



## Invited Article “THE OPTIMAL TAXATION”

Preecha Jarungidanan\*

### Introduction

In the last decade, ever-growing attention has been paid to find the optimal situation in various economic fields. In what follows, this paper tries to show the simplest way of the optimal taxation, which will be able to minimize the total sacrifice, minimize the social welfare and maximize the total utility of the society as a whole, by focusing on the ability to pay approach.

The ability to pay calls for equal amounts of tax to be paid by taxpayers with equal ability to pay and for different amounts of taxes when such capacities differ. So, the ability to pay approach leads up to a special taxation of property-owners. Most of the authors of the country report are in favour of property taxation, it is generally found reasonable that, other things being equal, a person should be taxed heavier the larger is his (net) wealth.

---

\* Associate Professor, National Institute of Development Administration (NIDA), Bangkok, Thailand.

## Index of Ability to Pay

Everyone agrees that the tax system should be equitable. Perhaps the most widely accepted principle of equity in taxation is that people in equal position should be treated equally. This principle of equality is fundamental to the ability to pay approach, which requires equal taxation of people with equal ability and unequal taxation of people with unequal ability.

There is no single index of ability to pay which is best under all circumstances. In the colonial period, real estate and personal property (such as cattle) were the most convenient index of "facility".<sup>1</sup> A significant share of income received in kind, so that money income as it is now defined, would have been a misleading index.

With the progress of industrial society and the development of a pecuniary economy, there followed a successive shift in emphasis to income rather than property as an index of ability to pay. Adam Smith had already formulated his first maxim in term of income only, and through the last century income came to be accepted as the proper index of ability to pay. The personal income tax accordingly come to be considered the most equitable tax.<sup>2</sup> Nevertheless, the problem still remains open to debate. It may be argued that income should be defined to include leisure, or that the index of ability to pay should be defined as consumption rather than income. Even if an accretion concept of income is accepted as the proper index of ability to pay, it is far from clear how accretion should be defined in concrete cases.<sup>3</sup>

Some writers point out that property will itself contribute to the standard of a person through the safety, it gives him against various economic risks, loss of income in case of sickness, unemployment etc.

Other things being equal the property owner has the advantage over another who owns no property and is dependent solely on his personal working power for acquiring his income, that is he has a larger income at his disposal with the same amount of effort.

One of the points drawn attention to is that income from work is less stable than that from property. Although, most western countries, today, the difference has become smaller as a result of active employment policy of the governments, combined with the statutory social provisions for wage and salary earners but the property income is still more stable than other kinds of income. For these reasons, if other things being equal, the property-owners should have more ability to pay.

---

<sup>1</sup> A. Musgrave and Peggy B. Musgrave. "Public Dinance In Theory and Practice." (New York: McGraw-Hill Book Company, 1973), p.322.

<sup>2</sup> R.A. Musgrave. "The Theory of Public Finance." (New York: McGraw-Hill Book Company, 1959), p.94.

<sup>3</sup> Ibid.



