The theory of taxation/3 (ch. 19 Stiglitz, ch. 20 Gruber, ch.15 Rosen)

- Desirable characteristics of tax systems (optimal taxation)

Optimal Taxation: Desirable characteristics of tax systems

- We have seen that most taxes introduce **deadweight losses because they alter relative prices and reduce the quantity traded of the taxed commodity/factor, thus altering the allocation of resources**
  - Only **Lump sum taxes are non distortionary** because they do not depend on alterable characteristics such as wealth or income or individuals/firms behaviour, but are **very difficult to implement** in practice and often have negative equity effects.
  - **Corrective taxes**, levied to correct market failures, also rise revenue (and thus reduce the reliance on other taxes) and improve economic efficiency (*double dividend*).

- **Optimal taxation** identifies tax policies that minimise the DWL of the tax system. This means choosing the tax rates across goods/factors that minimise the DWL for a given tax revenue requirement

Desirable characteristics of tax systems

A "good" tax system must have the following characteristics:

1. **Economic efficiency**: it should not distort individuals' economic behaviour and minimise the DWL.

2. **Fairness**: it should treat individuals in similar circumstances similarly (horizontal equity) and it should impose higher taxes on those who can better bear the burden of taxation (vertical equity)

3. **Administrative simplicity**: it should have low costs of administration and compliance

4. **Flexibility**: the tax system should be easy to adapt to changing economic and social conditions

5. **Transparency**: taxpayers should be able to easily ascertain what they are paying for.

Optimal taxation on *commodities* (the Ramsey Rule)/1 -Intuition:

- We have seen that **DWL = - (½) dt² η$_d$ Q,** this means that:
    1. **DWL** increases at the rate of the square of the variation in the tax rate;
    2. **DWL** increases with the absolute value of the elasticities: if either elasticity is zero, i.e.one side of the market is completely inelastic, there is no DWB.

   therefore with many goods **the most efficient way to raise tax revenue** (keeping DWB as low as possible) is:

- To **tax relatively more the inelastic goods**. E.g. medical drugs, food. (**inverse elasticity rule**). But this implies equity problems
- To **spread the taxes across all goods so as to keep tax rates relatively low on all goods** because DWB increases with the square of the tax rate (**broad base rule**)

Optimal *commodity taxation* : the Ramsey Rule/2

- **Key question**: **How to minimize the DWL associated to a set of commodities, subject to a tax revenue amount required by the government**:

$$\min (DWL_1 + DWL_2 + \dots DWLn)$$

$$\text{subject to } R_1 + R_2 + \dots Rn = \underline{R}$$

- **Ramsey Rule**: in order to minimize the **DWL**, given the **amount of tax revenue R** the government wants to raise, taxes should be set across commodities so that the **ratio between the Marginal DWL (MDWL) and the Marginal Tax Revenue (MR) is the same across all commodities:**

$$\frac{MDWL_i}{MR_i} = \lambda$$

- **Given the tax revenue R**, if **(MDWL/MR)$_A$ > (MDWL/MR)$_B$),** then taxing good A causes a greater DWL per euro of revenue than taxing good B. To reduce the DWL, **the tax on A should be reduced and the tax on B should be increased** until the ratios of MDWL/MR on both goods are the same and equal to λ**.**

Optimal *commodity taxation* : the Ramsey Rule/3 the Inverse Elasticity Rule

- In perfect competition with supply perfectly elastic, the **DWL= - (1/2)dt² η$_d$ Q** (assuming: P=1 and perfect competition), and the **MDWL = - t η$_d$ Q;** while the MR is equal to €1

- Then the Ramsey rule states that, given Q, the **optimal commodity tax rate t*,** should be set so that:

$$t_i^* = - 1/\eta_i \times \lambda$$

This means that the relative tax rates should be inversely related to demand elasticities.

Optimal *commodity taxation* : the Ramsey Rule/4

- This implies that we need to balance two aspects when setting optimal commodity taxes:

  - **Inverse Elasticity rule**: to improve tax efficiency **commodities with lower demand elasticities (low η) should be taxed more (because the DWL would be low) and vice versa.**

    → **equity implications**: commodities with low demand elasticity are usually **primary goods** which are largely consumed by low income consumers and this rule might have negative distributional (equity) effects (vertical equity).

