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Individual Taxation vs. Income Splitting:
Implications for Labor Force Participation

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Abstract

In this paper, the effect of the definition of the tax unit on the labor force participation of secondary workers is explored. Three alternative equal yield taxes based on the individual, unit, and quotient systems are compared according to their effect on tax variables. It is shown that under reasonable assumptions, an individual tax is more favorable to the labor force participation of secondary workers than are the unit and quotient taxes, and that the latter two taxes are equivalent in their effects on labor force participation.

Individual Taxation vs. Income Splitting:
Implications for Labor Force Participation

In recent years, there has been a strong trend among OECD countries
away from compulsory or family taxation and towards individual taxation.
As of 1977, individual taxation was allowed in seventeen OECD countries
and was compulsory in thirteen.[1] This change in tax practice has been
accompanied by a growing literature, both pro and con, on the relative
merits in terms of equity and efficiency of family and individual taxa-
tion.[2] The purpose of this paper is to explore an important aspect of
the efficiency question: what effect has the choice of the unit of
taxation upon the labor force participation of secondary workers within
the family?

I.   Taxation and the Participation Decision

There are three predominant approaches to the taxation of families.
One, individual taxation, ignores family relationships and taxes its
members as separate individuals. A second, unit taxation, treats the
family as a unit and aggregates the incomes of its members, applying a
single rate schedule to aggregate family income. The third, quotient
taxation, divides total family income into a number of parts depending
on the number of persons in the family (and sometimes on their composi-
tion). A single rate schedule is then applied and the resulting tax
liability is multiplied by the number of parts.

Among the most recent countries to adopt individual taxation are
Denmark (1970), Sweden (1971), and Austria (1973). Several countries
require individual taxation if family income is less than a certain fig-
ure (350,000 BF in Belgium and 5 million lire in Italy), while Canada

taxes husbands and wives separately when the wife earns more than $1,806.

Unit taxation is based on the dependency principle. In Great Britain, the wife's income is treated as if it were the husband's, and in recognition of this burden, he receives a special allowance.[3] Recent modifications of this system allow the wife a personal allowance against her own income and a couple can opt for separate taxation of their earnings, although they lose the married man's additional allowance if they do so.

The quotient system, as applied in France, allows two parts for married couples, and one-half part for each of their dependent children. A married couple with two children would be allocated three parts, and their tax payment would equal three times that of a single person with one-third their family income. In the United States, a modified quotient system is employed. Married couples receive two parts with no additional parts for dependent children. A married couple pays twice the tax of a single person with half their income. Hence, the term "income splitting" has become associated with the U.S. income tax.[4]

For a family with N members, the three types of taxation can be expressed symbolically as:

Individual:

$$T_I = \sum_{i=1}^{N} T_I(Y_i)$$

Unit:

$$T_U = T_U\left(\sum_{i=1}^{N} Y_i\right)$$

Quotient:

$$T_Q = qT_Q(\sum_{i=1}^{N} Y_i/q)$$

where T is the tax function, Y_i is the income of family member i, and
q = q(N) is the quotient which depends in some way on the number of fam-
ily members, N.

The choice of the unit of taxation is important to the labor force
participation decision because the definition of the tax unit affects
the reservation wage, the minimum wage necessary to induce participa-
tion.[5] In the absence of taxation, workers who are free to work as they
wish will choose to enter the labor market and supply positive hours of
work if their actual wage is greater than their reservation wage. If
their actual wage is less than their reservation wage, the worker will
choose not to participate in the labor force; and if the actual wage is
just equal to the reservation wage, the worker participates but offers
zero hours of work.

Income taxes act to change the reservation wage and, hence, affect
the labor force participation decision. On the one hand, increases in the
marginal rate of tax tend to increase the reservation wage and discour-
age labor force participation. And on the other, income taxes act to
reduce disposable non-work income, reducing the reservation wage, and
encouraging labor force participation. Since these effects are oppos-
ing, it is impossible, without adding more structure to the model, to
predict whether a change in taxes will encourage or discourage labor
force participation.

In what follows, we first develop a labor force participation model with a personal income tax based on the linear expenditure system.[6] The model allows us to see clearly the opposing effects of taxation on labor force participation. We then consider three equal yield hypothetical income taxes based on the individual, unit, and quotient system and assess which is most favorable and which least favorable to labor force participation.

II. A Model of Labor Force Participation with Taxes

In our model, we consider the primary worker's hours as given institutionally and consider the labor force participation decision of the secondary worker. Although married women are often secondary workers, free to work or not as they choose, the model applies equally to married men. Indeed, some families may not have any secondary workers and, for them, this model would not be applicable.

