



## Economic growth, corruption and tax evasion

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### ABSTRACT

In this paper, we explore tax revenues in a regime of widespread corruption in a growth model. We develop a Ramsey model of economic growth with a rival but non-excludable public good which is financed by taxes which can be evaded via corrupt tax inspectors. We prove that the relationship between the tax rate and tax collection, in a dynamic framework, is not unique, but is different depending on the relevance of the “shame effect”. We show that in all three cases – “low, middle and high shame” countries, the growth rate increases as the tax rate increases up to a threshold value, after which the growth rate begins to decrease as the tax rate increases. But, for intermediate tax rates, the rate of growth for “low shame” countries is lower than that of “uniform shame” countries which is, in turn, lower than that of “high shame” countries. This happens because the growth rate is more sensitive to variations of  $t$  in an honest country rather than in a corrupt country.

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### 1. Introduction

Tax evasion and fiscal corruption have been a general and persistent problem throughout history with serious economic consequences, not only in transition economies, but also in countries with developed tax systems. In general, tax evasion and corruption can have ambiguous effects on economic growth: tax evasion increases the amount of resources accumulated by entrepreneurs, but it also reduces the amount of public services supplied by the government, thus leading to negative consequences for economic growth. Although there is extensive literature investigating the origins, effects and extent of tax evasion and corruption, from both theoretical and empirical points of view, interaction between them has been partially explored. The analysis of tax evasion in the tax compliance literature dates back at least to the classic paper of Allingham and Sandmo (1972). Since then, a large amount of literature relating to corruption and tax evasion has emerged but, only recently can we find theoretical models which study tax setting and evasion in a context of growth models (e.g. Lin and Yang (2001), Chen (2003) and Ellis and Fender (2006)).

Lin and Yang (2001) extended the portfolio choice model of tax evasion from a static to a dynamic setting, finding that, while growth is decreasing with respect to tax rate in absence of evasion, it is U-shaped with respect to the tax rate in the presence of the tax evasion. In contrast to our model, in their work, the public goods are not productive, then diverting resources from the non-productive public sector to the

productive private sector, fiscal evasion will be conducive to economic growth.

Chen (2003) integrates tax evasion into an AK model with public capital financed by income tax which can be evaded. In his model, individuals optimize tax evasion, while the government optimizes the tax rate, auditing and fine rate, given the evasion level decided by consumers. In general, these policies have ambiguous effects, but for some parameters the author finds that the growth rate decreases as tax evasion increases.

Ellis and Fender (2006) introduce endogenous corruption into a variant of the Ramsey growth model where a government taxes private producers and uses the resources to either supply public capital or simply consumes the taxes itself (corruption form).

We deal not with bureaucratic but with fiscal corruption which establishes a direct impact of evasion/corruption on tax revenues, and thus on economic growth.

In our work, we develop a Ramsey model of economic growth with a rival but non-excludable public good which is financed by a percentage of taxes. We also assume that tax auditing may be performed by a corruptible tax inspector, who takes a bribe in exchange for not reporting the detected evasion, in accordance with Chander and Wilde (1992), Hindricks et al. (1999) and Sanyal et al. (2000). Thus, in our model, evasion goes hand in hand with the corruption of the tax inspector. In particular, we analyze the implications of endogenous evasion and corruption at a micro level and then we use the results of our static game as a framework for the growth model. In fact, taxation and tax evasion, in turn, influence both the provision of the public good and capital accumulation, affecting output and economic growth in two opposite ways: on one hand, higher tax evasion implies more capital accumulation and thus more economic growth; on the other hand,

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higher tax evasion leads to lower tax revenues, less provision of the public good and thus, a lower economic growth rate.

In contrast with some lines of research on tax evasion, we do not consider the issue of optimal remuneration of tax inspectors by assuming that the inspector is paid a fixed wage.<sup>1</sup>

We prove that the relationship between the tax rate and tax collection is not unique but is different depending on the relevance of the “shame effect” and depending on the static or dynamic context of the analysis.

Our work is part of one of two lines of research taken by literature on tax evasion (Feld and Frey, 2007), i.e. the line of research which considers tax morale as the key factor to explaining the fact that, contrary to the results of Allingham and Sandmo (1972), “people who exhibit empirically observed levels of risk aversion normally pay their taxes, although there is a low probability of getting caught and being penalized” (Frey and Torgler, 2007). In particular, we consider a growth model where the aggregate tax evasion is determined by non-pecuniary costs which depend upon the entrepreneurs’ attitude to social stigma.<sup>2</sup> In this respect, we analyze a dynamic model, where the aggregate tax evasion is microfounded on non-pecuniary costs.

Several empirical studies highlight the importance of non-economic factors on tax evasion: Alm and Torgler (2006) find that the tax morale can explain more than 20% of the total variance of the variable size of the shadow economy (used as a measure of tax evasion); thus, if tax morale is declining, the shadow economy is likely to increase. Richardson (2006) shows, in an empirical analysis based on data for 45 countries, that non-economic determinants have the strongest impact on tax evasion: in particular, tax morale is an important determinant of tax evasion.

