How Public Governance may Foster Private Corporate Governance?

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Abstract

This paper investigates Stulz [2005] "twin agency problems" (government expropriation and informed shareholders diversion of funds) explanation of the cross country variation of corporate ownership concentration. Below a tax threshold, ownership concentration depends only on public governance indicators (such as corruption or expropriation risk) as uninformed investors do not engage in the costly monitoring of private firms. Over this tax threshold, ownership concentration depends mostly upon law protecting investors and the efficiency of the judiciary system. In many countries, improving corporate governance depends primarily on policies improving the public governance of the tax system.

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1. Introduction

Corporate governance may be defined as a set of constraints and incentives which governs corporate managers and limit their discretionary decisions, not only with respect to shareholders interests (Jensen et Meckling [1976]) but also, for some scholars, with respect to stakeholders (Tirole [2005]), such as government (Desai, Dyck and Zingales [2007]). Countries, their institutions and their history matters a lot for corporate governance around the world (Morck [2005], Doidge, Karolyi and Stulz [2004]). In history and still now, a large number of countries have a negligible share of capital by

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firms which are not controlled by government or by families (or informed shareholders) with high ownership concentration.[1] In his presidential address at the American Association of Finance, Stulz [2005] argues that the twin agency problems that arise because rulers of sovereign states and corporate insiders pursue their own interests at the expense of outside investors imply that diffuse ownership is inefficient and corporate insiders must co-invest with other investors, retaining substantial equity. Stulz [2005] found empirical evidence that the degree of corporate ownership concentration increased with a measure of the risk of expropriation by government and with poorer minority investors rights, using La Porta et al. [1999] indices.

This paper investigates further Stulz [2005 and 2006] "twin agency problems" explanation of the cross country variation of ownership concentration. It makes two contributions. First, it provides a joint theory of (a) the costly decision by uninformed private investors to monitor informed shareholders (that is, the emergence of corporate governance) and (b) the degree of ownership concentration by informed shareholders, taking into account the public governance of the tax system and of the legal system. Ownership concentration depends mostly on the public governance of the tax system, when it is too costly for uninformed investors to monitor informed shareholders. For relatively high level of taxation, ownership concentration depends much less on the tax system and much more on the legal system protecting investors' rights. The tax threshold depends on the relative degree of efficiency of the tax system with respect to the legal system (such as the relative degree of corruption of tax inspectors with respect to judges). Small tax havens countries with low taxes and a good level of corporate governance is a particular case of the theoretical model. The second contribution is to provide empirical evidence which confirms the prediction of the theoretical model using a cross country data set of corporate ownership concentration. The data set merged Stulz [2005] indicators of private governance with Friedman et al. [2000] indicators of public governance. Regression analysis confirms that Stulz [2005] "twin agency problems" explanation of corporate ownership concentration depends on the efficiency of the tax system. Government expropriation risk explains corporate ownership concentration for countries with weak tax system. The legal protection of minority investors explains corporate ownership concentration for countries with efficient tax systems.

This paper is organized as follows. Section 2 presents the related literature. Section 3 presents investors and entrepreneurs' behavior leading to monitoring versus non monitoring regimes. Section 4 details empirical evidence. Section 5 concludes.

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[1]This does not imply that family firms are less profitable than widely held firms, which is not necessarily observed (Sraer and Thesmar [2004]). A major problem of weak corporate governance is that less wealthy entrepreneurs or entrepreneurial families are financially constrained.

2. Related literature

A few recent papers deal with corporate governance and taxes, at the intersection of two fields: taxes and corporate finance and tax evasion. The literature on taxes and corporate finance is large (Auerbach [2002]), with key results such that the tax adjusted weighted average cost of capital and Miller [1977] equilibrium. For example, Desai, Dharmapala and Fund [2006] extend a Miller [1977] equilibrium to consider the consequences of an increase in the progressivity of the personal income tax schedule for corporate ownership concentration. As well, the literature on tax evasion is large (Slemrod and Yitshaki [2002], Cowell [2004]) It began with Allingham and Sandmo ([1972]), who model individual taxpayers deciding whether and how much to evade taxes in an expected utility maximizing choice, facing a probability of paying a penalty in case of detected tax evasion. Slemrod [2004] stresses the differences between individual and corporate tax compliance, arguing that the latter should be analyzed in a principal agent framework. Papers on taxes and corporate governance model corporate tax evasion by informed shareholders or by the chief tax officer, government and the behaviour of a third party: uninformed shareholders.[2]

Chen and Chu [2005] investigate corporate tax evasion with a standard principal-agent model (Holmstrom [1979]) in which a risk neutral owner of firm hires a risk averse manager. They focus on the efficiency loss due to the separation of management and control. Using a costly state falsification framework (Lacker and Weinberg [1989], Crocker and Morgan [1998]), Crocker and Slemrod [2005] demonstrate that increasing the severity of penalties imposed on the chief financial officer (CFO or tax manager) is more effective in reducing tax fraud than when increasing the one imposed on shareholders, even if the optimal CFO bonus scheme decided by shareholders increases with reported tax deduction, because shareholders do not know whether the tax deduction is legal or illegal. Desai and Dharmapala [2006] models the return of a manager receiving high powered incentives (such as stock options) related to publicly disclosed and taxed corporate income and facing a convex cost of tax fraud and of an additional income diversion. An increase of high powered incentives leads to a decrease of additional income diversion and may increase or decrease tax fraud, depending on cross second derivatives of the cost function (which amounts to assumptions of complementarity or of substitutability of tax inspection and of uninformed investors monitoring). Desai, Dyck et Zingales [2007] determines the amount of tax fraud by informed shareholders facing a penalty increasing with the square of the amount of tax fraud, multiplied by the average of two parameters measuring first the quality of tax inspection and second the given quality of costless private monitoring, for a given insiders' ownership concentration. Tax fraud increases with the corporate

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[2]There are indeed other stakeholders in corporate tax fraud: customers and employees if the tax fraud is related to the national parallel economy, or, if the tax fraud is done by a multinational firm evading profits in a tax haven: the tax haven government and financial intermediaries in both countries.

income tax and decreases with the quality of both types of control. Government determines the quality of tax inspection. Both models makes a number of contributions on the relationship between tax fraud and diversion. The model in this paper focuses on two other contributions explaining (a) the costly decision by uninformed investors to monitor informed shareholders and (b) the degree of ownership concentration by informed shareholders, taking into account the public governance of the tax system and of the legal system.

Empirical evidence suggests that corporate governance and taxes explain firms market value, the private benefits of insiders ownership, government revenues, equity market participation and corporate ownership concentration. With respect to stock market firms value, Desai, Dyck and Zingales [2007] found that it can raise after a stronger tax enforcement in spite of the increase in the tax burden, using Russian equity market data. Desai and Dharmapala [2005] found that the average effect of tax avoidance on firm value is positive for well governed firms using the compustat database in the US. Desai and Dharmapala [2006] found that increases in incentive compensation tend to reduce the level of tax sheltering, which confirms a complementarity between diversion and sheltering. Dyck and Zingales [2004] found that lower level of private benefits of insiders ownership are associated with a high rate of tax compliance, with a high degree of statutory protection of minority shareholders and with a high degree of law enforcement and finally with larger capital markets. Using a panel of countries, Desai, Dyck and Zingales [2007] found that corporate tax rate increases have smaller (in fact negative) effects on government revenues when corporate governance is weaker. Desai, Dharmapala and Fung [2006] found that corporate ownership concentration and equity market participation is influenced by the progressivity of personal income tax influences for US data. Finally, Stulz [2005] found that the degree of corporate ownership concentration increased with a measure of the degree of expropriation by government and the anti-director rights indicator, using La Porta et al. [1999] data. This paper shows that each of Stulz's [2005] two factors plays a distinct role for two groups of countries: investors find it profitable to spend resources for corporate governance in a country or not, knowing that this decision depends on the efficiency of the tax system in a given country.

