On the Relation between Tax Rates and Evasion in a Multi-period Economy*

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Abstract

We extend the basic tax evasion model to a multi-period economy exhibiting sustained growth. When individuals conceal part of their true income from the tax authority, they face the risk of being audited and hence of paying the corresponding fine. Both taxes and fines determine individual saving and the rate of capital accumulation. In this context we show that the sign of the relation between the level of the tax rate and the amount of evaded income is the same as that obtained in static setups. This is in stark contrast to what is claimed by Lin and Yang (2001). Moreover, high tax rates on income are typically associated with low growth rates as occurs in standard growth models that disregard the tax evasion phenomenon.

Key words: Tax evasion, Growth.

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1. Introduction

In a paper recently published in this journal, W. Z. Lin and C. C. Yang (2001) argue that, when the standard model of tax evasion is extended from a static to a dynamic environment, the sign of the relationship between the fraction of income declared by taxpayers and the level of the tax rate on income is reversed. Yitzhaki (1974) in a very influential paper considered a static economy where the penalties were proportional to the amount of evaded taxes and individual preferences exhibited decreasing absolute risk aversion. In this quite realistic context, Yitzhaki showed that an increase in the tax rate results in a smaller amount of evaded income. However, a positive relation between tax rate levels and evasion has been documented by several empirical studies (see Clotfelter, 1983; Crane and Nourzad, 1987; Poterba, 1987; and Joulfaian and Rider, 1996). In order to reconcile theory with empirical evidence, an important number of papers has been devoted to generate that positive relation through substantial departures from the original Yitzhaki's model.[1] Therefore, the result of Lin and Yang (L-Y, henceforth) would constitute indeed a very important finding within the tax evasion literature, since they obtain the comparative statics result that agrees with the empirical evidence by "simply" extending the original model to a multi-period economy.

L-Y present a capital accumulation model where individuals have to choose in each period the amount of wealth they want to consume and the fraction of income they report to the tax agency. The tax agency audits taxpayers with some probability and, if a taxpayer is caught evading, he must pay the corresponding fine. As a by-product, the previous individual choices determine the total amount of productive investment, which in turn determines the stock of capital (or wealth) in the next period. L-Y claim that the amount of evaded income increases with the tax rate in this scenario. However, the intuitive arguments they use to give support to their surprising result are basically those of the static theory of portfolio selection (which yielded a comparative statics result opposite to theirs). Therefore, these arguments should not lead to a sign reversion of the comparative statics exercise in a multi-period economy.

Let us consider a static framework with all individuals having the same isoelastic Bernoulli utility defined on consumption, $u(c) = \frac{c^{1-\sigma}}{1-\sigma}$ with $\sigma > 0$. The particular case considered by L-Y corresponds to utility functions where the index σ of relative risk aversion is unitary. Let y be the income of an individual, x is the amount of voluntarily reported income, $\tau \in (0,1)$ is the flat tax rate on income, $p \in (0,1)$ is

[1] Among these papers, Cowell and Gordon (1988) consider a framework where taxpayers take into account the provision of public goods. Landskroner et al. (1990) add to the basic model the possibility of investing in financial assets and, thus, the tax evasion decision is embedded in a more general portfolio selection problem. Panadés (2001a) builds a Ricardian framework where the tax evasion implications of an increase in the tax rate are independent of the crowding out effect. Lee (2001) considers the possibility of self-insurance against possible penalties. Finally, Panadés (2001b) departs from the standard model by making taxpayers' utility to depend on their relative tax contribution.

the probability of being audited by the tax enforcement agency, and $\pi > 1$ is the proportional penalty imposed on the amount of evaded taxes when a taxpayer is caught evading.[2] Therefore, consumption turns out to be a random variable taking the value $y - \tau x - \pi\tau(y - x)$ with probability p and $y - \tau x$ with probability $1 - p$. Let $e = y - x$ be the amount of income concealed from the tax authority. Therefore, the final disposable income is $(1 - \tau)y + e\tau\widetilde{h}$ where $\widetilde{h}$ is a random variable whose probability function is

$$f(h) = \begin{cases} p & \text{for} \quad h = 1 - \pi, \\ \\ 1 - p & \text{for} \quad h = 1. \end{cases} \tag{1.1}$$

