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Abstract

Under Principal-Agent-Supervisor paradigm, we examine in this paper how a tax collection agency changes optimal schemes in order to lessen the occurrence of corruption between the tax collector and the taxpayer. The Principal, who maximizes the expected net fiscal revenue, reacts by decreasing tax rates when the supervisor is likely to engage in corrupt transaction with taxpayer.The combat against collusion and corruption may explain the greater reliance on indirect taxes than on direct taxes both in developed and developing countries.

JEL Classification : D82, H2
Keywords : Principal –Supervisor– Agent, Corruption, Tax Evasion

1. Introduction

Tax evasion occurs when agents believe that the public sector output is independant of their actions.This phenomena leads to excessively low public revenues and,in turn, to the underprovision of public goods. In the light of the new theories of endogenous growth, this clearly exerts a negative effect on the development process. The seminal paper on tax evasion is due to Allingham ans Sandmo (1972), who examine comparative statics of tax evasion with respect to change in the tax rate, the penalties for evasion ans the frequency of audit. The idea that a taxpayer may be tempted to report taxable income below its true value was later extended by Kolm (1973), Srinivasan (1973) ans Cowell (1985) among others[1].A major limitation of these previous studies lies in the exogeneity of both tax rate ans frequency of audit.

Hence, numerous studies have focused on the strategic interactions between fiscal authorities and economic agents being taxed, using game theoretic arguments or Principal Agent models to characterize the optimal taxation mechanisms at te disposal of the authorities (see Border and Sobel , 1987,Greenberg, 1984, Reinganum and Wilde,1985).More recently, models of tax evasion including the possibility of corruption in tax administration have been examined in the context of three-tier hierarchy. Indeed, the theory of hierarchica collusion developed by Tirole (1986, 1992) has been used in an effort to better capture complex relationships between governments, fiscal authorities and taxpayers. For example, potential corruption of fiscal agencies by taxpayers leads to higher audit rate than when such a pressure is absent (Chander and Wilde,1990). A certain degree of tolerance for collusion can be an integral part of efficient fiscal collection mechanisms given the resources

[1] For a comprehensive survey on tax evasion and implications for policy analysis ,see Slemrod ans Yitzhaki (2001).

constraint faced by the government (Flatters and Mcleod, 1995). Finally, considering wage incentives designed to thwart bureaucratic collusion, Besley ans MacLaren (1993) show that the efficiency wage may not be an appropriate choice.

Again, an important limitation remains in theses studies thaht have departed from the standard principal –agent setting by allowing taxpayer and tax collectors to collude.Indeed, according to this literature, it is always assumed that auditing is perfect. Once the audit is carried out , this assumption means that there is perfect certainty regarding the income of audited taxpayers.However, as shown in Cowell (1990), the structure of taxation largely depends on the level of information obtained regarding unobservable variables. To the best of our knowledge, Hindricks et al.(1999) is the first reference dealing with collection and tax evasion given the possibility of dishonesty among taw collectors. In their powerful analysis, the authors develop a model of the encounter between tawpayers and tax inspectors (both potentially corruptible) with the setting of a tax collector mechanism, and allow for the possibility of extorsion.

When the government is concerned to maximize revenue, Hendriks et al.(1999) demonstrate that the government cannot be better than set a proportional tax schedule. Focusing on the characterization of tax scheme that is evasion-proof, corruption-proof and revenue maximizing is undoubtedly a worthwhile issue. Nevertheless, the previous paper deals exclusively with direct taxation. In this paper, we argue that the dishonesty in taxation is also likely to explain differences in the structure of taxation. Indeed, the optimal tax-system framework can be applied to the policy-relevant choice between direct and indirect taxation. In particular, it is often claimed that a shift from income taxation to commodities taxation can combat tax –evasion (see Boadway et

al.,1994)[2]. Here, we present an additional argument to explain the preferencefor indirect taxes. Commodity taxation is a suitable instrument in the combat against bribery between taxpayers ans tax collectors.

