

Lecture 10: Taxation, tax incidence

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April 21, 2020, Public Finance

Course schedule

► Syllabus

Week	Date	Topic	Chapters	Lecturer
1	Feb 18	Economic rationale for the government	1, 2, 3, 4, 5	Miroslav Palanský
2	Feb 25	Public budgets	10, 26, 27	Natalia Li
3	Mar 3	Inequality		Marek Šedivý
4	Mar 10	Old-age pensions		Ondřej Schneider
5	Mar 17	Health economics	12	Ondřej Schneider
6	Mar 24	Public choice theory	7, 8	Miroslav Palanský
7	Mar 31	Cost-benefit analysis	6, 10, 11	Petr Janský
8	Apr 7	Externalities	9	Miroslav Palanský
9	Apr 14	Public procurement		Miroslav Palanský
10	Apr 21	Taxation, tax incidence	17, 18, 19	Miroslav Palanský
11	Apr 28	Optimal taxation, personal income taxation	20, 22	Miroslav Palanský
12	May 5	Tax evasion	24, 25	Petr Janský
13	May 12	Corporate taxation	21, 23	Petr Janský

Course requirements

► Syllabus

Requirement	Maximum points	Announced	Deadline
Problem Set 1	10	Mar 24	Mar 31, 23:59
Problem Set 2	10	Apr 14	Apr 21, 23:59
Wiki Edits	20	Feb 18	Apr 28, 23:59
Final Exam	60	Exam 1 on May 19, 14:00 Exams 2, 3 in June Exam 4 in September	
Total	100		

Today's lecture

Principles of taxation

How to tax?

Whom to tax?

Tax incidence

Summary of our progress in the course

1. When does/should the gov't intervene in the economy?
→ Market failures
2. How does/should the gov't spend money?
→ Expenditure programs
3. **How does/should the gov't raise money?**
→ **Taxation**

Why tax?

- ▶ Recall Musgrave (1939): Three branches of gov't:
 1. Stabilization branch
 2. Allocation branch
 3. Distribution branch
- ▶ The first two branches need resources to function
- ▶ The distribution branch uses taxation as its main tool

How to tax?

- ▶ 2 fundamental questions:
 1. How? → Efficiency, flexibility
 2. Whom? → Equity, transparency
- ▶ We want the tax system to be both efficient and equitable (as well as flexible and transparent), but these two principles are often in conflict
 - equity-efficiency trade-off

Types of tax

1. Taxes on income
 - 1.a. Taxes on earnings
 - ▶ Payroll tax
 - 1.b. Taxes on individual income (other than earnings)
 - ▶ Capital gains tax
 - 1.c. Taxes on corporate income
 - ▶ Corporate income tax
 2. Taxes on wealth
 - ▶ Property tax, estate tax, wealth tax
 3. Taxes on consumption
 - ▶ Excise tax, sales tax, value-added tax
- ▶ Direct (income, wealth) vs. indirect (consumption) taxes

Recap: The tax taxonomy

- ▶ Tax = the absolute amount paid on taxes (in money terms)
- ▶ Tax = tax base * tax rate
- ▶ Tax rate = the percentage (of the corresponding amount) paid on taxes
- ▶ Regressive/proportional/progressive tax vs. tax rate
- ▶ Average/marginal tax rate