  - **Broad base rule**: it is better to tax a large number of goods at a low rate, rather than to tax few goods at a high rate (***tax smoothing***), because the marginal DWL from a tax increases with the tax rate.

- **To balance these two rules, the government should tax the more inelastically demanded goods at a higher tax rate, but should tax the other goods as well**.

Optimal *income taxation*/1- Intuition:

- ***Optimal income taxation:*** Setting the tax rates across income groups so as to **maximize social welfare** given a tax revenue requirement.

- **Trade off between equity and efficiency**: the goal is to rise a certain amount of tax revenue, while maximising social welfare.
  - ➢ Society may be willing to accept **higher inefficiency (greater DWL) in return for a more equal distribution** of income.
  - ➢ However rising the tax rate may **reduce labour supply (behavioural effects of taxes)** and thus reduce the **tax base** and tax revenues (***Laffer curve***).

- We thus have to consider the **distributional consequences of taxation and the effects of taxation on labour supply** (which in turns affects the level of income and the tax base).

Optimal *income taxation/2- Ramsey Rule*

- **Ramsey Rule**: in order to maximise social welfare subject to a revenue requirement:

<div align="center">

Max SW= U1+U2+…Un

subject to: R1+R2+…Rn = <u>R</u>

</div>

- The income tax rate should be set so that across individuals :

$$\boxed{MU_i / MR_i = \lambda}$$

  i.e. the marginal loss of utility per each euro of tax revenue raised should be the same across all individuals**.**

- Since the Marginal Utility declines as individual consumption rises (due to the principle of diminishing marginal utility of consumption), **higher income taxes, reducing consumption, increase the MU of consumption for individual i.**

Optimal income taxation/3- Implications

The optimal tax system has **to balance vertical equity with behavioral reponses:**

- **Vertical equity**: social welfare is maximized when those who have a high level of consumption - and thus a low MU - (**the rich**) are taxed more heavily, while those who have a low level of consumption - and thus a high MU - (**the poor**), are taxed less heavily.

- **Behavioural responses**: however taxes cannot rise too much to avoid that individuals reduce labour supply and earn less income. **So there is a tax rate t* that maximise tax revenue.** Additional increases in taxe rates (t > t*) will reduce tax revenue, because income (the base of taxation) becomes smaller due to reduction in labour supply (**Laffer Curve**).

Since taxation affects labour supply, we have also to consider the **elasticy of labour supply** and **tax less individuals with very elastic labour supply** (for example women, or high income people).

Optimal Income Taxes

An Example (Gruber, 2007 chapter 20)


