Tax Evasion and Government Size—
A Micro-Political Theory

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Previous studies on tax evasion and government size have not specified the "political mechanism" through which increasing difficulties with tax evasion might lead to government expansion. This paper attempts to fill in the gap. We extend the celebrated Meltzer and Richard (1981) model to a plausible world where tax evasion is possible. It is shown in this extended model that: (i) the decisive voter is still the individual who has a median pre-tax income, and (ii) the presence of tax evasion will lower the redistributive benefit of taxation and enhance the distortionary cost of taxation facing the decisive voter at the margin. As tax evasion becomes increasingly difficult with "modernization," the marginal redistributive benefit of taxation will be enhanced and the marginal distortionary cost of taxation will be mitigated. This provides tax-evasion routes with a micro-political foundation to explain the expansion of government.

1   Introduction

Studies including Peltzman (1980), Kau and Rubin (1981), and North (1985) all argue theoretically or empirically that tax evasion has become increasingly difficult with "modernization" (say, due to declining tax collection costs), and this fact, in turn, has contributed to larger governments. However, increasing difficulties with tax evasion need not automatically increase government size. After all, tax policy is

decided in the political arena, and previous studies have not specified the "political mechanism" through which increasing difficulties with tax evasion might be linked with government expansion. This paper attempts to fill in the gap.

Meltzer and Richard (1981) (hereafter, M-R) consider a heterogeneous-consumer economy in which the income tax system in effect is linear: a proportional tax rate is imposed on all earned income and the tax revenue raised is distributed equally among individuals in a lump-sum manner.[1] M-R interpret the share of income redistributed as a measure of government size and examine how government size is endogenously determined under majority voting.

The M-R model holds a prominent position in the redistribution literature and has been elaborated and extended in many directions (Persson and Tabellini, 2002, Part I). Redistribution through linear income taxation may be criticized for being unrealistic in the sense that transfer receipts include the rich as well as the poor. Browning and Johnson (1984), however, emphasize that only the net effect of the taxes and transfers is crucial for redistribution. They provide evidence that linear income taxation can have distributional implications similar to those resulting from the entire actual tax and transfer system.

A key assumption of the M-R model is that individuals differ only in one single characteristic, namely earning ability. This single-characteristic setting is of course a simplification, for there is no reason to believe that individuals are alike in all other respects. In this paper we extend the M-R model to a plausible world where individuals differ not only in terms of their ability to earn income but also in terms of their ability to conceal income from the tax authority. We explore the implications of this extension for government size. Like M-R, our focus is on the redistribution or transfer part of government activities. This focus may not be a bad research strategy in view of the fact that income redistribution constitutes the most dramatic rise in government activities during the past century (Tanzi and Schuknecht, 2000).

The M-R model identifies two key factors for the determination of government size in a democratic economy. The first is the economy's income inequality as measured by the deviation between mean and median income. The larger the deviation, the higher will be the marginal redistributive benefit to the decisive

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[1] See also Romer (1975) and Roberts (1977).

median-income voter from taxing the rich and, consequently, the higher will be the share of income that is taxed and redistributed. The second is the degree of tax distortion as measured by the decline in the tax base caused by reductions in labor supply. The smaller the decline, the lower will be the marginal distortionary cost of taxation and the larger will be the "income pie" that is available for redistribution, and, as a result, the higher will be the share of income that is taxed and redistributed.

It is shown in our extended model that the decisive voter is still the individual who has a median pre-tax income and that, all else equal, the presence of tax evasion will make the size of government smaller through *both* lowering the redistributive benefit of taxation and enhancing the distortionary cost of taxation facing the decisive median-income voter at the margin. As tax evasion becomes increasingly difficult with "modernization," the marginal redistributive benefit of taxation will be enhanced and the marginal distortionary cost of taxation will be mitigated. This provides tax-evasion routes with a micro-political foundation to explain the expansion of government.

The rest of the paper is organized as follows. Section 2 introduces our model. Section 3 characterizes the political equilibrium resulting from our model and derives its implication for government size. Section 4 provides discussions and Section 5 concludes.

2   An Extended Meltzer-Richard Model

Our model is in essence the same as that set out in M-R but with an important difference: individuals differ not only in terms of their ability to earn income but also in terms of their ability to conceal income from the tax authority. Because of this difference, individuals in the M-R model do not evade taxes while individuals in our model may. As a minimal extension and to maintain a sharp contrast with the M-R model, we assume that both the tax authority's audit effort and the fines imposed on evasion are exogenously given (more details are given below).

