Tax Evasion, Investors Protection and Corporate Governance.

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Abstract

When limiting the extent of the hidden economy, tax inspection may be a substitute to private monitoring of investment projects. When enforcing investors protection, the judiciary system is a complement to private governance as it decreases private monitoring costs. Corporate income tax may finance government expenditures related to tax inspectors limiting the hidden economy and to the judiciary system enforcing investors protection. However, a corporate income tax increase enhance tax evasion. This paper provides the range of relevant value for the corporate tax rate which provides incentives for private monitoring leading to an increase of the number of projects which are financed, with a higher share of external funds.

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1. Introduction

International organizations such as the IMF, the world bank and the OECD as well as leading academics in Chicago and Harvard Universities expressed their concern with respect to the governance of firms and states, corruption and the impact of institutions related to the legal system on the economic performance of several countries in the last decade. Corruption, the lack of investor protection and tax evasion are striking features of economies in transition (Anderson and Kegels [1998], Berkovitz and Li [2000], Johnson et al. [2000], Hellmann and Schankerman [2000], Robinson [2001], Roland and Verdier [2003], Savafian et al. [2001]).

Corruption has negative effects on development through the misallocation of activities (Schleifer and Vishny [1993], Mauro [1995 and 1998], Bardhan [1997], Acemoglu

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and Verdier [1998], Ehrlich [2000], Jain [2001]). Corruption is frequent among bureaucrats (Rose-Ackerman [1978], Peters [2001], Treisman [2000]) and may increase due to social factors (Tirole [1996]). A high level of widespread corruption can remain for a long time as a persistent equilibrium (Andvig and Moene [1990]). With respect to taxation, specific incentives are required for higher level inspectors or lawyers in case of contest with tax inspectors (Chand and Moene [1999]). Rising civil servant wages or indexing thier income on the number of reported cases have some effect for decreasing corruption but is not sufficient for eradicating corruption (Besley and MacLaren [1993], Van Rijckeghem and Weder [2001], Hindriks, Keen and Muthoo [1999]).

The importance of an efficient legal system for providing investors protection has a striking effect on the efficiency of the financial system, with an advantage for common law according to La Porta et al. [1997, 1998, 2000, 2002]). An inefficient legal and judiciary system can remain stuck at an inefficient level for a long time, as observed in some countries. If the legal system inhibits the development of the financial system, why are the forces which stabilize this low equilibrium? Who gains from an inefficient system, whereas there are big bills left on the sidewalk for years (Olson [2003])? In a less dogmatic view with respect to the systematic advantage of common law, Berkovitz D., Pistor K. and Richard J.F. [2003] evaluated the forces at the root of the failures of historical transplant of legal system families around the world. Rajan and Zingales [2003] emphasize that in 1913, the advantage of common law countries with respect to the efficiency of investor protection is not found. Hay et al. [1996] present a theory of legal reform. Pistor [2000] present patterns of legal change with respect to investors protection in transition economies. Mookherjee and Png [1995] tackle the issue of corrupt law enforcers.

Microeconomic theory of imperfect information and taxation investigated how tax policy could stimulate entrepreneurship and alleviate informational problems through special tax schemes, e.g. using investment tax credit policy (De Meza and Webb [1988], Innes [1991], Keuschnigg and Nielsen [2003]). One may also remark that tax evasion and the size of the underground economy are related (Jung, Snow and Trandel [1994]). The size of the underground economy may foster asymmetric information and increase the risk for private investors. As well, a weak judiciary system has drawbacks with respect to investors governance when entrepreneurs may use funds for other purposes than adding value to the firm (Schleifer and Wolfenson [2002]). A low tax collection decreases government ability to provide a decent wage for civil servant in charge of the defense of property rights and increases the relative benefits of bribes.

