Chapter 16. Efficient and equitable taxation

The theory of optimal commodity taxation needs a government's goal. We assume that the only goal is to finance the state's expenditures with a minimum of excess burden and without using any lump sum taxes.
One individual consumes commodities X and Y as well as leisure (L). w=wage rate.
T=**time endowment** (*maximum numbers of hours per year an individual can work.*

No tax: $w(T-L) = P_xX + P_yY$
$$\Diamond\ wT = P_xX + P_yY$$

With tax (t): $wT = (1+t)P_xX + (1+t)P_yY + (1+t)wL$
$$\Diamond\ 1/(1+t) \times wT = P_xX + P_yY + wL$$

A tax at the same rate on all commodities, including leisure, is equivalent to a lump sum tax and has no excess burden. However, putting a tax on leisure time is impossible. Only the commodities ca be taxed and therefore some excess burden is unavoidable. It might seem that the solution is to tax the commodities at the same rate (**neutral taxation**), but this is in general not efficient.
To minimize overall excess burden, the marginal excess burden of the last dollar of revenue raised from each commodity must be the same. Otherwise, it would be possible to lower overall excess burden by raising the rate on the commodity with the smaller excess burden.

Ramsey rule: $(\Delta X)/X1 = (\Delta Y)/Y1$

The **Ramsey rule** states that to minimize excess burden, tax rates should be set so that the proportional reduction in the quantity demanded of each good is the same. When goods are unrelated in consumption the Ramsey rule implies that relative tax rates should be inversely related for the compensated demand elasticities (**inverse elasticity rule**). Efficient taxation requires that relatively high rates of taxation be levied on relatively inelastic goods.
**Inverse elasticity rule: $t_x / t_y = \eta_y / \eta_x$**

The **Corlett-Hague rule** (implication): when there are two commodities, efficient taxation requires taxing the commodity that is complementary to leisure at a relatively high rate.
Efficiency is not the only criterion for evaluating a tax system. Fairness is also important. A tax system should have a **vertical equity** – it should distribute burdens fairly across people with different abilities to pay. If society has distributional goals, departures from efficient taxation rule may be appropriate.
Sometimes the government itself is the producer of a good or service. Then the government should directly choose a price to be paid, a **user fee**. Choosing optimal user fees is quite similar to choosing optimal taxes. In the optimal tax problem, the government sets the price indirectly by the choice of the tax rate. With a user fee, this is done directly.
Decreasing average costs often leads to public sector production. Under these circumstances it is likely that there is a **natural monopoly**. A monopolist produces an inefficient output, because its price is higher than its marginal costs (MR=MC). This inefficiency and the fact that the society may not approve the existence of a monopoly provide a justification for government production.
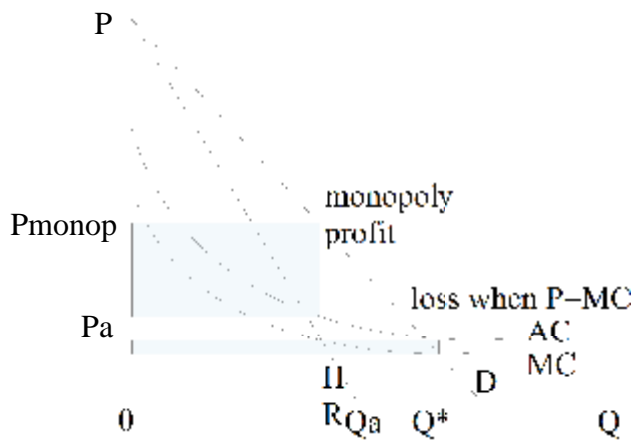
However, at the point of P=MC, the price is less than the average costs which means the government will have to incur losses. There are several solutions for this problem:

1. *Average cost pricing*
   Price equals average cost (P=AC), no profits/losses. But still falls short of the efficient amount.

2. *Marginal cost pricing with lump sum taxes*
   Price equals marginal cost (P=MC). Financing the deficit with lump sum taxes on the rest of the society guarantees that no new inefficiencies are generated by meeting the deficit. But lump sum taxes are generally unavailable, and there is a widespread belief that fairness requires consumers of a publicly provided service to pay for it (**benefits-received principle**).

3. *A Ramsey solution*
   The government has to raise a certain amount of revenue, by setting the user fees so that demand for each commodity is reduced proportionately.

Now we are going to focus on how progressive an income tax should be. The goal of the theory of optimal income taxation is to provide a systematic way for thinking about the right amount of tax progressivity.