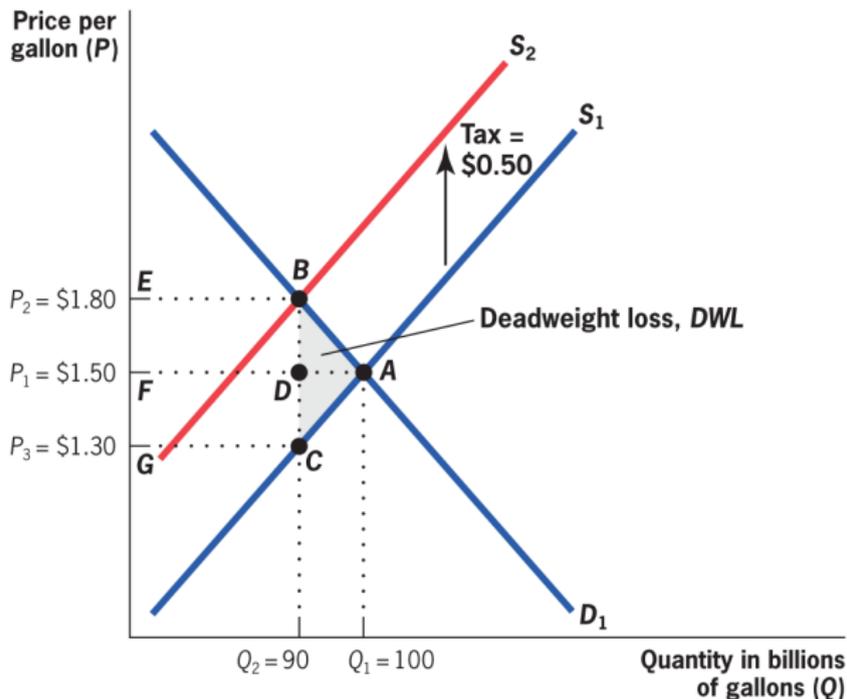
Efficiency

- ▶ Efficient tax systems are those that have low costs of existence
- ▶ In other words, the tax system should not take us too far away from the efficient allocation of resources
- ▶ Two main types of costs:
 - ▶ Welfare costs (deadweight loss)
 - ▶ Administrative costs

Deadweight loss (DWL) of taxation

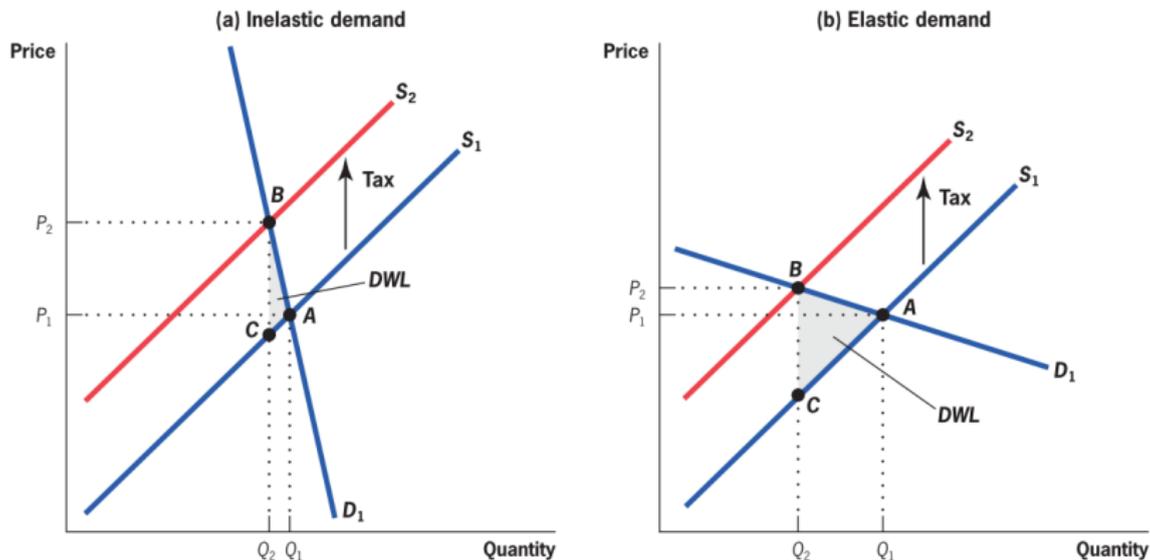
- ▶ Welfare loss (measured in dollars) created by a tax which is over and above the tax revenue generated by the tax
- ▶ Also called 'deadweight burden', 'excess burden'
- ▶ Can be represented in the supply and demand graph of the market as the Harberger triangle: $DWL = \frac{1}{2} * t * (Q^* - Q^E)$

Deadweight loss of taxation



Source: Gruber (2010, Figure 20-1)

DWL and elasticities



Source: Gruber (2010, Figure 20-2)

DWL and elasticities

- ▶ Recall: Elasticity of demand $\eta = \frac{\Delta Q/Q}{\Delta p/p}$
- ▶ Rearrange to

$$\Delta Q = \frac{\Delta p}{p} Q \eta$$

- ▶ Plugging in $t = \Delta p$:

$$DWL = \frac{1}{2} * t * (Q^* - Q^E) = \frac{1}{2} * t * \frac{t}{p} Q \eta = \frac{1}{2} \left(\frac{t}{p} \right)^2 p Q \eta$$

$$DWL = \frac{1}{2} \hat{t}^2 p Q \eta$$

DWL and elasticities: lessons

1. The (in)efficiency of any tax is determined by the extent to which consumers and producers change their behavior to avoid the tax
 - ▶ In fact, the DWL increases with the square of the tax rate
→ Tax many things a little bit, not a few things a lot
 - ▶ Administrative costs
2. DWL is caused by individuals and firms making inefficient consumption and production choices in order to avoid taxation
 - ▶ If there is no change in quantities consumed, the tax has no efficiency costs
→ Tax inelastic goods!?
 - ▶ Equity concerns

Deadweight gain of taxation?

