

NU Econ 101 Lecture 16: Taxation

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Where are we now?

- 1 Taxes
- 2 Competing tax bases
- 3 Tax incidence
- 4 Deadweight loss, neutrality, and the second best
- 5 Problems

Terminology of taxation (1)

There are many different types of taxes. Any particular tax can be defined in two parts:

- **Tax base:** The measure or value upon which the tax is levied.
- **Tax rate structure:** The percentages of a tax base that must be paid in taxes.

The base of a tax can be either a stock or a flow:

- A **stock** is a value measured at a particular moment in time.
- A **flow** is a change is a change in value measured across a period of time.

Terminology of taxation (2)

We sometimes compare taxes on their relative burdens:

- **A proportional tax** is a tax whose burden is the same proportion of income for all households.
- **A progressive tax** is a tax whose burden, expressed as a percentage of income, increases as income increases.
- **A regressive tax** is a tax whose burden, expressed as a percentage of income, decreases as income increases.

Sales taxes are regressive (1)

One flow that is often taxed is consumption (through a sales tax).

If everybody pays a fixed sales tax (say 5%) on every purchase, it would *appear* to be a proportional tax.

- But this would only be true if households of different income levels all consumed the same percentage of their income.
- Usually lower income families consumer a greater portion of their income (think of the term *living paycheck to paycheck*).

Sales taxes are regressive.

- Let's see it in an example with three households . . .

Sales taxes are regressive (2)

| HH | Income | Sav % | Consumption | Tax | $\frac{\text{Tax}}{\text{Income}}$ |
|----|--------|-------|-------------|-------|------------------------------------|
| A | 10 000 | 20 | 8 000 | 400 | 4.0 |
| B | 20 000 | 40 | 12 000 | 600 | 3.0 |
| C | 50 000 | 50 | 25 000 | 1 250 | 2.5 |

Even though all three households pay the same sales tax rate, the sales tax is regressive because lower-income households have a lower savings rate.

Calculating income taxes

If I say that I am in the tax bracket that pays a rate of 30%, does it mean that I am paying 30% of my total income in taxes?

- No, 30% is my marginal tax rate, not my average tax rate.

Suppose taxes did work that way – you paid a given tax rate on **all** of your income with the rate based on your bracketed income.

- Then some people would have an incentive to be paid less.
- Though they earn less, it would change their bracket, increasing their total after-tax earnings.
- Let's see an example . . .

Calculating income taxes (the wrong way)

Suppose that people earning below \$40,000 pay 10% in taxes and people earning above \$40,000 pay 20% in taxes.

| | Pre-tax income | Tax rate | Tax | After-tax income |
|-------------|-----------------------|-----------------|------------|-------------------------|
| Anne | 42 000 | 20 | 8 400 | 33 600 |
| Bob | 38 000 | 10 | 3 800 | 34 200 |

Does this seem fair?

- If this were how taxes worked, Anne would ask her boss to lower her salary by \$2,000.

Calculating income taxes (the right way)

Instead, we tax as follows:

| | Pre-tax income | Tax rate | Tax | After-tax income |
|-------------|----------------|----------|-------|------------------|
| Anne | 40 000 | 10 | 4 000 | |
| | 2 000 | 20 | 400 | 37 600 |
| Bob | 38 000 | 10 | 3 800 | 34 200 |

Anne's marginal tax rate is 20% because any additional income she earns will be taxed at that rate.

Anne's average tax rate is $\frac{4\,400}{42\,000} \approx 10.5\%$.

With progressive taxes, deductions are regressive

When you claim a **tax deduction**, that reduces your taxable income, i.e. the value of the base. Suppose a \$1 000 deduction.

| | Pre-tax | Taxable | Tax rate | Tax | After-tax |
|-------------|----------------|----------------|-----------------|------------|------------------|
| Anne | 40 000 | 40 000 | 10 | 4 000 | |
| | 2 000 | 1 000 | 20 | 200 | 37 800 |
| Bob | 38 000 | 37 000 | 10 | 3 700 | 34 300 |

The deduction saved Anne \$200, Bob only \$100.

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Principles of taxation

Who should pay taxes?

Benefits-received principle

People should pay taxes based upon how much benefit they receive for using the government services that the taxes allow.

Ability-to-pay principle

The people who should pay the most taxes are those who are most able to pay them (i.e. people with high income or wealth).

