A low-angle, upward-looking photograph of several large, light-colored stone columns of a classical building. The columns are fluted and have ornate capitals. The sky is a clear, pale blue. The text is overlaid on the right side of the image.

# **TAXATION AND EFFICIENCY**

## **Chapter 15**

Presentation prepared by Seuren 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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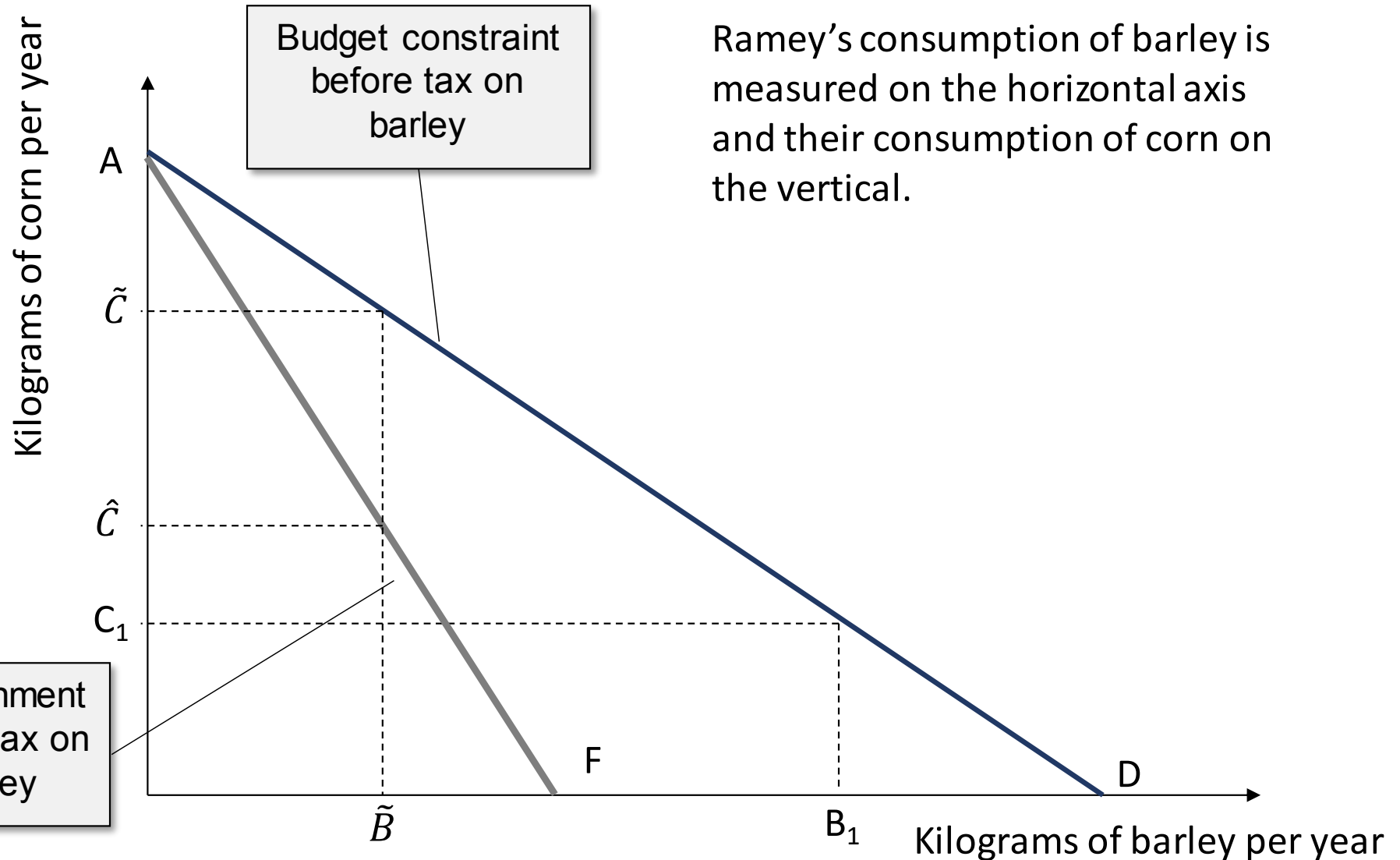
# Learning Objectives

1. Define the equivalent variation of a tax and depict it graphically.
2. Define the excess burden of a tax and illustrate it with indifference curves and budget constraints.
3. Use results from welfare economics to explain why an income tax entails an excess burden.
4. Explain why a lump-sum tax is efficient but not widely used.
5. Identify the excess burden of a tax and a subsidy on a graph with demand and supply curves.
6. Illustrate the excess burden resulting from the differential taxation of inputs.

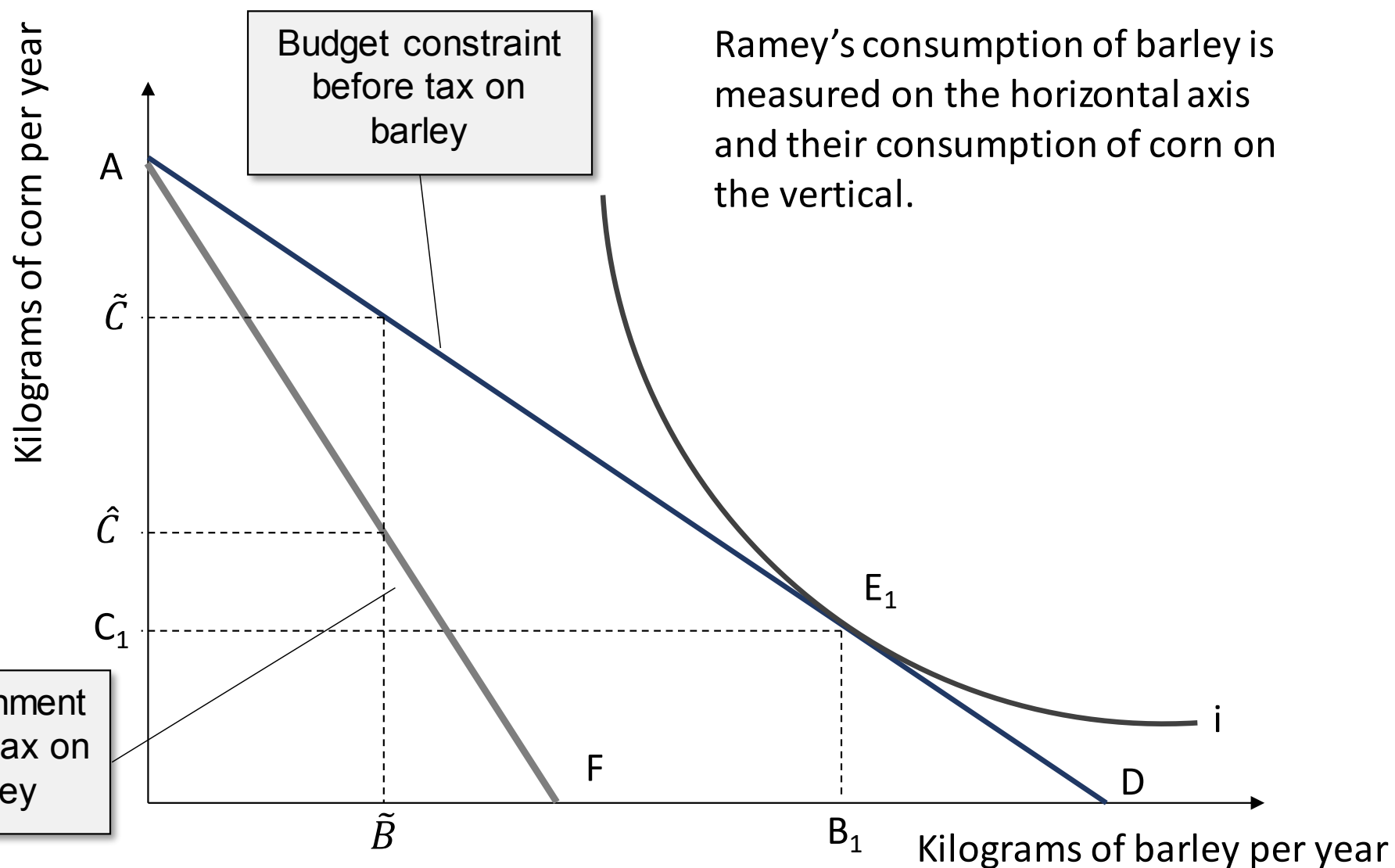
# Taxes Can Cause People To Change Their Purchasing Patterns