2.1 Economy

Consider an economy in which individuals are characterized by two parameters: the wage rate $w \in (0, \infty)$ and the probability of evasion detection $p \in [\underline{p}, 1]$ with $\underline{p} > 0$. The joint distribution of (w, p) among individuals is assumed to be common knowledge. An individual's wage rate reflects his or her ability to earn income, while the probability of evasion detection embodies his or her ability to conceal income from the tax authority.

The wage rate representation of the earning-ability characteristic is the same as that in M-R. As to the detection probability representation of the concealing-ability characteristic, we mainly follow Watson (1985).[2] Watson examines the labor market equilibrium in the presence of tax evasion. He basically assumes that the amounts of information available to the tax authority are different for different workers. This information heterogeneity results in the workers' having different abilities to conceal their true income (for example, it is easier for the evasion of a wage/salary earner to be detected by the tax authority than that of a self-employed). Let $d(.)$ denote the tax authority's audit effort or audit rule and k denote the individual type with regard to his or her ability to conceal income due to the heterogeneity of information available to the tax authority. Following Watson (1985), our probability of evasion detection can be interpreted as $p = d(.)k$. Since $d(.)$ is assumed to be exogenous, p and k are virtually identical. Alternatively, one may interpret our probability of evasion detection as $p = k - d(.)$, an index of concealing ability net of the tax authority's audit effort.[3]

There are two commodities in the economy: a consumption good c and labor l. In the tradition of Mirrlees (1971), the wage rates are set equal to the number of efficiency units of labor that individuals supply per unit of working time. The production technology is linear and transforms one efficiency unit of labor into one

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[2]See also Macho-Stadler and Perez-Castrillo (1997), who document the evidence that the degree of tax evasion varies substantially across sources of income and industries.

[3]The audit rule $d(.)$ may be a highly complicated function, depending on all sorts of information available to the tax authority. The evidence indicates that: "many taxpayers have only a rough idea of the average probability of audit in their class, and most have little idea as to how this probability changes with the level of income reported" (Andreoni *et al.*, 1998, Footnote 42, p. 833). In view of this evidence and the fact that the focus of this paper is not on audit rules, we adopt a short-cut approach, treating the tax authority's audit rule $d(.)$ as a black box and summarizing the net outcomes resulting from the black box simply with data that taxpayers face different probabilities of detection if they choose to evade taxes.

unit of the consumption good. The consumption good is taken as the numeraire. The preferences of individuals *qua* consumers are represented by a common utility function denoted $U(c,l)$. This function is assumed to be concave and well-behaved.

The income tax system in effect is linear and consists of two parameters: a marginal tax rate *t* and a lump-sum grant *a*. The tax system pays the lump sum grant *a* to each individual and finances the payment by imposing the marginal tax rate *t* on all earned income. An implicit assumption behind this tax system is that individual productivity is not directly observable and so taxes are imposed on earned income rather than on individual productivity.

An individual (characterized by earning ability *w* and concealing ability *p*) is assumed to choose labor supply *l* and declare income *X* so as to maximize the expected utility:

$$EU(w,p) = (1-p)U(A,l) + pU(B,l),\tag{1}$$

where $Y \equiv wl$, $A \equiv Y - tX + a$, $B \equiv Y - tX - Ft(Y-X) + a$, and $F > 1$ denotes the proportional fine which is assumed exogenous in our model.[4] The setup of (1) assumes: (i) true income is unknown to the tax authority but will be discovered once evasion is detected[5] and (ii) the caught evader will be fined and a penalty levied on the amount of taxes evaded, as is the case under most tax laws. This setup has been popular in the tax evasion literature since the seminal work of Allingham and Sandmo (1972) and Yitzhaki (1974).[6]

The original Allingham-Sandmo-Yitzhaki model assumes an exogenous income and, further, does not specify the use of the tax revenue raised from a proportional income tax. Here we follow the M-R model by both adding labor supply and specifying the redistributive use of the tax revenue raised. The key departure from the M-R model is that we consider the probability of evasion detection as a type dimension of individuals, allowing for individual heterogeneity

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[4]It is clear from (1) that if $F \leq 1$, all taxpayers will declare zero income ($X = 0$). We rule out this rather unrealistic and uninteresting case.

[5]It is arguable that the tax code itself may be imprecise and the tax auditors may mot be uniform so that the so-called "true income" may never be known; see Andreoni *et al.* (1998) and Ueng and Yang (2001) for more on this alternative assumption.

