Taxation and Efficiency

EC313 - Public Economics: Taxation

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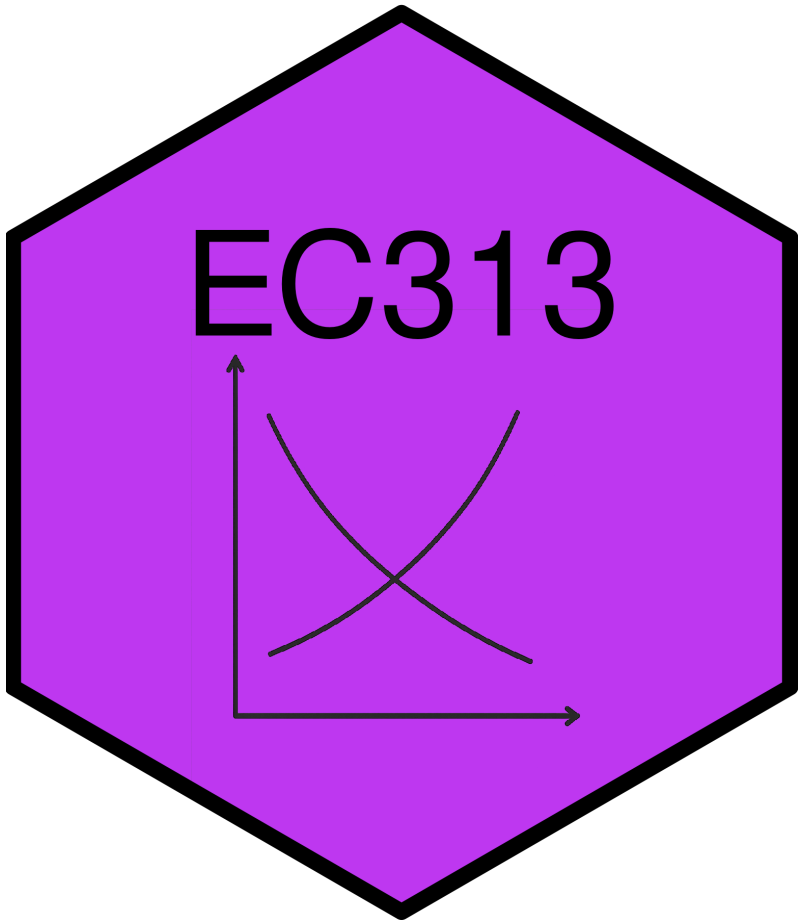

Goals of This Section

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- Outline different types of taxes
- Discuss different 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