■ FIGURE 20-7
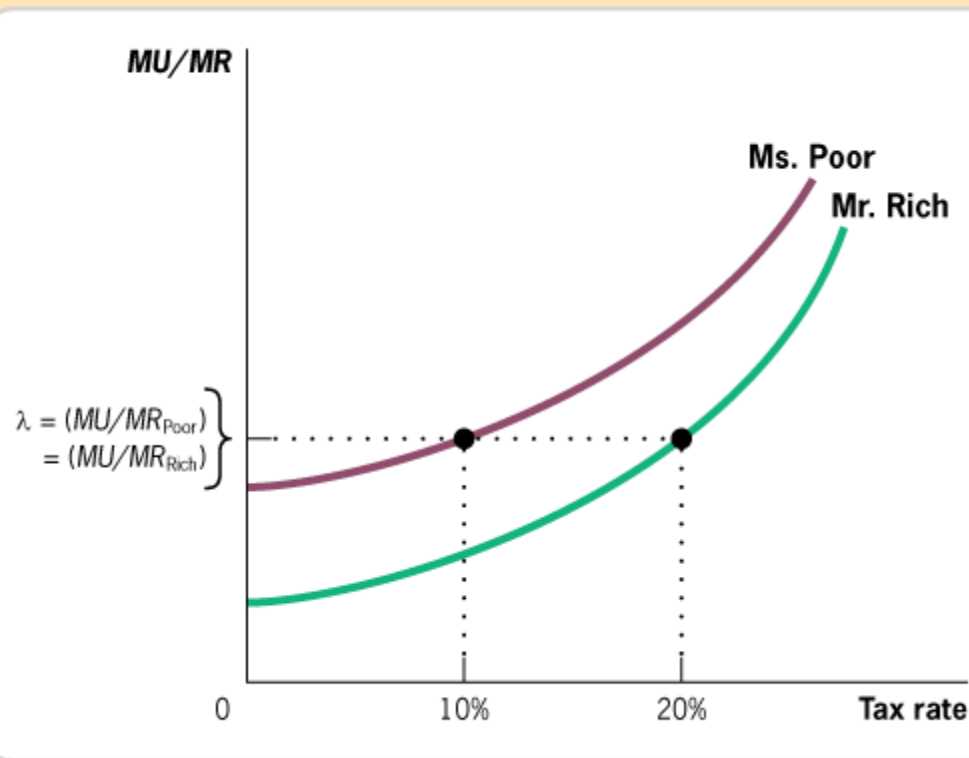
Optimal Income Taxation • The ratio of marginal utility to marginal revenue rises as tax rates rise for any taxpayer, but this ratio for Mr. Rich is everywhere below the ratio for Ms. Poor. Optimal income tax rates are those that equate this ratio across taxpayers. Here, the optimal rates are 10% for Ms. Poor and 20% for Mr. Rich.

Optimal Income Taxes

The Laffer Curve (Gruber, 2007- chapter 20)

■ FIGURE 20-6
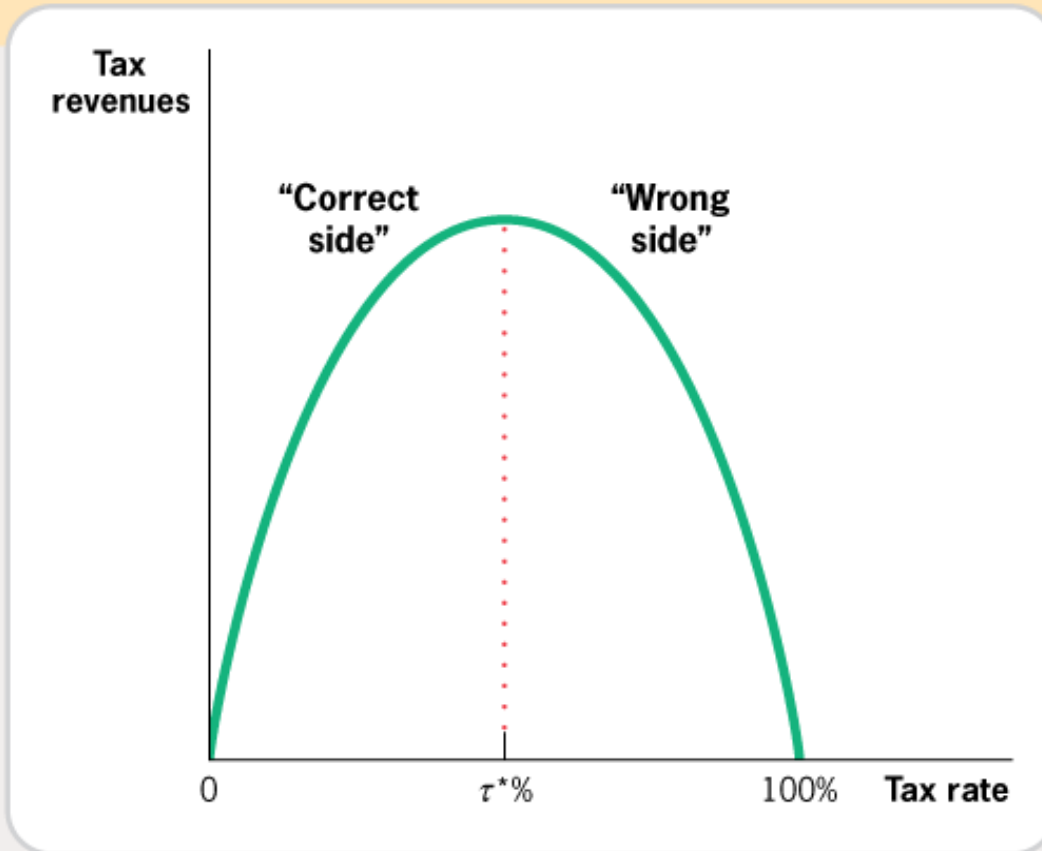
The Laffer Curve • As tax rates rise from 0 to τ^*, tax revenues rise; but when tax rates rise above τ^* toward 100%, tax revenues fall.