- Consider someone who normally buys 10 ice cream cones per week at \$1 per cone
- Then, suppose the government imposes a 25% tax on ice cream cones, bringing the price to \$1.25
- At this price, the person now buys no ice cream at all (they spend their money on other things), and zero tax revenue is collected from them
- This person is not paying any tax
  - However, they must be worse off because they are now buying other things when they would rather be buying ice cream (which they bought before the tax was in place)
- This is the excess burden of the tax

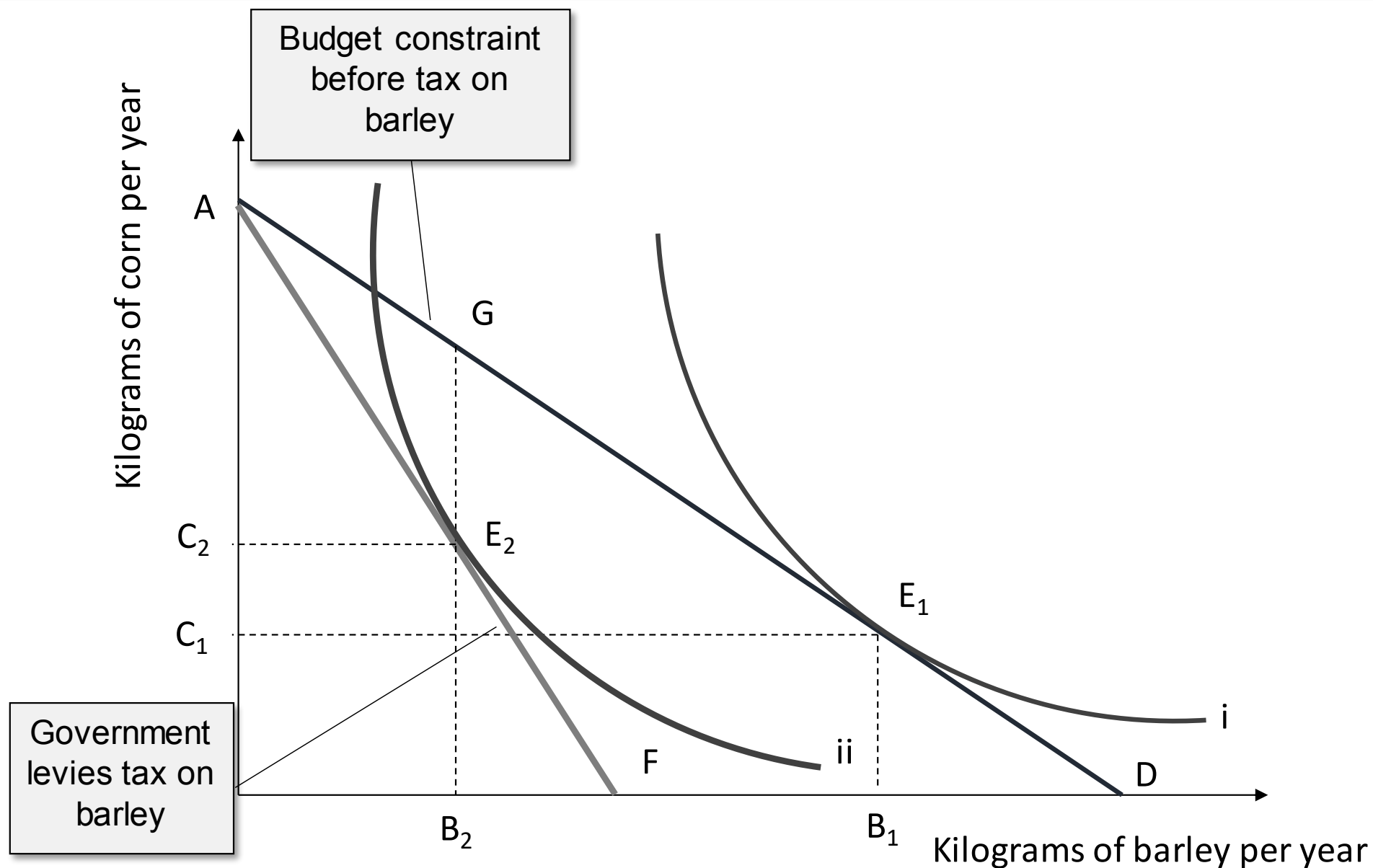
# Effect of a Tax on the Budget Constraint



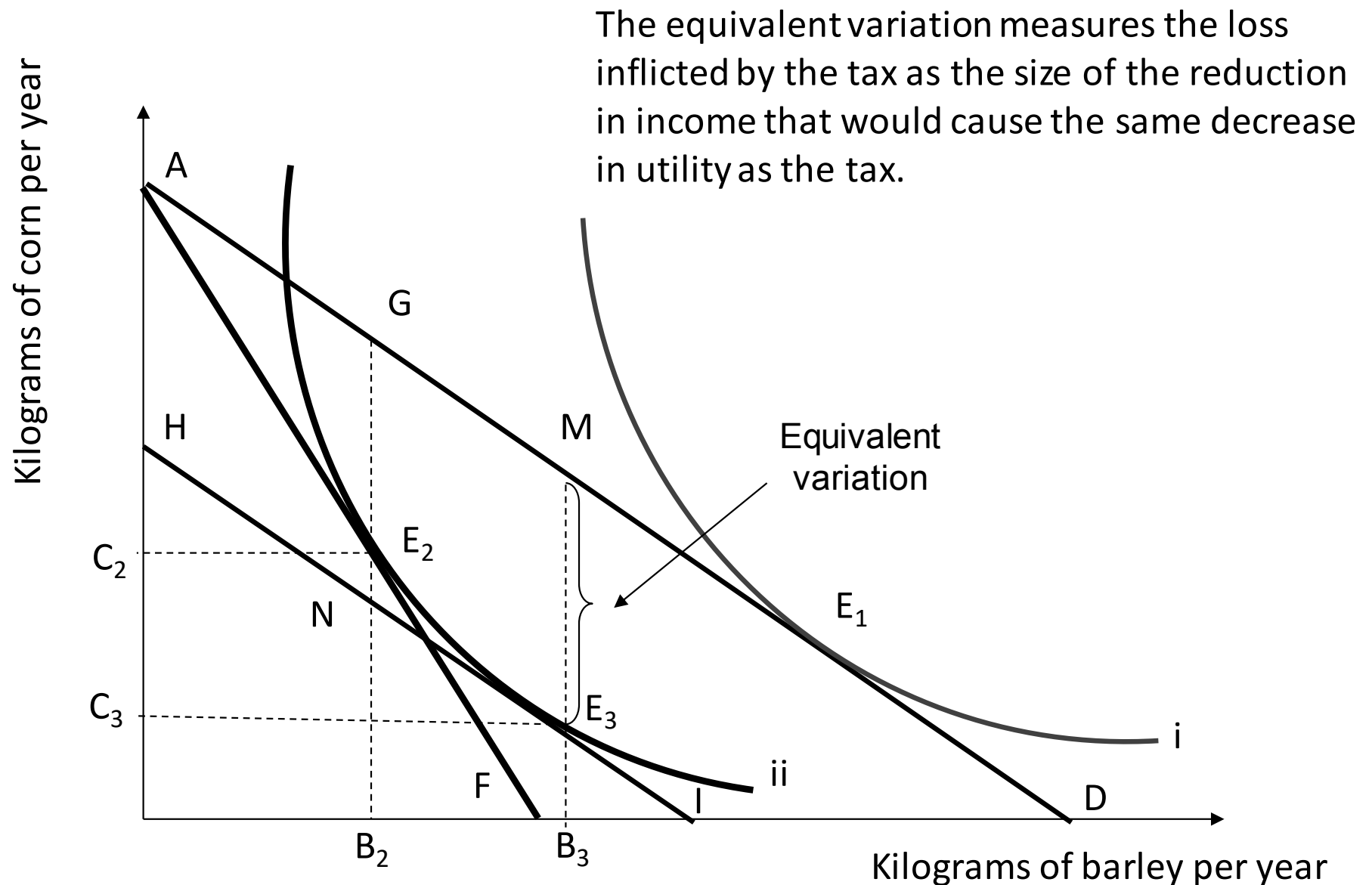
## Effect of a Tax on the Budget Constraint (cont.)