Excess Burden of a Tax with Indifference Curves

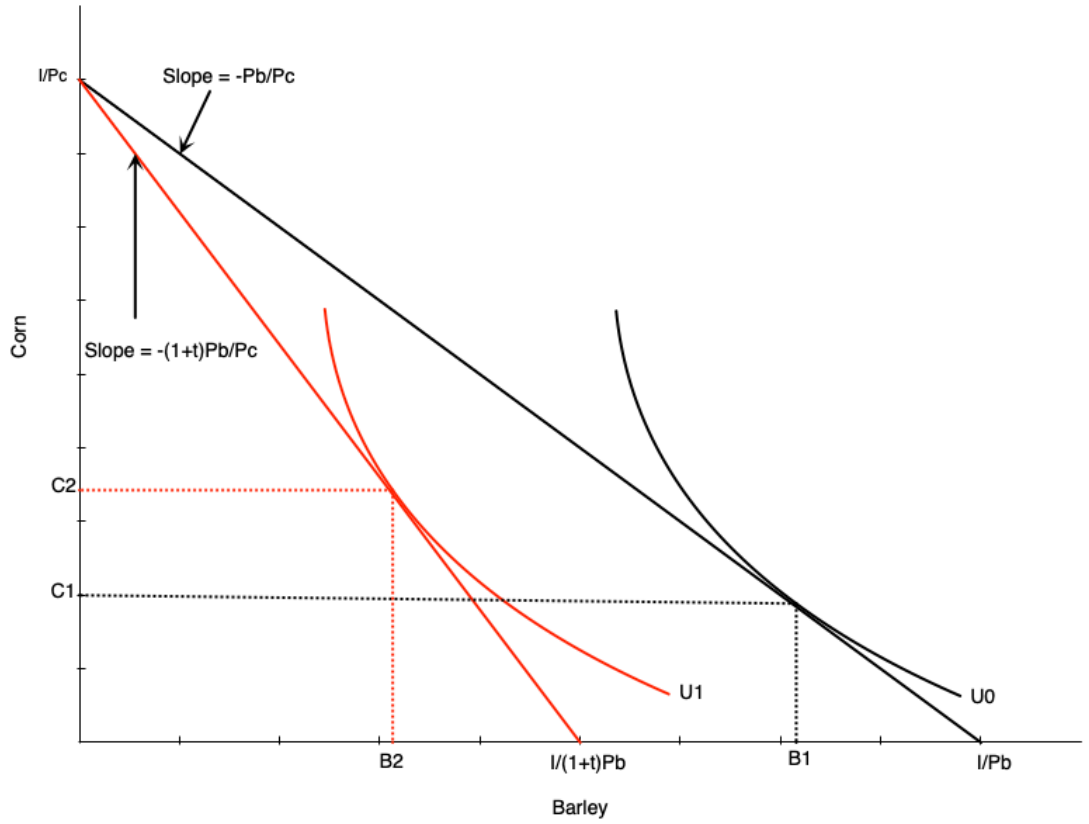
Introduction

- Governments levy taxes mainly to raise revenue to fund public goods and services
- Taxes can impose different types of costs on consumers
  - The direct cost of sending money to the government
  - Taxes can distort behaviour because of changes in prices
    - Without taxes consumers make choices about consumption
    - Taxes force them to substitute away from the taxed good and make sub-optimal choices
- Ideally a tax imposes the least possible cost in order to raise revenue
  - When the costs are larger, we say there is an excess burden

Ad Valorem Tax on Consumers

- Below we will see what happens when an ad valorem tax is imposed on one good
  - An ad valorem tax is a percentage tax on the price of a good
  - For example, a 10% sales tax on a $1 item means the consumer pays $1.10
- We will use indifference curves and budget constraints to analyze the effects of the tax
- We will then compare to a lump-sum tax
- Lesson is that ad valorem taxes that distort behaviour create excess burden
- Lump-sum taxes that do not distort behaviour do not create excess burden
- Difference due to the distortionary effect of changing relative prices with ad valorem taxes