This paper investigates under which conditions the control of tax evasion and the efficiency of the judiciary system may provide incentives for investors to monitor firms (i.e. to improve private governance) and as a consequence to finance a large number of investment projects and firms with a higher leverage with respect to projects where very little monitoring is necessary (e.g. investors finance only very short run working capital). Although the literature emphasizes mostly the complementarity of the efficiency of the judiciary system with private monitoring, it could be the case that

public monitoring acts as a substitute for private monitoring. In particular, reducing tax evasion and the size of the underground economy provides some relief for private investors. Government and investors hold both claims with respect to firms. The quality of accounts provided by firms to the government for tax purpose presents an obvious informational positive externality for investors. If it is easy to fool the state, it could be easy as well to fool investors, with respect to law enforcement.

By contrast, an efficient ex-post enforcement of contract by the judiciary system reduces the costs of monitoring by private investors. Those private monitoring costs may turn to fall below a threshold so that it turns to be profitable for private investors to monitor (it provides incentives). Finally, the efficiency of the judiciary system and the efficiency of the tax control increases with government income, whereas the tax increase fosters entrepreneurs to turn to the underground economy. The less tax evasion, the more likely it is that collected funds will help to finance judges, police and financial market authorities ensuring that enough money is put for technical assistance as well as for civil servants incentives. In turn, this may lead to a less widespread corruption of civil servants, as rising their opportunity cost of deviant behaviour. The civil servants in charge of the defense of property rights, as well as those in charge of tax inspection at the higher and intermediate levels are more likely to face the highest level of bribes, with respect to other public activities (Van Rijckeghem and Weder [2001]).

Taking into account those effects, we provide the relevant intervals for the tax rate which provides private incentives for governance and increase the number of project which are financed, for given government efficiency functions of the judiciary system and of the tax control.

This paper is organised as follows. In section 2 are presented investors and entrepreneurs' behaviour leading to monitoring versus non monitoring regimes. Section 3 concludes.

2. The model

The model has five types of agents: firms, intermediaries, investors, civil servants (tax inspectors and civil servants in charge of the defence of investors property rights: judges, police, financial market authorities) and government which describes a "small" open economy where the informational asymmetries and monitoring assumptions are based on Holmstrom and Tirole [1997]. There are two periods. In the first period, financial contracts are signed, investment decisions are made, the public level of investor protection is decided as well as next period civil servants income . In the second period, investment returns are realised, tax is collected, claims are settled and civil servant are paid. All parties are risk neutral and protected by limited liability so that no one can end up with a negative cash position.

2.1. Entrepreneurs

There is a continuum of entrepreneurs indexed by i uniformly distributed on $[0,1]$, who differ only with respect to their wealth (or internal equity) $E_i \geq 0$ distributed according to the cumulative distribution function $F(E)$. Aggregate entrepreneurs wealth is given by: $\int_0^{+\infty} E dF(E)$.

Decisions proceed in three steps. At the beginning of the first period, the entrepreneur chooses between two kinds of projects which require both the same fixed amount of capital, normalized to one: $K = 1$. If the entrepeneurs' wealth is below this fixed size, he needs external funds to be able to invest. These external funds are provided by uninformed investors or monitoring intermediaries together with uninformed investors. With asymmetric information, an incentive compatible contract with investors (either uninformed or monitoring) will rule out the low quality project, but will credit constrain a proportion of entrepreneurs. In the second period, a proportion of those entrepreneurs who were able to invest goes bankrupt with a return of zero on capital and the rest receives a return R_K. We assume the probability of success to be given as p_H. In a third step, a proportion f of those who invested and got a return R_K pays taxes whereas a proportion $1 - f$ decides to evade corporate income tax. f will be derived endogenously, depending on the level of government expenditures on tax control and the level of corruption in the economy.

There are two kinds of asymmetric information problems. First, an ex ante monitoring problem on choosing investment projects with or without positive net present value. Second, an ex post problem on contract enforcement, as the return on capital can be wrongly presented in order to avoid taxes and financial contract repayments.

