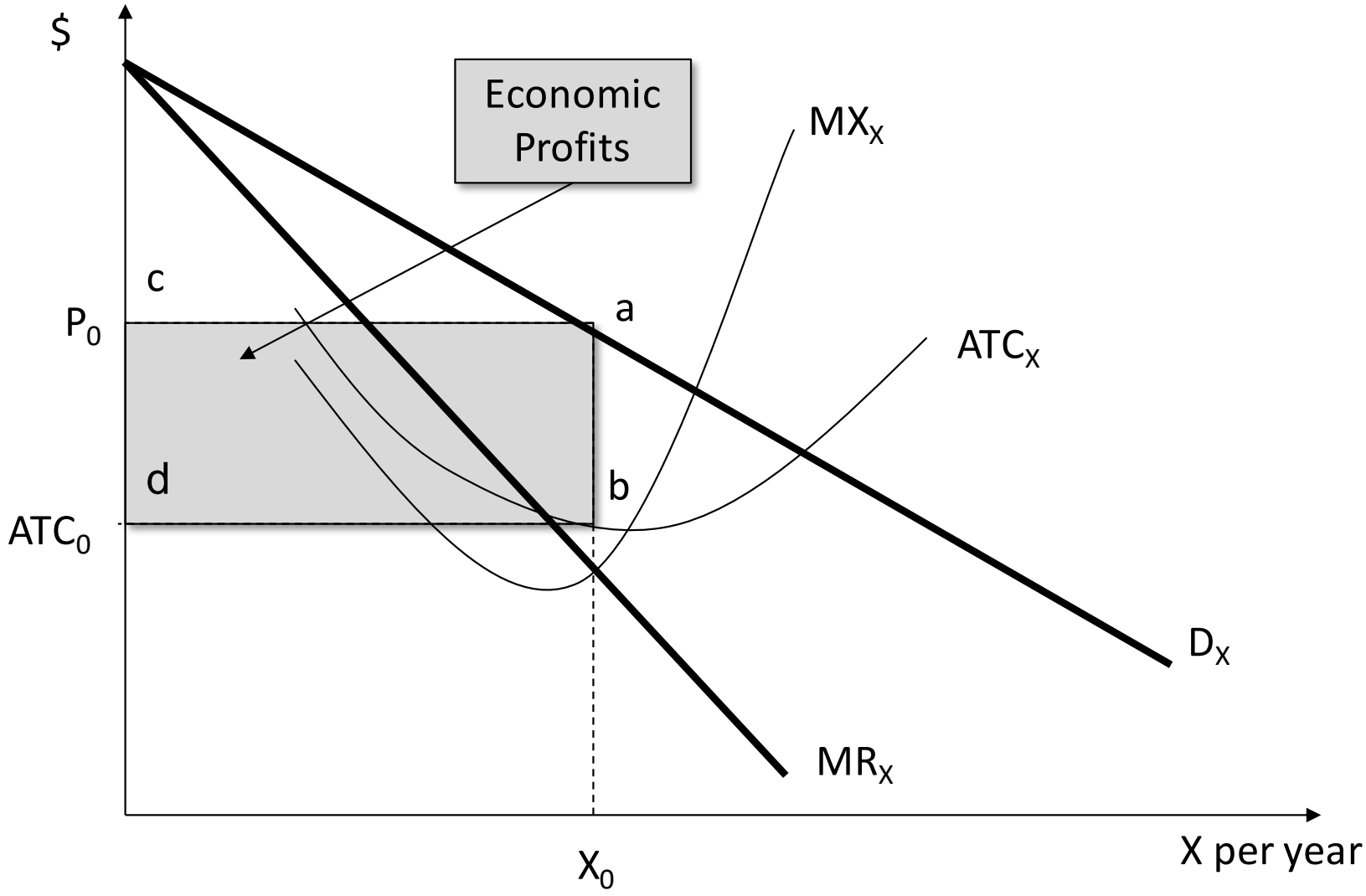


Commodity Taxation with Monopoly