# Effect of Tax on Consumption Bundle



# Excess Burden of the Barley Tax



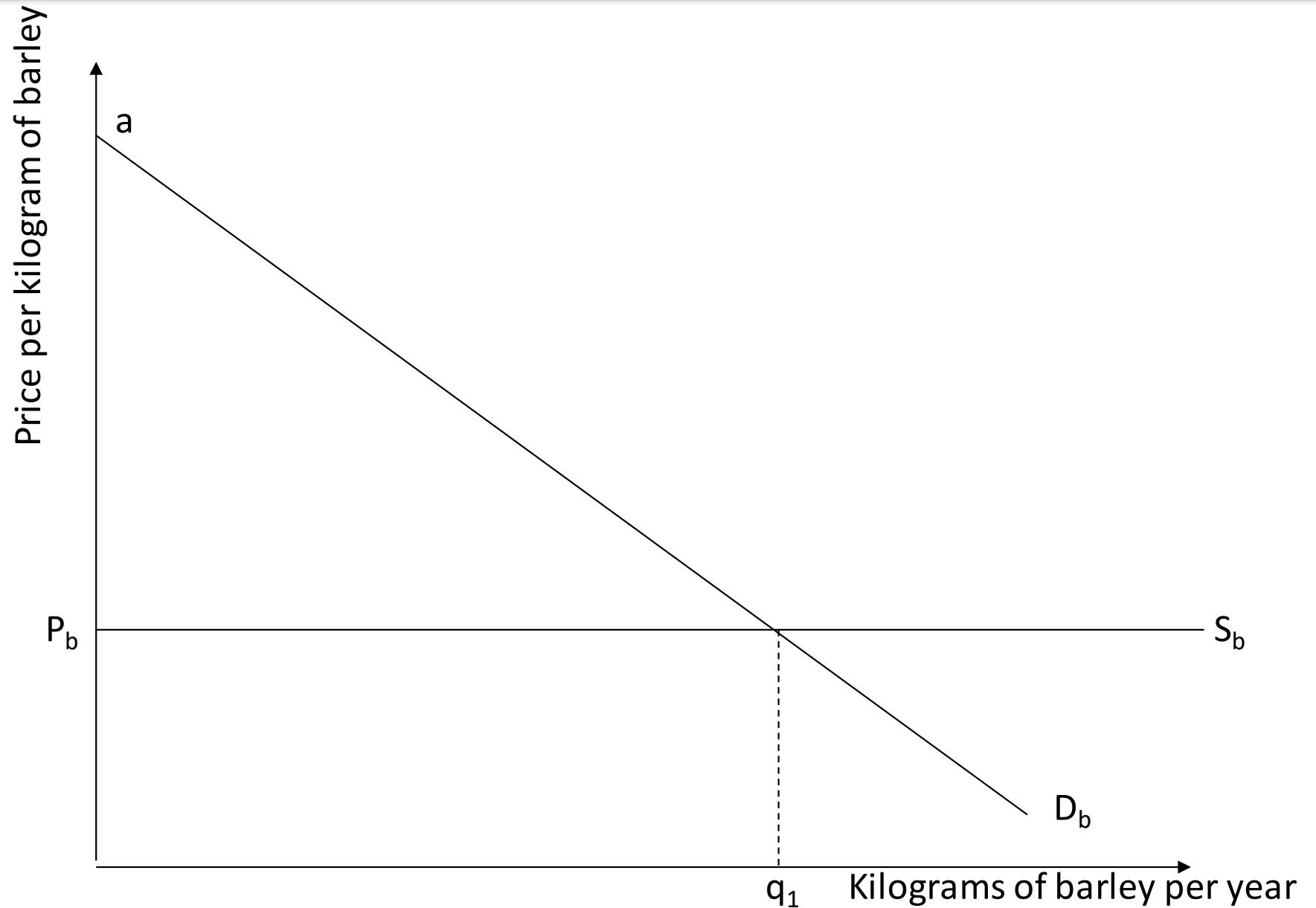
# Excess Burden: Questions and Answers

## Efficiency

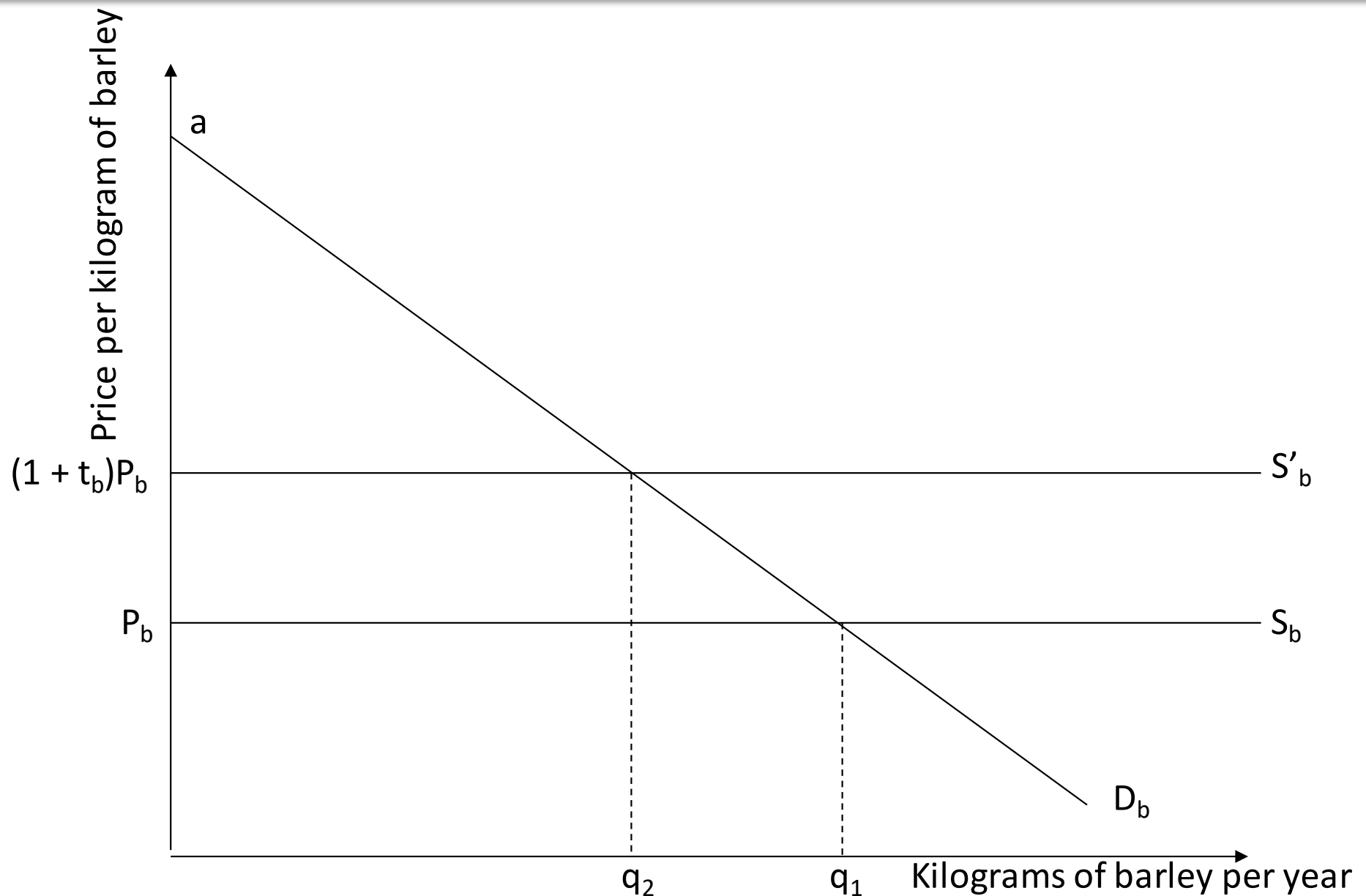
- If lump sum taxes are so efficient, why are they not widely used?