In the first "socially honest" project, we have the following setting: Capital generates a verifiable financial return equaling either R_K (success) with probability of success p_H or 0 (failure and bankruptcy) with probability $1 - p_H$. The entrepreneur has to call external finance $B = 1 - E_i$ to finance the project and to provide a return RB to outside investors. His returns after paying returns to outside investors are taxed proportionnaly at the rate τ. Entrepreneur face a probability $1 - f$ of successfully evading corporate income tax if, for example, they have the chance to be controlled by an inefficient tax inspector or if they are not controlled. They face a probability f of paying the corporate income tax. Whether or not he pays income taxes, he pays off the debt to the investors. The expected after tax return of the entrepreneur is then:

$$(1 - f\tau) p_H (R_K - RB)$$

In the second, "socially dishonest", project the entrepreneur engages in black market activity which reduces the probability of success of the official project for which he demands funds on the capital market (as he puts less effort in it): $p_L < p_H$. The black market activity provides without risk a maximal level of private benefits denoted $X(G) > 0$ (which is also a mean to avoid taxes). This "project" is labeled X-project in memory of X-inefficiency and represents one way of formalizing ex ante

moral hazard. The return on black market activity depends on government expenditures G for tax control, efficiency of the judiciary, rule of low, contract repudiation and risk of expropriation where a higher amount of governement expenditures decrease the return on black market activity. We assume the relationship between the extent of available black market activities and public control to be of constant elasticity: $X(G) = X_0 G^{-\varepsilon_X}$ (i.e. a log-linearized approximation around equilibrium values) where ε_X denotes the elasticity of black-market activity with respect ot government control. The expected after tax return of the entrepreneur is then:

$$(1 - f\tau) p_L (R_K - RB) + X(G) \tag{2.1}$$

Outside monitoring by intermediaries decreases the maximal level of private benefits from black market activity from $X(G)$ to $x(G)$ by a factor $0 < \gamma_c < 1$, leaving the probabilities of success unchanged. Then $0 < x(G) = \gamma_c X(G) < X(G)$. This project is labeled the x-project. The lower γ_c, the more efficient is investors' monitoring to limit black market activities. The expected after tax return of the entrepreneur is:

$$(1 - f\tau) p_L (R_K - RB) + \gamma_c X(G) \tag{2.2}$$

The rate of return of investor capital on (world) risk free assets is locally taxed and denoted $(1 - \tau) R_0$. It represents the opportunity cost for entrepreneurs in a "small" open economy. Furthermore, only the "socially honest" project is economically viable, i.e:

$$(1 - \tau)(p_H R_K - R_0) > 0 > (1 - \tau)(p_L R_K - R_0) \tag{2.3}$$

2.2. Non Monitoring Finance Equilibrium

In this section we derive the optimum amounts of investment of entrepreneurs and uninformed investors when no monitoring intermediary enters into the market. A minimum requirement for internal funds will be derived.

Uninformed (or non monitoring) individual investors demand an expected return which is at least equal to the world financial market return $(1 - \tau) R_0$ and do not monitor the entrepreneur that they may finance. In case of success, entrepreneurs and uninformed investors share the pre-tax return on capital $R_K = R_E E + R_u B_u$ where R_E is one plus the rate of return on internal equity, R_u is one plus the rate of return on uninformed finance and B_u represents uninformed external finance. In case of failure, no profits are distributed. Whenever the expected return investing in the project is the same as the return on an risk free asset there are enough funds available to finance the project. Assuming perfect competiton on the financial market, this leads to the participation constraint of the uninformed investor: $p_H R_u B_u = R_0 B_u$.

The entrepreneur chooses its own capital contribution E and the rate of payments to uninformed investors R_u according to an incentive compatible contract while maximising his expected after tax profits:

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$$(E, R_u) \in \arg\max (1 - f\tau) \left[p_H (R_K - R_u B_u) + R_0 (E_0 - E) \right]$$

subject to (i) the internal funds constraint:

$$0 \le E \le E_0$$

(ii) the accounting balance sheet equality between assets of fixed size (normalized to one) and liabilities:

$$E + B_u = 1$$

(iii) the accounting pre-tax shares of the returns on capital:

$$R_K = R_E E + R_u B_u$$

(iv) the participation constraint of uninformed investors facing perfect competition:

$$p_H R_u B_u = R_0 B_u$$

(v) the X-project incentive constraint:

$$(1 - f\tau) p_H R_E E \ge (1 - f\tau) p_L R_E E + X(G)$$

This incentive constraint implies that whenever the expected returns for a project with black market activity are ther same as the expected returns for a project without black market activity the entrepreneur chooses to be honest and not to engage in black market activity. It follows from this optimization problem that the firm will invest all internal funds available, $E = E_0$, and that the expected rate of return payed to uninformed investors equals the market rate, $R_u = R_0/p_H$.