Note that $E\left(\widetilde{h}\right) = 1 - p\pi$. We assume that $p\pi < 1$ (i.e., $E\left(\widetilde{h}\right) > 0$) as is customary in the tax evasion literature in order to guarantee that some evasion takes place. A taxpayer solves thus the following problem:

$$\underset{e}{Max}\ E\left\{\frac{1}{1-\sigma}\left[(1-\tau)\,y + e\tau\widetilde{h}\right]^{1-\sigma}\right\},$$

which, after making an affine transformation, is equivalent to

$$\underset{e}{Max}\ E\left\{\frac{1}{1-\sigma}\left[\left(\frac{1}{\tau}-1\right)y + e\widetilde{h}\right]^{1-\sigma}\right\}. \tag{1.2}$$

Note that the previous problem can be viewed as one of selecting the amount e invested in a risky asset with random return $\widetilde{h}$. Since $E\left(\widetilde{h}\right) > 0$, we know that the agent will invest some positive amount in the risky asset, that is, $e > 0$ or, equivalently, $x < y$. As τ increases, the argument of the Bernoulli utility function in (1.2) decreases for a given level e of evasion. Since the isoelastic utility displays decreasing absolute risk aversion, an increase in τ makes individuals more risk averse, and this obviously implies that the optimal amount e invested in the risky asset should decrease (see Arrow, 1970; and Pratt, 1964). In fact, Yitzhaki (1974) already proved that the negative relationship between the amount e of income concealed from the tax authority and the tax rate τ holds for all the utilities displaying a decreasing index of absolute risk aversion. Let us point out that this argument should also apply to a dynamic environment, since the sign of the relation between wealth and amount invested in risky asset is preserved in multi-period models of portfolio selection.

L-Y consider a multi-period economy with continuous time in order to perform the dynamic extension of the previous model. Needless to say, the model would become more transparent if it were presented using a discrete time formulation, since the technicalities associated with stochastic calculus would be circumvented. We will show that in a discrete time economy the amount of evaded income is decreasing in the tax rate, as should be expected from our previous discussion. This obviously contradicts the result obtained by L-Y. Note that there is no apparent reason for such a discrepancy since, regardless of whether we consider an economy in discrete or in continuous time, the optimal decision concerning tax evasion should be geared

[2] If the penalty rate π were smaller than one, evading taxpayers would never be punished.

towards maximizing the expected value function of next period wealth. Since the value function associated with an isoelastic Bernoulli function is also isoelastic (see Hakansson, 1970), the argument based on the relation between the behavior of the index of absolute risk aversion and individual risk taking should also apply to that dynamic context. Note also that, when the instantaneous rate of utility discount goes to infinity, the continuous time model of L-Y converges in fact to the standard static model of tax evasion, where consumption takes place immediately after the potential inspection has occurred. Clearly, the continuity of the policy function would prevent the amount of evaded income from becoming strictly decreasing in the tax rate when the discount rate goes to infinity, since L-Y claim that it is strictly increasing for all finite values of that discount rate.

We are thus left with the question of why L-Y obtain their surprising different comparative statics result. We think that their result is incorrect since, when they use the smooth patching technique in order to obtain the continuous time version of their model, they do not take into account the fact that the instantaneous standard deviation σ of the geometric Brownian motion defining the evolution of capital is proportional to the tax rate τ (see equation (A.3) in the Appendix of their paper). Therefore, the expression (11) that they obtain for the proportion of evaded income, $\widehat{e} = \dfrac{\overline{r}\tau}{A\sigma^2}$, is decreasing, rather than increasing, in the tax rate τ. The authors disregard the effect that τ has on the standard deviation σ of future wealth and, thus, they mistakenly treat σ as a constant.

L-Y also discuss the growth implications of their findings. In particular, since a higher tax rate encourages evasion, there is the possibility that more income become available to purchase new capital and, thus, the economy could end up growing faster. Obviously, since in the present paper we obtain the opposite result concerning the relation between the tax rate and the amount of evaded taxes, we cannot generate a growth rate that increases with the tax rate on income.

We will show however that, if the penalty rate is imposed on the amount of unreported income rather than on the amount of evaded taxes (as in Allingham and Sadmo, 1974), then the amount of income concealed from the tax authority increases with the tax rate. Even if this is the kind of result that is supported by the empirical literature, we should point out that actual tax codes around the world usually establish penalties proportional to the amount of evaded taxes. Finally, in this case it is possible to generate a rate of economic growth that is locally increasing in the tax rate.