3. The model

The model has three types of agents: entrepreneurs who are informed shareholders (for example, a family owning a firm), uninformed private investors, and government hiring civil servants (tax collectors and inspectors and civil servants in charge of the defence of investors property rights: judges, police, financial market authorities, banking regulators). There are two periods. In the first period, financial contracts are signed, investment decisions are made, the public level of investor protection is decided based on expected tax income of government. In the second period, investment returns are realized, corporate income tax is collected and claims are settled. Entrepreneurs and

uninformed investors are risk neutral and protected by limited liability so that no one can end up with a negative cash position. Government budget is fully tax financed without deficits. Entrepreneurs choose one of two types of financial incentive compatible contracts: a first one without corporate governance, a second one with some investors providing corporate control.

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) $E_{0i} \geq 0$ distributed according to the cumulative distribution function $F(E_0)$. Aggregate entrepreneurs wealth is given by: $\int_0^{+\infty} E_0 dF(E_0)$. 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: $K = 1$. The entrepreneurs may invest part of his wealth E, $(E < E_0)$ and call for external funds $1 - E$ provided by uninformed investors. Entrepreneurs choice between two projects is too costly to be observed by uninformed investors.

In the first project, capital generates a rate of return equal to R_K (success) with probability of success p_H or equal to 0 (failure and bankruptcy) with probability $1 - p_H$. A financial contract determines the rate of return R_{sg} for uninformed investors financing $B_{sg} = 1 - E$ without monitoring. As there is only two states of nature (success or default with zero return), a financial contract depending on the state of nature (share with dividend) does not differ with respect a debt contract facing bankruptcy. We consider the case where external finance is tax deductible for a corporate income tax rate τ (the case where external finance is not tax deductible is presented in appendix 1). The expected after tax return for the entrepreneur is:

$$(1 - \tau) p_H (R_K - R_{sg} B_{sg}) \tag{3.1}$$

In the alternative project when there is no corporate monitoring, the entrepreneur starts ex ante an hidden economy activity which, reduces the probability of success of the official project for which she demands funds on the capital market, as she puts less effort in it: $p_L < p_H$, as in Holmstrom and Tirole [1997]. The hidden economy activity provides an expected return denoted $R_X(G) = R_{X,0} G^{-\varepsilon_X} > 0$ which is not taxed: it decreases with a rise of public expenditures G, improving tax control, measured by a constant elasticity ε_X (inversely related to the degree of corruption of tax inspectors) and a scale parameter $R_{X,0}$. The scale parameter $R_{X,0}$ includes the proportion of government budget α_1 granted to tax inspection: $R_{X,0} = R'_{X,0} \alpha_1^{-\varepsilon_X}$. The expected after tax return of the entrepreneur of the alternative project is:

$$(1 - \tau) p_L (R_K - R_{sg} B_{sg}) + R_X(G) \tag{3.2}$$

The model describes a small open economy facing a world risk free interest rate R_0. It is assumed that the rate of return of the official project when the entrepreneur also invests in the parallel economy has a strictly negative net present value, whereas its rate of return when the entrepreneur does not invest in the parallel economy is

positive:

$$p_L R_K < R_0 \leq p_H R_K \tag{3.3}$$

This condition implies that the large number of risk neutral investors facing the opportunity cost R_0 sets an incentive constraint on entrepreneurs.

3.1. Financial Contract without Private Corporate Governance

In this section, the entrepreneur chooses the optimal amount of funds she invests in her firm E and what has to be the return on outside non monitoring investors R_{sg}.

Because investors protect themselves by setting an incentive constraint which ex ante enforces the no tax fraud and no diversion decision, the entrepreneur maximizes the after tax income of the no tax fraud project, taking into account her opportunity cost R_0 which is the risk free return for the remaining part of her wealth not invested in her project $(E_0 - E)$:

$$\max_{E, R_{sg}} p_H (1 - \tau) (R_K - R_{sg} B_{sg}) + R_0 (E_0 - E) \tag{3.4}$$

Profits can be written as:

$$(1 - \tau) p_H R_K - [(1 - \tau) p_H R_{sg} B_{sg} + R_0 E] + R_0 E_0, \tag{3.5}$$

As the size of the project is fixed $(K = 1)$, maximizing profits amount to minimizing the weighted average cost of capital without governance $(WACC_{sg})$:

$$\min_{E, R_{sg}} WACC_{sg} = (1 - \tau) p_H R_{sg} B_{sg} + R_0 E$$

subject to:

(i) the entrepreneurs wealth E_0 which limits the amount of funds she provides in her project :

$$0 \leq E \leq E_0 \tag{3.6}$$

(ii) At the start of the period, assets equal liabilities:

$$E + B_{sg} = K = 1 \Rightarrow B_{sg} = 1 - E \tag{3.7}$$

(iii) At the end of the period, the corporate income in case of success, which provides a definition for the rate of return R_E on the entrepreneur's equity:

$$R_E E = (1 - f\tau) (R_K - R_{sg} B_{sg}) \tag{3.8}$$

(iv) The participation constraint of a large number of risk neutral and uninformed investors in perfect competition on the loanable funds market, facing the opportunity cost of a return on the risk free asset R_0:

$$p_H R_{sg} B_{sg} \geq R_0 B_{sg} \qquad (3.9)$$

Their supply of funds is not limited: they may be national or foreign investors.

(v) The incentive constraint put forward by uninformed investors:

$$p_H R_E E \geq p_L R_E E + R_X (G) \qquad (3.10)$$

This constraints states that the expected profits of the entrepreneur without tax fraud is at least equal to her expected gains with tax fraud, so that the entrepreneur decides not divert funds.

