

**8** Application: The Costs of Taxation

PRINCIPLES OF  
**MICROECONOMICS**  
 FOURTH EDITION

N. GREGORY MANKIW

PowerPoint® Slides  
 by Ron Cronovich

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**In this chapter, look for the answers to these questions:**

- § How does a tax affect consumer surplus, producer surplus, and total surplus?
- § What is the *deadweight loss* of a tax?
- § What factors determine the size of this deadweight loss?
- § How does tax revenue depend on the size of the tax?

CHAPTER 8 APPLICATION: THE COSTS OF TAXATION 1

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**Review from chapter 6:**

- § A tax is a wedge between the price buyers pay and the price sellers receive.
- § A tax raises the price buyers pay, and lowers the price sellers receive.
- § A tax reduces the quantity bought & sold.
- § These effects are the same whether the tax is imposed on buyers or sellers, so we do not make this distinction in this chapter.

CHAPTER 8 APPLICATION: THE COSTS OF TAXATION 2

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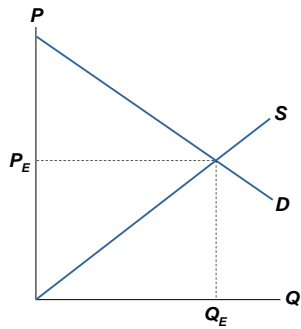
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### The effects of a tax

With no tax,  
eq'm price is  $P_E$   
and quantity is  $Q_E$ .

Govt imposes a  
tax of  $\$T$  per unit.

The price buyers  
pay is  $P_B$ ,  
the price sellers  
receive is  $P_S$ ,  
and quantity is  $Q_T$ .




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### The effects of a tax

§ Next, we use the tools of welfare economics to measure the gains and losses from a tax.

§ We will determine consumer surplus (CS), producer surplus (PS), tax revenue, and total surplus with and without the tax.

§ Tax revenue is

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### The effects of a tax

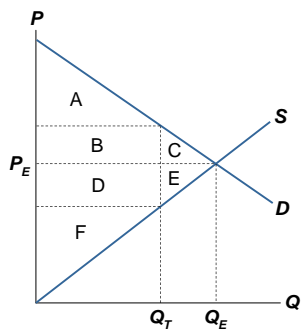
Without a tax,

CS =

PS =

Tax revenue =

Total surplus =




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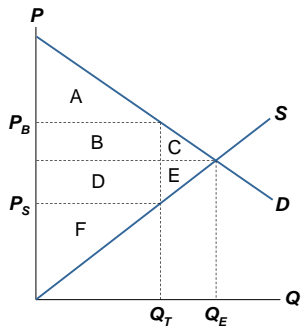
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### The effects of a tax

With the tax,  
 CS =  
 PS =  
 Tax revenue =  
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 Total surplus =  
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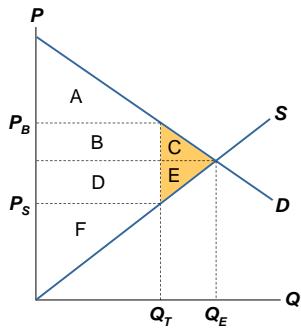
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### The effects of a tax

C + E is called




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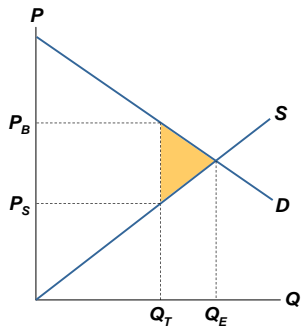
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### About the deadweight loss

Because of the tax,  
 the units between  
 $Q_T$  and  $Q_E$  are not  
 sold.




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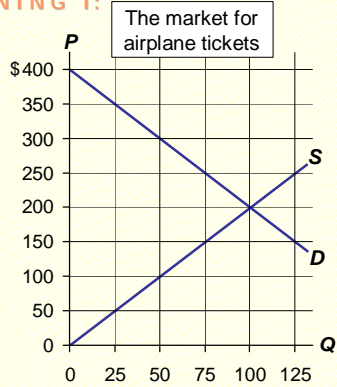
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**ACTIVE LEARNING 1:**  
**Analysis of tax**

- A. Compute CS, PS, and total surplus without a tax.
- B. If \$100 tax per ticket, compute CS, PS, tax revenue, total surplus, and DWL.



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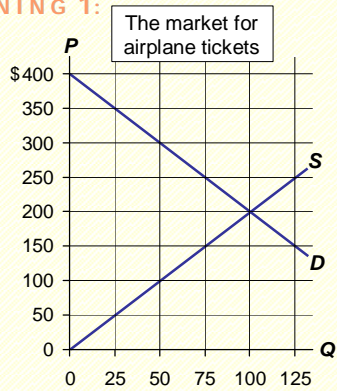
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**ACTIVE LEARNING 1:**  
**Answers to A**

- CS
- PS
- total surplus



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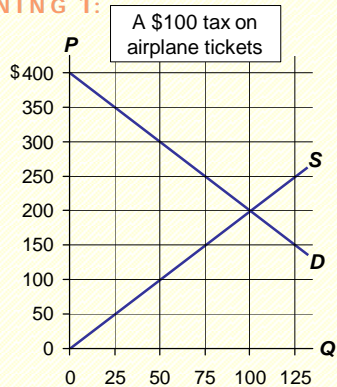
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**ACTIVE LEARNING 1:**  
**Answers to B**

- CS
- PS
- tax revenue
- total surplus
- DWL =



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**What determines the size of the DWL?**

