

Lecture 11: Optimal taxation, personal income taxation

Miroslav Palanský

Charles University, Prague



April 28, 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	Corporate taxation	21, 23	Petr Janský
13	May 12	Tax avoidance	24, 25	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

Optimal taxation

Optimal commodity taxation

Optimal income taxation

Recap: How to tax?

- ▶ 2 fundamental questions:
 1. How? → Efficiency, flexibility
 2. Whom? → Equity, transparency
- ▶ Equity-efficiency trade-off
- ▶ Equity concerns: vertical and horizontal
- ▶ Costs of taxation: deadweight loss, admin

Optimal taxation

- ▶ Objective: design the tax/transfer system so as to **maximize social welfare**
- ▶ Social profit function:

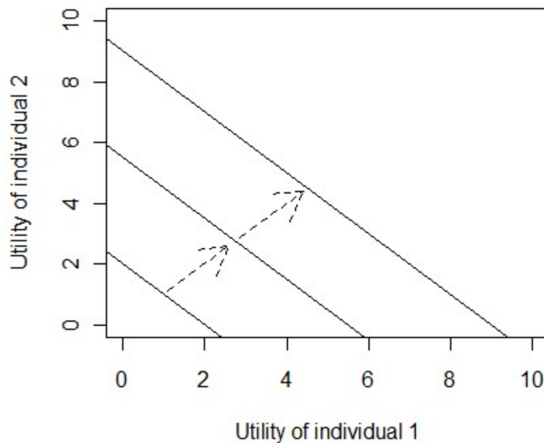
$$\pi_s = u(\text{public expenditure}) - v(\text{public revenue})$$

- ▶ There is a certain level of social welfare without gov't, and gov't intervenes in order to increase this level (i.e. to achieve $\pi_s > 0$)
- ▶ In other words, the gov't maximizes the social welfare function

Social welfare function

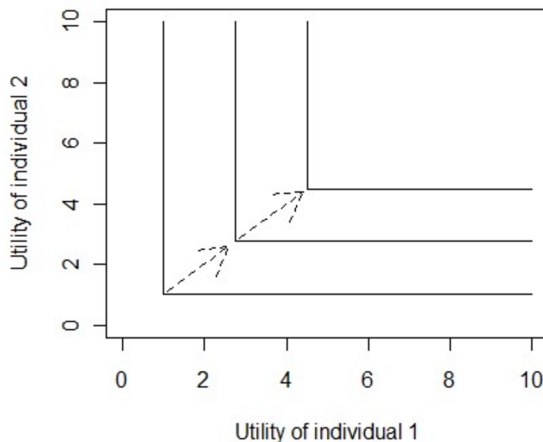
- ▶ SWF = a function that ranks social states
- ▶ An optimal tax/transfer system maximizes the SWF
- ▶ But just what does this social welfare function look like?
 1. Utilitarian: $W = \sum_{i=1}^N U_i$
 2. Rawlsian: $W = \min\{U_i\}$
 3. Bernoulli-Nash: $W = \prod_{i=1}^N U_i$... mix of (1) and (2)
 4. Mean Bernoulli-Nash: $W = \sqrt[N]{\prod_{i=1}^N U_i}$... mix of (2) and (3)
... and so on

Utilitarian SWF



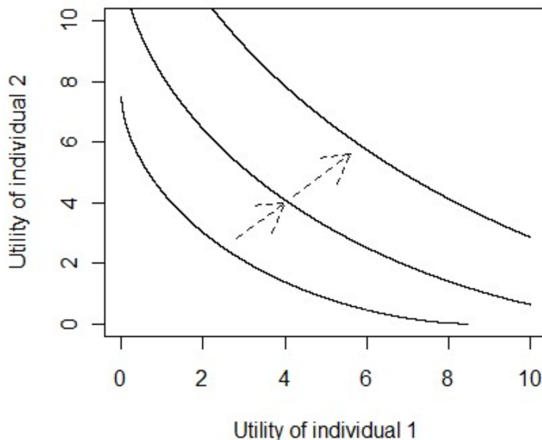
Source: <http://www.statisticalconsultants.co.nz/blog/social-welfare-functions.html>