Edgeworth's model (optimal income taxation) assumptions:
- The goal is to make the sum of individuals' utilities as high as possible.
  Maximize W=U1+U2+…+Un
- Individuals have identical utility functions that depend only on their incomes and these functions exhibit diminishing marginal utility of income.
- The total amount of income in fixed.

These assumptions imply that taxes should be set so that the after-tax distribution of income is as equal as possible. Edgeworth's model reflects a very progressive tax structure. Marginal tax rates on high income individuals are 100%.

However, the assumption that income is fixed is not realistic. The process of allocating the tax burden involves distorting work decisions and creating excess burdens. That is why the total amount of real income available will be reduced.

The model of **Stern** takes these work incentives in account.

Tax revenues = -α + t x Income   (*t=marginal tax rate*)

This is a **linear income tax schedule** (or flat income tax) – the geometric interpretation is a straight line. Note that the schedule is still progressive in the sense that the higher an individual's income, the higher the proportion of income paid in taxes. The optimal income tax problem is to find the best combinations of α and t – the values that maximize social welfare. The more elastic the supply of labor, the lower the optimal value of t, other things being the same. One limitation of Stern's analysis is that it constraints the income tax system to have only one single marginal tax rate.

Unless the government can credibly promise not to renege, it cannot conduct the fully efficient tax policy. This phenomenon is called the **time inconsistency of optimal policy** –the stated policy is inconsistent with the government's incentives over time, and taxpayers realize this fact. In this way, policy recommendations based on optimal tax logic may actually reduce welfare.

We just argued that an efficient tax is one with a small excess burden. But tax systems may be evaluated by standards other than those of optimal tax theory:

- **Horizontal equity**

People in equal positions should be treated equally. The difficulty is to measure these equal positions. Because work effort is at least to some extend under people's control, two individuals with different incomes may actually be in equal positions. It seems that the wage rate gives a better reflection of equal positions rather than income. However, the wage rate has problems too: (1) investments in human capital can influence the wage rate. (2) Wage rate per hour is often hard to measure. An alternative is to measure it in utilities.

The *utility definition of horizontal equity*:
- If two people have the same utility level before the tax, they should also be equally well off with taxation.
- Taxes should not alter the utility ordering.

However, as long as tastes for leisure differ, any income tax violates the utility definition of horizontal equity. People in different occupations pay unequal taxes (due to amenities that are not taxable), but there is no horizontal inequity, because of adjustments in the before-tax wage. The process of migrating between jobs continues until the net returns are equal (demand and supply of labor).

The conclusion is that a preexisting tax structure cannot involve horizontal inequity. All horizontal inequities arise from changes in tax laws, because individuals make commitments based on the existing laws that are difficult or impossible to reverse.

Transitional equity: The problem of fining fair processes to change tax regimes. Finding the right process is difficult and there are not may results available on the subject,

- **Cost of administration**

The assumption that collecting taxes involves no costs is clearly false. The choice of a tax and subsidy systems should take account of administrative and compliance costs. The trick is to find the best trade-off between excess burden and administrative costs. Any reduction in excess burden that arise from differentiating the tax rates must be compared to the incremental administrative costs.

- **Incentives for tax evasion**

Tax avoidance: change your behavior to reduce your tax liability (legal).
Tax evasion: failing to pay legally due taxes (illegal).

Positive analysis of tax evasion:

ρ = *probability of being audited, R= amount hidden for tax authorities*

Assume that you know the value of ρ and the penalty schedule. You make the decision by comparing the marginal costs and benefits of cheating. The optimal amount of cheating is where the two schedules cross. If the marginal cost of cheating exceed the marginal benefit for all positive values, the optimum of cheating equals zero. Still this model ignores some potentially important considerations:
- *Physic costs of cheating*: tax evasion makes people feel guilty
- *Risk aversion*: many people only care about expected income, and risk per se does not bother them.
- *Work choices*: the tax system may affect hours of work and job choices and stimulate the **underground economy –** economic activities that are either illegal, or legal, but hidden from tax authorities.
- *Changing probabilities of audit* :actually the audit probabilities depend on occupation and the size of the reported income.

Normative analysis of tax evasion

Consider two situations:

1. *Society cares about the welfare of tax evaders*
   The existence of an underground economy can raise social welfare. In this case, leaving the underground economy intact might be desirable if society has egalitarian income redistribution objectives.
2. *Evaders are given no weight in the social welfare function*
   The goal is to eliminate cheating at lowest administrative costs. Marginal cost of cheating is the product of the penalty rate and probability of detection. The probability of detection depends on the amount of recourses devoted to tax administration. Still the government can raise the marginal cost by setting really high penalties, but in reality we often see just a retribution, because society also cares about the process by which the result is achieved.