Principles of taxation

The benefits-received principle is OK if benefits are measurable.

- The tax on gasoline in the US funds highway construction and maintenance. The more gasoline you have used, the more you have used roads, so makes sense.

How do we measure personal benefits from national defense?

Most tax policy, in the US and internationally, is based upon the ability-to-pay principle.

What is the best tax base?

There are a number of different bases we could tax:

Flows:

- Individual income, consumption/sales, capital gains, savings, corporate income, payroll, excise taxes, customs duties

Stocks:

- Wealth (including inheritance/estate), property

Which should we tax?

Is consumption the best tax base?

English philosopher Thomas Hobbes argued that people should pay taxes in accordance with *what they actually take out of the common pot, not what they leave in.*

- A person's standard of living depends not on income, but consumption. Consumption is the best measure of well-being.

Note: A flat-rate sales tax is regressive, but you can have a progressive tax on consumption.

- Just add up total annual consumption and apply progressive rates to it to work out tax payments.

Is income the best tax base?

Consumption is how much you *choose* to spend. **Income is how much you're able to spend.** Some argue that the ability-to-pay principle favors an income tax.

Note that if you have both an income and a consumption tax, as many places do, you're effectively double-taxing consumption.

- You earn money to spend on consumption. That money is taxed both when you receive it and when you spend it.

Is wealth the best tax base?

If Anne has a trillion dollars in wealth but has retired (so has no income), and Bob has no money and makes 10 000 a year, who has more ability to pay taxes?

- Obviously Anne.
- On the other hand, with an income tax, Anne would have already paid significant taxes accumulating all that wealth.

Each base has its arguments, but there's no right answer...

- In reality, there are taxes on just about all of these.

Taxes affect incentives (1)

Tax policy can affect incentives in weird ways.

What are consequences of high income taxes in Europe?

- Entrepreneurialism might be negatively affected. Why bother trying to make tons of money if most of it will be taxed away!
- Or maybe it will be positively affected. Those high taxes pay for strong social safety nets (unemployment benefits etc.). Now the consequences of failed entrepreneurialism are reduced.

Taxes affect incentives (2)

Many people think it is unfair that children of very wealthy parents inherit large sums of money.

What might happen if we had a 100% estate tax?

- Parents can't leave money to their children when they die. Either they give it to charity or to government.
 - Many would like this outcome!
- Or maybe old rich people just decide to spend like crazy! Why save any when you can't leave it to your children? *Anybody for a billion dollar bottle of champagne? I'll take three!*

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Tax incidence

When the government taxes consumption or production of a good, who suffers?

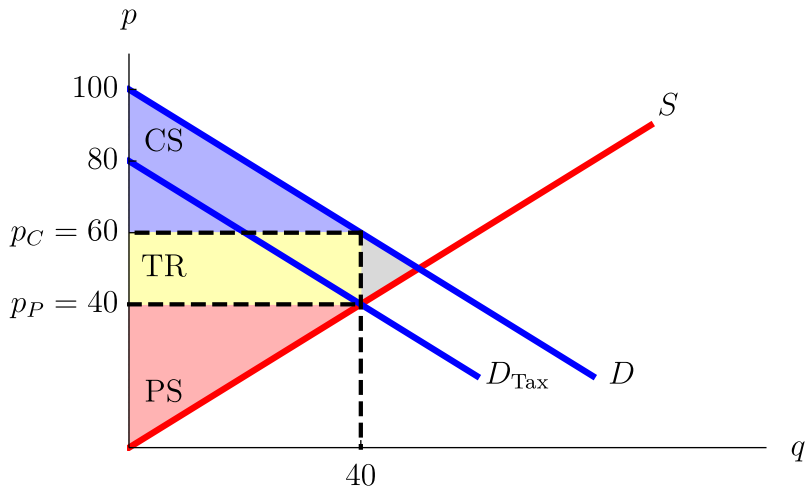
- Tempting to say consumers suffer when consumption is taxed and producers when production is taxed.
- But this isn't actually true!

Let's take an example:

- $S = MC(q) = q$ and inverse demand (D) is $p(q) = 100 - q$.
- First let's see what happens when the government puts a \$20 tax on consumption. Then a \$20 tax on production.