In the next section we develop the exact counterpart of the economy considered by L-Y using a discrete time formulation. This exercise will illustrate the robustness of Yitzhaki's analyisis. In Section 3 we consider the case where the proportional penalties are imposed on the amount of unreported income. We will also discuss in Section 4 the implications of changes in the tax rate for the rate of economic growth. As usual, the last section concludes the paper.

2. The Basic Model

Let us consider a competitive economy in discrete time with a continuum of identical individuals who are uniformly distributed on the interval $[0, 1]$. Each individual has access to a technology represented by the net production function $y_t = Ak_t$ with $A > 0$, where y_t is the net output per capita and k_t is the capital per capita in period t.[3] Output can be devoted to either consumption or investment. After production has taken place, the individual decides both his consumption c_t and the amount x_t of declared income, and then he pays the corresponding income tax at the rate $\tau \in (0, 1)$. If he is inspected by the tax agency, the total amount of unreported income is discovered and the taxpayer has to pay a penalty at the rate $\pi > 1$, which is imposed on the amount of evaded taxes (as in Yitzhaki, 1974). Inspection of a particular individual is an event that occurs with probability $p \in (0, 1)$. The amount of output remaining after consumption has taken place and taxes and (potential) penalties have been paid constitutes the net investment that is added to the initial capital stock k_t. The resulting stock k_{t+1} is used for next period production. Therefore, the individual budget constraint is

$$Ak_t = c_t + (k_{t+1} - k_t) + \tau x_t + \pi\tau (Ak_t - x_t),$$

if the individual is audited, and

$$Ak_t = c_t + (k_{t+1} - k_t) + \tau x_t,$$

if he is not.

We assume that the amount of taxes collected by the tax agency is devoted to finance a government spending that enters into the instantaneous utility of individuals in an additive way. Therefore, the marginal rate of substitution of private consumption between two arbitrary periods is not affected by the level of government spending. Since consumers take as given the path of government spending, the utility accruing from this spending can be suppressed from the consumers objective function. Hence, individuals maximize the following discounted sum of instantaneous utilities:

$$\sum_{t=0}^{\infty} \beta^t \ln c_t, \tag{2.1}$$

where $\beta \in (0, 1)$ is the discount factor.[4]

The amount of unreported income in period t is $e_t = Ak_t - x_t$. Hence, we can use the previous budget constraints to write the law of motion of capital per capita as

$$k_{t+1} = \begin{cases} [1 + (1-\tau) A] k_t - c_t + \tau(1-\pi)e_t, & \text{with probability } p, \\ [1 + (1-\tau) A] k_t - c_t + \tau e_t, & \text{with probability } (1-p), \end{cases}$$

or, equivalently,

$$k_{t+1} = [1 + (1-\tau) A] k_t - c_t + \tau e_t \tilde{h}, \tag{2.2}$$

[3] See Rebelo (1991) for a model where the Ak production function arises endogenously when physical and human capital are perfect substitutes. In this case the capital stock k embodies both kinds of capital.

[4] We use the logarithmic instantaneous utility function in order to replicate the analysis of L-Y. However, both the model of L-Y and ours can be generalized to an isoelastic utility function with non-unitary index of relative risk aversion.

where $\widetilde{h}$ is a random variable having the probability function given in (1.1).

The Bellman equation for the stochastic dynamic problem faced by an individual is

$$V(k_t) = \underset{c_t,\, e_t}{Max} \; \{\ln c_t + \beta E[V(k_{t+1}) | k_t]\}, \tag{2.3}$$

where k_{t+1} satisfies (2.2). It is well known that the value function for this problem is an affine transformation of the logarithmic function, $V(k_t) = D \ln k_t + G$ with $D > 0$ (see Hakansson, 1970). Therefore, using (2.2) and computing the expectation of $V(k_{t+1})$ conditional on k_t, the optimization problem faced by a taxpayer with initial capital k_t becomes

$$\underset{c_t,\, e_t}{Max} \; \{\ln c_t + \beta (D [p \ln (n_t - c_t + \tau (1-\pi) e_t) + (1-p) \ln (n_t - c_t + \tau e_t)] + G)\},$$

where

$$n_t = [1 + (1-\tau) A] k_t. \tag{2.4}$$

Differentiating with respect to c_t and e_t, we obtain the following first order conditions for the previous problem:

$$\frac{1}{c_t} = \beta D \left[\frac{p}{n_t - c_t + \tau (1-\pi) e_t} + \frac{1-p}{n_t - c_t + \tau e_t} \right],$$

and

$$\frac{p(\pi - 1)}{n_t - c_t + \tau (1-\pi) e_t} = \frac{1-p}{n_t - c_t + \tau e_t}.$$

