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Abstract: Using a simple model of income redistribution, we show that the government may use tax evasion as a way to redistribute income from the non- evaders to evaders. This will result then to a negative association between income inequality and per capita transfers and inefficiently high taxes.

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1. Introduction

This paper examines the effect of tax evasion on redistributive politics. Tax evasion- by excluding individuals from the payment of taxes- induces redistribution from the non- evading individuals to the evading ones. If the institutional structure of the economy is such that tax evading individuals are those at the top of the income distribution, tax evasion crates an inverse redistribution to the rich. Under certain conditions, this counterbalances the standard incentives of the government to satisfy the preferences of the majority by redistributing from the rich to the poor.

According to the theoretical model, in the presence of tax evasion the relationship between the size of the government (as measured by the level of government spending) and inequality may be negative, even though voting is unidimensional. This is different from the standard model of redistribution (Meltzer and Richards, 1981). Moreover, our model reveals that under certain parameter values the equilibrium tax rate may be higher than the revenue maximizing tax rate, i.e. the economy is operating in the negatively sloped part of the Laffer curve.

In the following section we present the structure of the model. Section 3 presents the equilibrium in the economy and our main numerical results. Finally section 4 concludes.

2. The model

2.1 Households

We assume an economy populated by a fixed number of risk neutral households/ individuals, N. Let e_i stand for household's i (exogenously determined) income. We assume that there is a continuum of households, $i \in [0,1]$, with Pareto distributed units of income, with

$$f(e) = a\frac{b^a}{e^{a+1}}, \text{ with } \alpha>1 \tag{1}$$

the Probability Distribution Function (PDF) of the Pareto distribution. Parameter b stands for the lowest income in the population, and parameter a determines the shape of the distribution (higher values of a imply greater equality). The Pareto distribution, in addition to being easy to work with, is a relatively good approximation of actual income distributions (see, Creedy, 1977). The mean of the Pareto distribution is equal to

$$\mu = \frac{ab}{a-1} \tag{2}$$

Apart from the income endowment each household receives a per capita transfer g from the government, which is financed by a proportional tax on income, at a tax rate t.

Each household however has the option to evade a fixed share ψ of its tax payments. In order to do so the household must incur a fixed cost equal to θ. At the same time a tax evading household faces an exogenous probability π of being detected by the tax authorities and thus paying a fine proportional to the total amount evaded, given by fe_it, where $f>1$.[2]

We assume that all households have similar preferences and their utility function is linear in expected income and is written as:

$$U_i^E = e_i - (1-\psi)e_it - \theta - \pi f \psi e_i t + g \tag{3}$$

if household i chooses to evade taxes, and

$$U_i^{NE} = e_i(1-t) + g \tag{4}$$

otherwise.

[2] This is equivalent to assuming that by paying a fixed cost θ, household i can evade the payment of $(1-\pi)fte_i$.

Household i will choose to evade taxes, if the utility derived under tax evasion is greater than the utility by honestly declaring its income, i.e. if (3) is greater than (4). Then if

$$e_i > \frac{\theta}{\psi(1-\pi f)t} \tag{5}$$

household i will choose to tax evade. Letting ε denote the level of income for which it holds that

$$\varepsilon = \frac{\theta}{\psi(1-\pi f)t}$$

It follows that only individuals with $e_i > \varepsilon$ will choose to tax evade, and individuals with $e_i < \varepsilon$ will honestly declare their income.

2.2 Government

The government receives income tax revenues and fines from those caught tax evading. We assume that it uses all these revenues in order to finance general transfers to the households, g.

Using the PDF of the Pareto distribution, the total tax receipts of the government are equal to:

$$\mathrm{T} = t\mu N - t\psi(1-\pi f)N\int_{\varepsilon}^{\infty} e\left(a\frac{b^a}{e^{a+1}}\right)de \tag{6}$$

Equation (6) states that total collected taxes are equal to total revenues in the absence of tax evasion (i.e. $t\mu N$) plus the fines to those caught tax evading minus the total amount evaded. According to (6) higher θ, π and f, i.e. higher cost of tax evasion, higher probability of detection and higher penalty are associated with higher revenue.