Ad Valorem Tax on Consumers

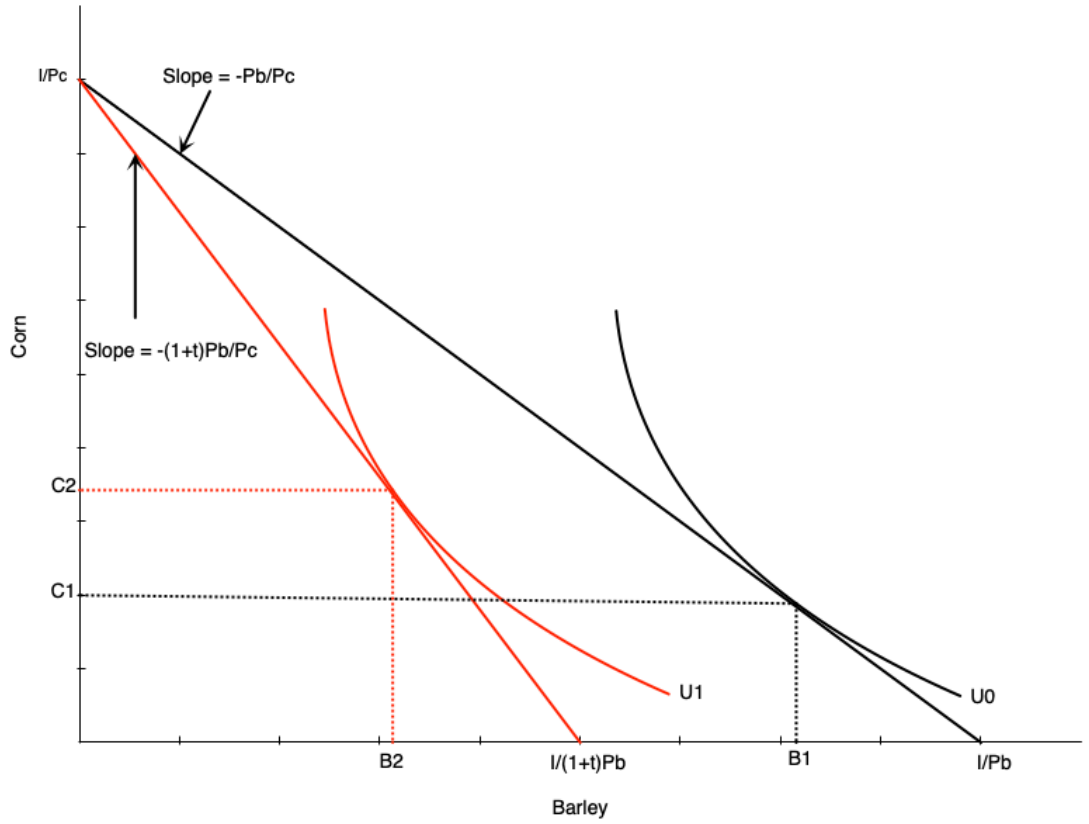


- Graph shows consumption decision for barley and corn
- Initially prices are P_B and P_C
- Budget constraint is $I = P_B B + P_C C$
- To plot budget constraint, put C on left side

$$C = \frac{I}{P_C} - \frac{P_B}{P_C} B$$

- Slope of budget constraint is $-\frac{P_B}{P_C}$
- Intercepts are $\frac{I}{P_C}$ and $\frac{I}{P_B}$
- Optimal consumption bundle is B_1 and C_1