The incentive constraint (v) amounts to a constraint on the minimum return on internal equity:

$$R_E E \ge \frac{X(G)}{(1 - f\tau) p_H - (1 - f\tau) p_L}$$

Taking into consideration the pre-tax profit sharing constraint (iii) and the balance sheet equality (ii), the incentive constraint leads to an internal equity/capital floor, that is a minimum level of wealth necessary to realize the investment project

$$E_1 = 1 - \frac{p_H}{R_0} \left(R_K - \frac{X(G)}{(1 - f\tau)(p_H - p_L)} \right)$$

and an external finance ceiling

$$B_u \le \frac{p_H}{R_0} \left(R_K - \frac{X(G)}{(1 - f\tau)(p_H - p_L)} \right).$$

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The aggregate tax collection with only uninformed investors is:

$$G_u = f\tau\Pi_u$$

with Π_u representing aggregate profits before tax payment:

$$\Pi_u = p_H \left(R_K - R_u B_u\right) \int_{E_1}^1 dF\left(E\right)$$

Under the following assumption (A1), some low wealth entrepreneurs are credit constrained when the minimal wealth threshold is strictly positive: $E_1 > 0$, that is:

$$p_H R_K - R_0 < p_H R_E^{\min}\left(X\right) E$$

We assume that assumption (A1) holds in the remaining sections of the paper.

2.3. The Monitoring Finance Equilibrium

A continuum of investors distributed on $[0, 1]$ may monitor entrepreneurs, at a non verifiable fixed cost $c\left(G\right) > 0$ by preventing entrepreneurs from undertaking a high level of "black market" activity (X-project), so that there remains only the "low level" of black market activity as a low quality project (x-project). In doing so, monitoring investors decrease the gain from cheating (due to the two states of nature assumption, monitoring finance may be related indifferently to debt or equity: it is only the governance effort which matters). Monitoring only reduces the black market activity, however, not the probability of tax evasion. We assume the costs of private monitoring to be of constant elasticity ε_C with respect to public expenditures $c\left(G\right) = c_0 G^{-\varepsilon_C}$ (i.e. a log-linearized approximation around equilibrium values). Monitoring costs decrease with public expenditures since public expenditures G for the efficiency of the judiciary, rule of law, contract repudiation and risk of expropriation decrease the available black market activity. For example, whatever the law system (common law, french law, german law, and so on), if the number of judges is unsufficient, the costs of judgment increase due to the extended time to obtain the enforcement of contracts; if the salary of judges is too low, the proportion of corrupt judges may rise. To some degree, $0 \leq G \leq 1$ measures the extent of investors protection in a given country.

Two non exclusive interpretations are possible: (a) monitors provide certification so that uninformed investors are ready to directly invest with less moral hazard (b) uninformed investors may channel funds through monitoring intermediaries. Due to the division of labour, firms do not monitor other firms.In case of success, entrepreneurs, uninformed investors and intermediaries share the return: $R_K = R_E E + R_u B_u + R_m B_m$, where R_m is equal to one plus the return on monitoring finance B_m. The entrepreneur chooses its own capital contribution E, the share of monitored external finance B_m, the payments to monitoring investors R_m and the payments to uninformed investors R_u according to an incentive compatible contract:

$$\max (1 - f\tau) \left[p_H \left(R_K - R_u B_u - R_m B_m \right) + R_0 \left(E_0 - E \right) \right]$$

subject to (i) the internal funds constraint:

$$0 \le E \le E_0$$

(iiM) the asset-liabilities accounting equality:

$$E + B_u + B_m = 1$$

(iiiM) the accounting pre-tax shares of the returns on capital:

$$R_K = R_E E + R_u B_u + R_m B_m$$

(iv) the participation constraint of uninformed investors:

$$p_H R_u B_u = R_0 B_u$$

(v) the x-project incentive constraint from the uninformed investors point of view (due to monitoring, a x-project is available instead of a X-project):

$$(1 - f\tau) p_H R_E E \ge (1 - f\tau) p_L R_E E + x(G)$$

(vi) the participation constraint of monitoring investors:

$$p_H R_m B_m = R_0 B_m + c(G)$$

(vii) the incentive constraint for the intermediary to monitor is given by:

$$p_H R_m B_m - c(G) \ge p_L R_m B_m$$

That is:

$$R_m B_m \ge R_m^{\min} B_m (c) = \frac{c(G)}{p_H - p_L}$$

To behave, the intermediary receives a higher return if cost of monitoring is high and the probability of getting the contract respected is low (lower investor protection) and if after tax probability of success in case of "cheating" increases (i.e. lower tax rate due to corruption of the tax inspector by the entrepreneur).

To find the optimal contract, let us note that the opportunity cost of monitoring investors is higher than the opportunity cost of uninformed investors. That is, the cost of monitoring finance is higher than the cost of uninformed investors. Entrepreneurs would demand the minimum level of intermediated capital in order to decrease their

weighted average cost of capital. Then the monitors incentive constraint, which limits $R_m B_m$ is binding. The binding incentive constraint (vii) and the zero profit condition for monitors (vi) allows to find the amount of monitoring finance $B_m(c)$ and its return $R_m = R_m^{\min}$:

$$
\begin{aligned}
R_m &= R_m^{\min} = \frac{R_0}{p_L} \\
B_m(c) &= \frac{c(G)}{p_H R_m^{\min}(c) - R_0} = \frac{c(G)}{R_0} \frac{p_L}{p_H - p_L}
\end{aligned}
$$

The entrepreneur incentive constraint (v) amounts to a constraint on the minimal rate of return on internal equity:

$$
R_E E \geq R_E^{\min}(x) E = \frac{x(G)}{(1 - f\tau) p_H - (1 - f\tau) p_L}
$$

With the help of the pre-tax profit sharing constraint (iiiM), the incentive constraints leads to an uninformed external finance/capital ceiling:

$$
B_u = \frac{1}{R_u} \left(R_K - R_E(x) E - R_m^{\min} B_m(c) \right) \leq \frac{1}{R_u} \left(R_K - R_E^{\min}(x) E - R_m^{\min} B_m(c) \right)
$$

With the help of the balance sheet equality (iiM), the entrepreneur incentive constraint (v) leads to an internal equity/capital floor, that is a minimal level of wealth $E_2(c)$ to be able finance the capital fixed cost taking into account the incentive constraint:

$$
E \geq E_2(c) = 1 - B_m(c) - \frac{1}{R_u} \left(R_K - R_E^{\min}(x) E - R_m^{\min} B_m(c) \right)
$$

The investors zero-profit condition (iv) determines R_u (which is lower than the return on investors incurring monitoring costs)

$$
R_u = \frac{R_0}{p_H} < R_m^{\min} = \frac{R_0}{p_L}
$$

The internal equity/capital threshold with monitoring is:

$$
E_2(c) = 1 - \frac{p_H}{R_0} \left(R_K - R_E^{\min}(x) E \right) - B_m(c) + \frac{p_H}{R_0} R_m^{\min} B_m(c)
$$

So that is threshold is an increasing affine function of monitoring cost:

$$
E_2(c) = 1 - \frac{p_H}{R_0} \left(R_K - R_E^{\min}(x) E \right) + \frac{c(G)}{R_0}
$$

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Monitoring is too costly to be socially useful when $E_2(c) < E_1$, which leads to an upper limit on monitoring cost (Assumption A2, the reverse conditions is labeled A2'):

$$c(G) < p_H \left(R_E^{\min}(X) E - R_E^{\min}(x) E \right)$$

That is:

$$c(G) < \widetilde{c} = \left(\frac{1 - \gamma_c}{1 - \frac{p_L}{p_H}} \right) \left(\frac{X(G_{um})}{1 - f\tau} \right)$$