Solving for c_t and e_t in the previous two equations, we obtain

$$c_t = \frac{1}{1+\beta D} n_t, \tag{2.5}$$

and

$$e_t = \left(\frac{\beta D}{1+\beta D} \right) \left(\frac{1-p\pi}{\tau(\pi - 1)} \right) n_t. \tag{2.6}$$

Using the expressions for c_t and e_t we have just obtained, the Bellman equation (2.3) becomes

$$\begin{aligned} D \ln k_t + G = & \\ & \ln \left(\tfrac{1}{1+\beta D} n_t \right) + \beta D p \ln \left(n_t - \tfrac{1}{1+\beta D} n_t + \tau (1-\pi) \left(\tfrac{\beta D}{1+\beta D} \right) \left(\tfrac{1-p\pi}{\tau(\pi-1)} \right) n_t \right) + \\ & \qquad \beta D (1-p) \ln \left(n_t - \tfrac{1}{1+\beta D} n_t + \tau \left(\tfrac{\beta D}{1+\beta D} \right) \left(\tfrac{1-p\pi}{\tau(\pi-1)} \right) n_t \right) + \beta G, \end{aligned}$$

where n_t is defined in (2.4). Collecting the coefficients of $\ln k_t$ appearing in the previous expression, we get

$$D = 1 + \beta D p + \beta D (1-p),$$

so that

$$D = \frac{1}{1-\beta}. \tag{2.7}$$

Substituting (2.7) and (2.4) into (2.5) and (2.6), we get the following consumption and evasion policies:

$$c_t = (1-\beta)\left[1+(1-\tau)A\right]k_t, \tag{2.8}$$

and

$$e_t = \frac{\beta(1-p\pi)}{\tau(\pi-1)}\left[1+(1-\tau)A\right]k_t. \tag{2.9}$$

It is then clear that the amount e_t of unreported income is decreasing in the tax rate τ for a given value of k_t, which is consistent with the original result obtained by Yitzhaki (1974).[5] Moreover, the amount of evaded taxes is

$$\tau e_t = \frac{\beta(1-p\pi)}{(\pi-1)}\left[1+(1-\tau)A\right]k_t,$$

which is also decreasing in the tax rate. Note that the consumption policy we have just obtained is exactly the same as the policy obtained when the tax evasion phenomenon is disregarded. The latter case is easily derived by making $p\pi = 1$ so that $e_t = 0$ (see (2.9)). In fact, the parameters p and π characterizing the tax enforcement policy do not have any effect on the amount of consumption in period t for given values of both the tax rate τ and the capital stock k_t. Therefore, the impact of a variation in the tax enforcement policy is totally absorbed by the amount of unreported income.

One difference between our discrete time formulation and its continuous time counterpart is that the consumption policy in discrete time depends on the tax rate, whereas it is independent of τ in continuous time. However, this discrepancy is also obtained when no tax evasion occurs. It is well known that, for the continuous time version of this model without tax evasion, the consumption policy is

$$c(t) = \rho k(t), \tag{2.10}$$

where $\rho > 0$ is the instantaneous discount rate on utility.[6] The policy function (2.10) is independent of the tax rate τ, which is in contrast to what is obtained in discrete time (see equation (2.8), which is also the consumption policy with no evasion). Nevertheless, it can be proved that the common rate of growth of both consumption and capital in continuous time when there is no evasion turns out to be

$$\frac{\dot{c}(t)}{c(t)} = \frac{\dot{k}(t)}{k(t)} = (1-\tau)A - \rho.$$

[5] We can immediately compute the fraction $\hat{e}_t$ of income concealed from the tax authority, which is the choice variable considered by L-Y. This fraction is

$$\hat{e}_t \equiv \frac{e_t}{Ak_t} = \frac{\beta(1-p\pi)}{\tau(\pi-1)}\left[\frac{1}{A}+(1-\tau)\right],$$

which is also decreasing in the tax rate τ.

[6] In continuous time individuals maximize

$$\int_0^{\infty} e^{-\rho t}\ln c_t\, dt.$$

It should be pointed out that the consumption policy (2.10) is identical to that obtained when tax evasion is present.