Rawlsian SWF



Source: <http://www.statisticalconsultants.co.nz/blog/social-welfare-functions.html>

Mixed SWF



Source: <http://www.statisticalconsultants.co.nz/blog/social-welfare-functions.html>

Lessons from last lecture

- ▶ To maximize efficiency:
 - ▶ Tax many things a little bit, not a few things a lot (but - admin costs)
 - ▶ Tax inelastic goods

Ramsey (1927) taxation

- ▶ Assumptions: taxing only commodities, only linear taxation
- ▶ $\min_{t_i} \text{DWL} (t_1, \dots, t_N)$ s.t. total tax revenue $\geq R_0$
 - ▶ R_0 is the required government spending
- ▶ Size of the DWL depends on elasticities
- ▶ Generalize for all commodities: $\frac{t_i}{p_i} \eta_U^i$ must be the same for all commodities
- ▶ Denote this value by $k \rightarrow \frac{t_i}{p_i} = \frac{k}{\eta_U^i}$... the Ramsey rule

Ramsey taxation

- ▶ Result: to minimize deadweight loss, the tax imposed should be inversely related to the elasticities of demand and supply:

$$\frac{t}{p} = k \left(\frac{1}{\eta_u^d} + \frac{1}{\eta^s} \right)$$

- ▶ t ... per unit tax
 - ▶ p ... after-tax price
 - ▶ k ... a proportionality factor
 - ▶ η_u^d ... elasticity of demand
 - ▶ η^s ... elasticity of supply
- ▶ Problem: demand for necessities is more inelastic than the demand for luxuries
→ such a tax system would be regressive

Classical optimal taxation theory

- ▶ Edgeworth (1897), Pigou (1920): a utilitarian social planner with full information will be **completely egalitarian**

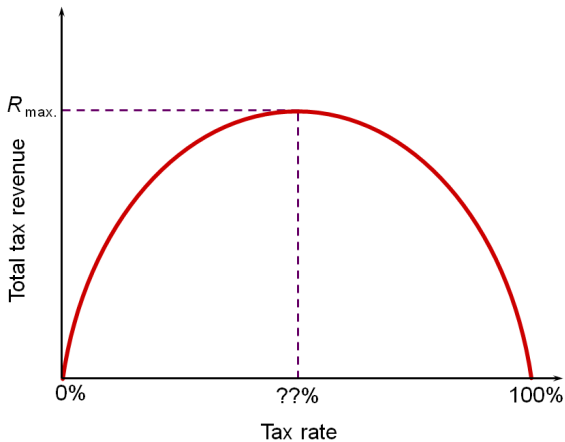
▶ Edgeworth box

- ▶ In other words, to maximize social welfare, if all people had the same preferences, they should all have the same income
- ▶ This is where the ability-to-pay principle comes in
- ▶ So why not 100% redistribution? Many obvious problems

Problem 1: Behavioral response

- ▶ In an ideal world, gov't observes productivity, and taxes it with a lump-sum tax
- ▶ In reality, gov't only observes income (= productivity * time)
- ▶ Time (effort), as we all know, is chosen by ourselves based on incentives, which are distorted by tax
- ▶ 4 elasticities of labor supply
 - ▶ Margin of response
 1. intensive (hours conditional on employment)
 2. extensive (participation)
 - ▶ Timing of response
 3. steady state (work vs. leisure)
 4. intertemporal substitution (work now vs. work later)