Using a simple three-tier hierarchy model, we stress in this paper the role of observability and collusion in the choice of taxation scheme. From an empirical perspective, we seek an information-theoretic explanation for the greater relaince on indirect ta xation rather than on direct taxation that one can observe both in developed and developing countries (see Dudley and Montmarquette, 1987). For our purpose, we derive a corruption-proof theorem resulting from a corner solution. Given the threat of collusion between taxpayers and tax collectors, a maximizing- revenue government sets a level of taxation that reduces the stake and then the benefits of collusion.The remainder of the this paper is organized as follows. In section 2, we present a model of taxation with potential dishonest agents.In section 3, we derive the optimal taxation structure; concluding comments are offered in section 4.

2. The Model

We examine taxation policy in the context of a three-tier hierarchy which involves a principal, an agent and a supervisor. For the presentation, we assume that the principal is the head of the tax collection agency, the supervisor is the tax collector and the agent is the taxpayer. A key assumption in our model is that the principal has never the supervisor'sinformation structure.

The principal is interested in controlling the agent's activity. Hence, he want to get information about the agent's level of income in order to set the optimal

[2] However, the result that changing the tax mix toward indirect taxes decreases the level of tax evasion relies on a strong assumption, since evasion is supposed to be possible only for the income tax.

taxation policy. The principal hires a supervisor to monitor the action of the agent ans he offers a contract to the supervisor to discipline the agent. Before contracting take place, the supervisor learns the agent's level of income.The role of the tax collector is to make report to the principal, whose content is a valulable source of information. Finally, the supervisor receives a payment from the principal depending on the report that makes. However, th ereport may be untruthful when the supervisor and the agent agree to collude[3]. When collusion occurs , it is accompanied by a covert transfer from the agent to the supervisor (see Tirole,1986); This transfer is a part of an enforceable side-contract between the the taw collector and the tax payer, which indicate the amount of covert transfer from the agent to the supervisor.

Let us consider a population of taxpayers, each tawpayer beung characterized by a revenue y. The government cannot costlessly observe the level of income. Nevertheless, the principal has information concerning the cumulative density of revenue denoted $G(y)$ and the corresponding density function $g(y)$, where $y \in Y$ and Y is defined over the support $Y = [y_o, \bar{y}]$. Let σ the state of information obtained by the supervisor about the taxpayer's revenue[4]. There are two cases. On the one hand, the supervisor observes the true value y. The tax collector learns that the taxpayer is of type y with probability ξ. On the other hand, with a probability $1-\xi$, the supervisor learns nothing about the type of agent and the signal is defined by $\sigma \in \{y \in Y, \varnothing\}$. We make the additional assumption that the signal σ is verifiable.

[3] The report is expected to be untruthful only if the tax collector ans the tax payer agree on sending a falsified report to the principal.Thus, the agent is unable to force the supervisor to send a falsified report ans the supervisor can not falsify the report without the help of the agent.

[4] The role of fiscal agency is to observe the revenue y ans to make report to the government. Investigation of a given tawpayer by thefiscal agency leads to a report which constitutes the signal σ.

Now, let r be the report made by the supervisor to the principal. The tax collector's report to the principal is denoted by r such that $r \in \{y \in Y, \varnothing\}$. The tax collector can only report $r = \varnothing$ when he learns nothing about the type of agent, while he can either tell truth $r = y$ or send a falsified report $r = \varnothing$ otherwise. So, the knowledge of the type of agent $y \in Y$ can give rise to a rent for the supervisor. When the tax collector's search for information is fruitful, the supervsior is in a position to manipulate the quality of information sent to the principal. Thus, it becomes clear that the supervisor is expected to have a strategic role in the implementation of the tax policy decided by the government.

