# Theft and taxes

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Abstract

This paper analyzes the interaction between corporate taxes and corporate governance. We show that the design of the corporate tax system affects the amount of private benefits extracted by company insiders and that the quality of the corporate governance system affects the sensitivity of tax revenues to tax changes. Analyses of a tax enforcement crackdown in Russia and cross-country data on tax changes support this two-way interaction between corporate governance and corporate taxation.

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## 1. *Introduction*

The state, thanks to its tax claim on cash flows, is de facto the largest minority shareholder in almost all corporations. Yet the state's actions are not part of the standard analysis of corporate governance.[1] This omission is even more remarkable given that corporate taxes are an integral part of the literature on corporate financing and investment decisions (e.g. Graham, 2003). At the same time, the public finance literature on taxation typically ignores any effects of governance on the functioning of the corporate tax system (see Auerbach, 2002; and Hassett and Hubbard, 1997).

In this paper, we provide a simple reason for integrating the analysis of corporate governance and taxation. Most transactions aimed at diverting corporate value toward controlling shareholders also reduce corporate tax liabilities. Similarly, many procedures aimed at enforcing a corporate tax liability make it more difficult for controlling shareholders to divert corporate value to their own advantage. More generally, the level of diversion and the amount of taxes paid are determined in a game that involves three parties–the state, insiders, and outside shareholders. Our claim is that each bilateral interaction has important spillover effects on the third party. How the state designs and enforces taxes influences the relationship between insiders and outside shareholders, and the nature of the relationship between insiders and outside shareholders (corporate governance) influences the corporate taxation system.

In a model that adopts this simple insight, we analyze how the corporate tax system affects the level of managerial diversion.[2] A higher tax rate increases the return to theft by insiders and worsens governance outcomes. By contrast, increased tax enforcement reduces the amount of private benefits these controlling shareholders can enjoy. Most interestingly, an increase in tax enforcement can increase the amount outside shareholders will receive, even accounting for increased levels of taxation. Accordingly, for a given tax rate, an increase in tax enforcement can increase (rather than decrease) the market value of a company.

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[1] The literature has typically emphasized legal protections for outside investors (e.g., La Porta et al., 1998; and Shleifer and Wolfenzon, 2002), the role of boards (e.g., Hermalin and Weisbach, 1998), and the presence of large shareholders (Morck, Shleifer and Vishny, 1988).

[2] Of course, managerial diversion is not the only possible corporate governance problem, others being perquisite consumption and empire building. As far as our model is concerned, perquisite consumption is formally equivalent to managerial diversion, but empire building is not. Hence, our analysis is mostly relevant for markets with large shareholders and poor corporate governance.

Much as the structure of taxation affects corporate governance, the model introduced in the paper also demonstrates that corporate governance affects the working of the tax system. When it is difficult to divert income, we derive the standard result of a relatively direct relation between tax rates and tax revenues. By contrast, when the corporate governance system is ineffective (i.e., when it is easy to divert income), an increase in the tax rate can reduce tax revenues while a decrease can increase tax revenues, implying a hump-shaped relation between corporate tax rates and corporate tax revenues. This nonmonotonic relation arises for the simple reason that when it is easy to divert income, managers will behave as residual claimants, accentuating their incentive to shelter income to avoid taxation. As a result, the revenue-maximizing tax rate is higher in countries with a better corporate governance system.

We then test the corporate governance and tax policy predictions of our model. The prediction that is easiest to test (i.e., that an increase in tax rates reduces stock prices) is not unique to this approach as the same implication also follows from a traditional view of taxes. The predictions that are unique to this approach (the effect of enforcement on stock prices and control premia) require us to measure variables that are difficult to quantify (tax enforcement) and even to observe in a systematic way (control premia). For this reason, we focus on Russia, an environment where both managerial diversion and tax evasion are more macroscopic. The drawback of this choice is that the illiquidity of the Moscow stock exchange limits the number of data points that can be employed.