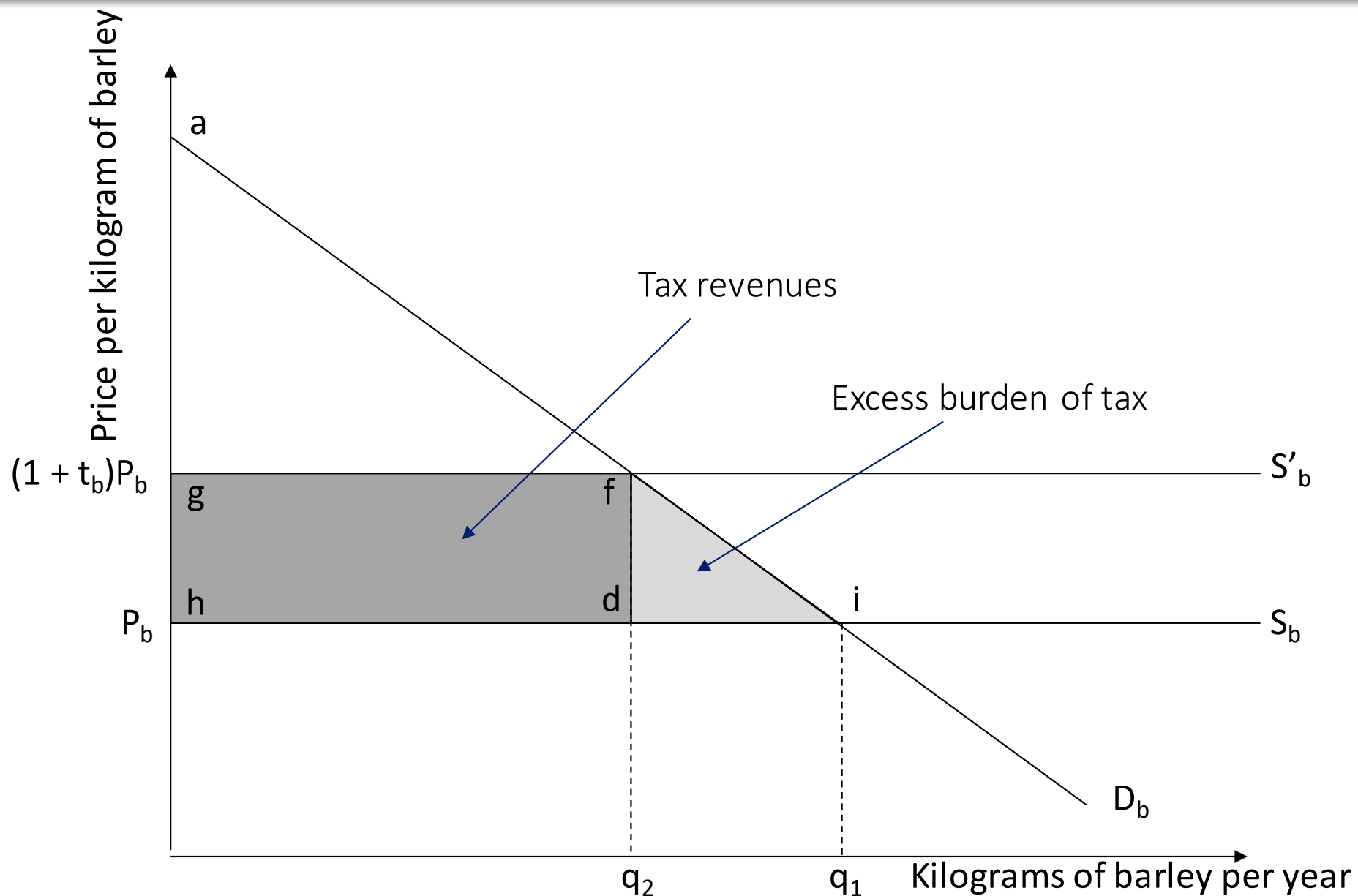
# Excess Burden of a Commodity Tax



## Excess Burden of a Commodity Tax (cont.)



# Excess Burden of a Commodity Tax (cont.)

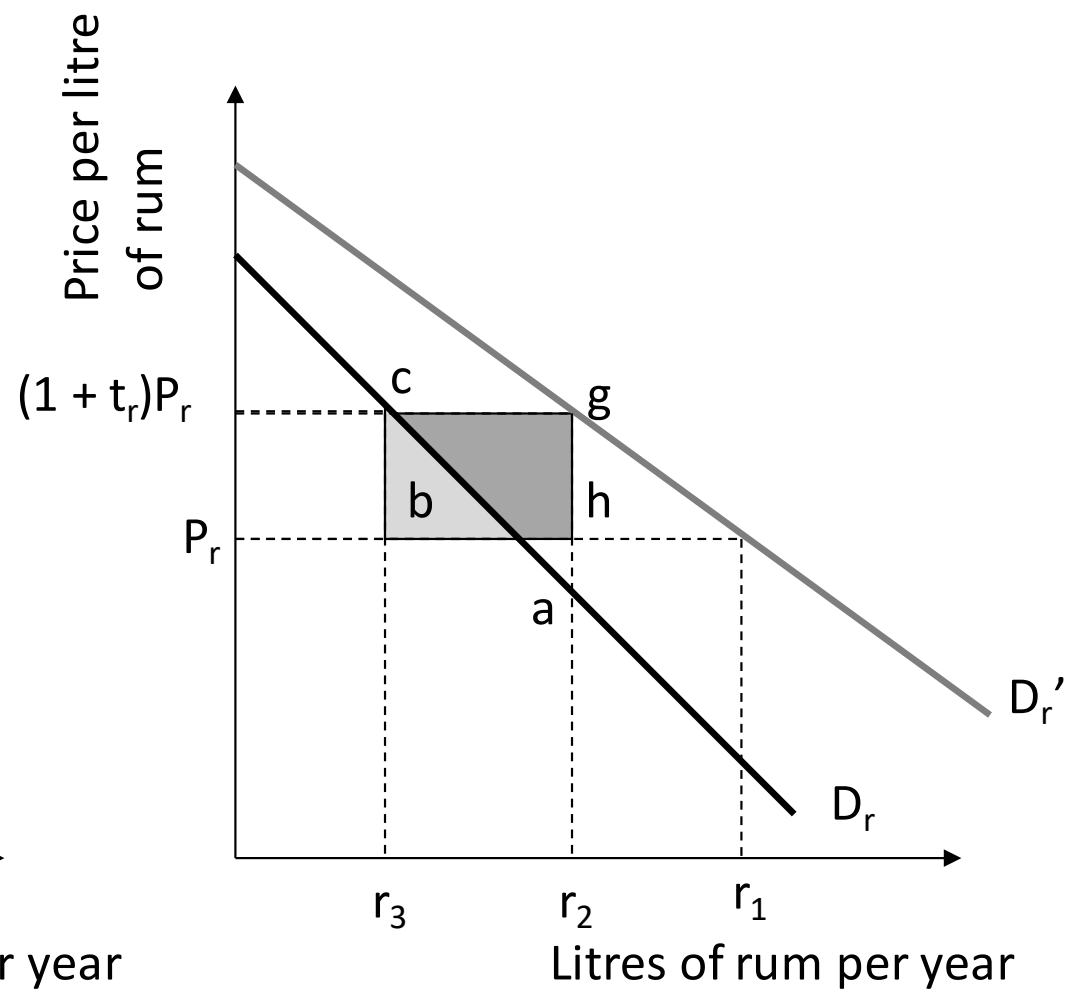
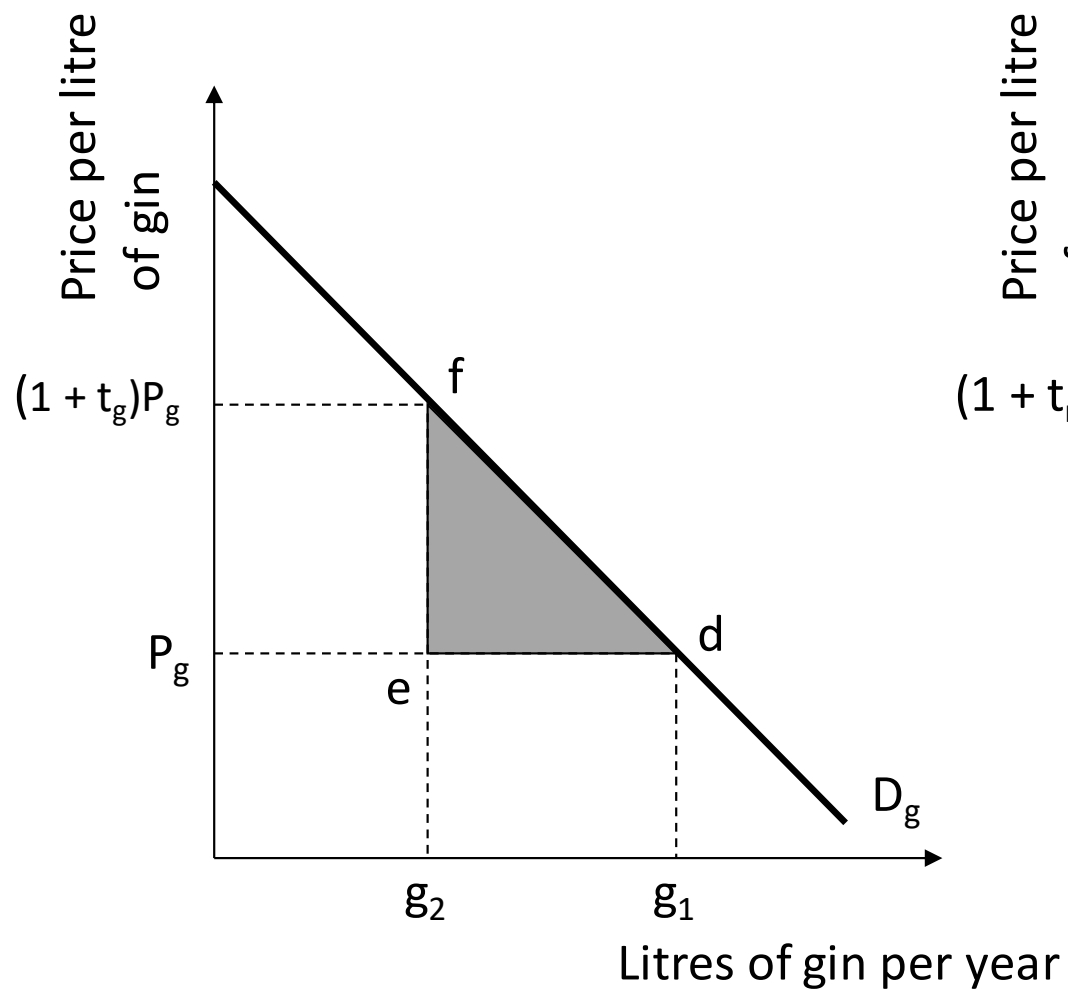