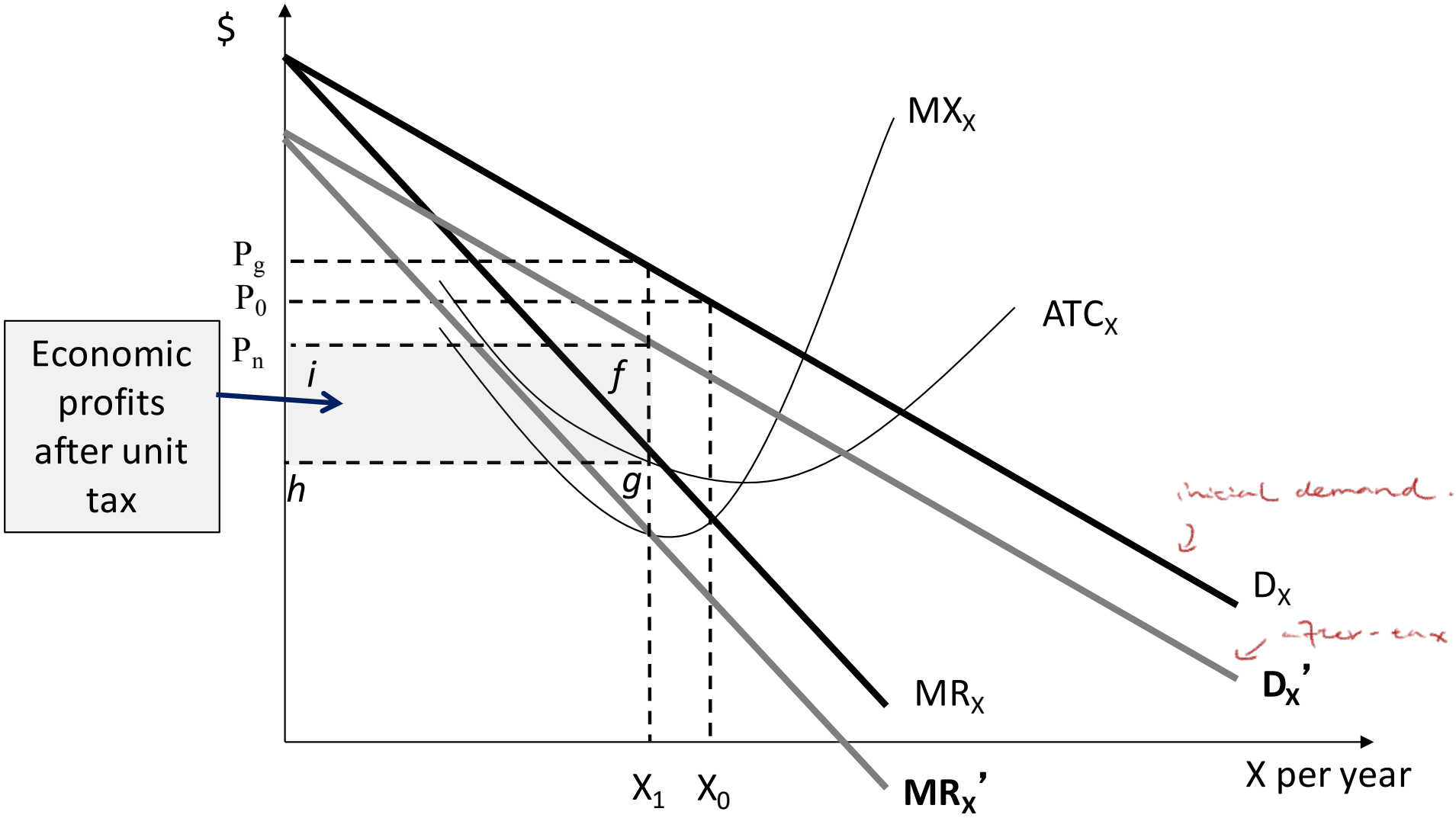
Despite market power, a monopolist is generally made worse off.