- § The govt needs tax revenue to finance roads, schools, police, etc, so it must tax some goods and services.
- § Which ones? One answer is that govt should tax the goods or services with the smallest DWL.
- § So when is the DWL small vs. large? Turns out it depends on
- § Recall: The price elasticity of demand (or supply) measures

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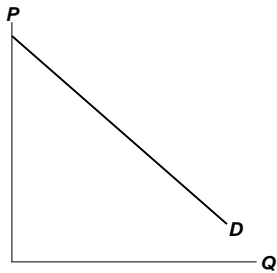
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**DWL and the elasticity of supply**

When supply is inelastic,



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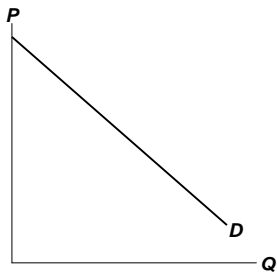
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**DWL and the elasticity of supply**

The more elastic is supply,



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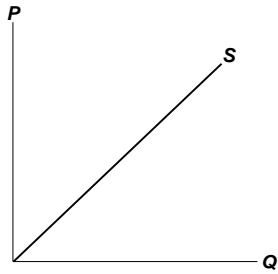
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### DWL and the elasticity of demand

When demand is inelastic,



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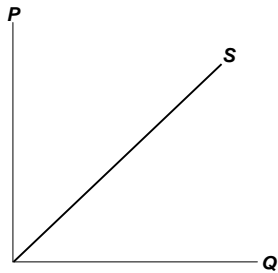
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### DWL and the elasticity of demand

The more elastic is demand,



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### Why elasticity affects the size of DWL

§ A tax

§ Elasticity measures how much buyers and sellers respond to changes in price, and therefore determines

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**ACTIVE LEARNING 2:**  
**Elasticity and DWL of a tax**

Would the DWL of a tax be larger if the tax were on

- A. Rice Krispies or sunscreen?
- B. Hotel rooms in the short run or hotel rooms in the long run?
- C. Groceries or meals at fancy restaurants?

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**ACTIVE LEARNING 2:**  
**Answers**

- A. Rice Krispies or sunscreen

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**ACTIVE LEARNING 2:**  
**Answers**

- B. Hotel rooms in the short run or long run

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**ACTIVE LEARNING 2:**  
**Answers**

C. Groceries or meals at fancy restaurants

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**ACTIVE LEARNING 3:**  
**Discussion question**

§ The government must raise tax revenue to pay for schools, police, etc. To do this, it can either tax groceries or meals at fancy restaurants.

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**How big should the government be?**

§ A bigger government provides more services, but requires higher taxes, which cause DWL.

§ The larger the DWL from taxation, the greater the argument for smaller government.

§ The tax on labor income is especially important, it's the biggest source of govt revenue.

§ For many workers,

§ How big is the DWL from this tax?  
It depends on elasticity....

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**How big should the government be?**

§ If labor supply is inelastic,

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**How big should the government be?**

Other economists believe

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**The effects of changing the size of the tax**

§ Policymakers often change taxes, raising some and lowering others.

§ What happens to DWL and tax revenue when taxes change? We explore this next....

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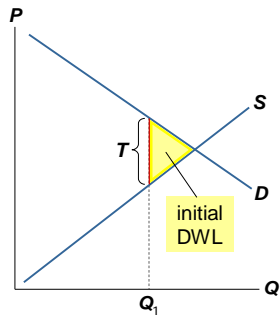
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### DWL and the size of the tax

Initially, the tax is  $T$  per unit.  
Doubling the tax




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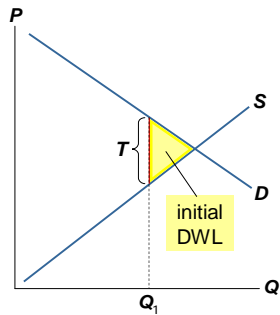
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### DWL and the size of the tax

Initially, the tax is  $T$  per unit.  
Tripling the tax




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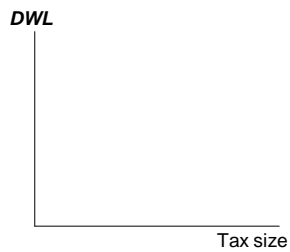
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### DWL and the size of the tax

**Implication**  
When tax rates are low, raising them doesn't cause much harm, and lowering them doesn't bring much benefit.  
When tax rates are high, raising them is very harmful, and cutting them is very beneficial.

**Summary**




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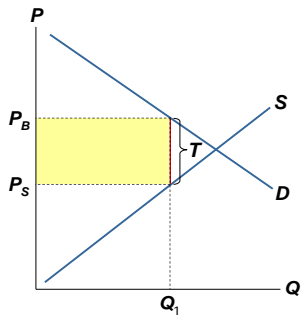
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### Revenue and the size of the tax

When the tax is small,




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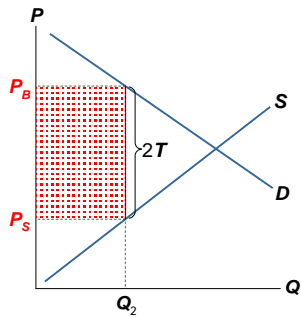
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### Revenue and the size of the tax

When the tax is larger,




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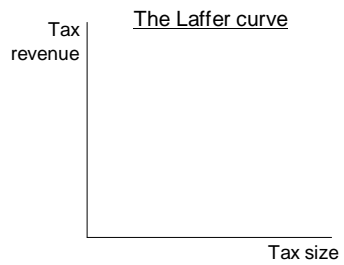
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### Revenue and the size of the tax

The **Laffer curve**




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