The first result is that the rate of return for outside investors corresponds to zero profit (which decreases the user cost of capital) with a risk premium taking into account the probability of default (equation iv): $R_{sg} = R_0/p_H$. Then, minimizing the $WACC_{sg}$ amounts to maximize the tax deduction from external funds, hence to minimize the entrepreneurs equity:

$$\min_E (1 - \tau) R_0 (1 - E) + R_0 E = \min_E \tau R_0 E = \min_E E, \qquad (3.11)$$

facing the incentive constraint (v). This constraint is a constraint over the entrepreneur's profits $R_E E$:

$$R_E E = (1 - \tau)(R_K - R_{sg} B_{sg}) = (1 - \tau)\left(R_K - \frac{R_0}{p_H}(1 - E)\right) \geq \frac{R_X(G)}{p_H - p_L}, \quad (3.12)$$

The incentive constraint sets a minimal ownership concentration belonging to the entrepreneur, family or informed shareholders:

$$E \geq E_{sg}^{\min} = 1 + \frac{p_H R_X(G)}{(1 - \tau)(p_H - p_L) R_0} - \frac{p_H R_K}{R_0} \qquad (3.13)$$

As the wealth of entrepreneurs is normalized between zero and one, if $E_{sg}^{\min} < 0$, all projects are financed, whatever the initial wealth of entrepreneurs. If $E_{sg}^{\min} > 1$, no project are financed. In what follows, the assume that: $0 < E_{sg}^{\min} < 1$, which implies an expected rate of return of the official project $p_H R_K$ high enough so that $E_{sg}^{\min} < 1$ but not too much, so that $E_{sg}^{\min} > 0$:

$$0 < E_{sg}^{\min} < 1 \Leftrightarrow \frac{R_X(G)}{(1 - \tau)\left(1 - \frac{p_L}{p_H}\right)} < p_H R_K < R_0 + \frac{R_X(G)}{(1 - \tau)\left(1 - \frac{p_L}{p_H}\right)} \qquad (3.14)$$

The ownership concentration by informed shareholders minimizing their WACC is $E = E_{sg}^{\min}$. The entrepreneur invests her remaining wealth $E_0 - E_{sg}^{\min}$ in the risk free investment R_0. In order to determine the returns from the parallel economy, the

tax base of aggregate profits Π_{sg} is obtained in summing up the number of financed projects as a function of the distribution of wealth of entrepreneurs in the country:

$$\Pi_{sg} = p_H \left(R_K - R_{sg} B_{sg} \right) \left(1 - F \left(E_{sg}^{\min} \right) \right) \tag{3.15}$$

The aggregate tax revenue with only uninformed investors is:

$$G_{sg} = \tau \Pi_{sg} \tag{3.16}$$

This leads to:

Proposition 1. *In the "poor private governance" trap, ownership concentration decreases with the efficiency of the public governance of the tax system:*

$$E_{sg} = 1 + \underbrace{\left[\Pi_{sg} \right]^{-\varepsilon_X} \frac{(\tau)^{-\varepsilon_X}}{(1-\tau)} \frac{p_H R_{X,0}}{(p_H - p_L) R_0}}_{\text{Public Governance of the Tax System}} - \frac{p_H R_K}{R_0}$$

Ownership concentration increases with the degree of corruption of tax inspectors, measured by the elasticity $-\varepsilon_X$ of the efficiency of the use of government income spent in order to limit tax fraud, with a measure of the net present value of the parallel economy project $R_{X,0}/R_0$, whereas the effect of taxation is ambiguous $\left(\frac{(\tau)^{-\varepsilon_X}}{1-\tau} \right)$: an increase of taxation rises the return on tax fraud, whereas it provides more public funds to fight against tax fraud. Ownership concentration decreases with the size of the tax base Π_{sg} and with the net present value of the official project $p_H R_K / R_0$.

3.2. Financial Contract with Corporate Governance

If some uninformed investors supply costly private corporate governance, then their monitoring activity decreases the expected return of informed shareholders from the parallel economy by a factor γ: $0 < \gamma R_X (G) < R_X (G)$ with $0 < \gamma < 1$. The smaller γ, the more efficient corporate governance is. Hence, the rate of return from the parallel economy for informed shareholders decreases with private governance γ and the public governance of the tax system (as $\partial R_X (G) / \partial G < 0$). The private cost of corporate governance $c (G) = c_0 G^{-\varepsilon_c}$ decreases with public spending allocated to the judiciary, with a constant elasticity ε_c measuring the efficiency of the use of public funds (related to the degree of corruption of judges) and a scale parameter c_0. The scale parameter c_0 includes the proportion of government budget α_2 devoted to the judiciary: $c_0 = c_0' \alpha_2^{-\varepsilon_c}$. This cost function is the envelope of the cost functions of all types of private monitoring investors, such as the delegates of uninformed shareholders representing them at the board(s), the staff of rating institutions, financial analysts, accountants certifying the accounts for uninformed investors, the quality of new share issues or of new bond issues or the staff of financial intermediaries providing credit and control and collecting funds from uninformed investors.

Uninformed investors in charge of corporate governance receive a rate of return R_g including a premium compensating the cost of monitoring, and provide funds B_g to be invested in the project. The expected return for informed shareholders when they choose the project partly involved in the parallel economy and when some uninformed shareholders supply private corporate governance is then:

$$(1 - \tau) \, p_L \, (R_K - R_{sg} B_{sg} - R_g B_g) + \gamma R_X \, (G) \tag{3.17}$$

Because of the agency problem, non monitoring investors set incentives constraints so that monitoring investors effectively spend the cost of monitoring (vi-g) and so that the entrepreneur chooses not to invest in the parallel economy (vii-g), which enforces the choice of the no tax fraud project by the entrepreneur. The entrepreneur maximizes her return by determining her ownership concentration E, the share of the capital financed by controlling uninformed shareholders B_g and its rate of return R_g including a control premium, and the rate of return for non controlling uninformed shareholders R_{sg}:

$$\max_{E, B_g, R_g, R_{sg}} p_H \, (1 - \tau) \, (R_K - R_{sg} B_{sg} - R_g B_g) + R_0 \, (E_0 - E) \tag{3.18}$$

Profits can be written as:

$$(1 - \tau) \, p_H R_K - [(1 - \tau) \, p_H R_{sg} B_{sg} + (1 - \tau) \, p_H R_g B_g + R_0 E] + R_0 E_0, \tag{3.19}$$

Maximizing profits amounts to minimizing the weighted average cost of capital with two kinds of uninformed investors ($WACC_g$):

$$\min_{E, B_g, R_g, R_{sg}} WACC_g = (1 - \tau) \, p_H R_{sg} B_{sg} + (1 - \tau) \, p_H R_g B_g + R_0 E$$

subject to:
(i) the entrepreneur ownership concentration is limited by her personal wealth E_0:

$$0 \leq E \leq E_0 \tag{3.20}$$

(ii-g) At the start of the period, liabilities are equal to total assets:

$$E + B_{sg} + B_g = 1 \tag{3.21}$$

(iii-g) At the end of the period, the after tax rate of return of the entrepreneur in case of success is given by:

$$R_E E = (1 - \tau) \, (R_K - R_{sg} B_{sg} - R_g B_g) \tag{3.22}$$

(iv-g) the participation constraint of non controlling uninformed investors facing perfect competition:

$$p_H R_{sg} B_{sg} \geq R_0 B_{sg} \tag{3.23}$$

(v-g) the participation constraint of controlling uninformed investors:

$$p_H R_g B_g - c(G) \geq R_0 B_g \tag{3.24}$$

(vi-g) Non monitoring investors constrain monitoring investors to spend the cost of monitoring $c(G)$. Without this incentive constraint, monitoring investors may receive the premium $R_g - R_{sg}$ without spending the cost of monitoring. The expected gain of monitoring investors if they control uninformed investors (which insures that the probability of success of the official project is p_H) is at least equal to their expected gain when they do not control (in this case, the probability of success of the official project is only p_L).