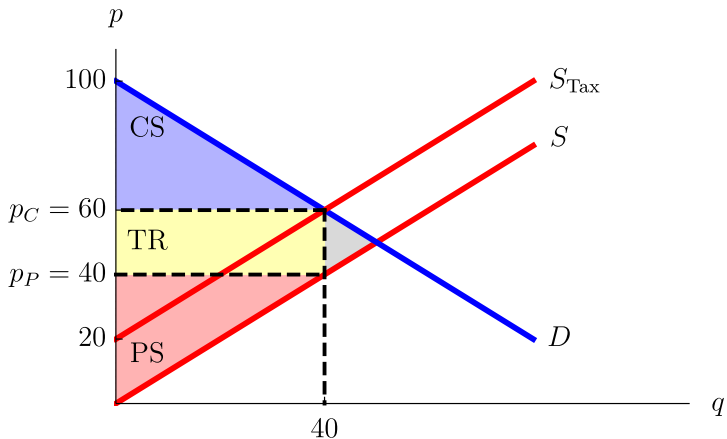
\$20 tax on consumption

With the \$20 tax, $D_{\text{Tax}} = 80 - q$:



\$20 tax on production

With the \$20 tax, $S_{\text{Tax}} = MC + 20 = q + 20$:



No difference?

Who the tax was charged on here was irrelevant. Each ends up paying half of the tax revenue in either case.

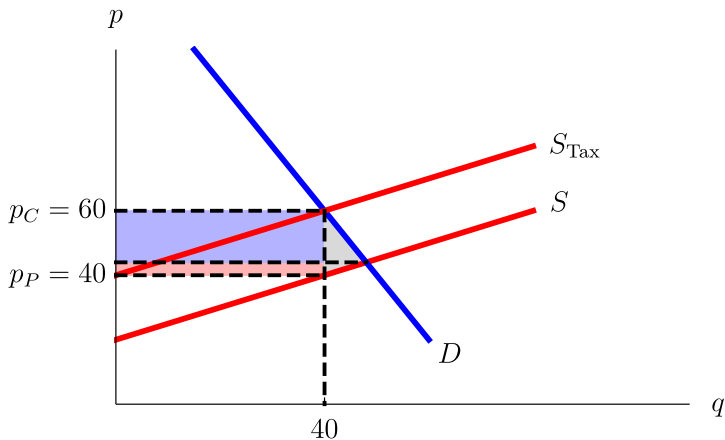
What really affects who pays?

- The more elastic demand is, the more the producers pay.
- The more elastic supply is, the more the consumers pay.

Let's tax production going forward and see examples . . .

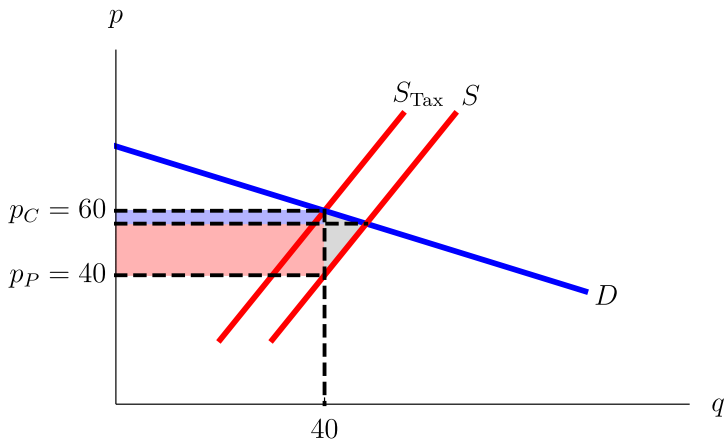
Elastic supply, inelastic demand

Now **blue area** is tax paid by consumers and **red area** is tax paid by producer. Sum of **red** and **blue** is the tax revenue (TR).



Inelastic supply, elastic demand

Now **blue area** is tax paid by consumers and **red area** is tax paid by producer. Sum of **red** and **blue** is the tax revenue (TR).



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Deadweight loss and neutrality

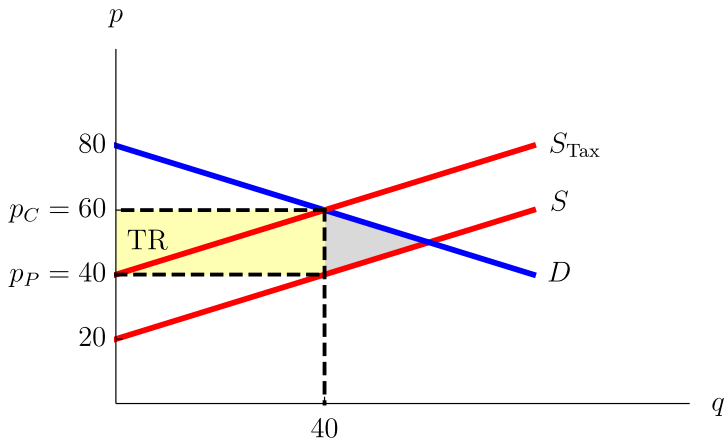
What affects the size of the deadweight loss?

