Chapt 2 Principles of Taxation

Alain Trannoy

AMSE, EHESS

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Outline

- 1. Principle of Justice underlying the use of Social Welfare functions with the same concave utility function
  - (see Slides in French " ")
  - Progressivity

- 2. Measures of deadweight loss (Excess burden) of taxation

- 3. Principle of equal sacrifice

Progressivity and inequality

Definition

- In terms of average tax rate

- A tax is progressive when the average rate of tax is increasing with income

- A tax is progressive when the average net-of-tax rate is decreasing with income

- A progressive tax does not need to have a increasing marginal tax rate.

- The Flat tax is progressive

Link between progressivity and inequality

- The Jakobsson theorem

- The tax is progressive everywhere **iff** the (relative) Lorenz curve of post-tax income is above everywhere the Lorenz curve of pre-tax income which is above everywhere the Lorenz curve of tax liabilities

Why : Link between Lorenz curves

- A general result whatever the tax schedule is progressive or not

- The Lorenz curve of pre-tax income is a weighted average of the Lorenz curve of post-tax income and the Lorenz curve of tax liabilities

- $L_X = tL_T + (1-t) L_{X-T}$ with t =T/X the average tax rate

- Then, $L_{X-T} > L_X$ iff $L_T < L_X$

Kakwani index

- The Kakwani index is the area between the Lorenz curve of pre-tax income and tax liabilities

- Kakwani index = Gini of taxes minus Gini of pre-tax income

Progressivity and Savings

- Suppose that savings follows Keynes's Law

- S= sY-a Keynes assumption.

- $Y_2 = Y_1$ + r S the link between incomes of two subsequent periods

- Under Keynes assumption, the Lorenz curve of the second period should be under the Lorenz curve of the first period

- Savings generates more and more unequality over time

The role of taxes ?

- Will progressive taxation offset the dispersing effect of savings ?

- $X = Y + r S(y - T(y))$

- Richter (1984) : Progressive taxation is not enough. Progressive taxation in terms of marginal tax rate is necessary

- The marginal tax rates should be increasing !

2. Efficiency : Measure of the excess burden

- A simple case : assumptions

- Partial equilibrium: A small tax on a good with neither substitutes nor complements

- Representative consumer

- No income effect (Why : see Chapt 1)

Measure of deadweight loss

- Dupuit (1844)

- The change in welfare due to the tax is the sum of change in consumer welfare, producer welfare and tax revenues

- The most difficult issue : measuring the loss of consumer welfare

Quasi-linear utility

- x: consumption in good
- y:cash in hand (what remains in the pocket after buying units of the good)
- $y = m + px$

- $U(y,x) = m + g(x)$ with g increasing and concave (expressed in money)
- No income effect on the consumption of good
- A particular representation of the preferences such that the marginal utility of money is =1 (cardinalization of preferences)
- Special property of indifference curves
- Demand (inverse) of good given by : $p = g'(x)$

Measure of welfare change due to the tax

- Initially: p;Finally: p+t

- Three measures of welfare change coincide

- In that case, the change of welfare measured by the marshallian surplus (MS) is equal to the the welfare change with the equivalent variation (EV) and compensating variation (CV)

Let x= D(p) the demand

MS = integral under the demand curve

THEOREM : For a quasi-linear utility function V(p, y)- V(p+t,y) = Change in MS

Compensating variation

- *Compensation variation* : CV= *what to add to income to compensate welfare effects of the tax* :

- CV(t) such that $V(p,y)=V(p+t,y+CV(t))$

- $CV(t)= E(p+t,V(p,y)) - y$

Equivalent variation

- *Equivalent variation: What to subtract from (in case of a tax) the income in order the consumer has the same welfare before tax as he gets with tax.*

- $EV = V(p, Y-EV)-V(p+t,y)$

- $EV = E(p,V(p+t,y))-y <0$

The three measures are equivalent

- *Theorem*: In case of a quasi-linear utility function, the three measures of change of welfare are equal

- EV(t)= CV(t) = Δ MS (t)

- When t is small dt, Δ MS (dt) = dt d(p+t)

- Linear approximation

- Δ MS (dt) = dt d(p+t)+ ½ dtdx

From the consumer analysis to partial equilibrium analysis

- Up to now, the price was assumed to be unchanged by the tax

- The equilibrium price is affected by the tax

- Generally the price will increase by a smaller amount
- Distinguish between the equilibrium consumer price p and the equilibrium producer price q
- P=q+t

Decomposition of welfare change

- Change in global welfare is the sum

- Change of consumer welfare (done) (replaced dt by dp*)

- Change in producer welfare, change in profit

= the change in the integral above the supply curve between q* and q**

- Change in taxes t.D(p**)

Dupuit approximation formula

- Under assumptions, the change in aggregate welfare is approximated by ½ dt dx when the tax is small

- With linear approximation of demand and supply, the change in consumption dx is proportional to dt.