We study how an increase in tax enforcement following the election of Vladimir Putin affected stock prices and the value of control (a proxy for the amount of managerial diversion). As predicted by the model, the market values of companies targeted by enforcement actions increased and the voting premium for these stocks decreased after the increase in tax enforcement. We also document that increased tax enforcement leads to substantial organizational changes in the targeted companies — changes that make managerial diversion more difficult.

To test the tax implications of our model, we assemble a panel of countries that differ in the quality of their corporate governance. We test whether the relation between tax rates and tax revenues depends upon the quality of corporate governance by investigating the revenue consequences of corporate tax rate changes from 1979 to 1997. We find that increases in

corporate tax rates have a lower impact on tax revenues in countries characterized by weaker corporate governance. In particular, the empirical estimates suggest that corporate tax rate increases lead to corporate tax revenue increases only in countries with very strong corporate governance. As outside shareholder protections weaken, rate increases are associated with lower revenue — consistent with the model's implication that rate increases encourage diversion that hide revenue from the tax authorities. In an effort to isolate the impact of the governance environment from other factors that vary across countries and could also influence the relation between tax rates and revenues, we include control variables associated with the institutional environment, such as measures of tax enforcement, corruption, and the strength of democratic institutions, and find that these factors do not alter our results. Our results also do not appear to be driven by the potential endogeneity of the tax rate as we instrument for tax rate changes with the ideology of the party in power.

The analysis in this paper has implications for the design of tax systems. It suggests that the fiscal effects of any corporate tax reform cannot be assessed without looking at the pre-existing corporate governance situation. This analysis also suggests a clear direction for reforms in emerging markets. By lowering the corporate tax rate, governments can improve governance outcomes, with particular gains where governance is weak to begin with. An increase in tax enforcement can provide payoffs to both governments and outside shareholders, as it generates greater revenue and higher outside share values. Political economy considerations suggest that such changes will be more likely when the ability of insiders to determine tax policy is weakened, as during crises.

Our paper relates to a larger literature on taxation. We only explore one dimension of the interaction between corporate governance and taxation. Other papers suggest additional costs and benefits of taxes with regard to governance outcomes. Arlen and Weiss (1995) emphasize how taxes, by favoring income retention, can exacerbate the agency problem between managers and shareholders. Roe (1991) claims that in the United States, taxes penalize ownership structures that facilitate monitoring. Morck (2003), in contrast, suggests a possible benefit of the double taxation of dividends in reducing the use of pyramidal ownership structures, and Desai and Dharmapala (2006) consider how ownership by managers influences tax sheltering decisions in the U.S. setting.

Our emphasis on taxation contributes to a large literature on the determinants of corporate governance. The analysis of any institution, including corporate governance, can be done on two levels, as noted by North and Thomas (1973) and Williamson (2000). The classical approach, followed by La Porta et. al. (1998) in most of their work, is to focus on how institutions that are easily changed, such as investor protections or security laws, affect corporate governance outcomes. We adopt that approach here with our focus on tax rates and tax enforcement. The second approach consists of deriving the emergence of these institutions as a result of a political economy game, where some deeper (or slow-moving in the language of Williamson) institutions are taken as exogenous. Pagano and Volpin (2005), for instance, show how the electoral system (majoritarian vs. proportional) affects the nature of the prevailing coalition and thus the quality of investor protection. Perotti and Von Thadden (2006), by contrast, take the distribution of wealth in society as given and endogenously derive the degree of investor protection. In our view, the classical approach is a necessary antecedent to the political economy approach. For example, once we know how security laws impact corporate governance, we can begin to model the political economy game. For this reason, we follow the classical approach in looking at the impact of corporate taxation on corporate governance. Since this analysis is missing from the literature, we see this exercise as a necessary first step to integrating corporate taxation into a political economy analysis. Some political economy models, (e.g. Acemoglu, (2003), do incorporate taxation into their analysis, but it is a stylized income tax far different from the corporate tax prevailing in most countries in the world. One of the benefits of our analysis is that of analyzing the impact of actual corporate taxation on corporate governance.