- ▶ We know that tax changes behaviour and thus influences the market outcome
- ▶ In presence of externalities, however, we want to change the market outcome to reach the social optimum (otherwise there is a deadweight loss of externality)
- ▶ In these cases, taxes actually eliminate DWL
 - ▶ Excise taxes, pollution regulation, carbon tax
 - ▶ Complementing with nudging (e.g., cigarette labels)
- ▶ At the same time, they raise revenue which can be used to subsidize positive externality-generating activity
 - ▶ Education, health care, public transport, RD, ...
- ▶ This is called the **double dividend of taxation**

Administrative costs

1. Direct admin. costs: running the tax collection office
 2. Indirect admin. costs: record keeping, filling out forms, professional services
- ▶ Influenced by many factors:
 - ▶ Complexity (deductions, special provisions, exceptions, tax schedule)
 - ▶ Type of tax (VAT vs. sales tax, capital vs. income)
 - ▶ Reporting requirements (privacy vs. transparency, EET)

Flexibility

- ▶ Tax systems are efficient when they are flexible, i.e., when they can easily be changed based on circumstances
- ▶ Some taxes are easily adjusted, some require extensive political debate, and some adjust automatically
- ▶ Automatic stabilizers (recall the stabilization branch of the gov't) dampen fluctuations in real GDP
 - ▶ Income taxes, when progressive, act as stabilizers: when incomes fall, taxes fall (and with progressive tax rates, even tax rates fall)

Equity

- ▶ One extreme: poll tax (equal tax, in money terms, on each citizen)
 - ▶ Thatcher (UK, 1990, although with an 80% reduction for students and unemployed) → riots, abolition, resignation
 - ▶ Historically used in some countries
 - ▶ Still effectively exists for some small taxes (garbage fees, concessionary TV fees, ..)
 - ▶ US health care 'poll tax' (Saez and Zucman, 2019)
- ▶ Diverging from the poll tax brings more equity
- ▶ Vertical equity vs. horizontal equity
- ▶ Ability-to-pay principle vs. benefits principle
- ▶ Redistribution branch of the government

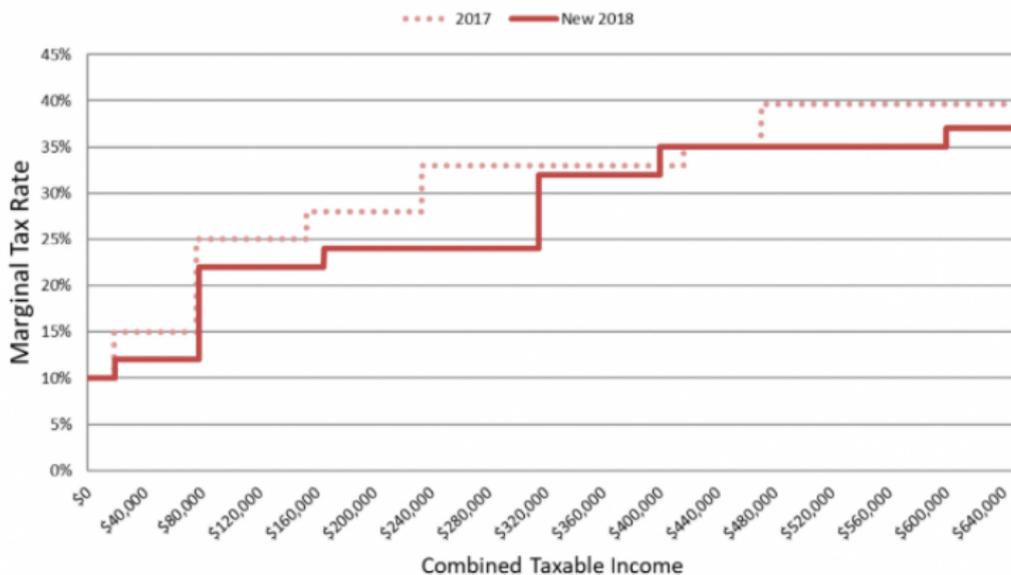
Vertical equity

- ▶ Groups with more resources should pay higher taxes than groups with fewer resources
- ▶ In other words, this is progressive tax (as opposed to flat tax or regressive tax)
- ▶ Among progressive tax systems, we recognize three types of tax rates:
 1. Progressive tax rates (ATR rises with income)
 2. Proportional tax rates (ATR same across income groups)
 3. Regressive tax rates (ATR decreases with income)
- ▶ Most countries implement progressive tax rates, but these are progressive to varying extents