[6]Andreoni *et al.* (1998) and Slemrod and Yitzhaki (2002) provide two recent surveys of the literature on tax evasion.

not only in terms of their ability to earn income but also in terms of their ability to conceal income from the tax authority.

2.2 Preliminary analysis

The first-order conditions for the maximization of (1) are:[7]

$$(1-p)U_c(A,l) = p(F-1)U_c(B,l) , \tag{2}$$
$$-w[(1-p)U_c(A,l) + pU_c(B,l)(1-Ft)] = (1-p)U_l(A,l) + pU_l(B,l) . \tag{3}$$

The second-order conditions and the uniqueness of the solution are assumed satisfied for simplicity. As shown by Pencavel (1979), virtually all of the comparative static effects of parameter changes from (2)-(3) are ambiguous.[8] This ambiguity is markedly different from the situation where all of the comparative static effects can be unambiguously signed if labor supply is not variable. In their recent survey of the tax evasion literature, Andreoni *et al.* (1998, p. 824) conclude: "Overall, adding labor supply substantially complicates the analysis."

Note from (1) that $A = B$ if $X = Y$. Using this result, we have from (2) that $X = Y$ (no evasion) is the individual optimal choice at the probability of evasion detection:

$$p_0 = \frac{1}{F} . \tag{4}$$

Individuals with $p \geq p_0$ will not evade taxes while those with $p < p_0$ will evade taxes. The reasoning behind this result is that the condition $pF = 1$ happens to represent a fair gamble for tax evasion in the setup of (1). It is well known that a risk averter takes no part in an unfavorable gamble or barely fair gamble but always takes some part in a favorable gamble (Arrow 1970, p. 99-100).[9]

For those individuals with $p \geq p_0$, there will be no evasion and so, from (3), $l = 0$ (no labor supply) is the individual optimal choice at the wage rate:

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[7]Unless otherwise specified, all subscripts denote partial derivatives.

[8]An exception is the response of evaded income $Y - X$ with respect to the lump-sum grant a (see Pencavel 1979, Table 2). We shall utilize this exception later.

[9]See also Yitzhaki (1987).

$$w_1 = \frac{-U_l(a,0)}{U_c(a,0)(1-t)} \; . \tag{5-1}$$

This condition is the same as the no-evasion case derived in M-R (1981, equation (5)). Individuals with $p \geq p_0$ (compliers) will choose to work only if their wage rates satisfy $w > w_1$.

As to individuals with $p < p_0$, we know from (3) that $l = 0$ (no labor supply) is the individual optimal choice at the wage rate:

$$w_2 = \frac{-U_l(a,0)}{U_c(a,0)(1-pFt)} \; . \tag{5-2}$$

Individuals with $p < p_0$ (evaders) will choose to work only if their wage rates satisfy $w > w_2$.

Using (1)-(3), one can derive the indirect utility function $V(a,t;w,p)$. Applying the envelope theorem yields:

$$V_a(w,p) = (1-p)U_c(A,l) + pU_c(B,l) , \tag{6}$$
$$V_t(w,p) = (1-p)U_c(A,l)(-X) + pU_c(B,l)[-X - F(Y-X)] . \tag{7}$$

These two results will be useful later.

Given the income policy variables a and t,[10] the expected revenue raised from an individual (characterized by w and p) equals:

$$r(a,t;w,p) = (1-p)tX + p[tX + Ft(Y-X)] = t[1-(1-pF)e]Y , \tag{8}$$

where $e \equiv (Y-X)/Y$ is the evasion rate and $t[1-(1-pF)e]$ denotes the "effective" marginal tax rate, which may differ from the "statutory" marginal tax rate t. If individuals comply (i.e., $pF \geq 1$ and so $e = 0$), the effective marginal tax rate will be the same as the statutory marginal tax rate. However, if individuals evade taxes (i.e., $pF < 1$ and so $e > 0$), the effective marginal tax rate will be lower than the statutory marginal tax rate.

Alternatively, one may view the term $[1-(1-pF)e]Y$ in (8) as the "effective" income, which equals "statutory" income Y minus "effective" evaded income

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[10]Recall that audit efforts and fines are assumed exogenous in our model.