The rest of the paper proceeds as follows. Section 2 presents a model of the relation between the tax system and corporate governance that generates several predictions on how corporate taxation affects corporate governance and how corporate governance affects corporate taxation. Section 3 considers several political economy issues that arise for our analysis. Section 4 tests the corporate governance implications of tax enforcement changes using recent changes in Russia, while Section 5 tests the effects of corporate governance on the impact of corporate tax changes in a panel of countries. Section 6 concludes.

**2.      *A simple model of tax evasion and managerial diversion***

To examine the relation between corporate governance and corporate taxes, we begin with a relatively standard model of governance on which we superimpose a corporate income tax. As La Porta et al. (1999) show, most countries have concentrated ownership structures, suggesting that the conflict between insiders and outsiders is most relevant. Accordingly, the model focuses on the problem of diversion by insiders.

## 2.1. *The optimal level of diversion*

Let $d \in [0,1]$ be the proportion of income that insiders divert. If insiders own a fraction $\lambda$ of the company, then, in the absence of any corporate income tax, the payoff to insiders is

$$\lambda(1-d)+d. \tag{1}$$

Diverting, however, is costly because insiders can be caught and penalized. We model this cost with the following quadratic function:

$$C(d) = \frac{\gamma}{2}d^2 \tag{2}$$

where $\gamma$ is a parameter that captures the quality of the corporate governance system, with a higher $\gamma$ indicating a better governance system. Hence, in the absence of taxes, the optimal amount of diversion is

(1) $$d^* = \min(\frac{1-\lambda}{\gamma},1). \tag{3}$$

## 2.2. *The effect of a corporate income tax*

We now superimpose a corporate tax in this simple model. Most corporate tax systems can be characterized by two parameters: the tax rate and the level of enforcement. On the one hand, the presence of a positive tax rate makes diversion more likely, as it increases the opportunity cost of diverting income (insiders will receive a reduced fraction of the money they do not divert, because the government is getting a fraction of it). On the other hand, the existence of a corporate tax introduces an additional monitor (the tax authority) which increases the probability that diversion will be detected and, hence, increases the expected cost of diversion.

In principle, the monitoring provided by the tax authority and the expected costs of being caught for tax avoidance could be very different from their counterparts in the corporate governance system. To begin, however, we assume that the likelihood of being caught for tax evasion through diversion increases with the amount that is diverted. To capture this, we assume that the expected cost of evading taxes for insiders has the same functional form as the corporate governance cost. In addition to being plausible, this assumption does not bias the model in favor of traditional governance mechanisms or the tax system:

$$C(d) = \frac{\alpha d^2}{2}.$$  (4)

Notice that this is not the total cost imposed on the company but only the personal cost insiders face if they are caught diverting. We ignore any financial penalty for the firm because it will be borne pro rata by insiders and outsiders and hence will not generate any conflict between the two parties.

In the basic model, we treat tax enforcement as independent from tax rates to provide a sharper intuition for the results. A more realistic approach would link tax rates and tax enforcement. As we discuss in Sections 2.4 and 3, however, the nature of this relation is highly nonmonotonic and depends upon the assumed objective function of the government and the specific nature of the political economy game. For this reason, we prefer to consider these alternatives subsequently.

In the presence of corporate taxation, the total payoff to insiders simplifies to

$$\lambda(1-d)(1-t) + d - \frac{\alpha+\gamma}{2}d^2.$$  (5)

Hence, the optimal amount of diversion is

(2)  $$d^{**} = \min(\frac{1-\lambda(1-t)}{\alpha+\gamma}, 1).$$  (6)

Comparing the optimal amount of diversion with and without taxation yields the following:

*Result 1:* Ceteris paribus, countries with a higher tax rate will have higher levels of diversion. This effect is stronger where tax enforcement is weaker.

*Proof:* $\dfrac{\partial d}{\partial t} = \dfrac{\lambda}{\alpha + \gamma} > 0; \dfrac{\partial^2 d}{\partial t \partial \alpha} = -\dfrac{\lambda}{(\alpha + \gamma)^2} < 0.$

In our framework this is an obvious point, but it suggests an important channel through which the tax system can worsen governance outcomes: higher tax rates lead to worse corporate governance outcomes by increasing the return from diverting.