Progressivity of PIT in Czechia

- ▶ Until 2008: progressive personal income tax rate with brackets
- ▶ Since 2008: proportional PIT rate (15%), but adjusted at both ends of the income distribution
 - still a *de facto* progressive tax rate on personal income
 - ▶ Tax credit (base at 24k CZK per year)
 - ▶ Solidary tax (for gross earnings over 48x the average salary, in 2019 this was 1.57 million CZK per year)
- ▶ Proposals for change to an outright progressive tax rate with brackets

Marginal income tax rate, US, 2017-2018



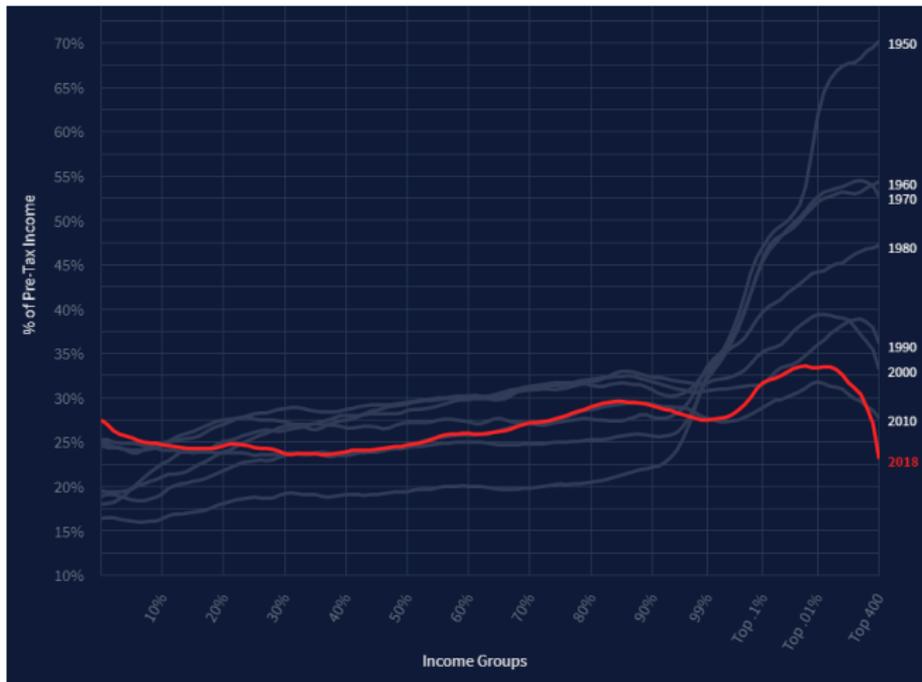
Source: IRS, FinancialSense.com

Tax brackets, US, 2020

Rate	Taxable income		
	Unmarried	Married	Heads of Households
10%	0–\$9,875	0–\$19,750	0–\$14,100
12%	\$9,876–\$40,125	\$19,511–\$80,250	\$14,101–\$53,700
22%	\$40,126–\$85,525	\$80,251–\$171,050	\$53,701–\$85,500
24%	\$85,526–\$163,300	\$171,051–\$326,600	\$85,501–\$163,300
32%	\$163,301–\$207,350	\$326,601–\$414,700	\$163,301–\$207,350
35%	\$207,351–\$518,400	\$414,701–\$622,050	\$207,351–\$518,400
37%	\$518,401 +	\$622,051 +	\$518,400 +