# Preexisting Distortions

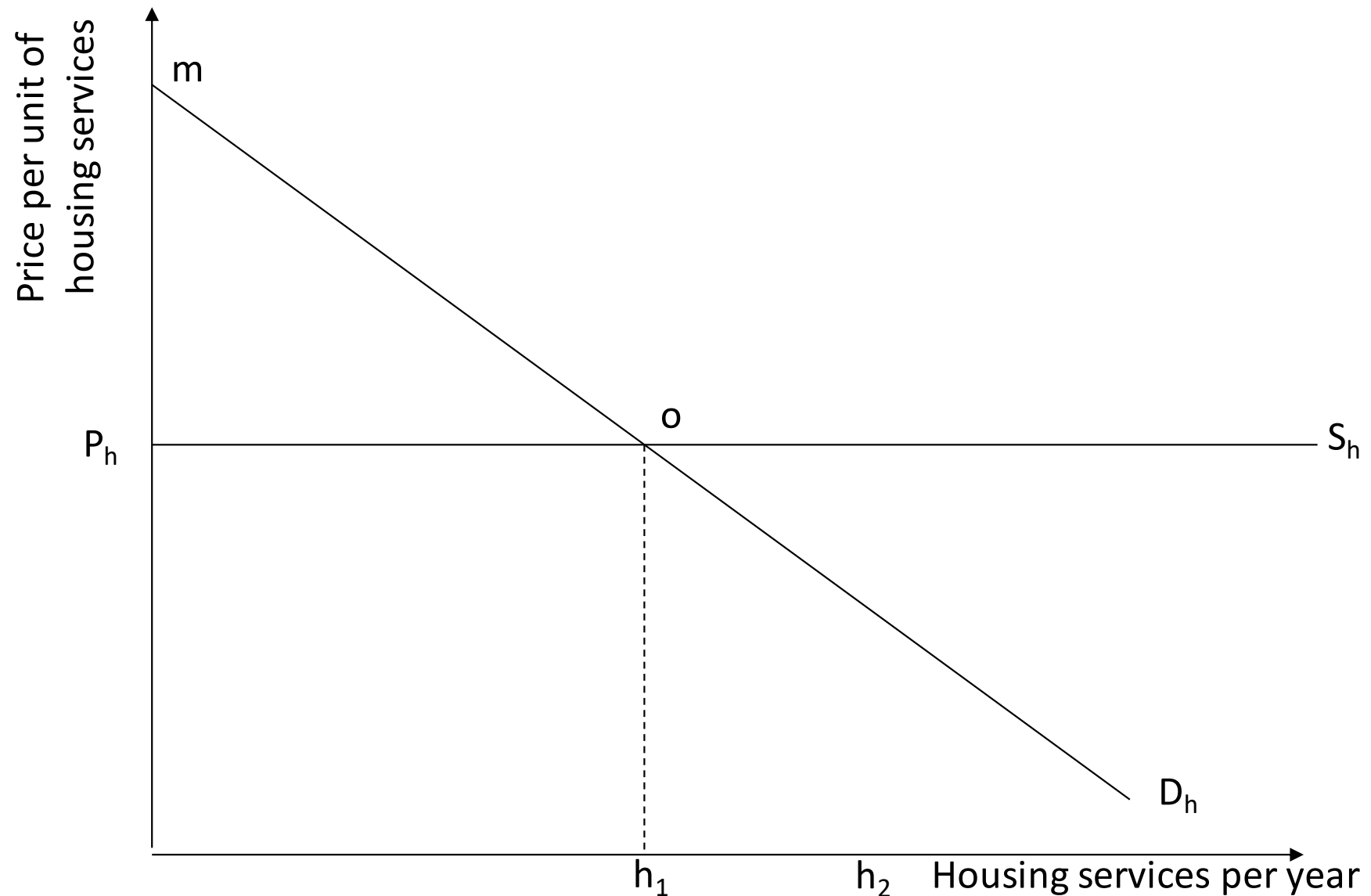
The analysis has assumed no <sup>existing</sup> distortions in the economy other than the tax under consideration. However, when a new tax is introduced, there are typically other distortions. This complicates the analysis of excess burden.

- Therefore, the efficiency impact of a given tax or subsidy cannot be considered in isolation.
- To the extent that there are other markets with distortions, and the goods in these markets are related (either substitutes or complements), then the overall efficiency impact depends on what is going on in all the markets.