Assume that the welfare of a representative family is defined by the following utility function

$$U = \beta \log(Y_1 + W_2 N_2 - T - \gamma_1) + (1 - \beta)\log(M - N_2 - \gamma_2)$$

where β is a constant between zero and one, the γ's are minimum required income and leisure, Y_1 is the income of the primary worker, W_2 is the gross wage rate of the secondary worker, N_2 is the number of hours worked by the secondary worker, T is the tax function, and M is the time endowment. The income of the primary worker is assumed to include the property income of the family and to be fixed and exogenous to the labor supply decision of the secondary worker. The tax function,

$$T = T(Y_1, W_2 N_2)$$

is assumed progressive, with positive first derivatives $T_1 = \frac{\partial T}{\partial Y_1}$ and
$T_2 = \frac{\partial T}{\partial (W_2 N_2)}$.

Maximization of U with respect to N_2 yields the following labor
supply function for the secondary worker:

$$N_2^* = \frac{\beta (1-T_2)(M-\gamma_2)}{(1-\beta T_2)} - \frac{(1-\beta)(Y_1-T+\gamma_1)}{W_2(1-\beta T_2)}$$

where the asterisk emphasizes that the nonnegativity restriction has not
been accounted for. The reservation wage, W_2^*, is computed by setting
$N_2^* = 0$ and solving. This gives:

$$W_2^* = \frac{(1-\beta)}{\beta} \cdot \frac{(Y_1-\hat{T}-\gamma_1)}{(1-\hat{T}_2)(M-\gamma_2)}$$

where the hats indicate that the variable is evaluated at $N_2^* = 0$. Hence,
labor force participation is given by:

LFP = 1   if $W_2 \geq W_2^*$

LFP = 0   if $W_2 \leq W_2^*$

Note first the non-tax determinants of the reservation wage. The
factor $\frac{(1-\beta)}{\beta}$ reflects the weight the family places on leisure relative
to income. The larger this factor, the more weight given to leisure,
the greater the reservation wage, and the less likely is labor force
participation of the secondary worker. Further, the income of the primary
worker, Y_1, and "required" leisure, γ_2, also both vary positively with
the reservation wage, and hence increases in either would be expected to
reduce labor force participation of the secondary worker. Finally, the
higher the "required" income of the family, γ_1, the lower the reservation
wage, and the more likely is participation.[7]

Turning now to the tax determinants of the reservation wage, we see that taxation affects the reservation wage through two terms, $\hat{T}$, the tax on the primary worker's income, and $\hat{T}_2$, the marginal tax rate on the first dollar earned by the secondary worker. Increases in the tax on the primary worker reduce the reservation wage and increase the probability of participation by the secondary worker. Increases in the marginal tax rate on the secondary worker's first dollar of earnings increase the reservation wage and reduce the probability of participation by the secondary worker. Only for tax changes which have opposing effects on $\hat{T}$ and $\hat{T}_2$ can we say what will happen to labor force participation. We will show in the remainder of the paper that an individual tax is more favorable to the labor force participation of secondary workers than either a unit or a quotient tax of equal yield, and that under certain conditions, equal yield unit and quotient taxes affect participation equally.

III. A Comparison of Equal Yield Family and Individual Taxes

In order to compare equal yield taxes, we need to make an assumption about the form of the tax function. We assume that the tax system is such that the marginal rate of tax is a constant fraction of income:

$$\frac{\partial T}{\partial Y} = \theta Y \ .$$

Since the tax is progressive, θ must be positive.

Given this assumption, the form of the tax function for individual, unit, and quotient taxation is:

Individual:

$$T_I = \frac{\theta_I Y_1^2}{2} + \frac{\theta_I Y_2^2}{2}$$

Unit:

$$T_U = \theta_U \frac{(Y_1 + Y_2)^2}{2}$$

Quotient:

$$T_Q = \theta_Q \left(\frac{Y_1 + Y_2}{2}\right)^2$$

where it is assumed that the quotient equals two parts for all families.[8] It then follows that in order to equalize revenues from the three taxes, it must be that

$$\theta = \theta_U = \theta_I \left[1 + \frac{\sum\limits_h Y_{1h} Y_{2h}}{\sum\limits_h \frac{Y_{1h}^2}{2} + \sum\limits_h \frac{Y_{2h}^2}{2}}\right]^{-1} = \frac{1}{2} \theta_Q$$

where the summation, h, is over all households in the economy. Since the term in parentheses ranges between one and two,

$$r \angle r_{\Xi} \underline{F} r_{\uparrow} \underline{F} r_{\Gamma} \angle 2r$$

where equality holds only if all families have only one earner or if $Y_{1h} = Y_{2h}$ for all h.