When the tax collector observes the level of income of the taxpayer ($\sigma = y$), the agent is induced to collude with the supervisor. In exchange of the dissimulation of the true parameter $y \in Y$, the agent offers a side contract to the supervisor. Hence, the agent decides to bribe the tax collector to prevent him from revealing the level of income $y \in Y$.To suppress reporting, the side contract includes an amount of covert transfer $b(y)$ from the agent to the supervisor as function of the type $y \in Y$.The aim of bribery is to preserve the rent value for the agent which is involved by the asymmetric nature of information between parties. When $\sigma = y$, it is in the interest of the supervisor to accept a bribe from the tawpayer, so that the signal does not translate into a true report to the government.

In order to get closer form solutions, we assume without loss of generality that the preferences of the fiscal agency are linear. Then, the utility function of th esupervisor is given by : $V(w) = w$, where w is the fiscal agency's level of revenue or salary. Besides, we denote by w_o the reservation level of the utility for the agency.In the following taxation game, the amount of agency's revenue

w depends on the report made by the supervisor. For the notation this means that $w = w(r)$ with $r \in \{y \in Y, \varnothing\}$. We have $w_o = w(\varnothing)$.

We are in position to write the objective function of the principal, which is assumed to be the expected net fiscal revenue. The fiscal revenue for the governement, which is denoted by R, may be expressed as :

$$R = \int_Y [(1-\zeta)(\tau(\varnothing)y - (1+\lambda)w_o) + \zeta(\tau(y)y - (1+\lambda)w(y))]dG(y) \qquad (1)$$

where $\tau(y)$ is the tax rate for an agent of type $y \in Y$, and λ may be seen as the cost of public funds (see Laffont and Tirole 1993). When the supervisor reports the true level of income, his wage $w(y)$ is greater than the reservation wage w_o with falsifiable report.

Bribey of the supervisor by a taxpayer is introduced in the following manner. Let us suppose that : $\sigma = y \in Y$[5]. The taxpayer proposes a lateral contract specifying a transfer $b(y)$to the supervisor. The division of the rent involved by asymmetric information in the hierarchy must be such that:

$$b(y)(1+\lambda_c) \leq \tau(\varnothing)y \qquad (2)$$

where the parameter λ_C indicates the cost of engaging in bribery (Laffont and Tirole 1993). Hence, avoiding collusion between the taxpayer and the supervisor in the case of an informative signal implies that the compensation $w(y)$made by to the supervisor by the government must satisfy the following non collusion constraint:

$$w(y) \geq \frac{\tau(\varnothing)y}{1+\lambda_c} \qquad (3)$$

[5] This corresponds to situation where the taxpayer is successfully audited by the supervisor.

Since $\lambda > 0$, the previous constraint becomes binding for the threshold value:

$$w(y) = \frac{\tau(\varnothing)y}{1+\lambda_c} \tag{4}$$

The key feature here is that $w(y)$ is a function of $\tau(\varnothing)$. Indeed, collusive behavior occurs when the agency may be tempted to report $r = \varnothing$ while the observed signal is $\sigma = y \in Y$. Our purpose in this setting is to examine how the informational asymmtery between the supervisor ans the principal may influence the optimal level of taxation.

3. Corruption an Optimal Policy

In collusion and corruption regime, there are a variety of situations where the tax collection agency may suffer a loss in net revenue as the outcome of intensified tax effort.Thus, faced with possible collusion betwee taxpayers ans supervisors, we study the optimal reaction in terms of taxation decision for the tax agency.

Anticipating the potential occurrence of corruption between the two lower ranks of the hierarchy, i.e. the supervisor and the agent, the government seeks to put in place a mechanism which induces the tax collector to truthfully reveal the information collected on taxpayers. Since, the principal's concern is to maximize expected revenue, he solve the following program:

$$\underset{\tau(\varnothing)}{Max}\, R = \int_Y \left[(1-\zeta)(\tau(\varnothing)y - (1+\lambda)w_o) + \zeta\left(\tau(y)y - (1+\lambda)\frac{\tau(\varnothing)y}{1+\lambda_c} \right) \right] dG(y)$$

(5)

where $\tau(\varnothing)$is the tax rate when the report from the supervisor to the principal is $r=\varnothing$. The question of interest here is to determine the optimal taxation response for the principal to prevent collusion between the taxpayer ans the tax collector. Since teh objective function in equation (5) is linear in the decision variable , we have the following result.