Ad Valorem Tax on Consumers

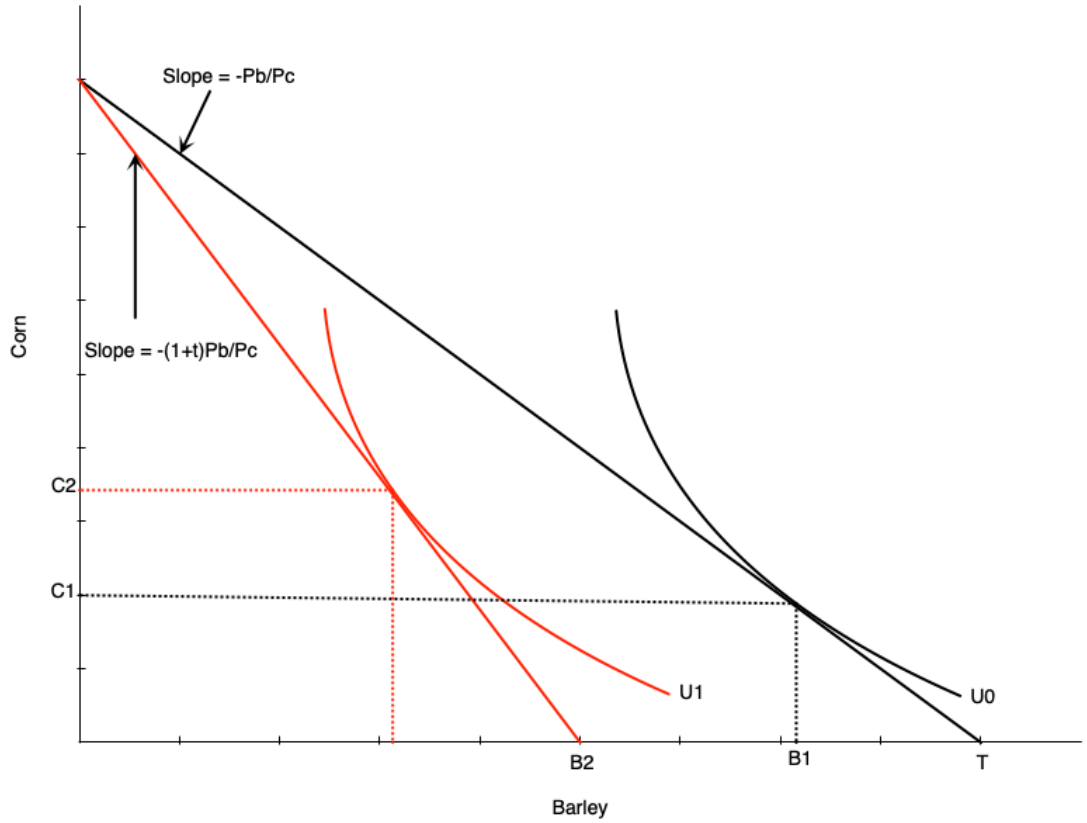


- An ad valorem tax of t on barley is imposed
- Price of barley rises to $P_B(1+t)$
- New budget constraint is $I = P_B(1+t)B + P_C C$
- Rearranging gives

$$C = \frac{I}{P_C} - \frac{P_B(1+t)}{P_C}B$$

- Slope of new budget constraint is $-\frac{P_B(1+t)}{P_C}$
- Intercepts are $\frac{I}{P_C}$ and $\frac{I}{P_B(1+t)}$
- New optimal bundle is B_2 and C_2

Ad Valorem Tax on Consumers



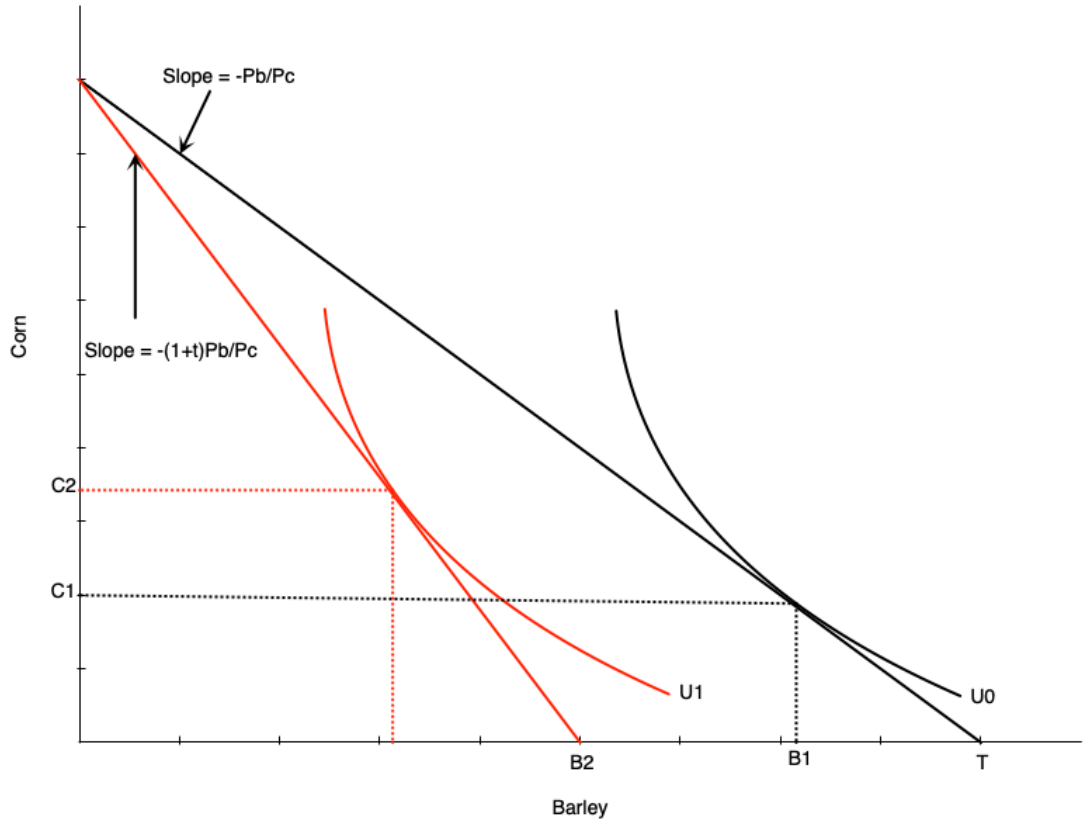
- Vertical distance between budget lines is tax collected
- On the old budget line if consumer buys B_2 barley, corn consumption is