- Q_D does down
- Price paid by consumers goes up
- Price received by the monopolist goes down
- Profits go down

Equilibrium of a Monopolist



Imposition of a Unit Tax on a Monopolist



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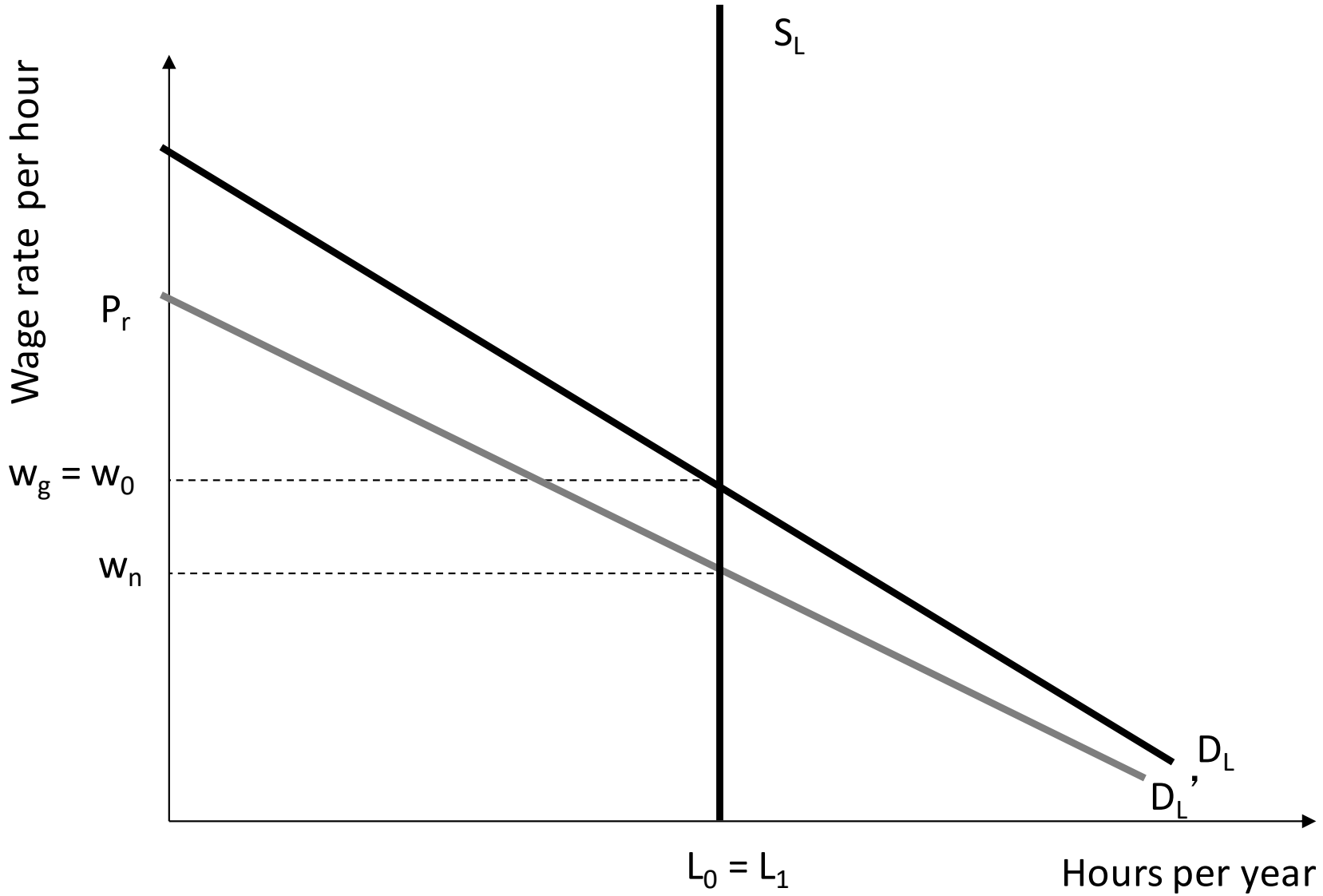


Taxes on Profits

Economic profit

- The return to owners of the firm in excess of the opportunity costs of the factors used in production.

Perfect competition

Monopoly

Measuring economic profit

Does not distort economic decisions:

- Thus, an attractive policy alternative but has little support from public finance specialists.