Result 1 looks at the effect of a higher tax rate, keeping all other dimensions constant. But this is not the right comparative static if we want to study the effects of the introduction of a corporate income tax. A corporate income tax introduces not only a positive $t$ but also additional enforcement through the variable $\alpha$.

*Corollary 1:* The introduction of a corporate tax improves corporate governance (i.e., reduces the amount of diversion) if and only if the level of tax enforcement exceeds a critical level defined as follows:

$$\alpha > \frac{\lambda \gamma t}{(1 - \lambda)}. \tag{7}$$

*Proof:* It follows by comparing Eq. (2) with Eq. (1).

The effect of the introduction of a corporate tax system on diversion is twofold. The fact that the government takes a fraction of profits increases the incentive to divert, while the additional monitoring provided by the tax authorities reduces it. The overall effect depends on the relative strength of the two forces.

*Corollary 2:* For a given monitoring ability of the tax authorities ($\alpha$), the introduction of a corporate tax is more likely to reduce diversion (and improve corporate governance) when

i)        The corporate governance system is weaker (lower $\gamma$);
ii)       Ownership is less concentrated (lower $\lambda$);
iii)     The tax rate is lower.

While obvious, this corollary has important implications. Countries with a poor record of tax enforcement cannot introduce steep corporate tax rates without causing a worsening of the amount of diversion, with the well-known effect on the functioning of capital markets (e.g., La Porta et al., 1998; Dyck and Zingales, 2004).

Having analyzed how different characteristics of the tax system affect the optimal amount of diversion, we can derive how taxes influence the market value of a company.

*Result 2:* The market value of a company increases with tax enforcement and decreases with the tax rate.

*Proof:* The market value is driven by the value minority shareholders can capture, which in turn is given by $V^m = (1-d)(1-t)$. Since $\frac{\partial V^m}{\partial d^{**}} < 0$ and $\frac{\partial d^{**}}{\partial \alpha} = -\frac{1-\lambda(1-t)}{(\alpha+\gamma)^2} < 0$, then $\frac{dV^m}{d\alpha} > 0$. Since

$\frac{\partial V^m}{\partial t} < 0$ and $\frac{\partial V^m}{\partial d} < 0$ and $\frac{\partial d^{**}}{\partial t} = \frac{\lambda}{(\alpha+\gamma)} > 0$, then $\frac{dV^m}{dt} < 0.$

An increase in the tax rate has two negative effects on minority shareholders. The direct effect is that the state takes a larger fraction of profits, reducing the value left to minority shareholders. This is the standard effect in the traditional view of taxes. The indirect effect is that a higher tax rate induces more diversion, reducing the value of claims held by minority shareholders. This is an additional cost we introduce by emphasizing the corporate governance implications of taxes. Since both effects go in the same direction, the result is unambiguous.

This approach also allows us to study the effect of a change in enforcement on diversion and equity prices. In principle, the effect of enforcement is ambiguous: greater enforcement leads to more taxes paid but also less diversion. Which effect dominates? In the model presented here, the effect is unambiguously positive, because the state gets only a fraction of the income, while insiders, when they divert, get 100%. Another way to view this problem (elaborated in a previous version of this paper) is to consider the sheltering and diversion decisions separately, with income sheltered from tax authorities split between insiders and outside shareholders. This modification leads to similar results so long as the fraction of income diverted by insiders exceeds the tax rate. Only when the fraction of income appropriated by the tax authorities exceeds that diverted by insiders is this result overturned. More generally, the result holds as

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long as, at the margin, the fraction of pretax income appropriated by the state is less than the fraction appropriated by insiders.

For our empirical analysis, it is also useful to derive the following two corollaries:

*Corollary 3:* Following an increase in enforcement, companies that were previously diverting more will experience a larger increase in price.