- Then the deadweight loss ΔW(t) goes on with the square of the tax.

Implication of the formula

- Dissemination of taxes/ small taxes are harmless.

- In an intertemporal setting, better to stabilize the level of taxes rather than to decrease and increase them

- Dissemination and stability : two basic rules induces by the minimization of the excess burden of tax

Equal sacrifice

- Justice in taxation

- Implicit: the distribution of welfare before taxes is assumed to be just.

- Other view: the distribution of welfare after a pure redistributive tax is considered to be just (the redistributive branch)

- Then, there are the public goods to be financed (the allocative branch)

- Principle of justice for taxes of the allocation branch

Two versions of equal sacrifice

- Stuart Mill : absolute sacrifice

- The same loss of utility

- With u = log : Cohen Stuart (1889): proportionate tax

- Cohen Stuart : equal proportionate sacrifice

- Link between the two. It is satisfies the equal proportionate sacrifice for u, it satisfies the absolute sacrifice wrt log (u)

How to apply if the utility function is unknown?

- Peton Young : not necessary to postulate a utility function

- Distributive Justice in taxation H.P Young JET 1988

- Axiomatization of the method of apportioning taxes

- We derive a utility function from primitives principles of distributive justice

- An example of normative economics (Fleurbaey)

Young axiomatization

- Definition of a loss problem (bankruptcy, bequest)

- Tax base: income over or above some subsistence level

- The tax method satisfies:

- 1.Horizontal equity : symmetry
- 2. Continuity

- + Principles of distributive justice

1. Consistency

- *General principle*: An allocation that is equitable for a group of individuals should be equitable when restricted to each subgroup of individuals.

- Consistency : The principle says that the way a group splits a given amount of tax should depend only on their own taxable income.

- Respected by the oldest method to solve bankruptcy pbs (Talmud Auman-Maschler JET 1985)

- Implicit in taxation: taxes are only a function of the taxpayer income

First Young Theorem

- A tax function is symmetric, continuous and consistent iff it is parametric

- Parametric: There exist a real number λ in [a,b] : t= f(x, λ) with f weakly monotonic in λ and f(x,a)=0 and f(x,b)=x
- λ solution of the budget equation (may not be unique)
- Examples: linear tax (not flax); the head tax (subject to ability to pay): Cohen Stuart : Cassel 1901.

- The piece-wise linear tax is not parametric.

2.Monotonicity

- Weak monotonicity : No one's taxes go down when the total tax goes up

- Strict monotonicity

- Consistency + continuity imply monotonicity but not strict monotonicity

3. Order preserving

- Someone who earns more than another before tax should not end up with less in terms of disposable income

- Weak and strict version

- When equal incomes ex ante: symmetry implies equal income ex post

- Strict order preserving cannot hold when taxes are confiscatory

4. Composition principle

- All the previous axioms leave open the exactly how a tax increase should be shared.

- Think of an increase of tax as a new tax added on top of the old t (a surtax)

- The natural basis to allocate the surtax is the taxpayers' current ability to pay, that is, the current after tax income, x-t.

- Every increment of tax should be allocated as if it were a surtax with respect to the current tax

5. Second Young theorem

- A tax method satisfies consistency, strict monotinicity, strict order-preservation and composition iff it is an equal sacrifice method, that is, there exists a utility function u(x),there exists a level of sacrifice s such that for all x, for all tax problems, the tax method equalizes absolute sacrifice relative to u(x).

The utility function is unbounded below

- When the income goes to zero, the utility goes to – infinity

- Supposed that u is bounded below When the incomes become small, because the tax is smaller than the income the difference in utility goes to zero.

Last property : scale invariance

- Two ways of defining it: independence to units of measurement

- Equity is relative. People then to evaluate how fairly they are treated in relative terms

- If we regard taxable income, net of subsistence, as an index of relative ability to pay, then the relative distribution of taxes should depend on the relative sizes of taxable incomes.

The third Yound theorem

- Suppose that a tax method F satisfies the conditions of theorem 2. It satisfies scale invariance iff it equalizes absolute sacrifice with respect to the log utility function or a power utility function.

- In the former case, F is the linear tax

- In the latter case, see formula (Cassel)

- Constant degree of relative risk aversion (CRRA with degree greater or equal 1

- Progressive tax (average taxes)