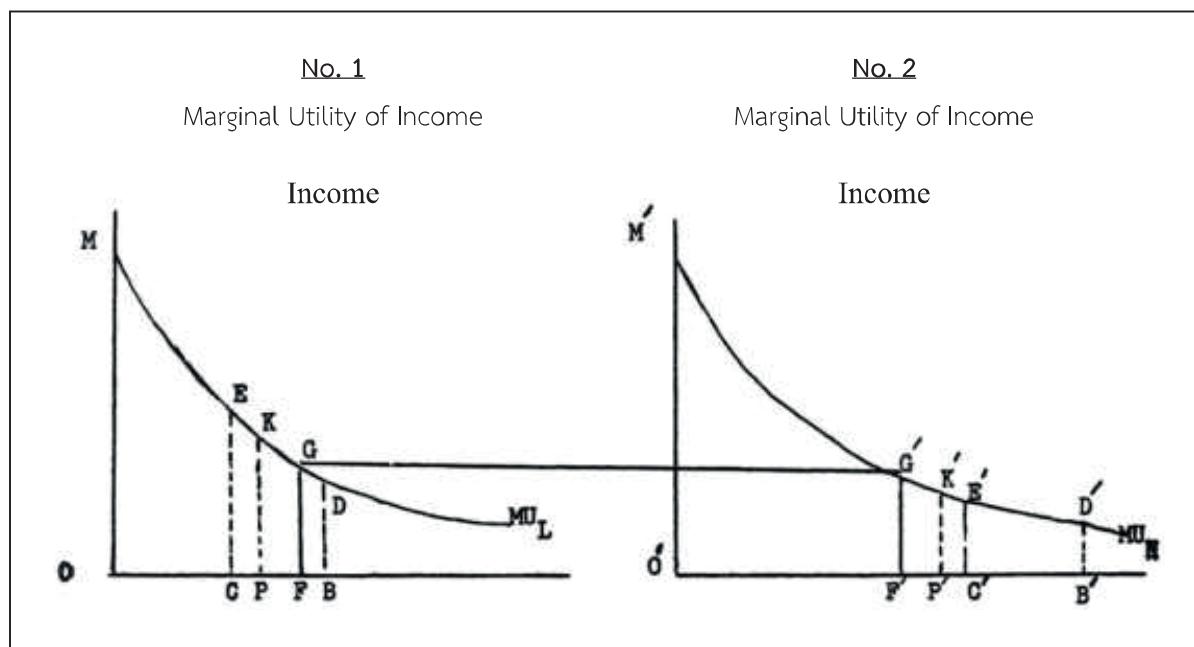
## Concepts of Equal Sacrifice

Since John Stuart Mill, the ability-to-pay rule has been viewed in term of an equal sacrifice prescription. Taxpayers are said to be treated equally if their tax payment involve an equal sacrifice or loss of welfare. The loss of welfare in turn is related to the loss of income. If the level of welfare as a function of income, the so call income utility schedule, is the same for all taxpayers, the equal sacrifice rule call for people with equal ability to pay to contribute equal amounts of tax. Further, people with different ability-to-pay should pay different amount.<sup>4</sup>

Three distinct concepts of equal sacrifice were advanced by Cohen-Stuart and Edgeworth. These include equal absolute, equal proportional, and equal marginal sacrifice.<sup>5</sup> All sacrifices to be express in terms of the utilities of individual taxpayer.

To illustrate these concepts, we must accept the necessary assumption that:

1. Income utility is measurable in cardinal terms.
2. Income utility schedule is the same for all people.



Measurement of Equal Sacrifice

(From Richard A. Musgrave, Peggy B. Musgrave, "Public Finance in Theory and Practice." Figure 8-1, p.200.)

<sup>4</sup> R.A. Musgrave and Peggy B. Musgrave, op. cit., p.198.

<sup>5</sup> R.A. Musgrave, op. cit., p.95.

Diagram No. 1 pertains to low-income taxpayer, L, and diagram No. 2 to high-income taxpayer, H.  $MU_L$  and  $MU_H$  are the respective marginal utility of income schedules which are identical and assumed to decline at a decreasing rate. Its income before tax is OB while that for H is O'B. The total utility are OBDM and O'B'D'M' respectively.

Equal Absolute Sacrifice Rule

$$[U(Y) - U(Y-T)]$$

Assume that a given revenue T is to be drawn from the two. L with income OB pay CB while H with income O'B' pay C'B' where CB + C'B' is the needed revenue T. The loss of utility of sacrifice incurred by L equal CBDE, while the loss of H equal C'B'D'E' and T is distributed such that CBDE = C'B'D'E'.

Equal Proportional Sacrifice

$$\left[ \frac{U(Y) - U(Y-T)}{U(Y)} \right]$$

L will pay PB and H will pay P'B', with PB + P'B' again equal to T. The tax is divided between the two so that the fraction of pretax utility loss for L (or PBDK/OBDM) is the same as that for H (or P'B'D'K'/O'B'D'M').

Equal Marginal Sacrifice

$$\left[ \frac{dU(Y-T)}{d(Y-T)} \right]$$

L pay FB and H pay F'B', where FB + F'B' is the required revenue T. The marginal sacrifice is the same, since FG = F'G'. At the same time, the total sacrifice for both (FBDG + F'B'D'G') is minimized. After-tax incomes are equalized at OF = O'F'.

The principle of equal marginal sacrifices as applied in the graph leave both taxpayers with the same income. It also results in least total sacrifice for both H ad L combined. If H, or L has income less than the amount required for subsistence, equal marginal sacrifice will not be achieved. Because they don't have to pay tax and it is impossible to tax the high income people until net income is less than the subsistence level.

Edgeworth, and later Pigou conclude that least aggregate sacrifice is the superior principle of tax distribution because it derives directly from the basic utilitarian principle of maximum happiness.<sup>6</sup>

<sup>6</sup> Richard A. Musgrave, op. cit., p.110.



Taxation required to finance public services should be distributed in accordance with equal marginal or, which the same, least aggregate sacrifice. The basic argument, however, applies over a wider range including the entire problem of the Distribution Branch. The principle makes it desirable to finance the costs of the Allocation Branch so as to minimize welfare loss in private-want satisfaction also renders it desirable to arrange the residual income distribution so as to maximize welfare in private-want satisfaction. Edgeworth accepts this broader implication of the welfare rule. Assuming a declining marginal income utility schedule, he concludes that welfare is maximized by an equal distribution.<sup>7</sup>

Introducing again the assumption of similar and declining marginal-utility schedules, Pigou says,

“.....it appears that a system of equal marginal sacrifice fully carried out would involve lopping off the tops of all income above the minimum income and leaving everybody, after taxation, with equal income. Moreover, the principle of least aggregate sacrifice does not apply to distributional considerations only. It requires as well that taxes be such as to minimize excess burden.”<sup>8</sup>

## The Maximizing Total Utility of Society Taxation

The equal-marginal sacrifice principle can be applied to maximize total utility of the society as a whole. This being the case, the same principle which allows for equal marginal sacrifice taxation in the finance of public services also call for equal marginal satisfaction from remaining private income, independent of the revenue level needed for this finance.