$y \equiv (1 - pF)eY$. As in M-R, the government budget is assumed balanced. We then have:[11]

$$t(\overline{Y} - \overline{y}) = a ,\tag{9}$$

where $\overline{Y}$ denotes per capita "statutory" income and $\overline{y}$ per capita "effective" evaded income. The only difference between (9) and its corresponding no-evasion equation in M-R (1981, equation (11)) is the replacement of per capita statutory income $\overline{Y}$ by per capita effective income $\overline{Y} - \overline{y}$.

2.3 Political economy

The preferences of individuals *qua* voters over linear income tax are presented by the indirect utility function $V(a,t;w,p)$. The marginal rate of substitution (MRS) between *t* and *a* for the individual characterized by *w* and *p* equals:

$$\left. \frac{da}{dt} \right|_{V(a,t;w,p)=\overline{V}} = -\frac{V_t}{V_a} = Y(a,t;w,p) ,\tag{10}$$

where the last equality has made use of (2) and (6)-(7). This result, that the MRS equals pre-tax income, is the same as that in the no-evasion case.[12]

The result in (10) is interesting since it implies that, as far as the MRS is concerned, our extension of the M-R model in essence does not make a difference. To understand this result, we may rewrite (1) as:

$$EU(w, p) = E\{U[(1-t)Y + a + rg, l]\} ,\tag{1$'$}$$

where $g \equiv t(Y - X)$ (the amount of tax evaded) and *r* denotes the random return on a dollar of tax evaded, as given by $r = 1$ with probability $1 - p$ and $r = 1 - F$ with probability *p* . An individual is assumed to choose the amount of *tax evaded g* and the labor supply *l* to maximize (1$'$). This is equivalent to the problem of maximizing (1) by choosing the amount of *income declared X* and the labor supply *l*. Applying the envelope theorem to (1$'$) yields:

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[11]Strictly speaking, the government budget should take into consideration the cost associated with the tax authority's audit effort. Since this cost is fixed exogenously in our model, ignoring it will not affect our results.

[12]See the proof of Lemma 1 in Roberts (1977).

$$V_a(w,p) = E\{U_c[(1-t)Y + a + rg, l]\} , \qquad (6')$$

$$V_t(w,p) = -E\{U_c[(1-t)Y + a + rg, l]\}Y . \qquad (7')$$

From ($6'$) and ($7'$), we immediately have (10). The basic intuition behind this result is that, as emphasized by Yitzhaki (1974), a tax rate change will only have an income effect on evasion (similar to a change in the lump-sum grant) if fines are levied on the *evaded taxes* instead of on the *evaded income*. It can be checked that if fines were levied on the amount of income evaded rather than the amount of tax evaded, then the result of (10) would no longer be true.

From the government's budget constraint (9), we have the marginal rate of transformation (MRT) between *t* and *a*:

$$\frac{da}{dt} = (\bar{Y} - \bar{y}) + t\frac{d(\bar{Y} - \bar{y})}{dt} . \qquad (11)$$

Except for the replacement of per capita statutory income $\bar{Y}$ by per capita effective income $\bar{Y} - \bar{y}$, the MRT here remains the same as that in the no-evasion case.[13]

Equating the MRS in (10) with the MRT in (11) implicitly determines the individually preferred tax rate:

$$Y(a,t;w,p) = (\bar{Y} - \bar{y}) + t\frac{d(\bar{Y} - \bar{y})}{dt} . \qquad (12)$$

The associated second-order condition for maximization requires:

$$\frac{d[\bar{Y} - \bar{y} - Y(a,t;w,p)]}{dt} + d[t\frac{d(\bar{Y} - \bar{y})}{dt}]/dt < 0 . \qquad (13)$$

Individuals who choose not to work will have $Y(a,t;w,p) = 0$. When $Y(a,t;w,p) = 0$, equation (12) happens to represent the first-order condition arising from maximizing per capita effective tax revenue $t(\bar{Y} - \bar{y})$. From (9), this is equivalent to maximizing the per capita lump-sum grant *a*. This result is intuitive. Individuals who do not work will face a zero MRS according to (10). Since only the lump-sum grant matters in their utilities, they would like to choose the tax rate that maximizes the amount of the lump-sum grant.

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[13]See Roberts (1977, equation (7)).

In contrast, individuals who choose to work will have $Y(a,t;w,p) > 0$ and hence a positive MRS according to (10). There is a tradeoff between t and a for these working individuals, and, consequently, they would choose a tax rate lower than the tax rate that maximizes the amount of the lump-sum grant. Since individuals possessing different earning and/or concealing abilities typically earn different levels of pre-tax income $Y(a,t;w,p)$, they *qua* voters will have conflicting interests in choosing tax policy. In the next section we show that the individual who has a median pre-tax income will be the decisive voter under simple majority voting if some regularity conditions are met.