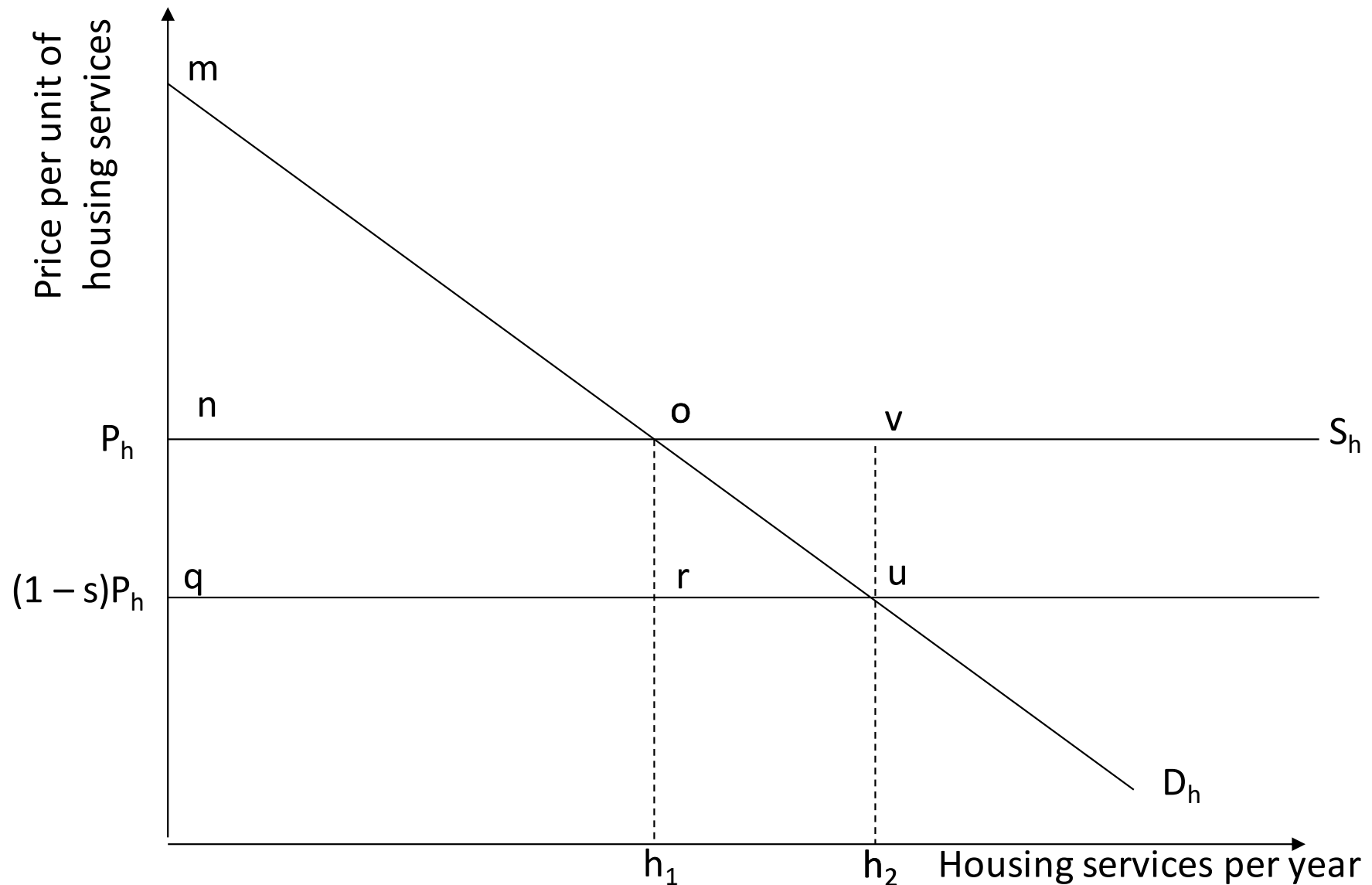
# A Pre-Existing Distortion



# Excess Burden of a Housing Subsidy

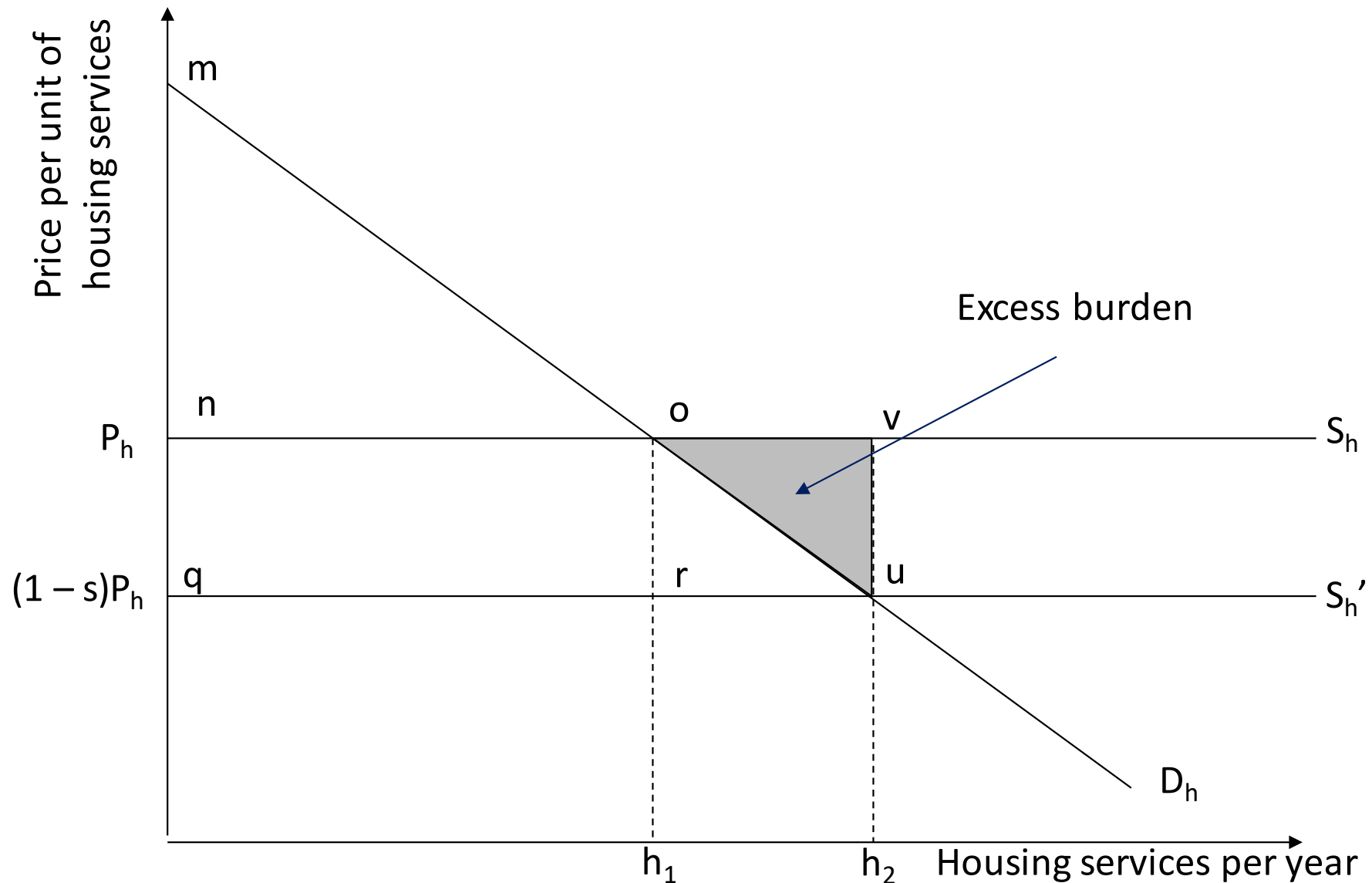


## Excess Burden of a Housing Subsidy (cont.)



# Excess Burden of a Housing Subsidy (cont.)

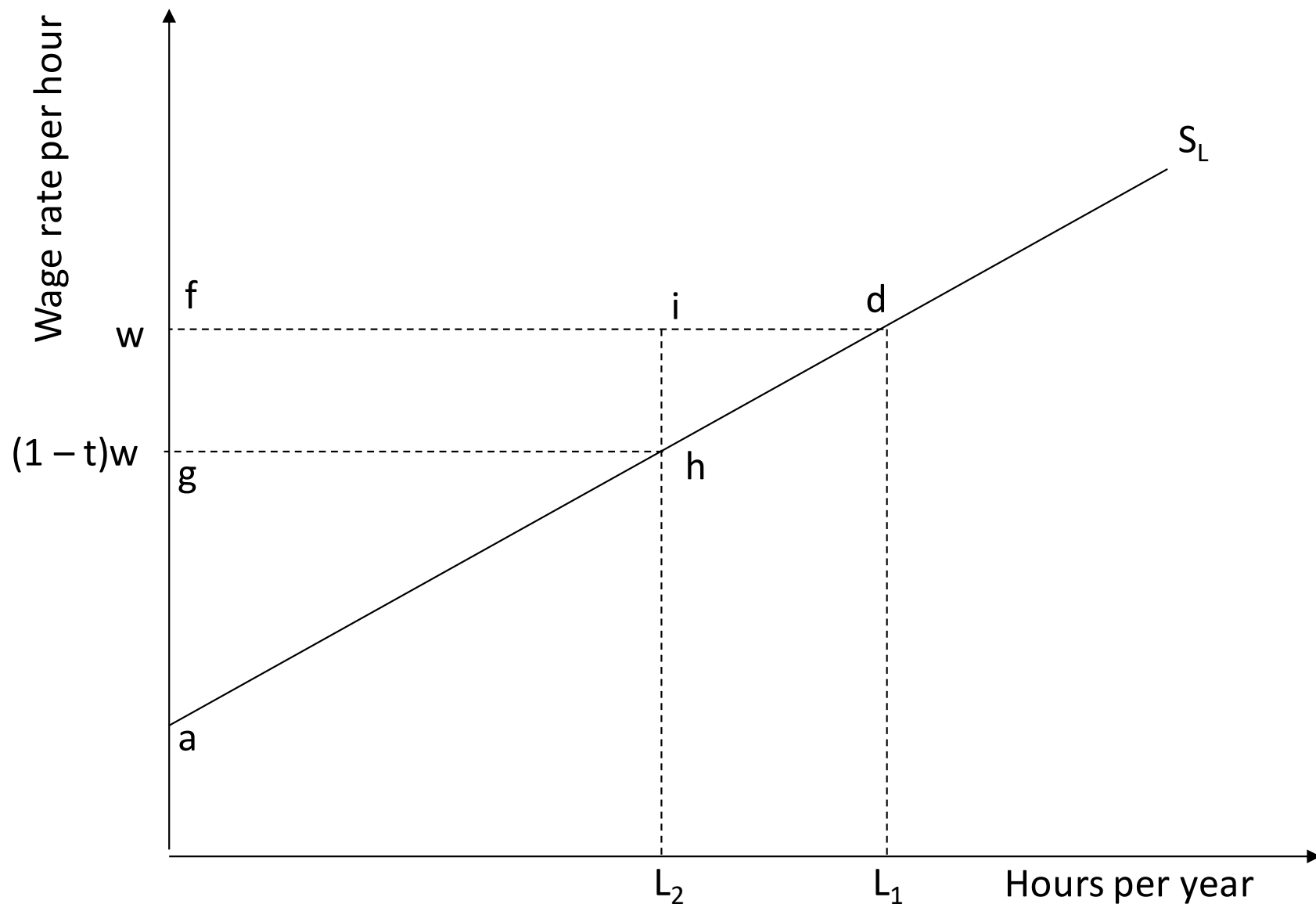
(demand side).