Proposition 1

There exists a probability $\zeta_o \in [0,1]$ such that the corruption-proof structure of taxation is given by :

$$\tau^*(\varnothing)=1 \quad \text{if} \quad \zeta<\zeta_o$$

$$\tau^*(\varnothing)\in]0,1[\quad \text{if} \quad \zeta=\zeta_o$$

$$\tau^*(\varnothing)=0 \quad \text{if} \quad \zeta>\zeta_o \qquad .$$

Proof:

The first order condition for an interior solution is :

$$\frac{dR}{d\tau(\varnothing)}=\left(1-\zeta-\zeta\frac{1+\lambda}{1+\lambda_c}\right)E(y)=0$$

with $E(y)=\int_Y ydG(y)$ is the average income. Let $\zeta_o \in [0,1]$be the threshold value such that $\left(1-\zeta_o-\zeta_o\frac{1+\lambda}{1+\lambda_c}\right)=0$, so that we can write:

$$\zeta_o=\frac{1+\lambda_c}{2+\lambda+\lambda_c}$$

Hence, the optimal value of $\tau(\varnothing)$ i s $\tau^*(\varnothing)=1$ if $\zeta<\zeta_o$ since $\frac{dR}{d\tau(\varnothing)}>0$, $\tau^*(\varnothing)\in]0,1[$ if $\zeta=\zeta_o$ since $\frac{dR}{d\tau(\varnothing)}=0$ and $\tau^*(\varnothing)=0$ if $\zeta>\zeta_o$ since $\frac{dR}{d\tau(\varnothing)}<0$. (Q.E.D)

Let us interpret this result of corruption-proof taxation. According to the previous proposition, the threat of collusion between taxpayer and supervisor leads the government to set a different scheme of taxation, with a shift from income taxation to commodity taxation. Indeed, a government which decides to use value added taxation reduce the occureence of bribery. The tax rates are lessened for the taxpayers characterized by an important probability of being dishonest[6].Hence, indirect taxation allows the government to curb corruption. Conversely, when occurrence of side transfers is low ($\zeta<\zeta_o$) , there is no need to alleviate the optimal tax rate and a scheme of direct taxation is efficient.

4. Conclusion

In this paper, we prove insights about the role of taxation scheme policies aiming to combat bureaucratic corruption. We study the optimal level of taxation that must be implemented by a government when there exists potential corruption between taxpayers and auditors. Using a model of three-layer hierarchy with asymmetric information between the supervisors, we show that the level of taxation should be set to zero when bribery is likely to

[6] When $\zeta>\zeta_o$,this corresponds to a situation where occurrence of bribery between taxpayer and tax collectors is likely.u

occur. Hence, by changing the tax mix toward indirect taxes, the principal can significantly affect the magnitude of collusive behaviors between taxpayer's ans tax collectors. For the sake of simplicity, our analysis relies on basic assumptions. Of course, other objectives may be taken into account by the governement (dealing with considerations of redistribution), but this does not the conclusion that indirect taxation is a suitable tool in the combat against bribery.

As a consequence, our analysis explains why it is desirable for a revenue-maximizing government to use indirect taxes rather than direct taxation. From an empirical viewpoint, one usually observes that the level of direct taxation remains low in poor developing countries, where collusive behaviors between taxpayers and tax collectors are more likely. Our framework proves that the greater reliance on commodity taxes than on in come taxes may be interpreted as the optimal decision for a government to reduce occurrence of collusive behaviors . While we have focused here on taxation decisions, there exists other organizational measures to combat collusion.In particular, instruments aimed at stopping excessive friendship between potential bribers ans public officials are expected to have a bribery-reducing impact.Examples are the use of extenal auditors or mechanisms of rotation among supervisory personnel. The tax mix is also an affective device to limit the magnitude of collusion, but it would be intersting to compare the effectiveness is these various measures in the observing combat againsit bribery.

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