As all tax revenues are used to finance per capita transfers g, we determine g as:

$$g = t\mu - t^a \psi^a (1-\pi f)^a \frac{ab^a}{(a-1)} \theta^{1-a} \quad (7)$$

3. Political equilibrium

From (3) and (4) it can be shown that due to tax evasion, the ranking of true utilities may not correspond to the ranking of after tax utilities, thus preferences are not single peaked and the single crossing condition is violated (Borck, 2009). To avoid this problem, we assume that policy (tax) choices are made though probabilistic voting. There are two political parties, each one proposing a tax rate *t*. Each voter then votes with a positive, but not necessarily equal to 1, probability the party's proposal that gives him the highest utility.[3] Probabilistic voting then, by assuming that each party seeks to maximize its expected vote share given the expected vote share of the other party, is equivalent to maximization of a weighted Benthamite social welfare function (Muller, 2003, p. 253- 259).

In Nash equilibrium both parties will propose the tax structure that maximizes

$$W = k\int_b^{\varepsilon} \left[e_i(1-t)+g\right]\frac{ab^a}{e_i^{a+1}}de + \int_{\varepsilon}^{\infty}\left[\left[e_i(1-t)-\theta-\psi(1-\pi f)e_i t\right]+g\right]\frac{ab^a}{e_i^{a+1}}de \quad (8)$$

where *k* is the relative weight of the non- evaders in the utility of the government.[4] Maximizing (8) subject to the government budget constraint (7), with respect to *t*, yields the following first order condition

[3] The idea behind probabilistic voting is that voters care about non- observable variables to the policy choices, like ideology, voter turnout, character of the candidates, influence of campaign advertising etc. (Coughlin, 1992).

[4] In the numerical results that follow we assume that $k<1$. This is necessary for a well defined solution that satisfies the second order conditions of the problem. This implies that the government places greater weight on the utility of the tax evaders, which however may be in equilibrium the majority of the population.

$$t^{-1}\theta + \frac{(1+a)b}{a-1}(1-k) - 2\frac{b^a t^{a-1}}{a-1}\psi^a(1-\pi f)^a\theta^{1-a} + (1-k)\frac{\theta}{\psi(1-\pi f)t^2} + \\ + \frac{(a-2)\theta\left[\psi\pi f(1-k) - (1-\psi-k\psi)\right]}{(a-1)\psi(1-\pi f)t} = 0 \tag{9}$$

As the reader can easily verify, equation (9) cannot be solved analytically for equilibrium *t,* denoted as t^*. Moreover the comparative static effects of changes in the inequality parameter a are, in general, ambiguous. [5] However, extensive experimentation with empirically relevant parameter values revealed that the qualitative nature of the results, which we present below, is robust.

Since our interest lies on the effects of a—ceteris paribus—change in inequality, and changes in a affect the average ability (and income) in the economy, in the following figures we depict the relationship between inequality and the variables of interest for a given level of average ability (by changing the underlying value of b). Following the empirical estimates of Creedy (1977) we assumed that a takes values between *1.5* and *3.0*. The rest of the parameter values used in the following figures are $f=1.2,\ \pi=0.05,\ k=0.85,\ \mu=0.3,\ \psi=0.75$. These values guarantee that the second order conditions of the maximization problem are satisfied, all endogenous variables of the model satisfy the underlying non- negativity constraints and that the equilibrium share of tax evading households takes on realistic values (i.e. undeclared income up to around 50%, as in Schneider, 2005).

The following figure depicts the relationship between a and the equilibrium tax rate t^* for θ=0.05 and $\theta=0.04$. Moreover in each diagram we also depict revenue maximizing tax rate, denoted $t^{\max}$ and the per capita transfer g as a share of average income μ as

[5] Note that increases in α imply greater equality.

these are crucial for understanding the intuition behind the underlying relationship between a and t^*[6]