Laffer curve



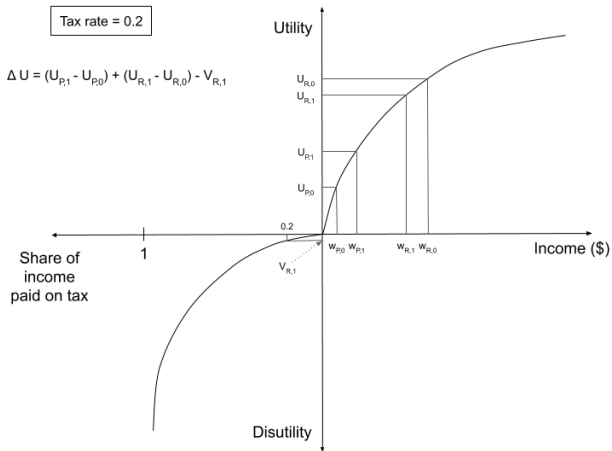
A Laffer Curve

Source: Adam Smith Institute

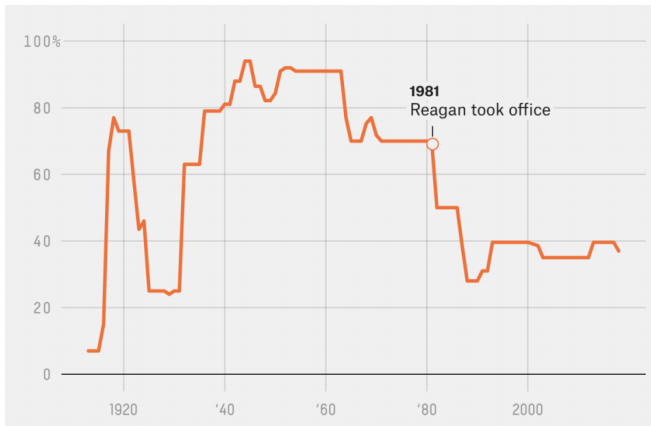
Problem 2: Perception of tax as confiscatory

- ▶ Even if redistribution brings more utility, giving up your income also brings additional disutility
- ▶ Redistribution must be perceived as fair; 100% redistribution is not
- ▶ See empirical results such as the ultimatum game, which point to high value of the sense of fairness
- ▶ When do fairness concerns kick in?

Redistribution and utility



High top PIT rates not unusual



Source: FiveThirtyEight.com, Tax Policy Center

Problem 3: Imperfect information

- ▶ Taxpayers have an incentive to conceal or bias information in order to pay lower taxes
- ▶ Tax evasion more likely when controls are vague (self-employment) than when there is third-party reporting (employment)
- ▶ Misinvoicing, underreporting, claiming undue deductions



Source: <http://i.imgur.com/TO5yNhe.jpg>

Bunching at kinks

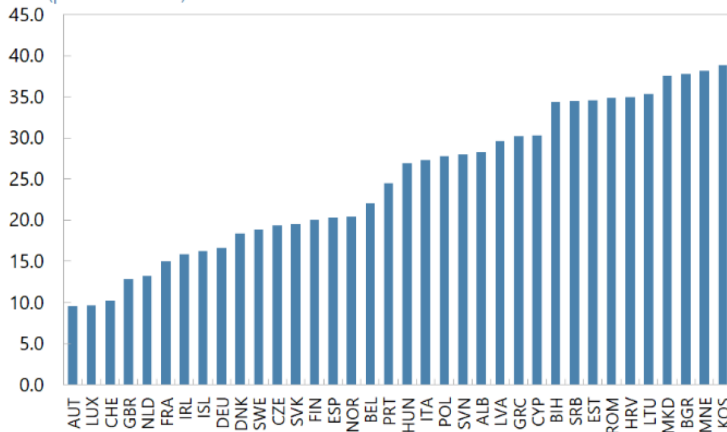
Panel B. Two or more children



Source: Saez (2010, Figure 4)

Shadow economy

Size of Shadow Economy in European Countries, 2016 (percent of GDP)