The investors monitoring cost has to be smaller than an endogenous threshold $\widetilde{c}$, which measures the maximal efficient value of monitoring costs. This maximal value of monitoring costs increases if the incentives to cheat for entrepreneurs are higher. That is, if the return from tax evading black market activity (X) are higher, if the relative gap between probability of success when some black market activity is done with respect to normal activity (p_L/p_H) narrows to one, if the expected tax rate on normal activity $f\tau$ increases (and if the tax evasion is less easy), so that the gain from tax evading activity increases, and finally, if the efficiency of investors monitoring to limit black market activity ($-\gamma_c$) increases.

There are three effects of the public expenditures for the efficiency of the tax and legal system. First, by limiting black market activities, the public monitoring decreases the available incentives for entrepreneurs. As such, public monitoring is a substitute to private investors monitoring, so that private monitoring turns to be inefficient or useless. Second, by contrast, an increase in the tax rate provides additional incentives for developing tax evading black market activities. As a consequence, an increase in tax rates rises the maximal efficient value of private monitoring costs. Third, by limiting the cost of private monitoring when investors need third party enforcement of contracts, public monitoring is a complement to private monitoring. The second and third effect are rationale for the positive correlation between law and finance found in several cross country regressions on law and finance by La Porta et al. [1998].

Under the private monitoring condition, the tax collection increases because a higher number of projects is financed:

$$G_{um} = f\tau \left(\Pi_u + \Pi_m \right)$$

Π_m represents the additional aggregate corporate income tax base related to additional projects which are now financed with the help of private ex ante monitoring:

$$\Pi_m = p_H \left(R_K - R_u B_u - R_m B_m \right) \int_{E_2}^{E_1} dF(E)$$

Another assumption is that: $0 < E_2(c)$ (assumption A3): some entrepreneurs remain credit rationed even with monitoring.

The private monitoring condition can be written as a condition on effective tax rate as follows:

$$1 < \left(\frac{1-\gamma_c}{1-\frac{p_L}{p_H}}\right) \frac{X_0}{c_0} \left(\frac{(f\tau)^{\varepsilon_C - \varepsilon_X}}{1-f\tau}\right) (\Pi_u + \Pi_m)^{\varepsilon_C - \varepsilon_X}$$

That is:

$$A = \frac{1-\frac{p_L}{p_H}}{1-\gamma_c} \frac{c_0}{X_0} \frac{1}{(\Pi_u + \Pi_m)^{\varepsilon_C - \varepsilon_X}} < \frac{(f\tau)^{\varepsilon_C - \varepsilon_X}}{1-f\tau} = g(f\tau)$$

Three effects of public expenditures affect the incentives: the private return from black market activity, the decrease of the cost of monitoring for investors, the increase of the tax gap for entrepreneurs between black market activity and observed economy.

a) When the elasticity of private monitoring with respect to public rule of law expenditures is higher than the elasticity of private black market return with respect to public rule of law expenditures, ($\varepsilon_C > \varepsilon_X$), the function g is increasing globally over $[0, 1[$. Then the private monitoring condition is:

$$f\tau > g^{-1}(A) \Leftrightarrow f > \frac{g^{-1}(A)}{\tau}$$

In that case, there is complementarity between high government public expenditures for the rule of law (and a low tax evasion) and the efficiency of private investors monitoring.