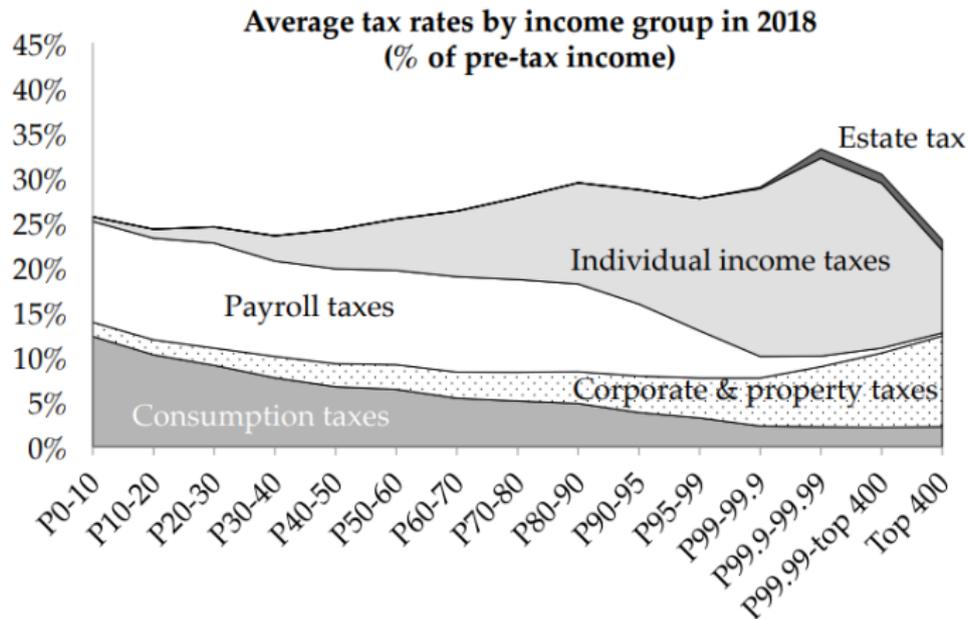
Source: IRS, AARP.org

Total tax rate progressivity over time



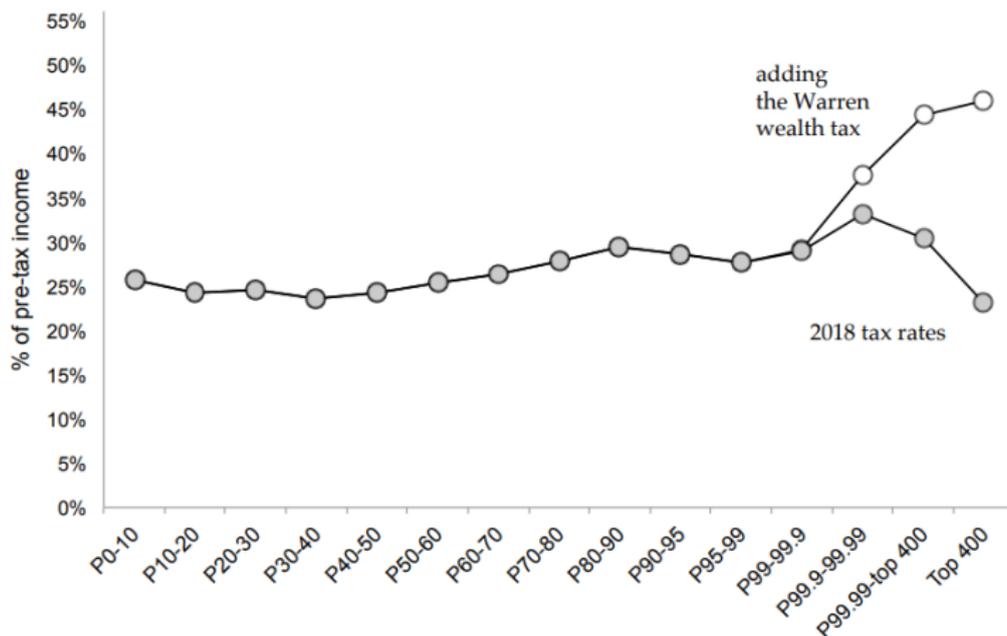
Source: TaxJusticeNow.org

Progressive PIT rate, but proportional tax rate overall?



Source: Saez and Zucman (2019)