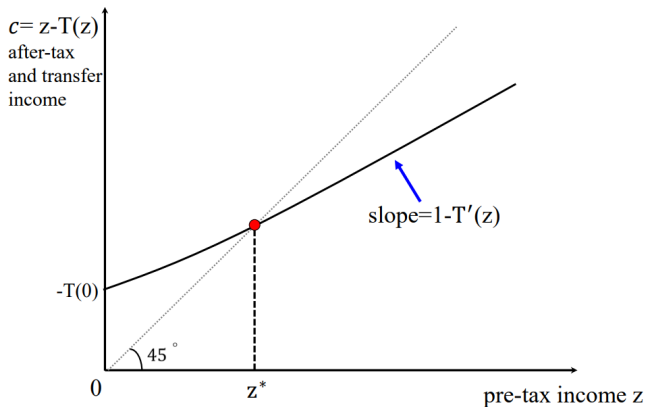


Source: IMF

Problem 4: Lower tail

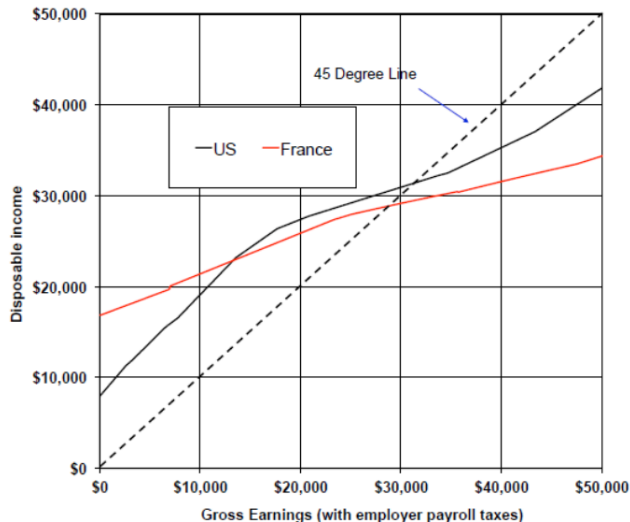
- ▶ People at the beginning of the income distribution receive transfers
- ▶ Who should be eligible? How large should these transfers be?

Tax/transfer system



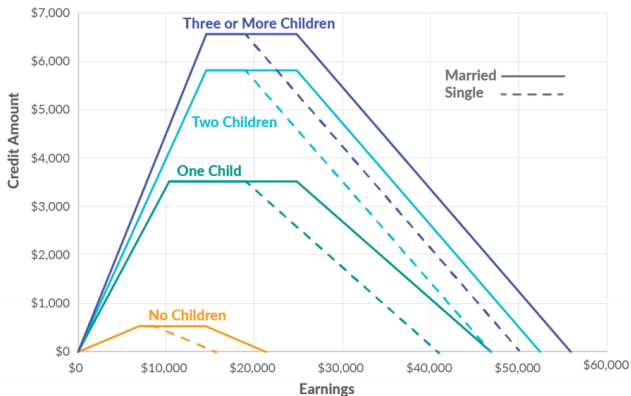
Source: Saez (2020)

Tax/transfer system



Source: Piketty and Saez (2013)

Earned income tax credit, US, 2019



Source: Tax Foundation

Optimal income taxation

- ▶ Mirrlees (1971): first rigorous mathematical model to quantify the equity-efficiency trade-off in the labor market
- ▶ Assumption: individuals differ in their productivity (i.e. their innate ability to earn income)
- ▶ The social planner would like to tax those of high ability and give transfers to those of low ability, but needs to make sure that the tax system does not induce those of high ability to feign being of low ability

Top marginal tax rates

- ▶ The schedule of marginal tax rates is the main battleground in the trade-off between equity and efficiency
- ▶ Consider an increase in the marginal tax rate at a given level of income Y_0
→ efficiency cost (discourages people who earn Y_0 from exerting effort)
- ▶ But this tax hike is non-distortionary for individuals who earn $Y \geq Y_0$: their average tax rate changes, but not their marginal tax rate
- ▶ Very complex derivation

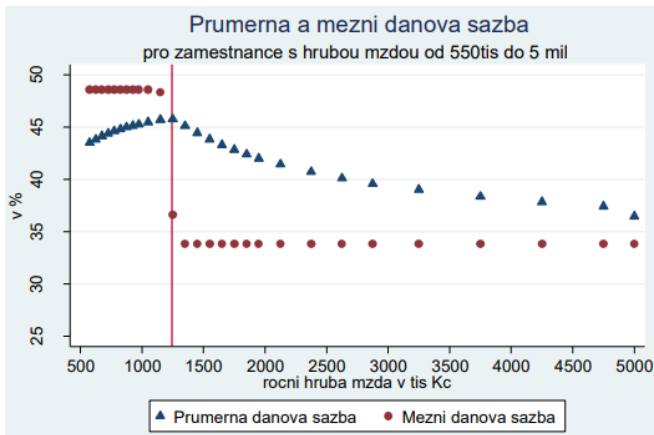
Saez (2001)