Tax Incidence and Capitalization (cont.)

Taxes on Land

- $PR = \$R_0 + \$R_1/(1 + r) + \$R_2/(1 + r)^2 + \ldots + \$R_T/(1 + r)^T$
- $PR' = \$(R_0 - u_0) + \$(R_1 - u_1)/(1 + r) + \$(R_2 - u_2)/(1 + r)^2 + \ldots + \$(R_T - u_T)/(1 + r)$
- $u_0 + u_1/(1 + r) + u_2/(1 + r)^2 + \ldots + uT/(1 + r)^T$

Capitalization

- A stream of tax liabilities becomes incorporated into the price of an asset.
- The person who bears the full burden of the tax forever is the landlord at the time the tax is levied.

General Equilibrium Models

- Show how various markets are interrelated.
- Consider a 2-commodity, 2-factor economy resulting in the following 9 possible ad valorem taxes:

t_{KF} = a tax on capital used in the production of food

t_{KM} = a tax on capital used in the production of manufactures

t_{LF} = a tax on labor used in the production of food

t_{LM} = a tax on labor used in the production of manufactures

t_F = a tax on the consumption of food

t_M = a tax on consumption of manufactures

t_K = a tax on capital in both sectors

t_L = a tax on labor in both sectors

t = a general income tax

Tax Equivalence Relations

- Partial factor tax: tax levied on an input in only some of its uses.
  - tKF, tLF, tKM, tLM
- Tax equivalence: any two sets of taxes that generate the same changes in relative prices.

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 equivalent to		are equivalent to		are equivalent to
t_K	and	t_L	are equivalent to	t

The Harberger Model

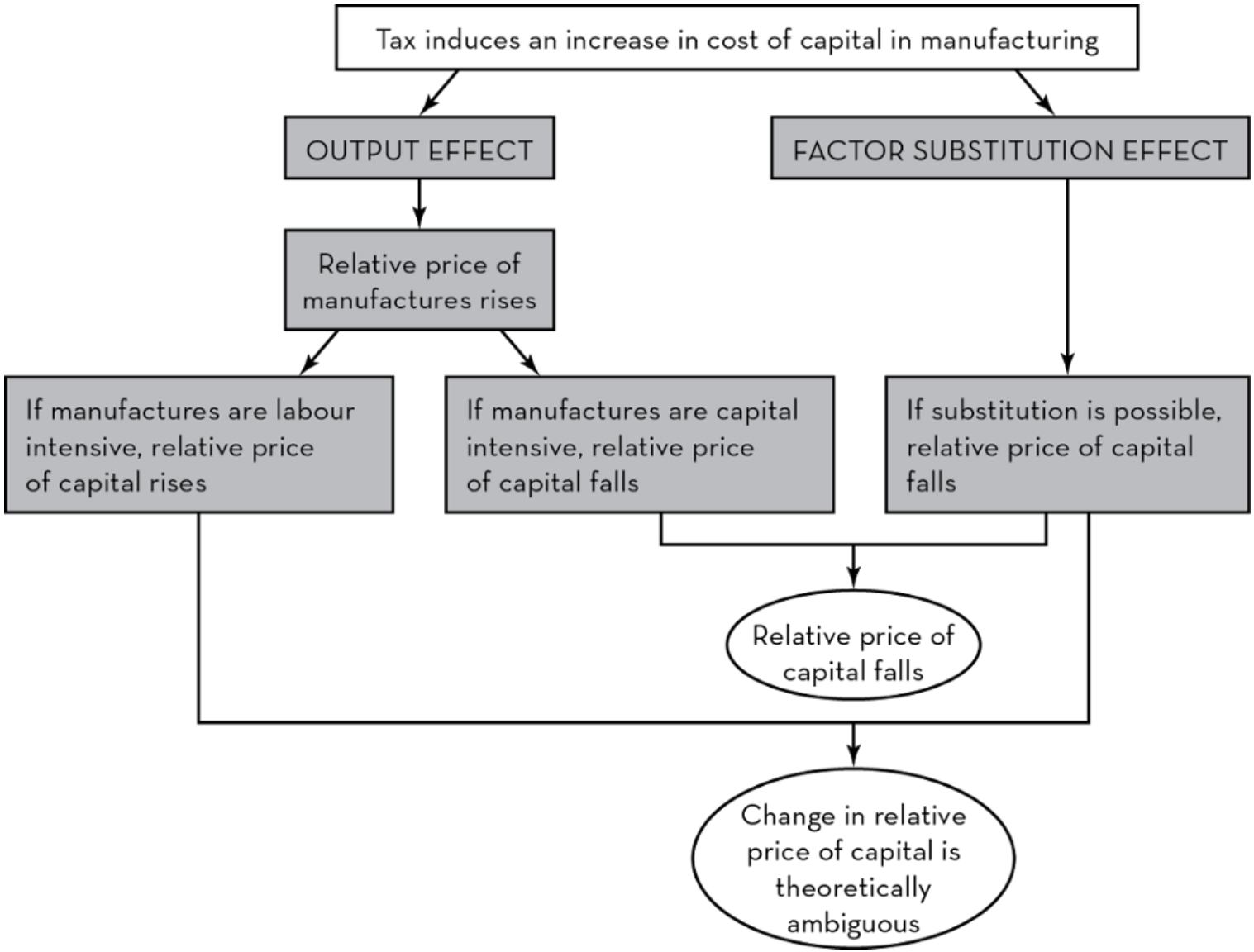
Assumptions:

- Technology
  - Elasticity of substitution
  - Capital intensive
  - Labour intensive
- Behaviour of factor suppliers
- Market structure
- Total factor supplies
- Consumer preferences
- Tax incidence framework

Analysis of Various Taxes

- Commodity tax (t_F)
- Income tax (t)
- General tax on labour (t_L)
- Partial factor tax (t_{KM})
  - Output effect
  - Factor substitution effect

Incidence of a Partial Factor Tax (t_{KM}) in a General Equilibrium Model



Questions For Discussion (1 of 4)

For commodity X, average cost is equal to marginal cost at every level of output. Assuming that the market for X is competitive, analyze the effects when a unit tax of u dollars is imposed. Now analyze the effects of the same tax assuming that the market for X is a monopoly. Discuss the differences.

Questions For Discussion (2 of 4)

Suppose that the demand for cigarettes in a hypothetical country is given by $Q_C^D = 2{,}000 - 200P_C$, where Q^P is the number of packs demanded and P_c is the price per pack. The supply of cigarettes is $Q_C^D = P_C \times 200$.

a. Find the price and quantity of cigarettes, assuming the market is competitive.

b. In an effort to reduce smoking, the government levies a tax of $2 per pack. Compute the quantity of cigarettes after the tax, the price paid by consumers, and the price received by producers. How much revenue does the tax raise for the government? How much revenue comes from consumers, and how much from producers?

Questions For Discussion (3 of 4)

Suppose that the demand curve for a particular commodity is $Q^D = a - bP$, where Q^D is the quantity demanded, P is the price, and a and b are constants. The supply curve for the commodity is $Q^S = c + dP$, where Q^S is the quantity supplied and c and d are constants. Find the equilibrium price and output as functions of the constants a, b, c, and d.

Suppose that a unit tax of u dollars is imposed on the commodity. Show that the new equilibrium quantity, producer price, and consumer price are the same regardless of whether the tax is imposed on producers or buyers of the good.

Now express the incidence on producers and on buyers as proportions of the tax revenue and comment on how the incidence depends on the slopes of the demand curve ($-b$) and the supply curve (d).

Questions For Discussion (4 of 4)

Suppose that the income tax in a certain nation is computed as a flat rate of 5 percent, but no tax is levied above $50,000 in taxable income. Taxable income, in turn, is computed as the individual's income minus $10,000; that is, everyone gets a $10,000 deduction. What are the marginal and average tax rates for each of the following workers? (Evaluate the marginal tax rate at each person's current income level.)

a. A part-time worker with annual income of $9,000.

b. A retail salesperson with annual income of $45,000.

c. An advertising executive with annual income of $600,000.

d. Is the tax progressive, proportional, or regressive with respect to income?