In our discrete time formulation, the growth rate of both consumption and capital when $e_t = 0$ is

$$\frac{c_{t+1}}{c_t} - 1 = \frac{k_{t+1}}{k_t} - 1 = \beta\left[1 + (1-\tau)A\right].$$

We see thus that under both formulations the rate of economic growth is decreasing in the tax rate when tax evasion is absent.

3. Penalties Independent of the Tax Rate.

In their seminal paper, Allingham and Sadmo (1972) introduced the portfolio approach to solve the static tax evasion problem, and they assumed that the penalties imposed on caught evaders were independent of the tax rate. Therefore, in their paper the penalty rate was imposed on the amount of evaded income rather than on the amount of evaded taxes. The optimal evaded income obtained in the previous section can be easily transformed to cope with this alternative assumption. Letting $\widehat{\pi}$ be the penalty rate on unreported income, we have that $\widehat{\pi} = \pi\tau$. Therefore, after replacing π by $\widehat{\pi}/\tau$, the policy function (2.9) becomes

$$e_t = \frac{\beta\left(\tau - p\widehat{\pi}\right)}{\tau\left(\widehat{\pi} - \tau\right)}\left[1 + (1-\tau)A\right]k_t. \tag{3.1}$$

The consumption policy (2.8) is not affected by this alternative assumption on the penalty structure.

Even if Allingham and Sadmo found that the effect of changes in the tax rate on unreported income was ambiguous for general concave utility functions, the derivative of e_t with respect to τ can be unambiguously signed in the present context under some parametric restrictions. As we did in the previous section, we assume that $p\pi < 1$ in order to generate positive evasion. This inequality becomes $p\widehat{\pi} < \tau$ in the present context. Moreover, in order to account for effective punishment to evaders, we assumed that $\pi > 1$, which now becomes $\widehat{\pi} > \tau$. Finally, we make the empirically reasonable assumption that the fine to be paid by evaders does not exceed the amount of concealed income, that is, $\widehat{\pi} < 1$.[7]

Performing the derivative of e_t with respect to the tax rate τ, we immediately get

$$\frac{de_t}{d\tau} = \underbrace{\left[\frac{\beta k_t}{\tau\left(\widehat{\pi} - \tau\right)}\right]}_{S}\underbrace{\left[\frac{\tau^2 + p\widehat{\pi}^2 - 2p\widehat{\pi}\tau}{\tau\left(\widehat{\pi} - \tau\right)}\left[1 + (1-\tau)A\right] - A\left(\tau - p\widehat{\pi}\right)\right]}_{Q}.$$

Clearly, the term S is strictly positive as $\widehat{\pi} > \tau$, whereas the term Q can be rewritten as

$$\frac{\tau^2 + p\widehat{\pi}^2 - 2p\widehat{\pi}\tau}{\tau\left(\widehat{\pi} - \tau\right)} + \frac{A\left[p\left(\widehat{\pi} - \tau\right)^2 + \tau^2(1-p)(1-\widehat{\pi})\right]}{\tau\left(\widehat{\pi} - \tau\right)}. \tag{3.2}$$

The denominator of the first term of the previous sum is positive since $\widehat{\pi} > \tau$ and the numerator satisfies

$$\tau^2 + p\widehat{\pi}^2 - 2p\widehat{\pi}\tau > \tau^2 + p\widehat{\pi}\tau - 2p\widehat{\pi}\tau = \tau\left(\tau - p\widehat{\pi}\right) > 0,$$

[7]Note that any reasonable calibration of the model of Alligham-Sadmo (1972) will yield $p < \tau$. Therefore, $\widehat{\pi} < 1$ implies that $p\widehat{\pi} < \tau$.

where the first inequality comes from the fact that $\widehat{\pi} > \tau$, while the last inequality arises since $p\widehat{\pi} < \tau$. Finally, the second term of the sum (3.2) is positive since $\widehat{\pi} < 1$ and $\widehat{\pi} > \tau$. Therefore, under our parametric restrictions, an increase in the tax rate results in a larger amount of income concealed from the tax authority. This is so because, when the fine imposed on evaders is independent of the tax rate, an increase in τ makes honesty more expensive, while the cost of evasion remains unchanged. Obviously, the amount τe_t of evaded taxes is now increasing in the tax rate τ for a given value of the current stock of capital k_t.

The comparative statics result we have just obtained is empirically more plausible than that of Section 2. However, the result of this section is obtained under a less appealing assumption, namely, that penalties are imposed on evaded income rather than on evaded taxes, which is at odds with the provisions of actual tax codes.