$$p_H R_g B_g - c(G) \geq p_L R_g B_g \tag{3.25}$$

(vii-g) Non monitoring investors set the incentive constraint on the entrepreneur, knowing that the premium reward (v-g) and the incentive constraint (vi-g) guarantees the control by some uninformed shareholders. The expected gain of the entrepreneur if she does not invest in the parallel economy has to be higher than if she invest in the parallel economy taking into account that private corporate governance decreases her returns from the parallel economy by a factor γ:

$$p_H R_E E \geq p_L R_E E + \gamma R_X(G) \tag{3.26}$$

In order to minimize her weighted average cost of capital $WACC_g$, the entrepreneur provides the lowest possible return for outside investor. She will minimize the two means of finance which are more expensive (her non tax deductible share ownership, and the share financed by controlling shareholders which is tax deductible but requires a return premium $R_g - R_{sg}$). The participation constraint (v-g) and the incentive constraint (vi-g) are then at their minimal level (equalities). These two equations determines the rate of return for monitoring investors R_g and their share of capital B_g:

$$\begin{cases} p_H R_g B_g - c(G) = p_L R_g B_g \\ p_H R_g B_g - c(G) = R_0 B_g \end{cases} \Leftrightarrow \begin{cases} R_g^* = \frac{R_0}{p_L} \\ B_g^* = \frac{c(G)}{R_0} \frac{p_L}{p_H - p_L} \end{cases} \Rightarrow R_g^* B_g^* = \frac{c(G)}{p_H - p_L} \tag{3.27}$$

Perfect competition between non monitoring investors (iv-g) determines their rate of return R_{sg}, which includes an identical risk premium than in the contract without corporate governance. It is lower than the return accruing to monitoring investors spending the cost of corporate governance:

$$R_{sg}^* = \frac{R_0}{p_H} < R_g^* = \frac{R_0}{p_L} \tag{3.28}$$

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Minimizing the weighted average cost of capital amounts to minimize the share ownership of the entrepreneur:

$$\min_E (1-\tau) R_0 \left(1 - E - B_g^* \right) + (1-\tau) \frac{p_H}{p_L} R_0 B_g^* + R_0 E = \min_E \tau R_0 E = \min_E E, \quad (3.29)$$

subject to the incentive constraint (vii-g):

$$R_E E = (1-\tau) \left(R_K - R_{sg}^* \left(1 - E - B_g^* \right) - R_g^* B_g^* \right) \geq \frac{\gamma R_X (G)}{p_H - p_L}. \quad (3.30)$$

The increase of the weighted average cost of capital due to the monitoring premium is a linear function of monitoring cost:

$$\left(R_g^* - R_{sg}^* \right) B_g^* = \left(\frac{p_H - p_L}{p_H p_L} \right) R_0 \frac{c(G)}{R_0} \frac{p_L}{p_H - p_L} = \frac{c(G)}{p_H} \quad (3.31)$$

The incentive constraint (vii-g) states that non monitoring investors invest in the firm only when the entrepreneur owns at least a sufficiently large amount of capital denoted $E_g^{\min}$:

$$E \geq E_g^{\min} = 1 + \frac{c(G)}{R_0} + \gamma \frac{1}{R_0} \frac{R_X (G)}{(1-\tau)\left(1 - \frac{p_L}{p_H} \right)} - \frac{p_H R_K}{R_0} \quad (3.32)$$

The entrepreneur chooses a minimal share exactly equal to $E = E_g^{\min}$ in order to benefit from the tax deductibility of uninformed investors investment. Her remaining wealth is held in the risk free asset. This leads to:

Proposition 2. *In the corporate governance regime, ownership concentration first decreases with respect to the efficiency of the public governance of the judiciary and, second, with respect to the efficiency of the public governance of the tax system, to an extent, measured by the parameter γ, which decreases with the quality of private governance:*

$$E_{sg} = 1 + \underbrace{\frac{c_0 \left(\Pi_{sg} + \Pi_g \right)^{-\varepsilon_c} \tau^{-\varepsilon_c}}{R_0}}_{\text{Legal System Governance}} + \gamma \underbrace{\left[\Pi_{sg} + \Pi_g \right]^{-\varepsilon_X} \frac{\tau^{-\varepsilon_X}}{(1-\tau)(p_H - p_L) R_0}}_{\text{Tax System Governance}} - \frac{p_H R_K}{R_0}$$

The legal system governance component determining corporate ownership concentration increases with a poor efficiency of public funding in the legal system $-\varepsilon_c$, which depends on the degree of corruption of judges and with the private cost of control c_0. It decreases with the tax base $\Pi_{sg} + \Pi_g$ and the effective tax rate τ.

3.3. Modelling Entrepreneurs Decision of Corporate Governance

The entrepreneurs whose wealth is higher than the minimal capital ownership required by uninformed shareholders in the contract without corporate governance ($E_{0,i} \geq E_{sg}^{\min}$) do not choose a financial contract with corporate governance, because this one increases the weighted average cost of capital of their project (one has always $WACC_g > WACC_{sg}$). By contrast, entrepreneurs facing capital rationing in the first contract without corporate governance turn to the contract with corporate governance with a higher $WACC$, if ever the capital ownership requirement for entrepreneurs is lower than in the contract without corporate governance. Then, the condition $E_g^{\min} < E_{sg}^{\min}$ determines the development of the corporate governance regime: a demand for corporate governance by entrepreneurs is met by a supply of governance by some investors who expect to recoup their monitoring cost. If this condition is fulfilled, an additional number of entrepreneurs whose initial wealth $E_{0,i}$ is between $\left[E_g^{\min}, E_{sg}^{\min}\right[$ are financed. In this economy, a smaller concentration of capital by informed shareholders is observed: $E_g^{\min} < E_{sg}^{\min}$ determined by equation (3.32).

Corporate governance enlarges the tax base by Π_g which measures the aggregated profits of projects which were not financed in the "no governance" regime:

$$
\Pi_g = p_H \left(R_K - R_{sg} B_{sg} - R_g B_g \right) \int_{\max\left(E_g^{\min}, 0\right)}^{E_{sg}^{\min}} dF\left(E_0\right) \tag{3.33}
$$

Tax collection in case of governance, denoted G_g is:

$$
G_g = \tau \left(\Pi_{sg} + \Pi_g \right) > G_{sg} = \tau \Pi_{sg} \tag{3.34}
$$

Corporate governance is chosen when $E_g^{\min} < E_{sg}^{\min}$, that is when the cost/benefit ratio of private governance is below the return in the parallel economy:

$$
\frac{c\left(G_g\right)}{1 - \gamma} < \frac{R_X\left(G_g\right)}{\left(1 - \tau\right)\left(1 - \frac{p_L}{p_H}\right)} \tag{3.35}
$$

Taking into account the public governance functions, this leads to condition G1:

Proposition 3. *Private Corporate Governance occurs when the corporate income tax rate is such that:*

$$
0 < \left(\underbrace{\frac{1 - \frac{p_L}{p_H}}{R_{X,0}} \left(\Pi_{sg} + \Pi_g\right)^{\varepsilon_X}}_{\text{Tax system efficiency}} \right) \left(\underbrace{\frac{c_0}{1 - \gamma} \frac{1}{\left(\Pi_{sg} + \Pi_g\right)^{\varepsilon_C}}}_{\text{Inverted legal system efficiency}} \right) = A < \frac{\tau^{\varepsilon_C - \varepsilon_X}}{1 - \tau} = g\left(\tau\right)
$$

$$
\tag{3.36}
$$

One determines which level of tax rate allows the emergence of corporate governance, taking into account three cases:

Case 1: When the elasticity of the public expenditures on the private cost of control is higher than the elasticity of public expenditures on the private return on the parallel economy, $(\varepsilon_C > \varepsilon_X)$, the function g is increasing over $[0,1[$ with $g(0) = 0$ and $\lim_{\tau \to 1} g(\tau) = +\infty$. Corporate governance occurs when the effective tax rate is over an endogenous threshold, function of $\varepsilon_C - \varepsilon_X$:

$$\tau > g^{-1}(A) \tag{3.37}$$

Case 2: When both elasticities of public expenditures are equal, $\varepsilon_X = \varepsilon_C$, the function g is increasing over $[0,1[$ with $g(0) = 1$. The minimal value of g is equal to unity, so that corporate governance occurs when $A \leq 1$, that is when the tax system efficiency is lower than the legal system efficiency. Else, condition (G) is similar to case 1.

