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Tax evasion and public expenditures on tax revenue services in an endogenous growth model

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ABSTRACT

This paper analyzes the relationship between tax evasion and the two main policy instruments affecting tax compliance, namely, the announced tax rate and the share of tax revenues allocated to tax monitoring mechanisms. For doing so, we adopt a simple one-sector endogenous growth model modified under tax evasion following the Roubini and Sala-i-Martin (1995) analysis on income taxes and tax compliance. Our model confirms Barro's (1990) theoretical finding stating that the optimal tax rate is equal to the elasticity of public capital. However, introducing a welfare function where governments care also about the degree of fiscal corruption in the economy, the effective tax rate is lower than the output elasticity of public capital in line with Futagami et al. (1993) and Turnovsky (1997) theoretical results. Finally, our model is calibrated using data on tax evasion from 35 OECD and 110 non-OECD countries for 2011. Simulation results suggest that both tax evasion and output growth are decreasing with the share of tax revenues allocated to monitoring expenses, while government's utility maximization imply an announced tax rate lower from the elasticity of public capital for both groups of countries.

1. Introduction

Income or corporate profit taxation matters for economic growth since taxes distort the accumulation of private capital. Standard endogenous growth models suggest that the rate at which physical capital is accumulated increases with their private return and, hence, high tax rates on income or corporate profits are typically associated with low growth rates (Lucas, 1988; Rebelo, 1991). However, taxation generates resources to finance the supply of the productive inputs provided by the government including public goods and infrastructure. Since individuals are not charged by their use of these public goods, government spending plays the role of an externality for the private sector. Such an externality ends up being an engine of endogenous growth since the resulting aggregate production function could display a high marginal productivity of private capital, which permits perpetual capital accumulation (Barro, 1990; Turnovsky, 1997). Therefore, there is a tension

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between the role of taxation in creating disincentives for the accumulation of capital and the role of the public spending financed by these taxes in raising the return from private capital.

An effective tax system must provide incentives to tax payers (individuals or corporate firms) for tax compliance; otherwise, no taxes would be remitted voluntarily in a competitive economy. Indeed empirical evidence suggests that tax evasion and fiscal corruption is a general and persistent problem in virtually every country with serious negative consequences. Tax evasion constitutes a sizable share of the shadow economy even in advanced industrialized countries around the globe. Slemrod and Yitzhaki (2002) estimate that about the 17% of income taxes are unpaid in the US, while the Tax Justice Network (2011) estimates that, on average, tax evasion rates in 119 developed and developing countries around the world exceed 50% of their healthcare spendings. Furthermore, Schneider (2000) reports that the shadow output equals 39% of the actual magnitude of reported GDP in developing countries, 23% in transition countries and 14% in OECD countries. Schneider and Enste (2000) and Bajada (2003) suggest that the underground economy and the associated tax evasion deepen recessions and increase the volatility of business cycles.

Starting from the seminal paper by Allingham and Sandmo (1972), a large amount of literature relating to fiscal corruption and tax evasion has emerged aimed to analyze its determinants, magnitude, and welfare effects in both developed and developing economies (see Feige, 1992; Jung et al., 1994 as well as the papers reviewed therein for a discussion on tax evasion and underground economies). However, few papers analyze tax policies and evasion in a context of economic growth models. Roubini and Sala-i-Martin (1995), assuming a positive relation between evasion and tax rates, find that financial repression is associated with high tax evasion and low economic growth. Lin and Yang (2001) extend the portfolio choice model in the presence of tax evasion from a static to a dynamic setting suggests that aggregate output growth is convex with respect to the statutory tax rate. However, their theoretical model neglects government externality assuming that public goods and infrastructure do not affect the productivity of the private sector. Chen (2003), on the other hand, integrated tax evasion into a standard AK model with public capital financed by income taxation. In his model consumers first optimize their tax evasion levels, and then government optimizes the statutory tax rate, tax auditing expenses and fines given the evasion level decided by consumers. In contrast to Barro's natural efficiency condition, his model suggests that the government must set the statutory tax rate above its expenditure externality degree. Finally, Dzhumashev and Gahramanov (2010) also adopted a standard endogenous growth model augmented with tax evasion adjusted into a dynamic portfolio framework. Their model is similar to that by Lin and Yang (2001) and suggests that tax evasion rates are proportional to public spending externality.

Along these lines, we also adopt a standard one-sector endogenous growth model modified accordingly to analyze how government decisions on the statutory tax rate and monitoring tax compliance impact the rate of growth in the economy. Based on the theoretical framework of Roubini and Sala-i-Martin (1995), we impose a tax evasion rate which is a positive function of the announced tax rate and a negative function of tax revenues allocated for tax monitoring purposes. In contrast to Chen (2003), we assume that tax revenues are allocated between tax monitoring and public capital formation so that both expenditures are a constant share of total tax revenues. In that way we ensure that Barro's (1990) natural efficiency condition is satisfied in the steady-state, *i.e.*, the effective tax rate is indeed equal to the output elasticity of public capital. In addition, in the public sector of the economy we assume that the government cares not only about the consumption levels, but also about the degree of fiscal corruption as this is reflected by tax evasion rates in the economy.

The above novel features of our model introduce a trade-off between tax evasion and output growth rates, which is an important consideration for our *social planner* type government in determining welfare maximizing policies. Using data from 35 OECD and 110 non-OECD countries we first present empirical estimates of the tax evasion function at an aggregate level, confirming Roubini and Sala-i-Martin (1995) assumption on the relation between the two policy variables and evasion rates. These estimates are then used to assess the long-run effects of the two policy variables on government's utility maximization by simulating our model for the two groups of countries separately.

The paper is organized as follows. Section 2 presents our model with effective taxation assuming that individuals have the incentive to evade taxes and government allocates a constant share of tax revenues to tax auditing. Section 3 determines the growth maximizing tax rate, while Section 4 takes into consideration government's perceptions about tax evasion. In Section 5 our theoretical model is calibrated using data from a sample of 35 OECD and 110 non-OECD countries and Section 5 concludes the paper.

2. A growth model with effective taxation

2.1. Model description

We consider a closed economy populated by N identical agents who produce a single aggregate commodity (Y). Further, we assume that there is no population growth and that the labor force is equal to the population, with labor supplied inelastically. Accordingly the ith representative firm produces its output (Y_i) using the following *Cobb–Douglas* production technology:

$$Y_i = AK_i^{\alpha}\left(\frac{K_g}{L}L_i\right)^{(1-\alpha)} \tag{1}$$

where $0<\alpha<1$ is the output elasticity of private capital, A is a technological parameter, K_i denotes the stock of private