Finally, let us point out that the sign of comparative statics exercise performed in this section agrees with that obtained by Yaniv (1994) in a static setup. This author showed that the amount of income concealed from the tax authority is increasing in the tax rate when the utility function is isoelastic with an index σ of relative risk aversion satisfying $\sigma \leq 1/\widehat{\pi}$. This assumption is clearly met in our model since we are assuming that $\sigma = 1$.

4. Growth Implications of Changes in the Tax Rate

In order to analyze the effect of tax rate changes on the rate of economic growth when fines are proportional to the amount of evaded taxes, we should first compute the expectation of the law of motion (2.2) conditional on the stock of capital at t,[8]

$$E\left(k_{t+1}|\, k_t\right) = \left[1 + (1-\tau)\, A\right] k_t - c_t + \tau e_t \underbrace{(1 - p\pi)}_{E\left(\widetilde{h}\right)}.$$

Applying the law of large numbers to a continuum of i.i.d. random variables, we obtain that the average capital per capita $\bar{k}_{t+1}$ coincides with its conditional expectation $E\left(k_{t+1}|\, k_t\right)$. Therefore, the rate of growth γ of capital (and, hence, of consumption) in per capita terms satisfies

$$\gamma \equiv \frac{\bar{k}_{t+1}}{\bar{k}_t} - 1 = \left[1 + (1-\tau)\, A\right] - \frac{c_t}{k_t} + (1 - p\pi)\, \tau \left(\frac{e_t}{k_t}\right) - 1.$$

Using the policy functions of consumption and evasion (2.8) and (2.9), the previous expression becomes

$$\gamma = \left[1 + (1-\tau)\, A\right] \beta \left[1 + \frac{(1-p\pi)^2}{\pi - 1}\right] - 1, \tag{4.1}$$

[8] Note that the conditional variance of next period capital is

$$Var\left(k_{t+1}|\, k_t\right) = \tau^2 e^2 Var\left(\widetilde{h}\right).$$

This variance depends on the tax rate τ. However, this dependence was disregarded by L-Y.

and, thus,

$$\frac{d\gamma}{d\tau} < 0.$$

This result also contradicts the one found in L-Y. These authors claim that the relationship between γ and τ is U-shaped in this context. This is so because they mistakenly obtain that an increase in the tax rate results in higher evasion. Furthermore, they obtain that, for sufficiently high values of the tax rate, a further increase in the tax rate triggers very large levels of individual evasion. This implies that more resources become available for capital accumulation and hence the economy ends up growing faster. However, our comparative statics exercise shows that higher tax rates are associated with lower evasion levels. Hence, there is no channel from which faster capital accumulation may arise when the tax rate goes up.

If we consider instead the framework proposed by Allingham and Sadmo (1972) with penalties independent of the tax rate, the growth rate (4.1) will become

$$\gamma = [1 + (1 - \tau) A] \beta \left[1 + \frac{(\tau - p\widehat{\pi})^2}{\tau (\widehat{\pi} - \tau)} \right] - 1.$$

Note that when τ gets close to zero, the rate of growth approaches infinity, and the same occurs when τ tends to its upper bound $\widehat{\pi}$. This means that γ is a non-monotonic function of the tax rate, and, in particular, it is decreasing for low values of τ, whereas it is increasing for high values of τ. Since tax evasion is encouraged by higher tax rates in the Allingham and Sadmo's model under our parametric restrictions, an increase in τ could result in more resources available for acquisition of capital and hence in higher growth rates.

5. Conclusion

In this paper we have shown that the negative theoretical relationship between unreported income and tax rates is preserved in a multi-period economy when fines are imposed on the amount of evaded taxes. However, under the much more unrealistic assumption that the fine paid by caught evaders is independent of the tax rate, the sign of the previous relation is reversed regardless of whether we consider a static or a dynamic setup.

Concerning the rate of economic growth when fines are proportional to the tax rate, we have shown that the rate of capital accumulation cannot increase with the tax rate, since the amount of disposable income always decreases in this case. However, if fines are imposed on the amount of unreported income, then the larger evasion triggered by higher tax rates could increase the amount of disposable income and, thus, capital could be purchased at a faster pace.

We have considered a capital accumulation model where government spending is totally unproductive. We have analyzed in a related paper (Caballé and Panadés, 1997) the case where government spending is used as a productive input (as in Barro, 1990). We should point out however that the comparative statics results concerning the relation between tax evasion and tax rates obtained in the present paper also hold under this alternative assumption on the role of government spending.

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