Case 3: When $\varepsilon_C < \varepsilon_X$ (1% of additional public expenditures imply a higher decrease of the private return from the parallel economy than a decrease of the cost of control by monitoring investors), the function g is first increasing then decreasing for expected tax rate in $[0,1]$ with $\lim_{\tau \to 0} g(\tau) = +\infty$ and strictly positive values in this interval, with a minimum given by: $\min_{\tau \in [0,1]} g(\tau) = \left(\frac{\varepsilon_C - \varepsilon_X}{\varepsilon_C - \varepsilon_X - 1}\right)^{\varepsilon_C - \varepsilon_X} (1 - \varepsilon_C + \varepsilon_X)$. One defines the restriction on the function g over the interval of tax rates where it is decreasing as g_2 and its restriction over the interval of tax rate where it is increasing as g_1.

When $\min_{\tau \in [0,1]} g(\tau) > A$, corporate governance always occurs.

When $\min_{\tau \in [0,1]} g(\tau) \leq A$: Two conditions are possible for the effective tax rate.

- First, as in case 1 and 2, corporate governance occurs when the effective tax rate is higher than a given threshold: $\tau > g_1^{-1}(A)$ obtained as the highest solution of the intersections of the function g with an horizontal line $g^{-1}(A)$.

- Second, the "tax haven" countries attracting foreign investors suggest that they may benefit from a *substitution effect between public control and private control*. This is described by the fact that corporate governance occurs for low tax rate: $0 < \tau < g_2^{-1}(A)$ with $g_2^{-1}(A)$ being the lowest solution of the intersection of the function g with the horizontal line $g^{-1}(A)$. In this case, corporate governance occurs even with a weak public governance, *because of the substitution effect between public control and private control*, when the elasticity ε_X is higher than the complementarity effect related to the elasticity ε_C. Such a condition on the public governance elasticities may be feasible in small countries (cities such as Hong Kong and Singapore in our data sets, islands) with a small and locally concentrated tax base to control so that the potential efficiency of public funds used against tax fraud is relatively high (see also Desai, Foley and Hines [2006a and b].

- No corporate governance occurs for these values: $g_2^{-1}(A) < \tau < g_1^{-1}(A)$.

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Figure 1 represents the conditions on the tax rate in the three cases. The higher curve corresponds to the case $\varepsilon_C = \varepsilon_X - 0.3$, the intermediary curve to the case where $\varepsilon_C = \varepsilon_X$, the lower curve to the case where $\varepsilon_C = \varepsilon_X + 0.3$. To simplify the figure, only a single horizontal line is plotted for $A = 2.5$ (in fact, A decreases when $\varepsilon_C - \varepsilon_X$). For the effective tax rates τ such as the curves are over the horizontal line, corporate governance occurs.

Figure 1: $g\left(\tau\right) = \frac{\tau^{(\varepsilon_C - \varepsilon_X)}}{1-\tau}$ as a function of the corporate income tax rate τ:
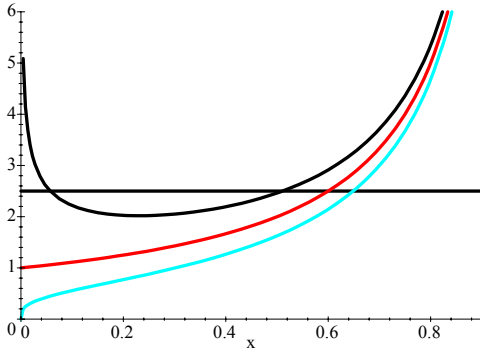
4. Empirical Evidence: Public Governance, Taxation and the "Poor Private Governance" Trap

This section investigates further Stulz's [2005] empirical evidence of the twin agency effects explaining the cross country variance of the concentration of corporate ownership. Stulz data set is merged with public governance indicators used by Friedman et alii [2000], so that four countries from the Stulz data base could not be taken into account (India, New Zealand, South Africa and Turkey) and the number of countries in the cross section is now $N = 31$ (see table 1 for the data set used in the following regressions). Stulz [2005] used as a measure of ownership concentration named "Close_ew" (denoted E in this paper), the equally (value-)weighted average fraction of firm stock market capitalization held by insiders according to Worldscope in 2002. Using regression analysis, he explained this measure of ownership concentration as a decreasing function of the government expropriation risk index (the index increases with "less expropriation risk") and the anti director rights index (the index increases with more laws items protecting minority investors) by La Porta et al. [1999]:

$$E = \underset{(p<.0001)}{1.114} - \underset{(p=.0001)}{0.056} \; LessExprisk - \underset{(p=0.016)}{0.033} \; Antidir \text{ with adjusted } R^2 = 0.452$$

(4.1)

The four missing observations do not change Stulz's results. As shown by Stulz [2005], this regression is highly robust to the addition of a number of control related to financial development (GDP/head, Bond Capitalization/GDP, Stock Market Cap-

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italization/GDP, and so on). We checked that it is also robust to the addition of the controls related to public governance used by Friedman et alii [2000] and that is remains among the best regressions with two explanatory variables maximizing the adjusted R^2 (all these results are available upon request to the authors). Note that La Porta et al. [1999] government expropriation risk index has a good substitute in Stulz [2005] regression: La Porta et al. [1999] corruption index ($R^2 = 0.8$).

In this paper, the theoretical model predicts that, below a tax rate threshold, ownership concentration decreases with indicators of the public governance of the tax system (such as corruption index), and that, above the tax threshold, ownership concentration is much less sensitive to the public governance of the tax system and depends on the public governance of the legal system (not only formal law, but also the efficiency of the judiciary measuring the degree of corruption of judges).

We use the "tax level and efficiency of taxation" index published by the Heritage foundation for the year 1997 (Friedman et al. [2000]). It measures the tax rates on corporate profits, income and "other significant activities". The assessment includes both average and marginal tax rates, as well as a view of how the tax system is administered. This tax index is scaled from one to five, with ten possible values, increasing with the level of taxation and the efficiency of the tax system.