Optimal income taxation/4 - implications

- A ***progressive taxation on income*** (usually adopted for equity reasons) **is less efficient than a *proportional income tax because:***

  - **progressive taxes have higher marginal tax rates for successive bands of income which produce higher substitution effects** and are more likely to introduce disincentives to work and higher DWL

  - However a reduction in top tax rates is contrary to **equity rules**.

Marginal and average tax rates: an example

- If my income is 2500 euro and the tax rates are:

  ➤ 5% for income up to 1000 euro

  ➤ 6% for income between 1000 and 2000 euro

  ➤ 7% for income above 2000 euro

- I have to pay in total 145 euro: the MTR is 7% the ATR is 5,8%.

  With progressive taxation: MTR>ATR

  Regressive taxation: MTR<ATR

  Proportional taxation: MTR=ATR

Fairness in practice: horizontal vs vertical equity

- **Horizontal equity**: individuals with the same characteristics should be treated the same and pay the same taxes. **Non discrimination principle**.

  Problems: which characteristics should we consider (preferences may differ)? How do we define equal treatment?

- **Vertical equity**: individuals with higher *ability to pay* should be taxed more or individuals who receive more from the government should pay more taxes?.

  Problems: how do we define the ability to pay (it is not observable)? How much more should those considered better off pay?

Fairness in practice: different basis of taxation

- It is possible to tax only measurable variables:
  a. Income
  b. Consumption
  c. Benefits

Income (or lifetime income)

- most used basis for taxation, but indirect and imperfect measure of an individual ability to pay, because it penalises those who work harder.
- How do we consider differences in characteristics such as health (deductions in medical expenses), marital status (individual vs household income taxation), presence of children (deductions for the costs to rise children)?.

Consumption (or lifetime consumption) measures what one consumes (takes out of society) rather than what one contributes: **C=Y-S**. The question is then whether savings should be exempted from taxation.

Benefit approach: individuals should pay taxes in relation to the benefits they receive from public services. Adopted for some services where fees may be charged to users. Difficult to apply for pure public goods and for low income individuals. In addition benefit taxes (fees) introduce distortions in the use of public facilities

To summarise/1

- The **efficiency costs of taxation is measured by the DWL** arising from the reduction in the consumption/production of a commodity,

- The **DWL rises with the elasticity of demand and supply and with the square of the tax rate** (the higher the tax rate, the larger the incremental deadweight loss of taxation)

- When there are **pre-existing distortions** (like externalities), taxes have **larger efficiency costs.**

- **Progressive taxes have a larger efficiency cost** than proportional taxes (but equity issues)

- **Optimal commodity taxation** involves **balancing the inverse elasticity rule** (taxing more the inelastically demanded goods) and **the broad base rule** (broadening the tax base and minimise overall tax rates)

- **Optimal income taxation** involves **balancing equity** (taxing more the rich) and the **efficiency** goals(reducing the distortions associated with taxing more the rich).

To summarise/2

- **Optimal commodity taxation**:
  - Ramsey Rule: $t_i^* = -\lambda / \eta_i$. Optimal tax is inversely proportional to the elasticity of demand.
  - Tradeoff: DWL rises with η_i but also with t^2.

- **Optimal income taxation**:
  - Trade-off between equity and efficiency: the goal is to rise a certain amount of revenue, while maximising social welfare
  - Ramesy Rule: Set **t*** across income groups so that at **t*** the **MUi/MRi=** λ for all individuals i
  - **t*** maximises revenue, if t>t* tax revenue will decrease (Laffer curve).