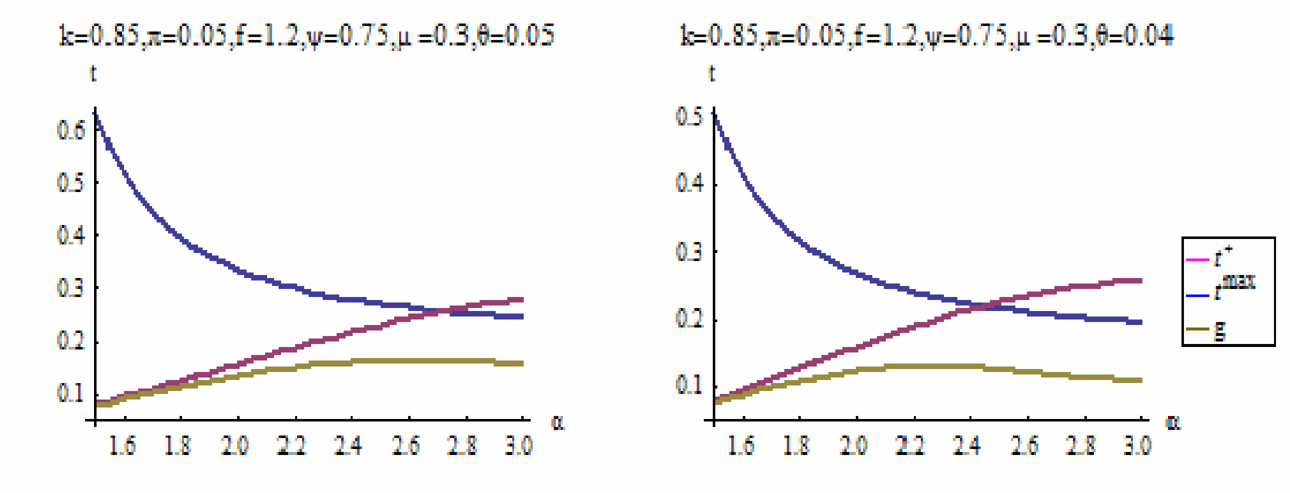

Figure 1: Relationship between *t* and *a*, for *θ=0.05* and *θ=0.04*

Our main results can be summarized along the following lines. Firstly, the effect of a change in a on the per capita transfers (g) is non- linear. However, for a wide range of values for α (in the first diagram of Figure 1 for $\alpha<2.7$ and in the second diagram for $\alpha<2.5$) the relationship between income inequality and g is negative. Therefore in the presence of tax evasion the standard positive relationship between income inequality and redistribution (e.g. Meltzer and Richard, 1981) may be reversed. Secondly, when t^* is higher than t^{max}, higher t^* implies that per capita transfers are falling, as the government operates on the negatively sloped side of the Laffer curve. Finally, Figure 1 reveals that when the cost of tax evasion θ, is higher, per capita transfers will be an increasing function of equality for a wider range of parameter values.

[6] Differentiating (6) with respect to t we obtain a Laffer type curve relationship, where the revenue maximizing tax rate is: $t^{\max} = \frac{\theta}{b}(1-\pi f)^{\frac{a}{1-a}} a^{\frac{1}{1-a}}$

The intuition behind the above relationships can be better understood using the properties of the probabilistic voting model. The political equilibrium is achieved when the marginal welfare of the two groups (evaders and non- evaders) is equalized (Mueller, 2003). Consider then an increase in *a*. Due to the Pareto distribution, for given *t*, higher *a* implies an increase in the share of the tax evading households which in turns increases the tax burden on the non-evades sharply. This is reflected in an increase in the marginal welfare of non evaders and a fall in the marginal welfare of the tax evading households, resulting in a higher t^*. When $t^* < t^{\max}$, higher t^* implies higher per capita transfers. The exact opposite occurs when $t^* > t^{\max}$, thus resulting into a non- linear relationship between inequality and per capita transfers.

4. Conclusions

Our findings suggest that in the presence of tax evasion, higher income inequality may be associated with lower redistribution and that a government that cares enough for the tax evading population, may impose a greater tax rate than the one required to maximize revenue. Since the relevant empirical literature on the relationship between inequality and redistribution does not take into account the role of institutions, our analysis may provide a potential explanation for the lack of clear cut empirical evidence (see e.g. Perotti, 1996).

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