3   Equilibrium Characterization and Its Implications

This section first proves and characterizes the equilibrium resulting from our model and then explores the implications of tax evasion for government size.

3.1   Voting equilibrium

Itsumi (1974) and Romer (1975) show by example that if individuals cease to work, their induced preferences over linear income tax may not be single-peaked. This precludes the employment of Black's (1948) median voter theorem to prove the existence of a simple majority voting equilibrium. Roberts (1977) proposes the so-called "hierarchical adherence" as a replacement for "single-peakedness" in the context of linear income taxation. This condition requires that the ordering of individuals in terms of some pre-tax variables be independent of the tax policies chosen. M-R invoke the hierarchical adherence condition to show the existence of a majority voting equilibrium. We adopt the same condition here:

Assumption A1. *Hierarchical adherence: the ordering of individuals in terms of their pre-tax income is independent of the linear income tax in effect.*

Besides Assumption 1, we also impose two mild assumptions:

Assumption A2. *Leisure (negative labor) is a normal good.*

Assumption A3. *The Arrow-Pratt measure of absolute risk aversion is decreasing in income.*

Assumption A2 is standard; M-R make the same assumption. As to Assumption A3, it seems to accord with both intuition and everyday observation (see Pratt, 1964 and Arrow, 1970, chapter 3). This assumption is typically imposed in the tax evasion literature.

We are ready for the characterization of the political equilibrium:

Proposition 1. *Assuming A1-A3, then: (i) a simple majority voting equilibrium exists in our economy and (ii) the decisive voter is the individual who has a median pre-tax income.*

Proof: See Appendix 1.

3.2   Implications for government size

M-R interpret the share of income redistributed as a measurement of government size. They also regard the deviation between mean and median income as an indicator of income inequality in the economy. We follow their step here.

On the basis of Proposition 1 and (12), the political equilibrium is characterized by:

$$(\bar{Y} - \bar{y}) - Y^m = -t\frac{d(\bar{Y} - \bar{y})}{dt}, \tag{14}$$

where Y^m denotes the median pre-tax income of the economy. From (13), the associated second-order condition is:

$$\frac{d(\bar{Y} - \bar{y} - Y^m)}{dt} < -d[t\frac{d(\bar{Y} - \bar{y})}{dt}]/dt . \tag{15}$$

If there were no tax evasion, evaded income would be identically zero so that equation (14) would reduce to:

$$\bar{Y} - Y^m = -t\frac{d\bar{Y}}{dt}, \tag{14'}$$

which is the political equilibrium characterized in M-R (1981, equation (13)).

A result common to both (14) and ($14'$) is that the decisive voter is the individual who has a median pre-tax income. Thus the size of government in a sense reflects the preferences of the middle class in both our model and in the M-R model. If there were no evasion, the decisive median-income voter would trade off the marginal redistributive benefit of taxation (in the form of the deviation between the economy's mean income and his own median income, the left-hand-side in ($14'$)) against the distortionary cost of taxation (in the form of a smaller tax base, the right-hand-side in ($14'$)). The decisive median-income voter faces the same tradeoff in our extended model, except that the "statutory" mean income, $\overline{Y}$, in ($14'$) is replaced by the "effective" mean income, $\overline{Y} - \overline{y}$, in (14).

How will the replacement of the "statutory" term $\overline{Y}$ in ($14'$) by the "effective" term $\overline{Y} - \overline{y}$ in (14) affect the size of government? Comparing (14) and ($14'$), it is obvious that the presence of the $\overline{y}$ term will, all else equal, lower the marginal redistributive benefit of taxation facing the decisive median-income voter. As to the presence of the term $d\overline{y}/dt$, we argue in Appendix 2 that $d\overline{y}/dt > 0$, and hence its presence will, all else equal, enhance the marginal distortionary cost of taxation facing the decisive median-income voter. Taken together and on the basis of the second-order condition (15), there are three possibilities as shown in Figures 1-3.

Figure 1 represents the "normal" case where, as tax rates rise, the marginal redistributive benefit of taxation is decreasing while the marginal distortionary cost of taxation is increasing. As can be seen from the figure, the presence of tax evasion (i.e., the presence of the terms $\overline{y}$ and $d\overline{y}/dt$ in (14) when compared to ($14'$)) will, all else equal, lead to a lower degree of income redistribution and hence a smaller government.