According to Kim (2003), we assume that people may fear social stigma (shame effect) only if they are detected as cheaters/corrupted. In this paper, we have extended the static analysis of Cerqueti and Coppier (2009), in a long run context incorporating the presence of a public sector. Indeed, in the short-run, it is a plausible assumption that governments can be completely opportunistic, that is, they provide nothing for the citizenry, not even national defense. But, in the long run, even taxpayers who are initially ashamed of cheating will eventually change their minds and become less ashamed. It is doubtful that the citizenry will have a strong sense of loyalty to an opportunistic government, especially one that offers no productive output to its citizens. Following Barro and Sala-i-Martin (1992), we incorporate a public good into a growth model. Considering in a growth model also the “productive” effect of tax revenues i.e. the provision of public goods, we obtain different results from e.g. Chen (2003) and Lin and Yang (2001) who consider only the negative effect of taxes on capital accumulation. In order to be more precise, we show that in all three cases – “low, middle and high shame” countries, the growth rate increases as the tax rate increases up to a threshold value, after which the growth rate begins to decrease as the tax rate increases. As we will see, this result derives from the behavior of tax revenues in a static framework.

The paper is organized as follows. The next section contains a discussion about some stylized facts concerning evasion, corruption and growth. In Section 3, we first present the model and then we

formalize and solve the game, describing the model in a static framework. In Section 4 we extend the analysis into a dynamic context, endogenizing output and we go on to analyze the relationship between the tax rate, dynamic tax revenues and the income growth rate. We conclude in Section 5.

## 2. Empirical motivation of the paper: some stylized facts

This section contains some stylized facts about corruption, evasion and their relationship.

The phenomenon of tax evasion is of great relevance when the State collects taxes. In the U.S., the Internal Revenue Service estimates that 17% of income tax liability is not paid (Slemrod and Yitzhaki, 2002). In economies where there is a great extent of corruption, this is related to a high level of tax evasion (see Tanzi and Davoodi, 2000). In this respect, the analysis of tax evasion in a corrupted environment is an important area of research, and empirical economics literature contains some evidence. In particular, two types of corruption may take place: bureaucratic corruption and fiscal corruption. The former concerns the attitude of bureaucrats who ask for a bribe in order to guarantee public services while the latter is related to the dishonesty of tax inspectors, who ask for a bribe in order not to report evasion. Since in this work we deal with the problem of fiscal corruption, we rely henceforth only on the literature on the latter. Chu (1990) mentions that, in a survey undertaken by the city government of Taipei in 1981, 94% of monitored tax administrators are corrupt; in Sanyal et al. (2000), The Police Group in 1985 suggests that 76% of all Indian tax auditors are corrupt and that 68% of taxpayers had paid bribes. Ul Haque and Sahay (1996) state that 20–30% of Nepalese tax revenue goes to bribery, and cite a former prime minister of Thailand as evidencing that corruption is associated to the loss of 50% of tax revenues.

It is worth noticing that evasion is a necessary condition for fiscal corruption. Therefore, the analysis of the phenomenon of evasion may provide several insights into the dynamics of fiscal corruption. The empirical evidence gives that the occurrence of evasion is also driven by the level of tax rate implemented by the State. This aspect is theoretically confirmed when the analysis is carried out in accordance with the classical model of Allingham and Sandmo (1972). Indeed, when the fine imposed on evaders is independent from the tax rate, an increase in the tax rate makes honesty more expensive, while the costs of evasion remain unchanged. In particular, higher tax rates encourage rather than repress tax evasion. In a large majority of the cases, experimental, econometric and survey evidence shows that an increase in the tax rate leads to an increase in tax evasion.<sup>3</sup> Some notable exceptions, however, are Feinstein (1991) and Alm et al. (1993), who find a negative relationship between tax rates and tax evasion. A further supporting argument on the positive relationship between tax evasion and tax rates can be found in Gupta (2005, 2006). The author analyzes data related to Greece, Italy, Portugal and Spain – countries with a well-established tradition of tax evasion – and shows how higher tax evasion would cause a benevolent social planner to optimally increase the tax rates, when implicit taxation is also available as a source of revenue. Our paper also, in a static context, confirms this stylized fact, showing that as the tax rate increases the number of entrepreneurs who will find it worthwhile to be corrupt, i.e. evaders, increases.

A further economic variable to be considered in order to describe corruption is the monitoring level of the State. A remarkable amount of empirical work has validated the deterrence effect of the probability of being caught (auditing) and of penalty severity, although some differences appear regarding the size of the deterrence

<sup>1</sup> For example Besley and McLaren (1993), Hindriks et al. (1999) and Mookherejee and Png (1995), deal with the issue of optimal remuneration of inspectors. Besley and McLaren (1993) compare three distinct remuneration schemes which provide different incentives to the inspectors: efficiency wages, reservation wages and capitulation wages. Hindriks et al. (1999) consider a model where all the actors are dishonest. Mookherejee and Png (1995) also consider only corruptible agents, but they remove the exogenous matching of the auditor and the evader: they consider it a moral hazard problem, since, for evasion to be disclosed, the inspector has to exert a costly non-observable effort.

<sup>2</sup> For a complete review of the main hypothesis proposed in literature on the different types of non-pecuniary costs that influence tax morale see Dell’Anno (2009).

<sup>3</sup> See, for example, Friedland et al. (1978); Clotfelter (1983); Baldry (1987); Christian and Gupta (1993); Jaulfaian and Rider (1996); Andreoni et al. (1998) and Pudney et al. (2000).

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