Effects of a wealth tax

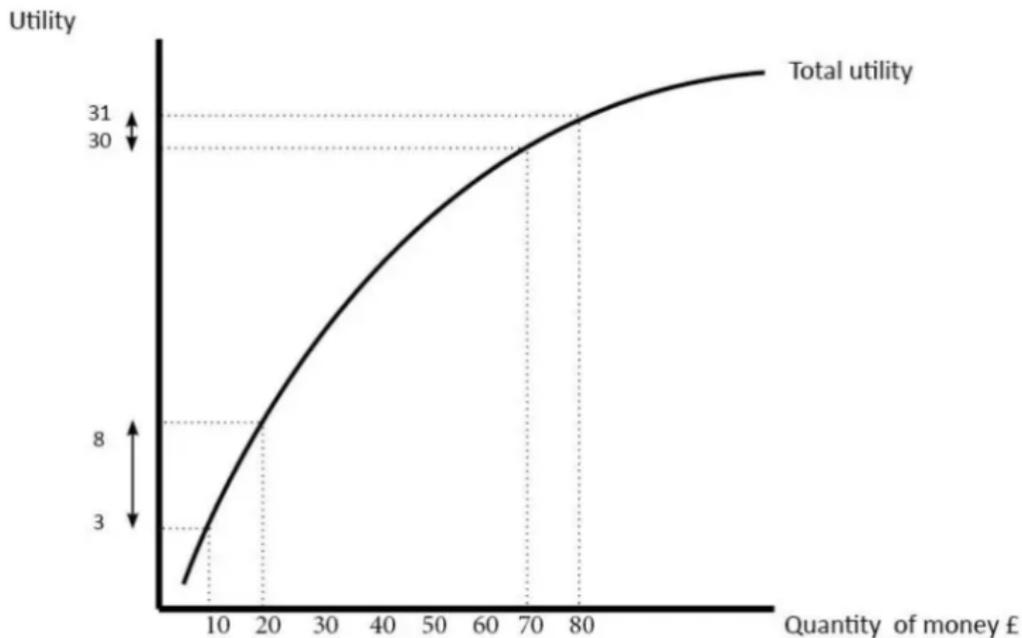


Source: saez2019a

Progressivity of tax systems

- ▶ Ultimately, the issue comes down to two questions:
 1. Who should pay higher rates?
 - ▶ Those who are able to—but how to define that?
 - ▶ Those who benefit—but what about equity?
 - ▶ Income/wealth and consumption taxes
 2. How much higher rates should they pay?
 - ▶ Politics?
 - ▶ What utility function do you believe in?

Marginal utility of income



Source: EconomicsHelp.org

Progressive tax and redistribution

- ▶ Tax is the key tool of the redistribution branch of the gov't
- ▶ Recall lecture on inequality and Problem Set 1
- ▶ Extent of redistribution is a topic of political debate (seemingly left vs. right, but truly about the shape of the utility function)

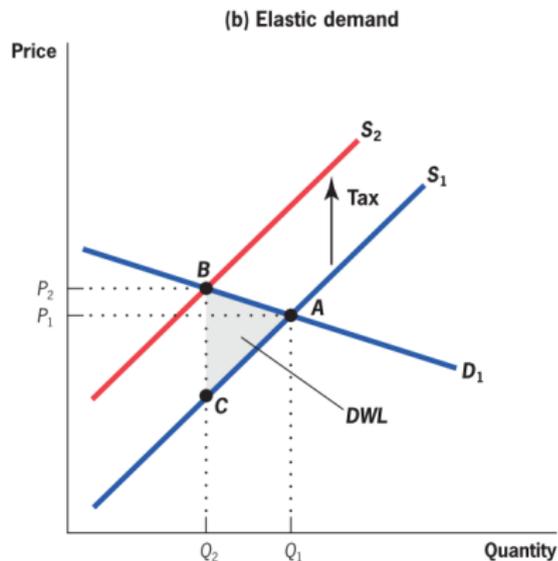
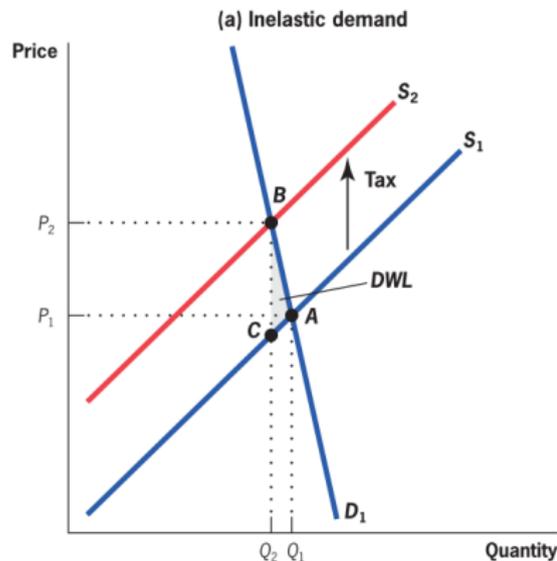
Horizontal equity

- ▶ Similar individuals should be treated similarly by the tax system
- ▶ But how to define similar individuals?
- ▶ Example: who should pay more tax, a single mother with 4 kids or a woman with disabilities?
- ▶ Horizontal equity is a constant topic of debates and the cause of many exemptions, deductions and special provisions in our tax code