The other two possibilities (see Figures 2-3) have the same qualitative result.
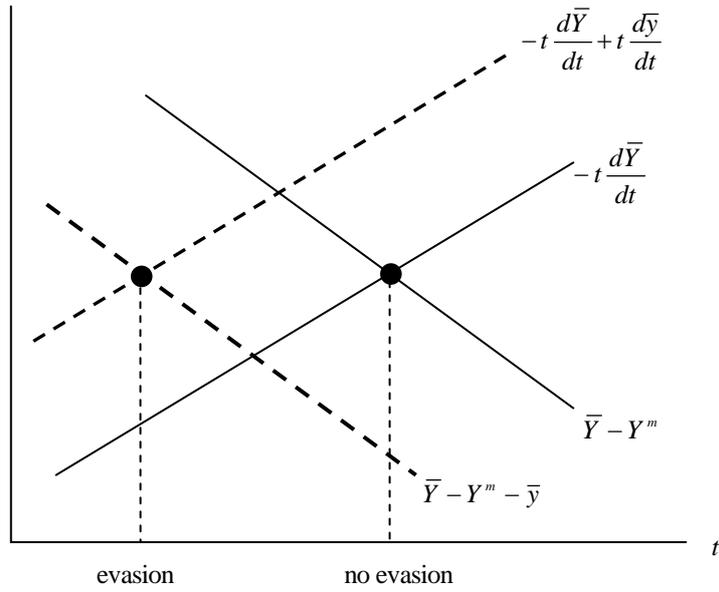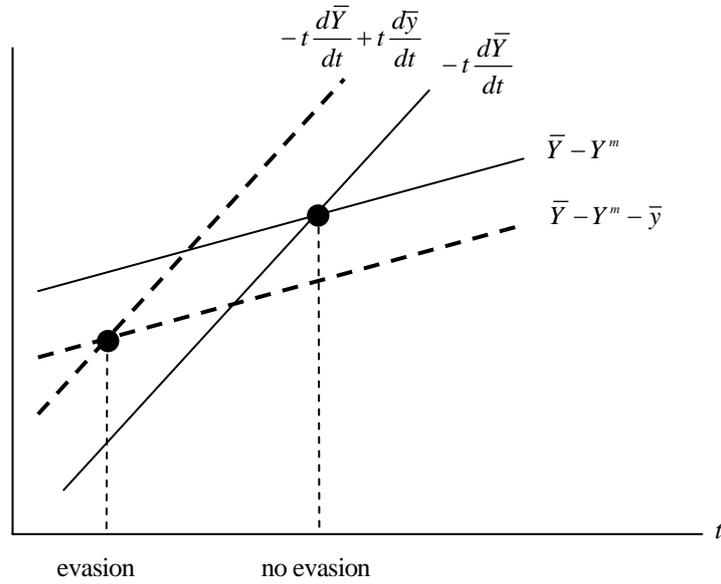
$$-t\frac{d\overline{Y}}{dt}+t\frac{dy}{dt}$$