$$C' = \frac{I}{P_C} - \frac{P_B}{P_C} B_2$$

- On the new budget line if consumer buys B_2 barley, corn consumption is

$$C_2 = \frac{I}{P_C} - \frac{P_B(1+t)}{P_C} B_2$$

Ad Valorem Tax on Consumers



- Difference is

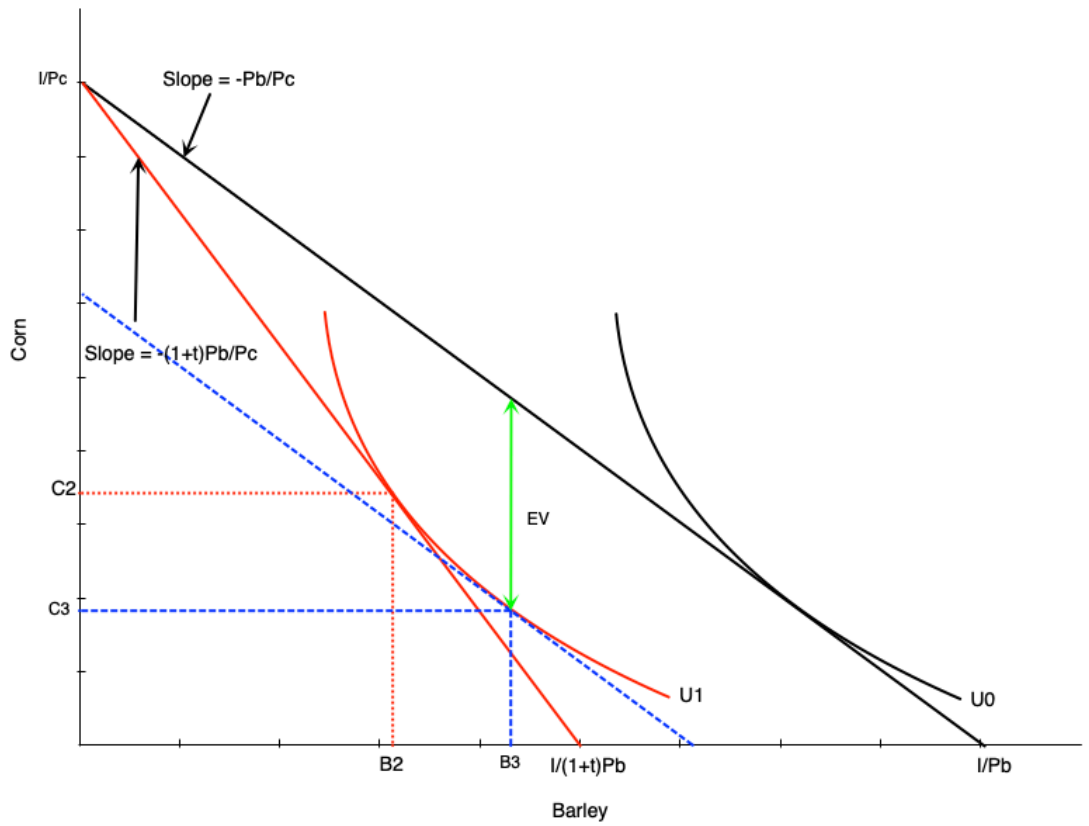
$$C' - C_2 = \frac{P_B t}{P_C} B_2$$

- Measures reduction in corn consumption due to tax
- To measure in dollar terms

$$P_C(C' - C_2) = tP_B B_2$$

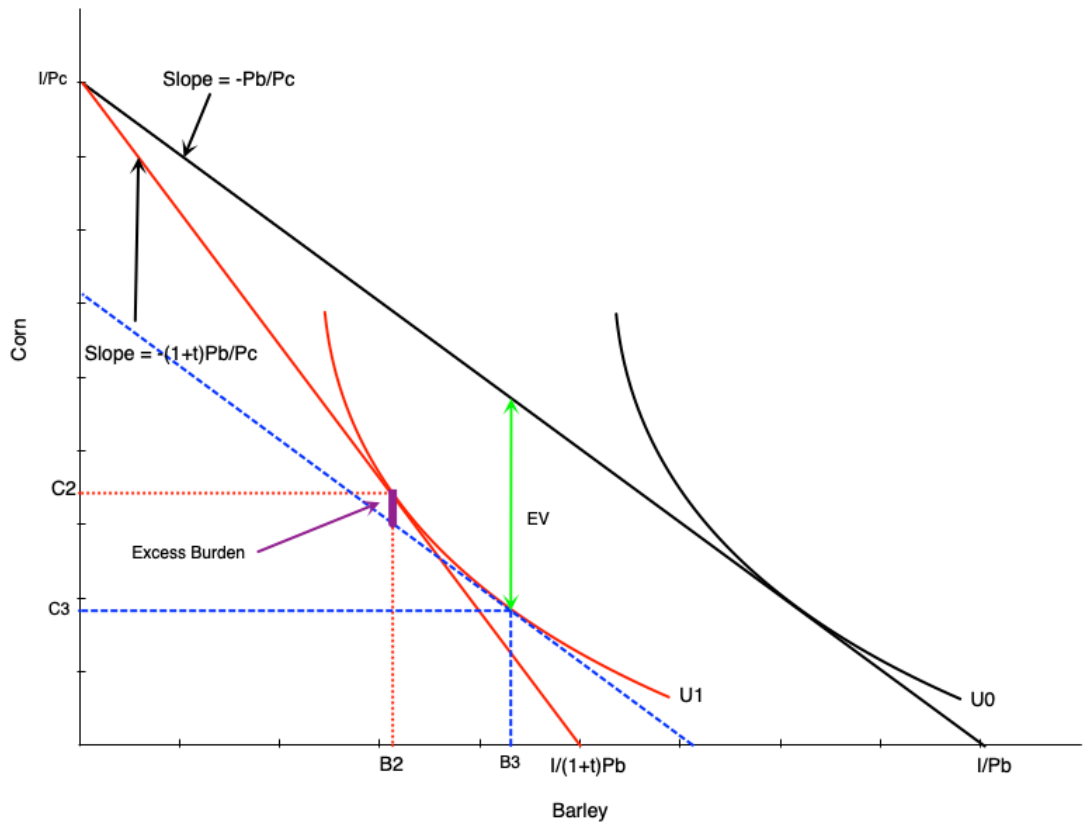
- This is the tax rate times the value of barley consumed

Equivalent Variation



- As a comparison, consider leaving prices unchanged and reducing income to reach the same utility as we got with the tax
  - This income reduction is the **equivalent variation**
- Shift the original budget line parallel in until it is tangent to the new indifference curve
- Distance between the original and new budget lines is the equivalent variation