Figure 1: Plot of $g(f\tau) = \frac{(f\tau)^{\varepsilon_C - \varepsilon_X}}{1-f\tau}$ functions for cases such that $\varepsilon_C \geq \varepsilon_X$:
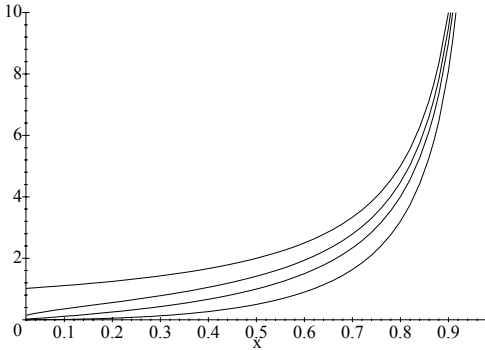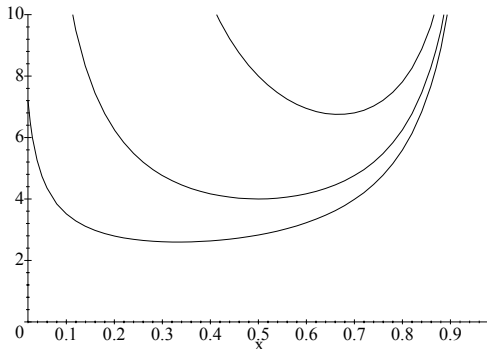

b) For $\varepsilon_X = \varepsilon_C$, the minimal value of g is now 1, so that monitoring is always efficient when $A \leq 1$.

Else the condition is similar to the a) with a simplified explicit inverse function. There is complementarity between public expenditures for the rule of law and investors monitoring.

c) For $\varepsilon_C < \varepsilon_X$, the function g is first decreasing, then increasing globally over $[0, 1]$ with strictly positive minimum value in this interval, which leads to a condition C' (minG<A) for two solution for the inequality.

Figure 2: Plot of $g\left(f\tau\right) = \frac{(f\tau)^{\varepsilon_C - \varepsilon_X}}{1 - f\tau}$ functions for cases such that $\varepsilon_C < \varepsilon_X$: $\frac{(f\tau)^{\varepsilon_C - \varepsilon_X}}{1 - f\tau}$

When $\min g\left(f\tau\right) = \left(\frac{\varepsilon_C - \varepsilon_X}{\varepsilon_C - \varepsilon_X - 1}\right)^{\varepsilon_C - \varepsilon_X} \left(1 - \varepsilon_C + \varepsilon_X\right) > A$ (condition A) the monitoring condition is always fulfilled.

When $\min g\left(f\tau\right) < A$: then the condition can be fulfilled is the tax rate is sufficiently low for monitoring (substitution effect) $f\tau < \left[g^{-1}\left(A\right)\right]_2$ or sufficiently high (highest solution for the intersection of the g curve with the horizontal line $g^{-1}\left(A\right)$) so that $f\tau > \left[g^{-1}\left(A\right)\right]_1$ (the complementarity effect dominates). In between, tax rate differential with black market projects provides incentives for entrepreneurs to cheat ex ante.

This means that there is 1% more of public expenditures for the rule of law leads to a higher decrease in percent on black market activities income than the percent decrease on investors cost of monitoring through law. In that case, investors would monitor only when government intervention is small.

2.4. Endogenous Tax Evasion and Private Monitoring

In this section, we consider that the probability of tax evasion increases as tax increases (a fourth effect on taxation). For example, this may lead to a higher level of bribes for tax inspectors as the gain for tax evasion increases. As well it increases the benefits of crime so that a cost benefit analysis of crime and punishment would lead to the following specification (Becker [1968], Becker and Stigler [1974]). To simplify matters, we consider that $f(\tau) = f_0 - \delta\tau \in [0,1]$ is a decreasing function of the tax rate for $\tau \in [0,1]$. Then the conditions depend on the function $h(\tau) = \tau f(\tau) = f_0\tau - \delta\tau^2$. In that case, former lower bound equalities of the type $h(\tau) > g^{-1}(A)$ leads also to an upward bound (under some conditions on f_0 and γ_f to check that this upward bound is such that $\tau_{\max} < 1$) due to an increase in the proportion of tax evasion. Hence, the tax rate is such that public expenditures for the rule of law have to be between this interval:

$$\left[\tau_{\min} = -\frac{1}{2\delta}\left(-f_0 + \sqrt{(f_0^2 - 4\delta g^{-1}\left(A\right))}\right), \tau_{\max} = -\frac{1}{2\delta}\left(-f_0 - \sqrt{(f_0^2 - 4\delta g^{-1}\left(A\right))}\right)\right]$$