$$-t\frac{d\overline{Y}}{dt}$$

$$\overline{Y}-Y^{m}$$

$$\overline{Y}-Y^{m}-\overline{y}$$

evasion   no evasion

Figure 1

$$-t\frac{d\overline{Y}}{dt}+t\frac{dy}{dt}\quad -t\frac{d\overline{Y}}{dt}$$

$$\overline{Y}-Y^{m}$$

$$\overline{Y}-Y^{m}-\overline{y}$$

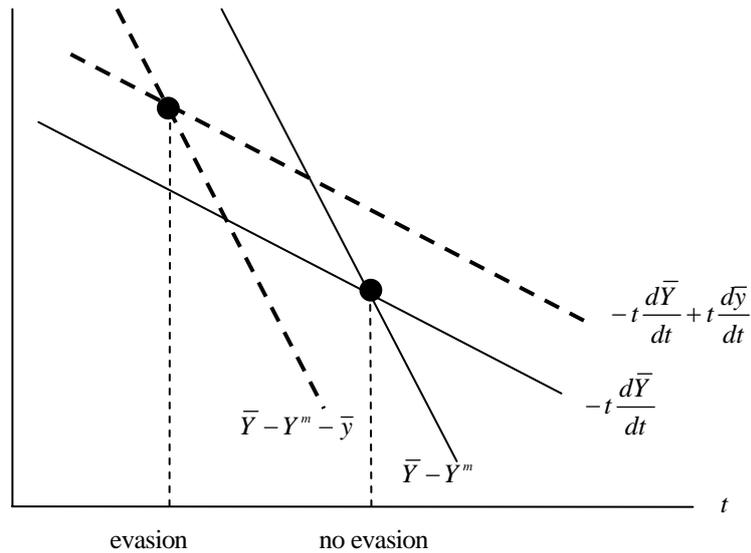evasion   no evasion

Figure 2

Figure 3

The above comparison is between the case with evasion and the case without evasion. We now make a comparison between more and less evasion. It is clear from Figures 1-3 that, all else equal, government size will increase if the per capita effective evaded income $\bar{y}$ shrinks. Thus reductions in $\bar{y}$, by enhancing the marginal redistributive benefit to the decisive median-income voter from taxing the rich, provide a potential explanation for government expansion. It is also clear from Figures 1-3 that, all else equal, government size will increase if the term $d\bar{y}/dt$ gets smaller. Thus reductions in $d\bar{y}/dt$, by mitigating the marginal distortionary cost of taxation, provide another potential explanation for the expansion of government.

To sum up the comparison between (14) and ($14'$), we state:

Proposition 2. *The decisive voter under simple majority is the individual who has a median pre-tax income, regardless of whether we are in the M-R model or our extended M-R model. The presence of tax evasion will, all else equal, result in a smaller government by both lowering the marginal redistributive benefit of taxation and enhancing the marginal distortionary cost of taxation facing the decisive voter. Since reductions in $\bar{y}$ enhance the marginal redistributive benefit of taxation while*

reductions in $d\overline{y}/dt$ mitigate the marginal distortionary cost of taxation, the size of government will, all else equal, expand if $\overline{y}$ and/or $d\overline{y}/dt$ diminish over time.

Proposition 2 states the effects of reductions in $\overline{y}$ and/or $d\overline{y}/dt$ on government size. However, it does not say anything about whether reductions in $\overline{y}$ and/or $d\overline{y}/dt$ have occurred in the real world. We discuss this issue next.

4   Discussion

Peltzman (1980) suggests that "modernization" is a good proxy for tax collection costs. He considers a measure of modernization in his empirical study on the expansion of government, finding a substantial positive correlation between "modernization" and government size.

Kau and Rubin (1981, p. 262) hypothesize that "there have been changes in production technologies which have indirectly led to an increase in the proportion of income which is subject to taxation." These changes are secular, including fewer self-employed individuals, improved record keeping due to increased incorporation, and the substitution of market production for home production. All of these changes have increased the difficulty of both legal tax avoidance and illegal tax evasion, resulting in larger governments. North (1985, p. 392) puts forth a similar hypothesis: "The supply of government was made possible by new technology which, coupled with the consequences of growing market specialization, lowered the costs of government monitoring of income and wealth and increased the efficiency of government taxation." Kau and Rubin (1981) find empirical support for their hypothesis. Henrekson (1992) and Ferris and West (1996) provide additional empirical support.

The Peltzman-Kau-Rubin-North hypothesis is clearly interesting and potentially important. In terms of our model, the hypothesis may be interpreted qualitatively as providing an economic rationale for why reductions in $\overline{y}$ and/or $d\overline{y}/dt$ occur. This interpretation seems plausible because increasing difficulties with tax evasion will lower the level of evaded income for certain and will likely constrain or weaken the response of evaded income to a change in tax rates as well. However, reductions in $\overline{y}$ and/or $d\overline{y}/dt$ need not automatically result in larger governments. After all, tax policy is decided in the political arena, and the Peltzman-

Kau-Rubin-North hypothesis does not specify the "political mechanism" through which reductions in $\bar{y}$ and/or $d\bar{y}/dt$ might be embodied in the growth of government. The contribution of this paper, we believe, is to articulate the Peltzman-Kau-Rubin-North hypothesis with a micro-political foundation. In particular, by enhancing the redistributive benefit of taxation and lowering the distortionary cost of taxation facing the decisive median-income voter at the margin, we provide a political rationale with micro foundation as to why and how increasing difficulties with tax evasion will result in government expansion.

5 Conclusion

As in the M-R model, the political institution here appears as simply a voting rule that aggregates individual preferences over policy. Although a useful step, this simple model ignores factors such as the role of bureaucrats and the influence of legislators and interest groups. To account more completely for the possible impact of tax evasion on government size, it would be desirable for future research to encompass more features of political institutions.