Tax incidence

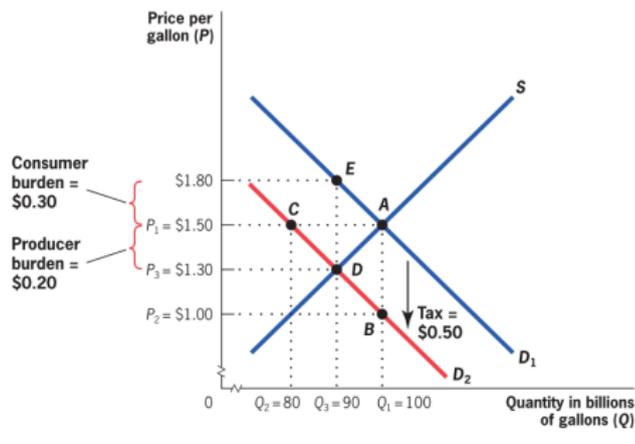
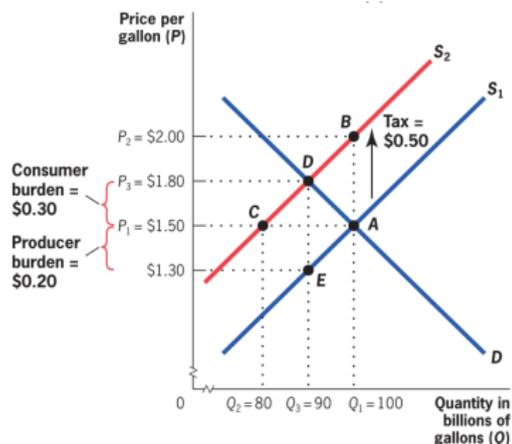
- ▶ Tax incidence is the study of the effects of tax policies on prices and the economic welfare of individuals
- ▶ Who ultimately bears the burden of tax?
- ▶ An example of positive analysis (and serves as input for policymaking)
- ▶ Statutory (legal) vs. economic incidence
- ▶ Example: capital income tax designed to fall primarily on the rich (owners of capital), but is often transferred into prices and borne by consumers
- ▶ All comes down to elasticities

Who pays the tax?



Source: Gruber (2010, Figure 20-2)

Tax incidence in theory..

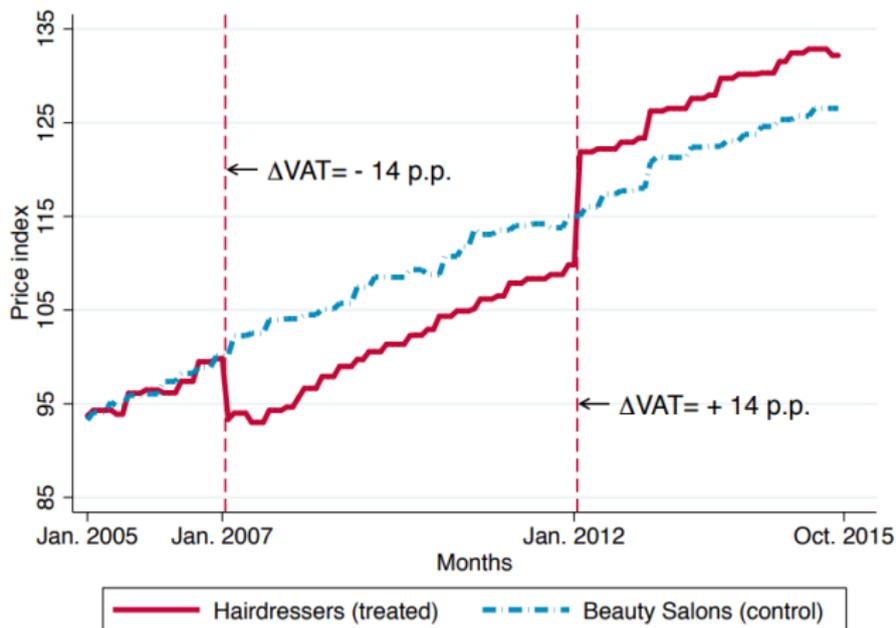


Source: Gruber (2010, Figures 19-2b, 19-3)

..and in practice: Incidence of VAT

- ▶ VATs in Europe are economically significant
- ▶ EU rules restrict large fluctuations except for an experimental program on tax incidence → perfect conditions for research (data freely available)
- ▶ Benzarti et al. (2020) uses a Finnish experiment on hairdressing salons in which VAT decreased by 14 p.p. in 2007 and was reverted back in 2012