- The deadweight loss is coming from the fact that the tax is affecting the decisions of consumers and producers.
- If the supply and demand are elastic, consumption and production choices are effected drastically.
 - Big deadweight loss!
- If the supply and demand are inelastic, consumption and production choices are not affected much.
 - Little deadweight loss!

Let's have a look . . .

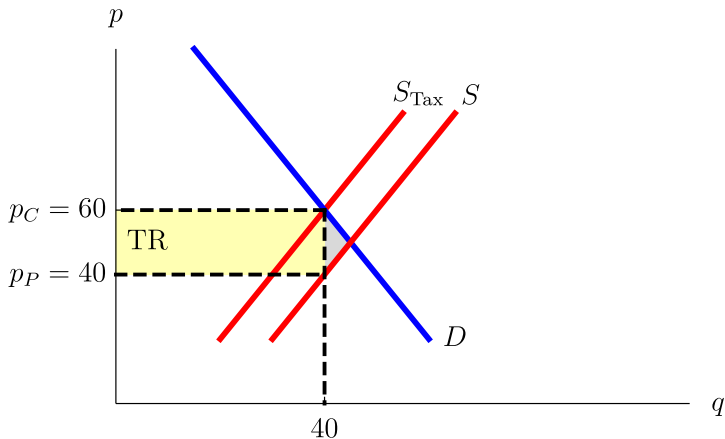
Elastic supply and demand

Remember deadweight loss is gray area. **Big deadweight loss!**



Inelastic supply and demand

Remember deadweight loss is gray area. **Small deadweight loss!**



Principle of neutrality

We want to collect taxes. But we don't want to affect decisions, because that will cause deadweight loss.

Principle of neutrality

All else equal, taxes that are neutral with respect to economic decisions (that is, taxes that do not distort economic decisions) are generally preferable to taxes that distort economic decisions. Taxes that are not neutral cause deadweight loss.

The theory of the second best (1)

**Suppose we find a tax that affects decisions significantly.
Should we get rid of it?**

- Not necessarily!

Theory of the second best

If one optimality condition in an economic model cannot be satisfied, it is possible that the next-best solution involves changing other variables away from the values that would otherwise be optimal.

The theory of the second best (2)

What does that mean?

If we have some taxes that distort behavior that we cannot feasibly change, getting rid of another tax that distorts behavior might make us yet worse off!

- Distortions can cancel each other out, somewhat . . .
- Two wrongs don't make everything right, but they might be better than having one wrong and one right.

The theory of the second best (3)

More generally . . .

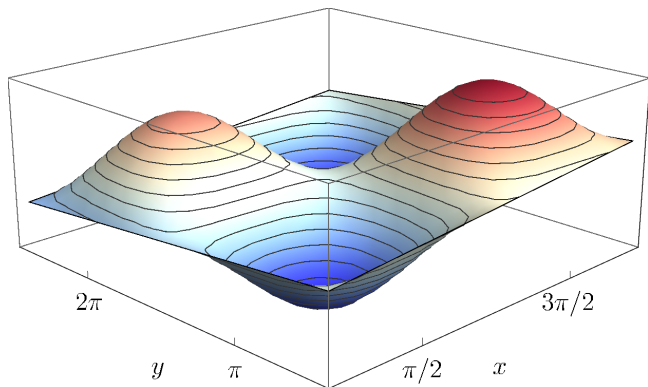
If two variables are suboptimal, moving one variable to its optimal value without changing the other might make you worse off!

- This is really paralyzing to economists like me.
- Everything is so screwed up, fixing one thing might make us worse off!

As always, let's see a picture!

The theory of the second best illustrated

If you're on top of the small mountain, you might be tempted to change x and y to get up the big mountain. But unless you can change both x and y , you don't want to change either!



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Useful problems

- Chapter 19: 1, 2, 5, 9, 10