Appendix 1

Appendix 1 proves Proposition 1. The proof needs a definition and a lemma.

Definition 1. *A utility function $V(x_1, x_2; \theta)$ is said to satisfy the Spence-Mirrlees condition if the marginal rate of substitution $(\partial V / \partial x_1)/(\partial V / \partial x_2)$ is monotone in θ (a scalar parameter).*

The Spence-Mirrlees condition is also known as the "single-crossing" property in the literature since it implies that the indifference curves of two different types of agents in θ can only cross once.

Lemma 1. *(Gans and Smart, 1996). If the utility function $V(x_1, x_2; \theta)$ satisfies the Spence-Mirrlees condition, then the median (in the ordering of θ) voter for all function constraints $x_1 = f(x_2)$ is decisive in simple majority voting.*

Gans and Smart (1996) emphasize that their result incorporates several other findings related to the median voter theorem as special cases.

The strategy for the proof of Proposition 1 involves two steps. First, we need to show that induced individual preferences over the lump-sum grant a and the marginal tax rate t satisfy the Spence-Mirrlees condition (with $x_1 = a$ and $x_2 = t$). Second, it is necessary to prove that (9) defines an implicit function between the lump-sum grant a and the marginal tax rate t. Once these two results are obtained, we can vindicate Proposition 1 through the Gans-Smart lemma.

Proof of Proposition 1. *Step 1.* Consider two individuals characterized by (w, p) and (w', p'). With the imposition of Assumption A1, $Y(a, t; w, p)$ and $Y(a, t; w', p')$ can be ordered independent of variations in the lump-sum grant a and the marginal tax rate t. This in turn implies that (w, p) and (w', p') can be ordered in terms of their corresponding ordering in Y. Let this ordering be denoted by θ. We then see from (10) that the Spence-Mirrlees condition holds in our context. *Step 2.* First, note from (4) that whether or not a taxpayer will evade taxes is determined solely by p and F and, in particular, it has nothing to do with the lump-sum grant a. Next, by Assumption A2, $\overline{Y}$ is a strictly decreasing function of a lump-sum grant since an increase in the lump-sum grant will reduce labor supply. Pencavel (1977) shows that, if Assumption A3 holds, evaded income will be a strictly increasing function of a lump-sum grant in the case of the linear income tax. This then implies that $\overline{y}$ is a strictly increasing function of a lump-sum grant. Taken together, $\overline{Y} - \overline{y}$ is strictly decreasing in the lump-sum grant a so that there is a unique a which solves the balanced budget constraint (9) for each t. In other words, (9) defines an implicit function (the Laffer curve) between the lump-sum grant a and the marginal tax rate t. From Steps 1 and 2, applying Lemma 1 leads to Proposition 1.

Note that the Gans-Smart lemma is applicable to any arbitrary function constraint $x_1 = f(x_2)$. In our context, the employment of the lemma requires no condition with regard to the budget constraint (9) other than that it simply defines an implicit function between the lump-sum grant a and the marginal tax rate t.

Appendix 2

We argue here that the sign of $d\bar{y}/dt$ is positive.

The per capita effective evaded income $\bar{y}$ depends on the lump-sum grant a and the marginal tax rate t, and hence $\bar{y} = \bar{y}(a,t)$. This leads to:

$$\frac{d\bar{y}}{dt} = \frac{\partial \bar{y}}{\partial t} + \frac{\partial \bar{y}}{\partial a} \cdot \frac{da}{dt} . \tag{A1}$$

As noted in the proof of Proposition 1, $\partial \bar{y}/\partial a$ has a positive sign. From (10)-(11), we also have in political equilibrium:

$$\frac{da}{dt} = Y^m . \tag{A2}$$

The sign of da/dt is positive since a decisive working voter will not choose a point that is on the declining portion of the Laffer curve.[14] The second right-hand-side term of (A1) is thus positive. As to the first term on the right-hand-side (i.e., $\partial \bar{y}/\partial t$), its sign is ambiguous a priori and we need to appeal to empirical findings (Pencavel, 1977). Though not unanimous, there is much evidence in support of the intuition that higher tax rates will encourage rather than repress evasion (i.e., $\partial \bar{y}/\partial t > 0$).[15] Put together, it seems reasonable to assign (A1) a positive sign.

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[14]The decisive voter will not choose the maximum of the Laffer curve either as long as he or she works, so that there exists a tradeoff between t and a in induced preferences.

[15]See Lin and Yang (2001) for the relevant references.

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