Let us first introduce tax threshold effects in Stulz regression. The threshold value is close to the median value of the tax index $\mathbf{1}_{\tau > \tau^*} = \left(TaxIndex \geq \frac{4}{5} \right)$, which selects to 18 countries over 30 with high tax levels (see list in appendix 3):

$$
\begin{aligned}
E = & \underset{(p<.0001)}{0.975} - \underset{(p=0.049)}{0.041} \mathbf{1}_{\tau < \tau^*} LessExprisk - \underset{(p=0.41)}{0.018} \mathbf{1}_{\tau < \tau^*} AntiDir \\
& - \underset{(p=0.22)}{0.687} \mathbf{1}_{\tau > \tau^*} - \underset{(p=0.56)}{0.032} \mathbf{1}_{\tau < \tau^*} LessExprisk - \underset{(p=0.005)}{0.047} \mathbf{1}_{\tau > \tau^*} Antidir \quad (4.2)
\end{aligned}
$$

The parameter of the expropriation risk index for countries over the tax threshold and the anti director right index for countries below the tax threshold are not significantly different from zero taking the 5% maximal level of the p-value of type I error (p-values=41% and 56%, respectively). Removing these two variables in order to compare adjusted R^2 between models including only significant parameters leads to the regression:

$$
E = \underset{(p<.0001)}{0.922} - \underset{(p=0.041)}{0.041} \mathbf{1}_{\tau < \tau^*} LessExprisk - \underset{(p=0.045)}{0.329} \mathbf{1}_{\tau > \tau^*} - \underset{(p=0.005)}{0.045} \mathbf{1}_{\tau > \tau^*} Antidir
$$
$$(4.3)$$

with adjusted $R^2 = 0.510$. The parameter estimate of the variable $\mathbf{1}_{\tau > \tau^*} * Exprisk$ is not significantly different from zero. as well as the one of the variable $\mathbf{1}_{\tau < \tau^*} * Antidir$ which suggests that $\gamma = 0$ in equation (3.32). This regressions points three new effects with respect to Stulz regression. First, there is a regime shift with respect to a taxation threshold $\mathbf{1}_{\tau > \tau^*}$ which leads to a decrease of the concentration of ownership, with a differential intercept coefficient significantly different from zero for a p-value of

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type I error equal to 4.5%. Second, expropriation risk decreases the concentration of ownership only for countries below the taxation threshold. Third, the formal improvement of law protecting small investors decreases the concentration of ownership only for countries with high taxes (over the taxation threshold), with a p-value of type 1 error equal to 0.5%.

The government expropriation measure used by Stulz is highly correlated with La Porta et al. [1999] corruption index, with $R^2 = 0.8$. The corruption index is also highly correlated with measures of the underground economy (Friedman et al. [2000]). Substituting the expropriation risk index by the corruption index (higher value of the index means less corruption) leads to:

$$E = \underset{(p<.0001)}{0.867} - \underset{(p=0.004)}{0.040} \mathbf{1}_{\tau<\tau^*} LessCor - \underset{(p=0.009)}{0.275} \mathbf{1}_{\tau>\tau^*} - \underset{(p=0.003)}{0.045} \mathbf{1}_{\tau>\tau^*} Antidir \quad (4.4)$$

with adjusted $R^2 = 0.577$. The regression improved in terms of R^2 and in terms of $p - value$ of type I error for parameters, all below 1%. Let us now consider an interaction term between formal law (antidir index) and a measure of the efficiency of the judiciary (La Porta et al. [1999]) (similar results are obtained with the rule of law index: equality of citizens under the law and access of citizens to a non discriminatory judiciary (Fraser Institute, 1995)):

$$E = \underset{(p<.0001)}{0.867} - \underset{(p=0.003)}{0.040} \mathbf{1}_{\tau<\tau^*} LessCor - \underset{(p=0.005)}{0.279} \mathbf{1}_{\tau>\tau^*} - \underset{(p=0.0008)}{0.00488} \mathbf{1}_{\tau>\tau^*} Antidir \cdot NonDiscJudic$$
$$(4.5)$$

with adjusted $R^2 = 0.614$. The p-value of Student tests decreased for all explanatory variables. Finally, another regression leads to similar results including a index of the judiciary for high tax countries:

$$E = \underset{(p<.0001)}{0.860} - \underset{(p=0.0010)}{0.039} \mathbf{1}_{\tau<\tau^*} LessCor - \underset{(p=0.0015)}{0.029} \mathbf{1}_{\tau>\tau^*} RuleLaw - \underset{(p<0.0001)}{0.055} \mathbf{1}_{\tau>\tau^*} Antidir$$
$$(4.6)$$

with adjusted $R^2 = 0.626$, with all p-value of Students tests below 0.0015. The Rule of Law and Judiciary index (Fraser Institute, 1995) rates the equality of citizens under the law and access of citizens to a non discriminatory judiciary.

Finally, we check whether the endogeneity of the tax threshold affects the above results using Heckman [1990] selection model. We first estimate the linear probability model of belonging to the high tax index group of countries with the best adjusted R^2 for two variables, using all indicators of the merged data set without missing observations for the 31 countries:

$$\Pr\left(TaxIndex \geq \frac{4}{5}\right) = \widehat{p} = \underset{(p<.0001)}{-1.25} + \underset{(p=0.016)}{0.2} LessExprisk - \underset{(p=.0001)}{0.38} Sharecap$$

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The probability of belonging of the group of high tax index increases with "less expropriation risk" and decreases with more share capitalization with respect to GDP. First, government expropriation risk is negatively correlated with the probability of being a high tax index country. Conversely, this suggests that governments of low tax index countries have difficulties to collect taxes and hence are more tempted to expropriate investors. Second, the high share capitalization variable captures a group of low tax countries in Stulz [2005] data set which are offshore centers with high GDP per head (Switzerland, Singapore and Hong-Kong). Setting $\widehat{p} < 0.5$ to forecast that a country belongs to the group of low tax index and $\widehat{p} > 0.5$ to forecast that a country belongs to the group of high tax index leads to a perfect prediction.

Nonetheless, the linear probability model has drawbacks: it predicts probabilities above one and below one and residuals are not normal. However, the probit model cannot be estimated with these two explanatory variables because of a perfect separation of the data set so that maximum likelihood estimates are not valid. In particular, there is a perfect prediction using the 50% threshold over the predicted probability ($\widehat{p} < 0.5$) for classifying low or high tax countries. We report the probit estimates with only one explanatory variable (the expropriation risk index) with the highest R^2, so that there is not a complete separation of the countries (F is the cumulative standardized normal distribution):

$$\Pr\left(\mathbf{1}_{\tau > \tau_{\min}}\right) = \widehat{p} = F\left(\underset{(p<.0001)}{-1.25} + \underset{(p=0.016)}{0.2} \; LessExprisk\right)$$

We compute the inverse of the Mills ratio for each country. We check whether the endogenous selection of the tax threshold affects the above results on each subsamples, as the tax threshold is highly correlated with the expropriation risk, which is itself highly correlated with the corruption index. For the group of low tax index countries (12 countries), with adjusted $R^2 = 0.57$:

$$E = \underset{(p=.0002)}{0.996} - \underset{(p=0.0163)}{0.053} \; LessCor - \underset{(p=0.411)}{0.021} \; IMR$$

The inverse of the Mills ratio is not significant. For the group of high tax index countries (19 countries), with adjusted $R^2 = 0.28$:

$$E = \underset{(p<.0001)}{0.620} - \underset{(p=0.0159)}{0.048} \; Antidir - \underset{(p=0.430)}{0.077} \; IMR$$

The inverse of the Mills ratio is not significant. The adjusted R^2 is lower than in the first group, which suggests that the anti-director right index can be improved, taking into account a measure of the efficiency of the judiciary.