- ▶ Using elasticities to derive much simpler formulae
- ▶ Simulations with real data → optimal top marginal rates for labor income between 50% and 80% (!)
- ▶ Drawbacks:
 - ▶ No tax evasion
 - ▶ Elasticities not perfectly observable and very sensitive to preferences

Optimal taxation: a short guide to estimates

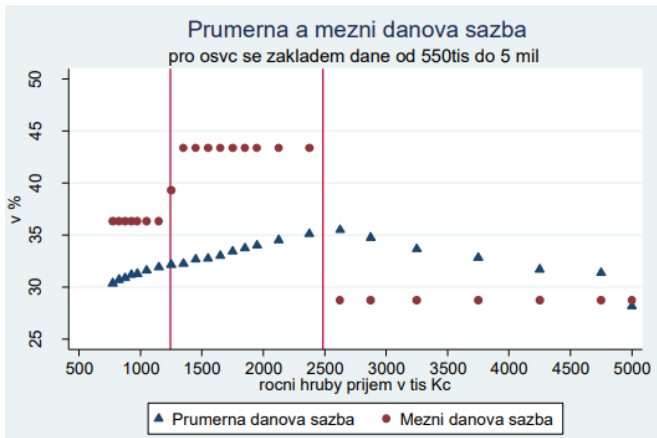
- ▶ Three main factors that affect the estimated optimal tax rate t^* :
 - ▶ Elasticity: inelastic increases t^*
 - ▶ Distribution: inequality increases t^*
 - ▶ Social welfare function: caring about the poor (and the size of the group) increases t^*
- ▶ Dušek and Šatava (2015): using realistically selected input parameter values, the optimal marginal tax rates imposed on the highest incomes range between 33–43% for Czechia

Taxing employees' income in Czechia



Source: Dušek and Šatava (2015)

Taxing entrepreneurs' income in Czechia



Source: Dušek and Šatava (2015)






Thank you!

Miroslav Palanský




miroslav.palansky@fsv.cuni.cz

miroslavpalansky.cz

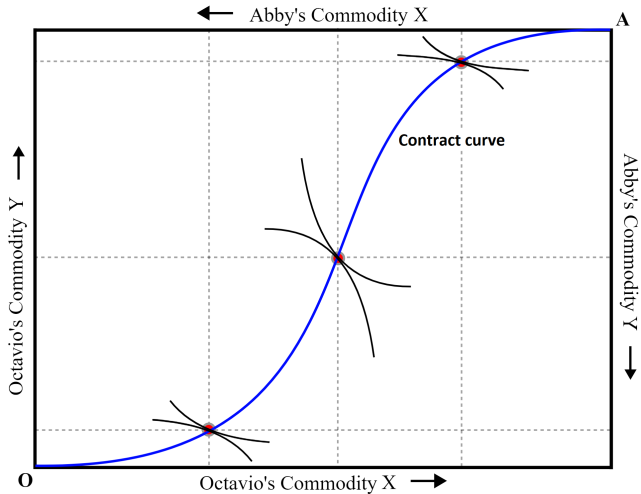
References I

-  Edgeworth, F. Y. (1897). "The Pure Theory of Taxation". *The Economic Journal*, 7(25) (cited on p. 15).
-  Mirrlees, J. A. (1971). "An Exploration in the Theory of Optimum Income Taxation". *The Review of Economic Studies*, 38(2) (cited on p. 29).
-  Pigou, A. C. (1920). *The Economics of Welfare*. London, United Kingdom: Macmillan (cited on p. 15).
-  Piketty, T. and Saez, E. (2013). "Optimal Labor Income Taxation". In: *Handbook of Public Economics*. Vol. 5. Elsevier (cited on p. 27).
-  Ramsey, F. P. (1927). "A Contribution to the Theory of Taxation". *The Economic Journal*, 37(145) (cited on p. 12).

References II

-  Saez, E. (2001). “Using Elasticities to Derive Optimal Income Tax Rates”. *The Review of Economic Studies*, 68(1) (cited on p. 31).
-  – (2010). “Do Taxpayers Bunch at Kink Points?” *American economic Journal: economic policy*, 2(3) (cited on p. 23).
-  – (2020). *Graduate Public Economics Slides*. (Cited on p. 26).

Edgeworth box

[← Back](#)

Source: Wikipedia