First consider the implications of these assumptions for $\hat{T}$, the tax on the primary worker. Setting Y_2, the income of the secondary worker, equal to zero, yields for the three forms of taxation:

Individual:

$$\hat{T}_I = \frac{\theta_I Y_1^2}{2}$$

Unit:

$$\hat{T}_U = \frac{\theta_U Y_1^2}{2} = \frac{\theta Y_1^2}{2}$$

Quotient:

$$\hat{T}_Q = \frac{\theta_Q Y_1^2}{4} = \frac{\theta Y_1^2}{2}$$

and it follows that since $\theta_I \geq \theta$,

$$\hat{T}_I \geq \hat{T}_U = \hat{T}_Q \,.$$

The tax on the primary worker is highest under individual taxation, and identical under unit and quotient taxation when the taxes are equal yield.

Next consider the implications for $\hat{T}_2$, the marginal tax rate on the first dollar earned by the secondary worker. For the three forms of taxation this gives:

Individual:

$$\hat{T}_{I2} = 0$$

Unit:

$$\hat{T}_{U2} = \theta_U Y_1 = \theta Y_1$$

Quotient:

$$\hat{T}_{Q2} = \theta_Q \frac{Y_1}{2} = \theta Y_1$$

and it follows that

$$\hat{T}_{I2} < \hat{T}_{U2} = \hat{T}_{Q2} \,.$$

The marginal tax rate on the first dollar earned by the secondary worker is least under individual taxation, and equal under unit and quotient taxation.

What does this imply for the labor force participation of secondary workers? Since individual taxation results in a higher tax on the primary worker and a lower marginal tax rate on the first dollar earned by the secondary worker, the reservation wage will be lower and labor force participation higher under individual taxation than under unit or quotient taxation. Further, since equal yield unit and quotient taxes affect the tax on the primary worker and the marginal tax rate equally, they have equivalent effects on labor force participation.[9]

IV. Conclusions

In this paper we have shown that under certain assumptions, an individual income tax is more favorable to the labor force participation of secondary workers than either an equal yield unit tax or an equal yield quotient tax. Also, equal yield unit and quotient taxes are likely to have equivalent effects on participation. These conclusions are important in light of the trend toward adoption of individual taxation among European countries, and in view of several recommendations for reform of the U.S. income tax.

Among those supporting individual taxation in the U.S. are Rosen (1977), Munnell (1980), and Brazer (1980), while Pechman (1977) supports a form of unit taxation. Under the Pechman proposal, families would still be treated as the unit of taxation but income splitting would be eliminated. The same rate schedule would be used for individuals and married couples. In order to reduce the work disincentives associated

with this type of tax, Pechman proposes a special deduction or credit based on the earnings of the lesser-earning spouse.

While this paper has focused solely on the effect of the definition of the tax unit on the labor force participation of secondary workers, choice of the appropriate unit of taxation rests on other factors as well. The definition of the tax unit affects the number of hours worked by secondary workers as was shown by Rosen (1976). Other efficiency effects—on marriage, divorce, cohabitation, and fertility, for example—require further study.

The results of this paper rest on several assumptions: exogenous labor supply of primary workers, linear expenditure system, and a tax linear in the marginal tax rate. Further research is being directed toward analyzing the consequences of their relaxation.

Footnotes

[1] Organization for Economic Cooperation and Development (1977), p. 15.

[2] See especially Munnell (1980), Brazer (1980), McIntyre (1980), McIntyre and Oldman (1979), and Rosen (1977).

[3] Kay and King (1978), p. 211.

[4] Since 1969 when a reduction was made in the rate schedule for single persons, the U.S. income tax has not been an example of true income splitting.

[5] In technical terms, the reservation wage is defined as the marginal rate of substitution between income and leisure at zero hours of work.

[6] The model extends the model of Deaton and Muellbauer (1980), pp. 274-275, by adding an income tax.

[7] The presence of children in the home is likely to increase both γ's and, hence, have opposing effects on participation.

[8] These functions were derived by integrating the marginal tax rate function.

[9] This result depends on the assumption that the quotient is identically equal to two for all families. Where this assumption is violated, equivalence of unit and quotient taxation is no longer exact.

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