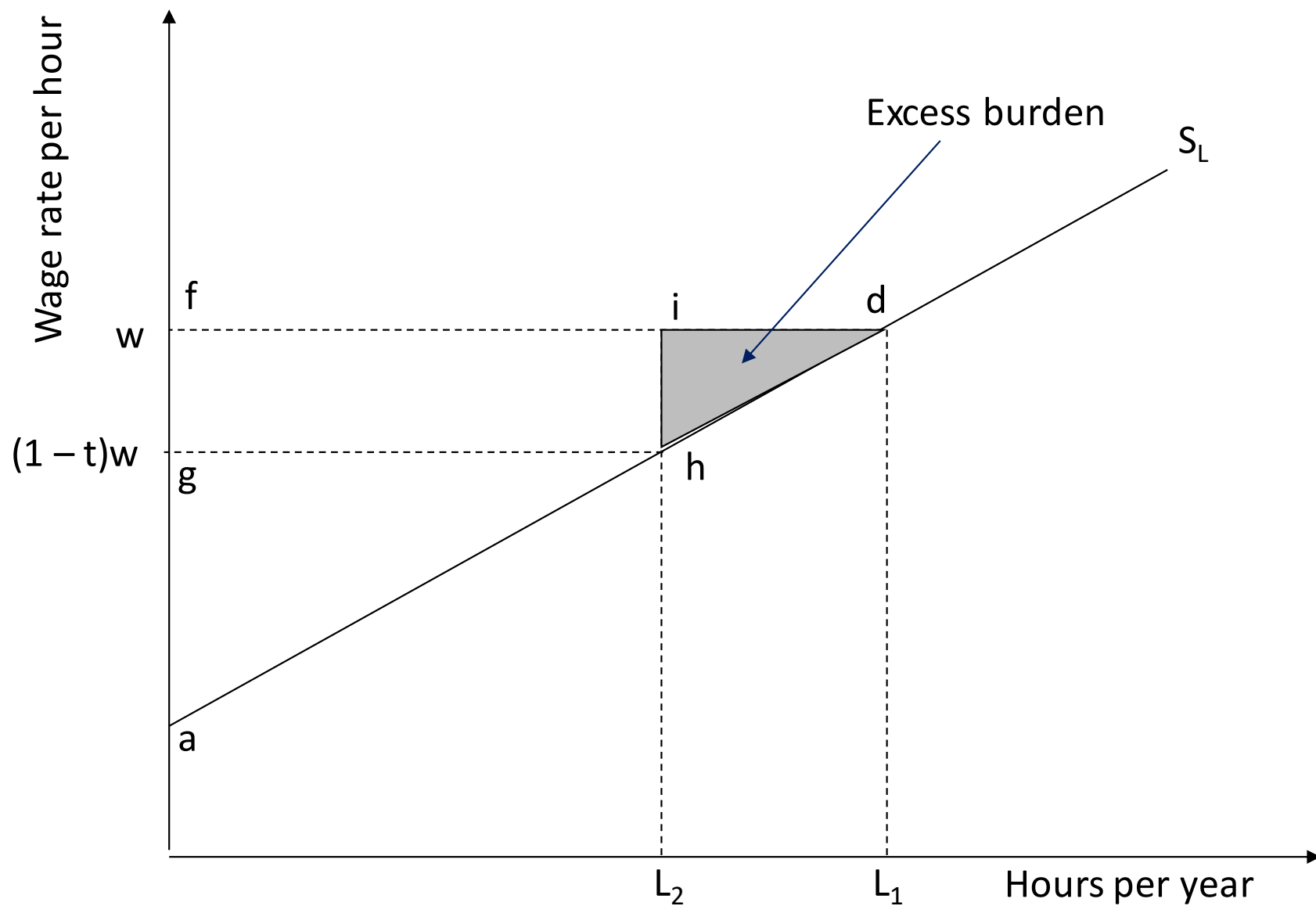


# Excess Burden of a Tax on Labour

(supply side)