Finally, empirical evidence confirms the prediction of the model of the decision of corporate governance. Stulz [2005] twin agency does not generally hit countries in the same way. The theoretical model suggests that each agency problem are substitutes, as private corporate governance decreases the sensitivity of corporate ownership concentration with respect to the governance of the tax system by a factor $1 - \gamma$.

- In low tax countries, ownership concentration depends on the public governance of the tax system, related to corruption and government expropriation risk.

- In high tax countries, once the tax system "treatment" has been successful, improving laws and the efficiency of the judiciary protecting private investors is successful in decreasing the degree of ownership concentration.

- The "poor private governance trap" is mostly determined by a poor public governance of taxation related to the ability to meet a tax threshold.

If the tax system is weak, changing the law protecting investors has little effect on the degree of ownership concentration. Hence, improving the tax system and tax revenue, decreasing the size of the underground economy and decreasing corruption and in turn the risk of expropriation of investors by government (which increases with a poor tax system) is a "prior" institutional change in order to foster private corporate governance. In other words, transplanting US common law or changing the law protecting small investors in, say, Peru has no chance to lead to a sharp decrease of ownership concentration. In this context, writing "codes of good conduct" of informed shareholders, improving the investors rights changing formal law and the efficiency of the judiciary lacks credibility for local and foreign investors. Investors cautiously let entrepreneurs finance the bulk of their project and do not spend costly monitoring resources at loss. Empirical evidence confirms that changing the formal law with respect to investors protection without improving public governance and tax collection may not be as successful as expected. Hence, "state building" in Fukuyama's [2005] parlance is a priority to improve private corporate governance, for a number of countries.

5. Conclusion

This paper suggests that Stulz [2005] twin agency problems faced by investors (government expropriation risk, informed shareholders hold up) does not generally affects countries in the same way. First, there is a threshold on the public governance of the tax system which determines whether the private decision to improve corporate governance is reduced to a minimum (the "poor private governance" trap, where the demand of less wealthy entrepreneurs cannot be met by the supply of costly monitoring by investors), although, in some particular cases (tax havens), it is possible that private governance develops with low taxes, as a substitute of public governance.

Second, the theoretical model suggests that the two agency problems are substitutes, as private corporate governance decreases the sensitivity of corporate ownership concentration with respect to the governance of the tax system. In particular, ownership concentration depends on the public governance of the tax system and on corruption, which itself is correlated to the size of the underground economy for countries with a poor public governance of the tax system (Friedman et al. [2000]). For countries with a better public governance of the tax system, ownership concentration depends much more on the public management of the legal system.

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The message of this paper is that the design of private microeconomic incentives for the supply of costly monitoring depend on the public governance of the tax system and of the legal system, both a macroeconomic question through tax revenue and a microeconomic question, with the design of incentives inside the black box of public administration. Hence, for several emerging economies, improving the public governance of the tax system is a prior condition in order to observe a decrease of ownership concentration and better private corporate governance.

The relationship between corporate governance and government is here focused on an opposition between emerging and developed countries, which is indeed a very important question due to financial globalization. When one compares developed countries with respect to the relationship between corporate governance and government, or the political economy of corporate governance, many other factors are at stake, and it is currently a hot topic for scholars.

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Appendix 1: If available, tax deductible external finance is chosen.

The entrepreneur favors tax deductible external finance (that is debt instead of "uninformed equity"). If ever she chooses non deductible equity, the $WACC'_{sg}$ is higher:

$$WACC'_{sg} = p_H R_{sg} B_{sg} + R_0 E > (1 - \tau) p_H R_{sg} B_{sg} + R_0 E.$$

Then entrepreneurs who have enough wealth to be financed by tax deductible investors ($E^{\min}_{sg} < E_0$) do not choose non tax deductible external funds. For entrepreneurs who are facing external finance rationing, it turns out that the minimal internal wealth requirement for non tax deductible investors incentive constraint is higher $E^{\min\prime}_{sg}$ than the other threshold $E^{\min}_{sg} < 1$. Then entrepreneurs facing external capital rationing by tax deductible investors also face external capital rationing by non tax deductible investors, whose informed funding threshold $E^{\min\prime}_{sg}$ is determined by the following incentive constraint:

$$R_E E = (1 - \tau) R_K - R_{sg} B_{sg} = (1 - \tau) R_K - \frac{R_0}{p_H} (1 - E) \geq \frac{R_X(G)}{p_H - p_L} \qquad (5.1)$$

That is:

$$E \geq E_{sg}^{\min\prime} = 1 - (1-\tau)\frac{1}{R_0}\left(p_H R_K - \frac{R_X(G)}{(1-\tau)\left(1 - \frac{p_L}{pH}\right)}\right) \quad (5.2)$$

The same condition guarantees that the two threshold are below one and that the tax deductible internal funding threshold is lower than the non tax deductible internal funding threshold:

$$E_{sg}^{\min} < E_{sg}^{\min\prime} < 1 \Leftrightarrow \frac{R_X(G)}{(1-\tau)\left(1 - \frac{p_L}{pH}\right)} < p_H R_K \quad (5.3)$$

Tax deductible external finance is preferred by entrepreneurs. If ever tax deductible finance or if protection from government expropriation rate is not possible or is limited for all uninformed investors including banks providing credit, then the minimal share owned by entrepreneurs will rise up to $E_{sg}^{\min\prime}$.

Appendix 2: Ex Post Tax Fraud Tax and Corporate Governance.

This appendix shows how very high corporate income tax rates (up to 100%) are detrimental to the supply of private corporate governance. It is assumed that the effective tax rate is the product of the tax rate τ and of the probability f of effectively paying tax rate, which decreases when the corporate income tax rate increases. A linear approximation of the relation between the probability of paying effectively taxes and the tax rate is considered: $f(\tau) = f_0 - \delta\tau \in [0,1]$ for a tax rate between $\tau \in \left[0, \max\left(1, \frac{f_0}{\delta}\right)\right]$ and with $0 < f_0 \leq 1$. A rise of the corporate income tax rate may increase the benefit of tax fraud, in a cost benefit analysis (Becker and Stigler [1974]). For example, the entrepreneur gains more from tax fraud, so that she may increase the bribe paid to a tax inspector in order to avoid to pay taxes in case of tax inspection.