Bent Hansen developed the classical model by extending the individual utility function as follow:<sup>9</sup>

$$U_i = U(Y_i, W_i, L_i)$$

where

$U_i$  = Utility of  $i$  'th individual

$Y_i$  = All of his income (except income from his property)

$W_i$  = His net wealth

$L_i$  = His leisure time

The necessary assumption are the same as the previous assumption.

<sup>7</sup> Ibid.

<sup>8</sup> A.C. Pigou. A Study in Public Finance, 3<sup>rd</sup> Ed. (London: Macmillan & Co., Ltd., 1951), p.43.

<sup>9</sup> Bent Hansen. “Aspects of Property Taxation: A General Report.”, Public Finance, Vol. 15, 1960, p.202.

## Income Taxes Only

If the authorities decide to use only income taxation. The individual utility-functions become:

$$U_i = U_i(Y_i - T_{Y_i}, W_i, L_i)$$

Given

$$\sum T_{Y_i} = \text{Constant}$$

The necessary condition for maximizing the total utility of the society as a whole is

$$\begin{aligned} \frac{\partial U_i}{\partial (Y_i - T_i)} &= \lambda \\ \lambda &= \text{The marginal utility of disposable income} \end{aligned}$$

Because  $\sum T_{Y_i}$  is constant, so  $T_{Y_i}$  will be adjusted until the marginal utility of disposable income of everybody in the society is equal, which means that the income tax to be paid by an individual depends upon the size of his own income, then the total utility of society as a whole is maximize.

## Income Tax and Property Tax Together

Assume that the household think of and reacts to the income tax a deduction to income and the property tax as a deduction from his net-wealth.

If the authorities consider to use both income taxes,  $T_{Y_i}$ , and net wealth taxes,  $T_{W_i}$ , the utility-functions become:

$$U_i = U_i(Y_i - T_{Y_i}, W_i - T_{W_i}, L_i)$$

Given that

$$\sum T_{Y_i} + \sum T_{W_i} = \bar{T} = \text{Constant}$$

The problem for the authorities is now to choose the  $T_{Y_i}$ 's and the  $T_{W_i}$ 's so as maximize.

$$\sum U_i(Y_i - T_{Y_i}, W_i - T_{W_i}, L_i)$$

The necessary conditions for maximizing total utility as a whole are:

$$\frac{\partial U_i}{\partial (Y_i - T_{Y_i})} = \lambda$$

and  $\frac{\partial U_i}{\partial (W_i - T_{W_i})} = \lambda$



The new conditions tell us that the marginal utility of wealth shall be the same with all taxpayers and equal to the marginal utility of income. The maximum conditions, together with  $\sum T_{Yi} + \sum T_{Wi} = \bar{T}$ , determine the tax amounts,  $T_{Yi}$  and  $T_{Wi}$ , together with  $\lambda$ .

It should in principle be possible to extend the reasoning of the proceeding two subsections to include also the case of a tax which hit leisure directly. One, although rather utopian and totalitarian way to do this would be to have a regular “leisure-tax” to be delivered in kind, which simply means that a certain amount of unpaid work should be delivered to the authorities. The more hours a person had to work for the state, the less would his leisure-time be and the lower his utility. The discussion of this extension of the tax system is analogous to the previous case.

## Conclusion

This paper defined the “optimal taxation” as the tax system which be able to minimize the total sacrifice, maximize the social welfare and total utility of the society as a whole and tried to focus on the ability to pay principle to achieve this goal.

The maximum aggregate welfare is everywhere accepted as the right goal of government. In order to achieve this goal, the taxation required to finance public service should be distributed in accordance with equal marginal or least aggregate sacrifice principle which can minimize total sacrifice at the same time.

Under the certain assumptions, the maximum total utility of society as a whole can be achieved by taxing until the marginal utility of net income, net wealth and leisure of each individual are the same.

## References

Hansen, Bent. “Aspect of Prperty Taxation: A general Report.” *Public Finance*, Vol. 15, 1960.

Pigou, A.C. *A Study in Public Finance*, 3<sup>rd</sup> Ed. (London: Macmillan & Co., Ltd., 1951).

Musgrave, Richard A., and A.T. Peacock. *Classic In The Theory of Public Finance*. (London: I.E.A., 1958).

Musgrave, Richard A., and Peggy B. Musgrave. *Public Finance in Theory and Practice*. (New York: McGraw-Hill Book Company, 1973).

Musgrave, Richard A. *The Theory of Public Finance*. (New York: McGraw-Hill Book Company, 1959).