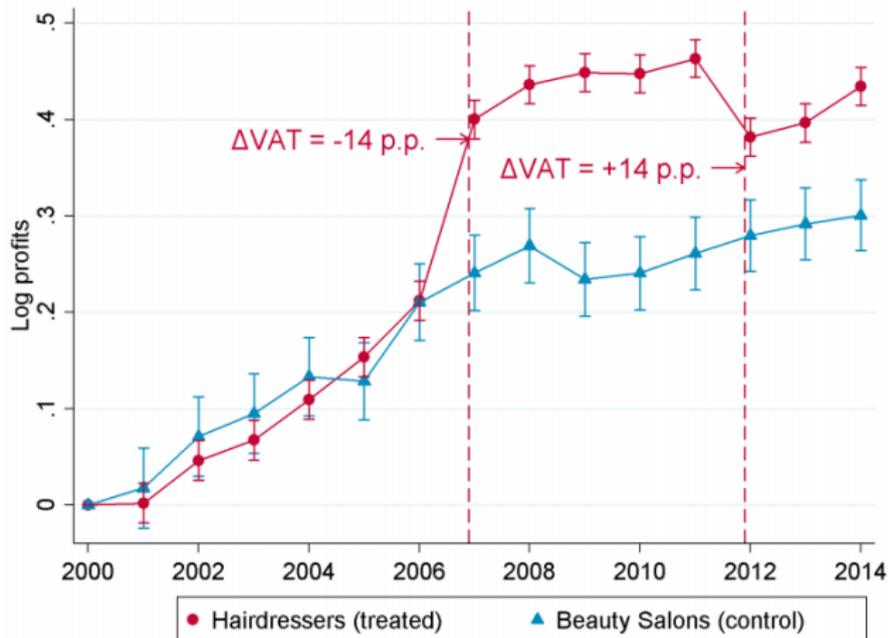
Incidence of VAT



Source: Benzarti et al. (2020, Figure 1)

Incidence of VAT

(a) Profits



Source: Benzarti et al. (2020, Figure 5a))

Tax salience

- ▶ Most likely explanation for this asymmetry: people are inattentive to taxes (while the model assumes full salience)
- ▶ Producers pocket a part of the tax cut because consumers are inattentive to taxes, and producers pass a tax hike because they can easily justify the price increase to consumers.
- ▶ Chetty et al. (2009) test this prediction using a field experiment in US supermarkets



Source: Chetty et al. (2009, Exhibit 1)

Excise tax (included) vs. sales tax (not included)

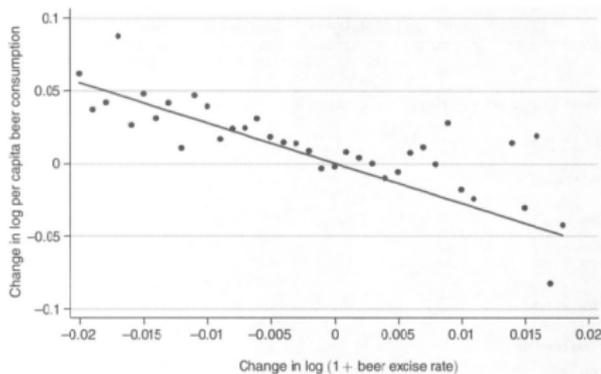


FIGURE 2A. PER CAPITA BEER CONSUMPTION AND STATE BEER EXCISE TAXES

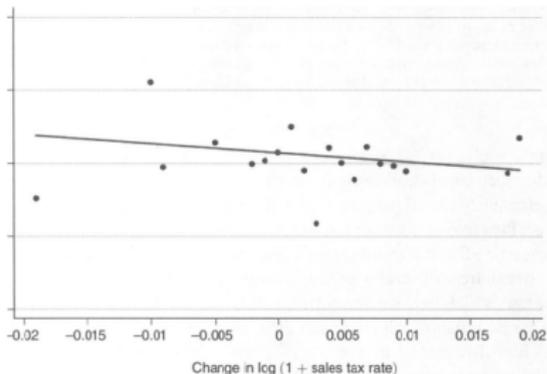


FIGURE 2B. PER CAPITA BEER CONSUMPTION AND STATE SALES TAXES

Source: Chetty et al. (2009, Figure 2)



Thank you!

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References I



Benzarti, Y., Carloni, D., Harju, J., and Kosonen, T. (2020). “What Goes up May Not Come down: Asymmetric Incidence of Value-Added Taxes”. *Journal of Political Economy*, forthcoming (cited on pp. 34–36).



Chetty, R., Looney, A., and Kroft, K. (2009). “Salience and Taxation: Theory and Evidence”. *American Economic Review*, 99(4) (cited on pp. 37–39).



Gruber, J. (2010). *Public Finance and Public Policy*. Third. New York, USA: Worth Publishers (cited on pp. 12, 13, 32, 33).



Musgrave, R. A. (1939). “The Voluntary Exchange Theory of Public Economy”. *The Quarterly Journal of Economics*, 53(2) (cited on p. 6).



References II



Saez, E. and Zucman, G. (2019). *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay*. WW Norton & Company (cited on pp. 19, 25).