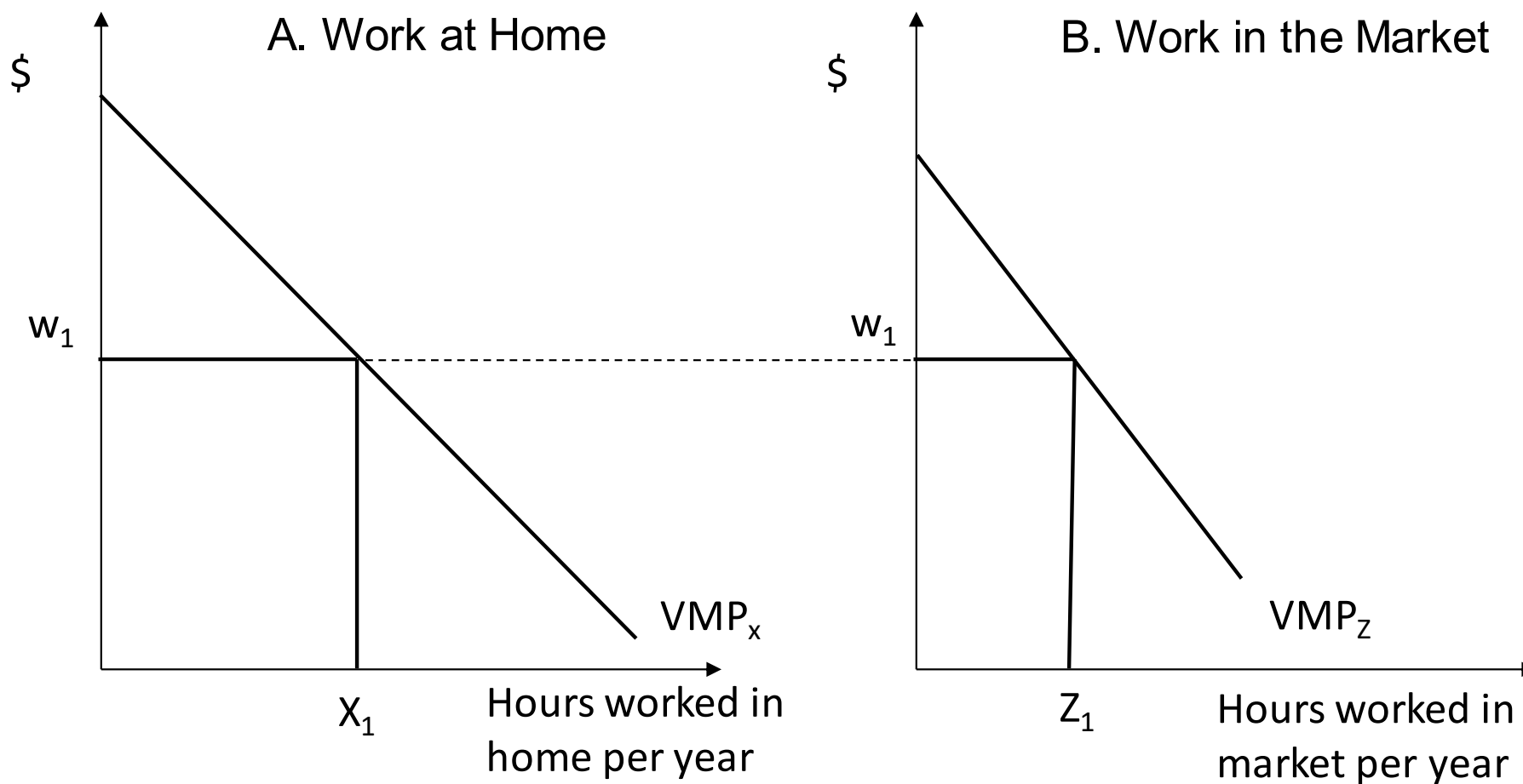


## Excess Burden of a Tax on Labour (cont.)

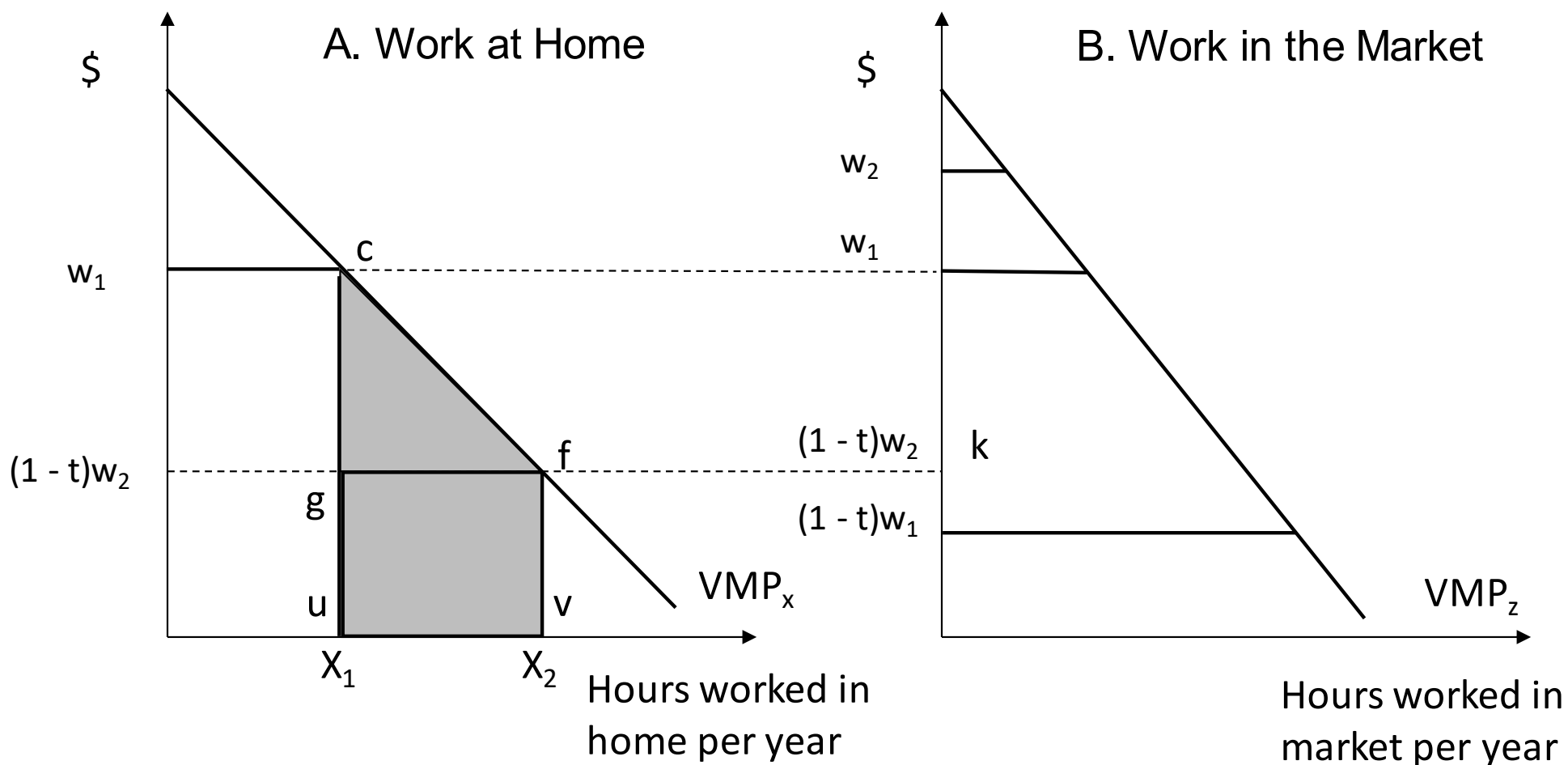


# Differential Taxation of Inputs: The Allocation of Time Between Housework and Market Work (cont.)

- Value of the Marginal Product (VMP)

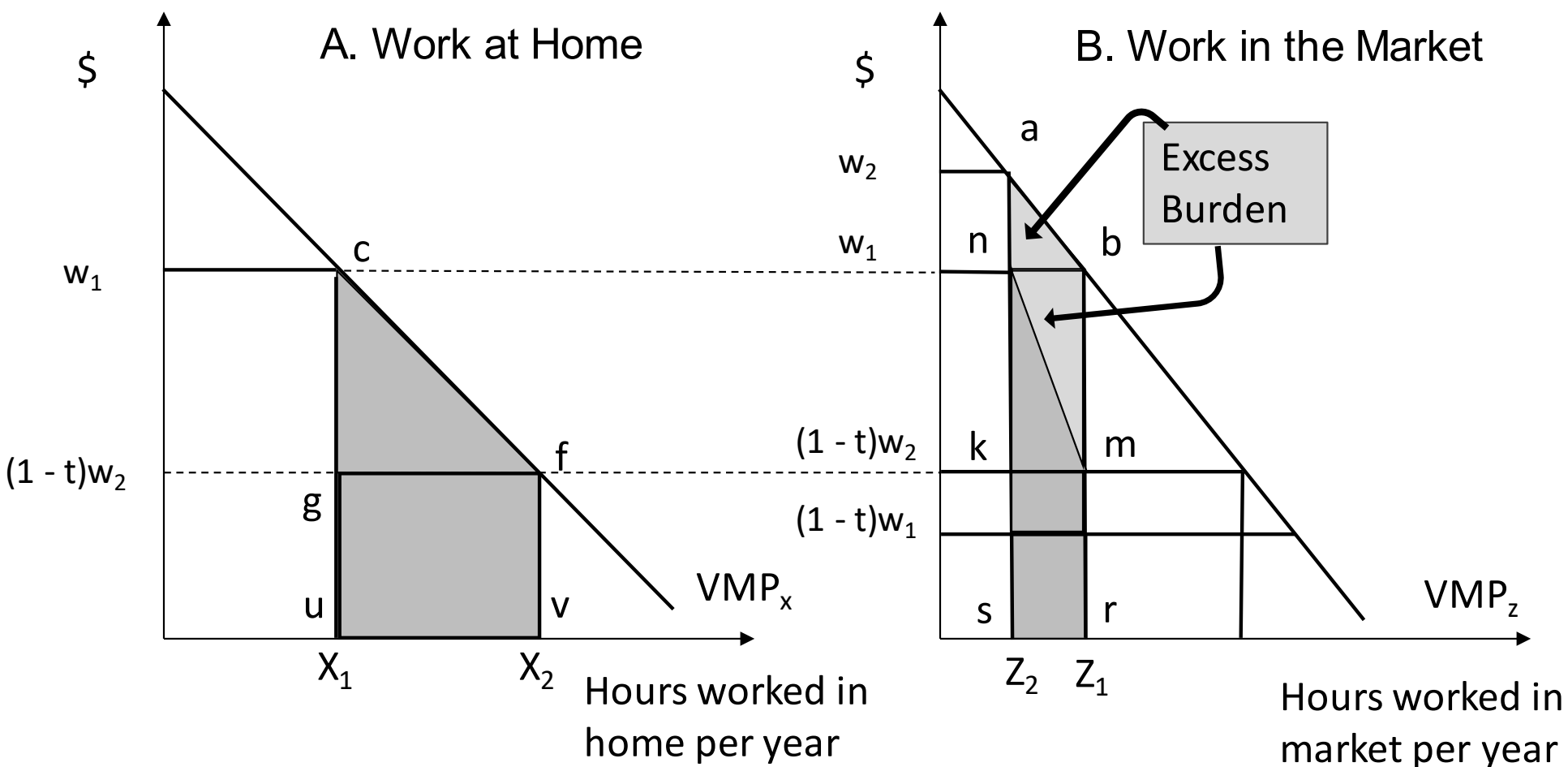


# Differential Taxation of Inputs: Differential Factor Taxation (cont.)



# Differential Taxation of Inputs: Differential Factor Taxation (cont.)

$$\text{Excess burden} = \frac{1}{2} (\Delta Z) t w_2$$



# Chapter 15 Summary

- Taxes and subsidies generally impose excess burdens – a cost beyond the tax revenue collected.
- Excess burden is caused by tax-induced distortions in behaviour. It may be examined using either indifference curves or compensated demand curves.
- Lump-sum taxes do not cause distortions but are unattractive as a policy tool.

## Chapter 15 Summary (cont.)

- Excess burden calculations typically assume no other distortions; if distortions exist, the incremental excess burden of a new tax depends on its effect in other markets.
- Subsidies also create excess burdens because they encourage people to consume goods valued less than the marginal social cost of production.
- The differential taxation of inputs creates an excess burden. Such inputs are used “too little” in taxed activities and “too much” in untaxed activities.

## Questions For Discussion (1 of 2)

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


- 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 (2 of 2)

Under the Canadian tax system, capital that is employed in the corporate sector is taxed at a higher rate than capital in the noncorporate sector. This problem will analyze the excess burden of the differential taxation of capital.

Assume that there are two sectors, corporate and noncorporate. The value of marginal product of capital in the corporate sector is given by  $VMP_c = 100 - K_c$ , where  $K_c$  is the amount of capital in the corporate sector; the value of marginal product of capital in the noncorporate sector is given by  $VMP_n = 80 - 2K_n$ , where  $K_n$  is the amount of capital in the noncorporate sector. In total, there are 50 units of capital in society.

- a. In the absence of any taxes, how much capital is used in each sector? (*Hint: Draw a diagram along the lines of  Figure 15.9 to organize your thoughts.*)
- b. Suppose that a unit tax of 6 is levied on capital employed in the corporate sector. After the tax, how much capital is employed in each sector? What is the excess burden of the tax?