Taxes and Efficiency Losses

$$EL_{\tau_B} \sim \tau_B^2$$

Taxes Cause Efficiency Losses

- Your benefits from widgets
  - $30 benefits on first
  - $25 on second
- My cost is $15

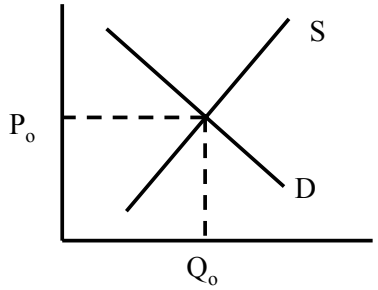
Taxes Cause Efficiency Losses

- Your benefits from widgets
  - $30 benefits on first
  - $25 on second
- My cost is $15
- We will agree to build both. Your benefits are $55 and my costs are $30.
- How we split the $25 net gain is negotiable.

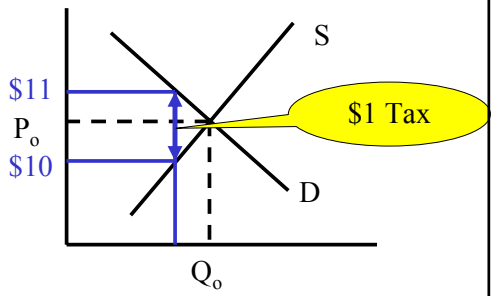
Taxes Cause Efficiency Losses

- Your benefits from widgets
  - $30 benefits on first
  - $25 on second
- My cost is $15
- Now the government imposes a $12 tax on widgets.
- We will still build the first one, but not the second.
- The consequence is $10 in benefits foregone.

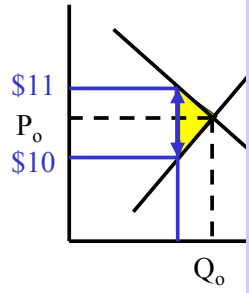
Efficiency Losses



Efficiency Losses



Efficiency Losses



The shaded area shows the efficiency loss; the value of mutually advantageous trades forgone by suppliers and customers.

A Theorem

- Efficiency loss is proportional to square of tax rate.
- If a 1% tax costs $100 in EL, a 2% tax costs $400, a 3% tax costs $900, etc.

Can the efficiency loss be avoided?

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Can the efficiency loss be avoided?

- In General, No
- There are some special cases.
- Generally, if you want government, you must tax and that means efficiency losses.
- But there are steps you can take to minimize the efficiency loss.

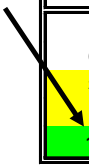
Broad Taxes vs. Narrow Taxes

Tax Rate on Apples	Tax Rate on Bananas	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Apples	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Bananas
1%	0%	$100	0
0%	1%	0	$100

Broad Taxes vs. Narrow Taxes

Tax Rate on Apples	Tax Rate on Bananas	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Apples	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Bananas
1%	0%	$100	0
0%	1%	0	$100
2%	0%	$400	$0
0	2%	0	$400
1%	1%	$100	$100

Broad Taxes vs. Narrow Taxes



Tax Rate on Apples	Tax Rate on Bananas	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Apples	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Bananas
1%	0%	$100	0
0%	1%	0	$100
2%	0%	$400	$0
0	2%	0	$400
1%	**1%**	**$100**	**$100**

Some Applications

- Apples or Bananas

Some Applications

- Apples or Bananas
- Excise Taxes

Some Applications

- Apples or Bananas
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- "Sin" Taxes

Some Applications

- Apples or Bananas
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- The Ohio Lottery

A Qualification

Tax Rate on Apples	Tax Rate on Bananas	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Apples	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Bananas
1%	0%	$100	0
0%	1%	0	$100
2%	0%	$400	$0
0	2%	0	$400
1%	1%	$100	$100

A Qualification

Tax Rate on Apples	Tax Rate on Bananas	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Apples	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Bananas
1%	0%	$100	0
0%	1%	0	$50~~$100~~
2%	0%	$400	$0
0	2%	0	$200~~$400~~
1%	1%	$100	$50~~$100~~

A Qualification

$$\frac{\tau_B}{\tau_A} = \frac{\left[\frac{R}{EL}_{\tau_B=1\%}\right]}{\left[\frac{R}{EL}_{\tau_A=1\%}\right]}$$

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1%		0
0%		$50~~$100~~
2%		$0
0		$200~~$400~~
1%		$50~~$100~~

A Qualification

$$\frac{\tau_B}{\tau_A} = \frac{\left[\frac{R}{EL}_{\tau_B=1\%}\right]}{\left[\frac{R}{EL}_{\tau_A=1\%}\right]}$$

Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Apples	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Bananas
$100	0
0	$50~~$100~~
$400	$0
	~~$400~~
	~~$100~~

$$\frac{\tau_B}{\tau_A} = \frac{\left[\frac{\$100}{\$50}\right]}{\frac{\$100}{\$100}}$$

A Qualification

$$\frac{\tau_B}{\tau_A} = \frac{\left[\frac{R}{EL}_{\tau_B=1\%}\right]}{\left[\frac{R}{EL}_{\tau_A=1\%}\right]}$$

Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Apples	Efficiency Loss from Forgoing Mutually Beneficial Purchases and Sales of Bananas
$100	0
0	$50~~$100~~
$400	$0
	~~$400~~
	~~$100~~

$\tau_B = 1.333\%$

$\tau_A = 0.666\%$

$$\frac{\tau_B}{\tau_A} = \frac{\left[\frac{\$100}{\$50}\right]}{\frac{\$100}{\$100}}$$

$$\frac{\tau_B}{\tau_A} = \left[\frac{R_{\tau_B=1\%}}{EL_{\tau_B=1\%}} \frac{R_{\tau_A=1\%}}{EL_{\tau_A=1\%}} \right]$$

$\tau_B = 1.333\%$

$\tau_A = 0.666\%$

$$\left[\frac{\$100}{\$50} \frac{50\%}{50\%} \right]$$

$$\frac{\tau_B}{\tau_A} = \left[\frac{R_{\tau_B=1\%}}{EL_{\tau_B=1\%}} \frac{R_{\tau_A=1\%}}{EL_{\tau_A=1\%}} \right]$$

Is there a proof? Yes, but I put it in a separate lecture

$\tau_A = 0.666\%$

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End

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