The private investors monitoring decision depends now on the function : $h(\tau) = \tau f(\tau) = f_0\tau - \delta\tau^2$ instead of depending on the corporate tax rate only. The lower bound inequalities $f_0\tau - \delta\tau^2 > g_i^{-1}(A)$ lead also to higher bound inequality for the tax rate τ, if parameters f_0 and δ are such that this lower bound is below one, $\tau_{\max}(g_i) < 1$, else it is no longer a constraint. In this case, corporate governance occurs when the tax rate belong to the following interval:

$$\left[\tau_{\min}(g_i) = \frac{1}{2\delta}\left(f_0 - \sqrt{\left(f_0^2 - 4\delta g_i^{-1}(A)\right)}\right), \tau_{\max}(g_i) = \frac{1}{2\delta}\left(f_0 + \sqrt{\left(f_0^2 - 4\delta g_i^{-1}(A)\right)}\right)\right]$$
$$(5.4)$$

The other inequality $f_0\tau - \delta\tau^2 > g_2^{-1}(A)$ leads to other intervals for the tax rate:

$$[0, \tau_{\min}(g_2)] \cup [\tau_{\max}(g_2), 1] \quad (5.5)$$

This leads to the following proposition:

Proposition 4. *The Corporate Governance regime prevails for the following conditions on the corporate tax rate τ, the efficiency of public expenditures protecting investors ε_C (inversely related to the degree of corruption of judges) and the efficiency of public expenditures limiting the size of the parallel economy ε_X (inversely related to the degree of corruption of tax inspectors):*

(a) When $\varepsilon_C \geq \varepsilon_X$ (judges are less corrupt than tax inspectors), corporate governance occurs when the tax rate has to be between a higher and lower threshold: $[\tau_{\min}(g), \tau_{\max}(g)]$.

(b) When $\varepsilon_C = \varepsilon_X$ (judges are as corrupt than tax inspectors) and $1 \geq A$ OR when $\varepsilon_C < \varepsilon_X$ (judges are more corrupt than tax inspectors) and $\left(\frac{\varepsilon_C - \varepsilon_X}{\varepsilon_C - \varepsilon_X - 1}\right)^{\varepsilon_C - \varepsilon_X}(1 - \varepsilon_C + \varepsilon_X) \geq A$: private corporate governance occurs whatever the tax rate level.
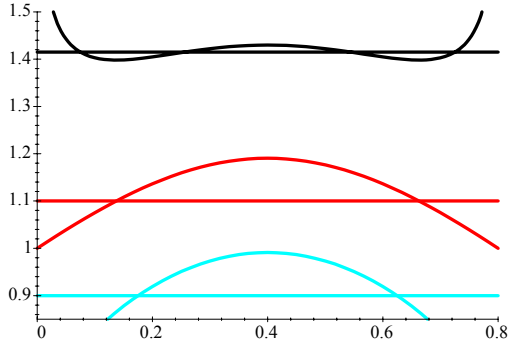
(c) When $\varepsilon_C < \varepsilon_X$ (judges are more corrupt than tax inspectors) and $\left(\frac{\varepsilon_C - \varepsilon_X}{\varepsilon_C - \varepsilon_X - 1}\right)^{\varepsilon_C - \varepsilon_X}(1 - \varepsilon_C + \varepsilon_X)$ A: private corporate governance occurs when the tax rate belongs to:

$$[0, \tau_{\min}(g_2)] \cup [\tau_{\min}(g_1), \tau_{\max}(g_1)] \cup [\tau_{\max}(g_2), 1] \qquad (5.6)$$

To the central values $[\tau_{\min}(g_1), \tau_{\max}(g_1)]$ are added the extreme cases related to private versus public governance substitution regimes $[0, \tau_{\min}(g_2)] \cup [\tau_{\max}(g_2), 1]$.

Figure 2 presents 3 examples for 3 values of $\varepsilon_C - \varepsilon_X$ for the function $\frac{(0.8 \cdot \tau - 1 \cdot \tau^2)^{\varepsilon_C - \varepsilon_X}}{1 - 0.8 \cdot \tau + 1 \cdot \tau^2}$ with $f_0 = 0.8$ and $\delta = 1$ (hence $\tau \leq 0.8$) with 3 thresholds A related to elasticities $\varepsilon_C - \varepsilon_X$ corresponding to 3 horizontal lines.

Figure 2: Condition for corporate governance as a function of tax rate

The higher curve corresponds to case (c) with $\varepsilon_C = \varepsilon_X - 0.1$ (judges are more corrupt than tax inspectors), the intermediary curve to case (b) with $\varepsilon_C = \varepsilon_X$ (judges are as corrupt as tax inspectors) and the lower curve to case (a) with $\varepsilon_C = \varepsilon_X + 0.1$ (judges are less corrupt than tax inspectors). The tax rates allowing corporate governance corresponds to values of the curves higher than their respective horizontal lines, representing the value A. In case (a) and (b) it is possible that corporate governance never occurs when A is high enough (the curve remains below A for all values of tax rates)

Table 1

Countries are sorted by EHFRTX7, which is the "tax level and efficiency of taxation" index published by the Heritage foundation for the year 1997, GDP is gross domestic product, Closeew is equally (value) weighted average fraction of firms' stock market capitalization held by insiders according to Worldscope in 2002, Corrupt decreases with corruption, Exprisk decreases with expropriation risk and Antidir is the index of minority protection, SHL5JUD is the index of the efficiency of the judiciary (these four variables are La Porta et al. [1999] indices), EFFRRL5 is a Rule of Law and Judiciary index (Fraser Institute, 1995)

COUNTRY	EFHRTX7	GDP	CLOSEEW	EXPRISK	CORRUPT	ANTIDIR	SHL5JUD	EFFRRL5
Hong Kong	1.5	21023	0.56	8.29	8.5	5	10	7.5
Brazil	2.5	4298	0.63	7.62	6.3	3	5.75	0
Malaysia	3.0	3845	0.48	7.95	7.4	4	9	2.5
Peru	3.0	2181	0.71	5.54	4.7	3	6.75	2.5
Philippines	3.0	1093	0.72	5.22	2.9	3	4.75	2.5
Singapore	3.0	21343	0.57	9.3	8.2	4	10	0
Switz	3.0	44437	0.46	9.98	10.0	2	10	10
Thailand	3.0	2501	0.57	7.42	5.2	2	3.25	2.5
Argentina	3.5	7246	0.55	5.91	6.0	4	6	2.5
Chile	3.5	4172	0.68	7.5	5.3	5	7.25	5
Greece	3.5	11454	0.59	7.12	7.3	2	7	5
Mexico	3.5	3299	0.8	7.29	4.8	1	6	0
Finland	4.0	26296	0.42	9.67	10.0	3	10	10
USA	4.0	27487	0.35	9.98	8.6	5	10	7.5
Australia	4.5	20330	0.42	9.27	8.5	4	10	7.5
Austria	4.5	28772	0.62	9.69	8.6	2	9.5	7.5
Britain	4.5	18920	0.35	9.98	9.1	5	10	7.5
Canada	4.5	19624	0.27	9.67	10.0	5	9.25	7.5
Denmark	4.5	33740	0.47	9.67	10.0	2	10	10
Japan	4.5	41438	0.44	9.67	8.5	4	10	7.5
Korea	4.5	9746	0.35	8.31	5.3	2	6	7.5
Norway	4.5	32408	0.44	9.88	10.0	4	10	10
Sweden	4.5	27308	0.37	9.4	10.0	3	10	10
Belgium	5.0	26821	0.55	9.63	8.8	0	9.5	10
France	5.0	26657	0.62	9.65	9.1	3	8	7.5
Germany	5.0	29595	0.64	9.9	8.9	1	9	7.5
Holland	5.0	26483	0.43	9.98	10.0	2	10	10
Ireland	5.0	17834	0.31	9.67	8.5	4	8.75	7.5
Italy	5.0	18807	0.49	9.35	6.1	1	6.75	7.5
Portugal	5.0	10667	0.63	8.9	7.4	3	5.5	7.5
Spain	5.0	14814	0.51	9.52	7.4	4	6.25	5