This leads to conditions for thresholds of public expenditures (with a particular case with substitutability). Results are summed up in the following proposition:

Proposition 1. *The conditions for the existence of private monitoring extending the number of financed project with a higher leverage (Else, the non-monitoring finance equilibrium prevails) are:*

(a) For $\varepsilon_C \geq \varepsilon_X$ (the efficiency of public expenditures is higher for contract enforcement than for decreasing the size of the opportunities in the underground economy) and for a tax rate between two levels $[\tau_{\min}, \tau_{\max}]$, with $\tau_{\min} = -\frac{1}{2\delta}\left(-f_0 - \sqrt{(f_0^2 - 4\delta g^{-1}(A))}\right)$ and $\tau_{\max} = -\frac{1}{2\delta}\left(-f_0 + \sqrt{(f_0^2 - 4\delta g^{-1}(A))}\right)$. The minimal threshold is necessary to finance the enforcement of the rule of law. The maximal threshold is related to the fact that high tax rate increases endogenously tax evasion.

(b) For $\varepsilon_C < \varepsilon_X$ and $\left(\frac{\varepsilon_C - \varepsilon_X}{\varepsilon_C - \varepsilon_X - 1}\right)^{\varepsilon_C - \varepsilon_X}(1 - \varepsilon_C + \varepsilon_X) \geq A$: Any tax rate leads to private monitoring.

(c) For $\varepsilon_C < \varepsilon_X$ and $\left(\frac{\varepsilon_C - \varepsilon_X}{\varepsilon_C - \varepsilon_X - 1}\right)^{\varepsilon_C - \varepsilon_X}(1 - \varepsilon_C + \varepsilon_X) < A$: Tax rate could be either very low or very high (leading to a very high tax evasion and little tax income) to take advantage of the substitution effect for the fight against underground economy: That is, either $\tau < \tau_{\min,2} = -\frac{1}{2\delta}\left(-f_0 - \sqrt{(f_0^2 - 4\delta [g^{-1}(A)]_2)}\right)$

or $\tau > \tau_{\max,2} = -\frac{1}{2\delta}\left(-f_0 + \sqrt{(f_0^2 - 4\delta [g^{-1}(A)]_2)}\right)$

or relatively high (with a higher limit) to take advantage of the complementarity effects $[\tau_{\min,1}, \tau_{\max,1}]$ with $\tau_{\min,1} = -\frac{1}{2\delta}\left(-f_0 - \sqrt{(f_0^2 - 4\delta [g^{-1}(A)]_1)}\right)$ or $\tau_{\max,1} = -\frac{1}{2\delta}\left(-f_0 + \sqrt{(f_0^2 - 4\delta [g^{-1}(A)]_1)}\right)$

These results are related on the efficiency of public expenditures with respect to the fight against corruption and the hidden economy (i.e. the value of the elasticities ε_C and ε_X).

3. Conclusion

We reached two conclusions. First, when the elasticity of the underground economy with respect to public expenditures (a substitute to private monitoring) is lower in absolute value than the elasticity of the private costs of going to court to enforce financial contracts with respect to public expenditures (a complement to private monitoring), there exist a lower limit and an upper limit on the corporate income tax rate which provides incentives for private monitoring. Ex post third party enforcement of contracts by the judiciary system leads to ex ante private monitoring, which in turn leads to an increase in the number of projects which are financed, with a larger share of external funds or a higher leverage.

Second, under the alternative assumption on the elasticities of the efficiencies of public control on tax evasion and of public enforcement of private contracts, a similar interval with medium values for tax rates provides incentives for monitoring. However, as the marginal gains on the fight for tax evasion are substitutes to private monitoring, there is a case for a extreme values of the tax rate to provide incentives for private

monitoring. Either the tax rate is close to zero or very high (with such a level of tax evasion that government income is very low): in those cases, the private investors are left to their responsability for control which is a substitute effect of government control. Nonetheless, they would do it only if the government third party role for the enforcement of contract does not fail: that is, if the judiciary system leads to a private monitoring cost of going to court, including bribes for corrupt judges, which is sufficiently low.

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