Excess Burden

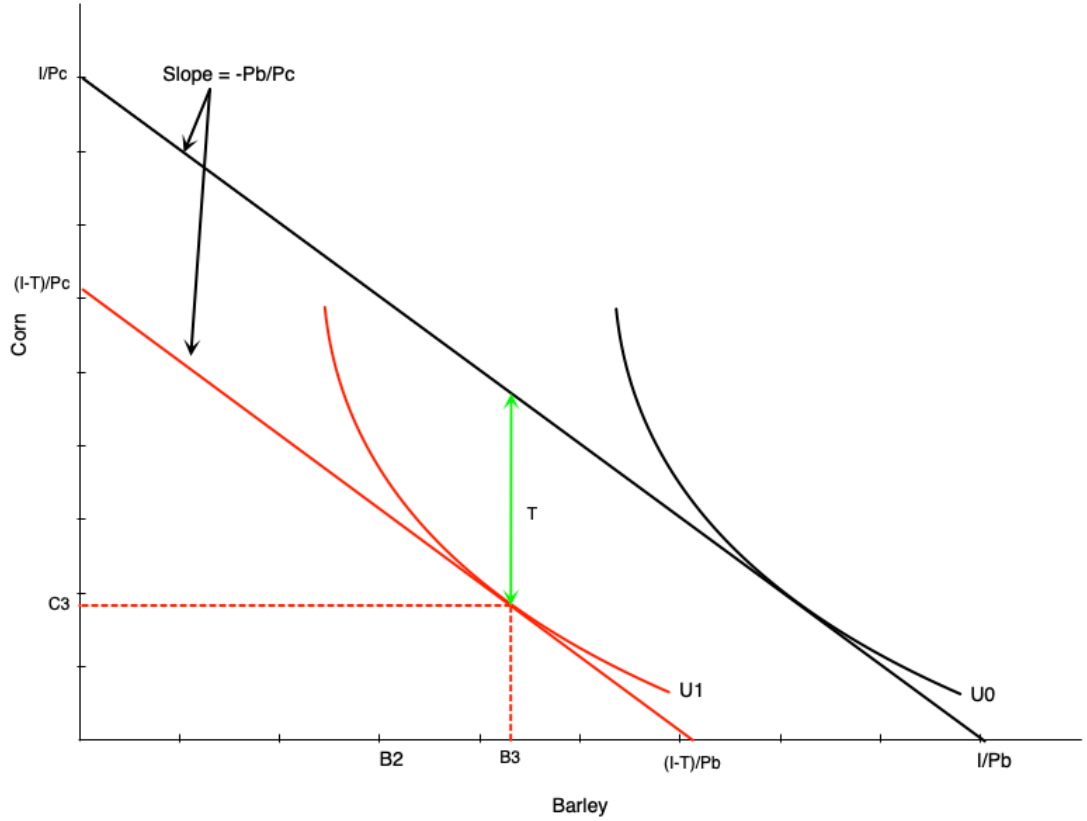


- The **excess burden** of a tax is the loss in welfare beyond the tax revenue collected
- In the graph it is the difference between the equivalent variation and the tax revenue collected
  - Equivalent variation measures loss in welfare
    - Distance in green
  - Tax revenue is money collected by government
    - Distance between black and red budget lines
- In this case, equivalent variation is larger than tax revenue

Excess Burden

- An ad valorem tax on one good creates two effects
  1. Income effect: consumer is poorer, so consumes less of all normal goods
  2. Substitution effect: relative price of taxed good rises, so consumer substitutes away from taxed good
- Excess burden arises because of the substitution effect
  - Consumer substitutes away from taxed good to other goods
  - This leads to a loss in welfare beyond the tax revenue collected
- One way to see this is to compare an ad valorem tax to a lump-sum tax
  - Lump-sum tax only has income effect, no substitution effect
  - So no excess burden

Lump Sum Tax

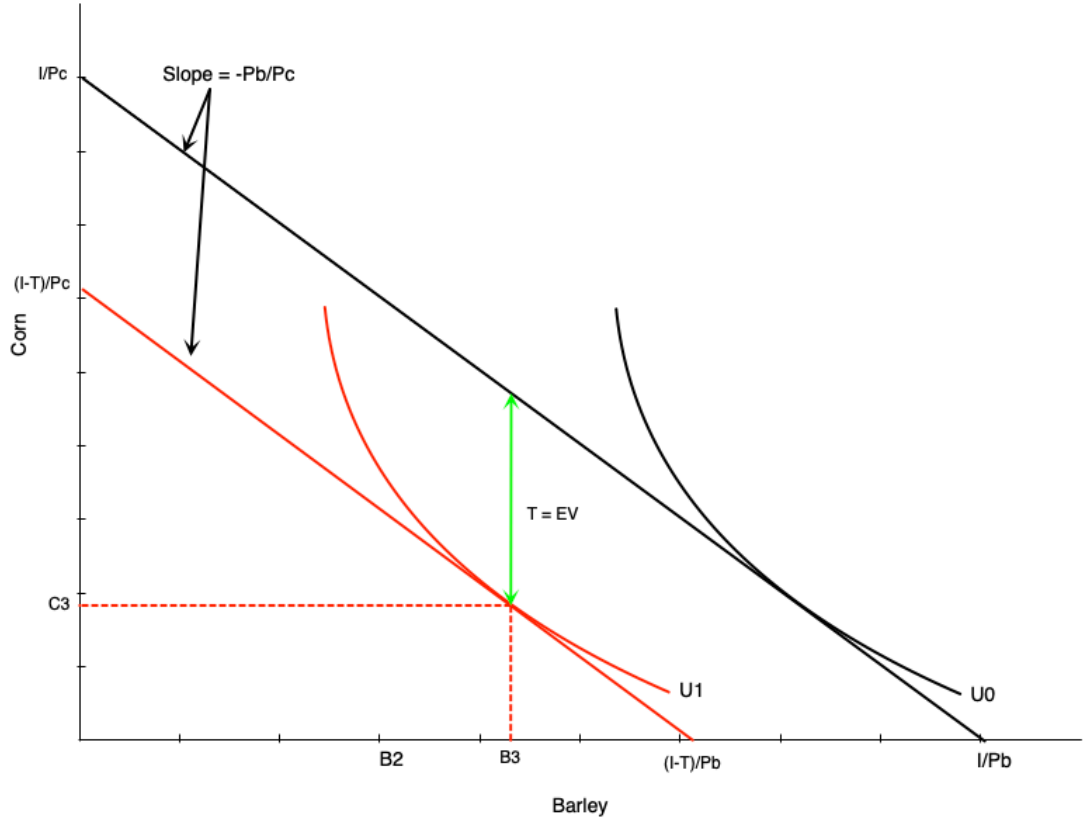


- A lump-sum tax T is imposed
- New budget constraint is
  $I - T = P_B(1 + t)B + P_C C$
- Rearranging gives

$$C = \frac{I - T}{P_C} - \frac{P_B(1 + t)}{P_C}B$$

- Budget line shifts down in parallel by T
  - Prices do not change, so slope does not either
- New optimal bundle is B_3 and C_3

Lump Sum Tax



- Tax revenue is T
  - Does not depend on how much of each good is consumed
- Equivalent variation is also T
  - Distance between original and new budget lines is T
- So there is no excess burden
  - Welfare loss equals tax revenue collected
- Arises because a lump sum tax is a pure income effect
  - No substitution effect, so no excess burden

Challenges with Excess Burden

Efficiency

- If lump sum taxes do not create excess burden, why not use them?
- Often they are unattractive politically
  - A fixed tax on everyone is viewed as unfair
  - It is also regressive
- There are few examples in the world
  - UK had a poll (head) tax in the late 80s that was unpopular
  - Some municipal government charge fixed fees for licenses/permits
- So governments widely use distortionary taxes instead

Income taxes

- Income taxes can also involve excess burdens
- Income taxes distort labour supply decisions
  - Higher tax rates reduce the after-tax wage
  - This causes people to substitute away from labour towards leisure
  - This is a substitution effect that creates excess burden
- Like with goods, income taxes change relative prices, and therefore behaviour
- Changes the price of leisure relative to consumption

References

References

- Rosen, Harvey S., and Lindsay M. Tedds, and Trevor Tombe, and Jean-Francois Wen, and Tracy Snoddon. Public Finance in Canada. 6th Canadian edition. McGraw-Hill Ryerson, 2023.
- Gruber, Jonathan. Public Finance and Public Policy. 7th edition. Worth Publishers, 2022.