*Proof:*

$$\frac{\frac{dV^m}{d\alpha}}{V^m} = \frac{(1-t)\frac{1-\lambda(1-t)}{(\alpha+\gamma)^2}}{(1-t)(1-\frac{1-\lambda(1-t)}{\alpha+\gamma})} > 0.$$

Following Dyck and Zingales (2004), let us define the control premium (CP) as the difference between the per share payoff controlling shareholders receive and that outside shareholders receive, normalized by the total value of the company computed at the price of non-controlling shares:

$$CP = \frac{\lambda[\frac{V^i}{\lambda} - \frac{V^m}{1-\lambda}]}{\frac{V^m}{1-\lambda}} = (1-\lambda)\frac{V^i}{V^m} - \lambda.$$

Accordingly, we have

*Corollary 4:* The value of control decreases with tax enforcement.

*Proof:* $\frac{\partial CP}{\partial \alpha} = \frac{(1-\lambda)}{(V^m)^2}[\frac{dV^i}{d\alpha}V^m - V^i\frac{dV^m}{d\alpha}]$. By using the envelope theorem $\frac{dV^i}{d\alpha} = \frac{\partial V^i}{\partial d}\frac{\partial d}{\partial \alpha} = 0$.

Since by Result 2 $\frac{dV^m}{d\alpha} = \frac{\partial V^m}{\partial d}\frac{\partial d}{\partial \alpha} > 0$, the result follows.

Since tax enforcement reduces the amount of income diverted, this reduces the value of control and increase the value of minority shareholders. Hence, the control premium should decline. Below we focus on this empirical prediction associated with changes in enforcement because this prediction is unique to the governance dimension of taxes emphasized here. We do not focus on

the prediction about the relation between tax rates and the value of claims held by minority shareholders since both the traditional view of taxes and the governance view of taxes generate the same implication.

## 2.3. *The effect of the corporate governance environment on the tax system*

While the previous section considers the effect of a tax system on corporate governance outcomes, we now turn to the effect of the corporate governance environment on the functioning of the tax system.

First, our simple model produces a hump-shaped relation between corporate tax revenues and corporate tax rates.

<u>*Result 3:*</u> If $0 < \dfrac{\alpha + \gamma + \lambda - 1}{2\lambda} < 1$, then corporate tax revenues as a function of corporate tax rates are hump-shaped.

<u>*Proof:*</u> Corporate tax revenues are given by $t(1-d) = t - t[\dfrac{1 - \lambda(1-t)}{\alpha + \gamma}]$. Differentiating this with respect to $t$ we obtain $1 - \dfrac{1 - \lambda + 2\lambda t}{\alpha + \gamma}$, which reaches an interior optimum for $t \in [0,1]$ if

$$\dfrac{\alpha + \gamma + \lambda - 1}{2\lambda} < 1.$$

The intuition for this result is straightforward. An increase in corporate tax rates increases the amount of diversion, which in turn reduces taxable income. The net effect can be a decline in tax revenues. The intensity of this behavioral response is driven by the size of the expected cost of diversion ($\alpha + \gamma$). It is also driven by the extent of ownership concentration ($\lambda$), which makes insiders internalize the benefits of diversion more. If the expected cost of diversion or the level of insider ownership is not sufficiently high, then the behavioral response to increases in tax rates is sufficiently strong that these rate increases will not yield additional revenues.

The most interesting aspect of the corporate governance dimension of taxes, however, is not the existence of a range of parameter values where corporate tax revenues decline with tax rate increases, but a link between the shape of this relation and two keys indicators of a corporate

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governance system: the quality of the corporate governance system, $\gamma$, and the level of ownership concentration, $\lambda$.

*Corollary 5:* The sensitivity of corporate tax revenues, CTR, to tax rate changes increases with the quality of the corporate governance system $\gamma$.

*Proof:* $\dfrac{d^2 CTR}{dt d\gamma} = \dfrac{1 - \lambda + 2\lambda t}{(\alpha + \gamma)^2} > 0.$

Corollary 5 states that better corporate governance increases the sensitivity of tax revenues to tax changes. In fact, better corporate governance reduces both the equilibrium amount of diversion and the sensitivity of diversion to changes in the tax rate. If higher tax rates lead to less diversion because of the quality of the corporate governance system, then an increase in tax rates will lead to greater revenues.

A similar effect holds for ownership concentration.

*Corollary 6:* The sensitivity of tax revenues to tax rate changes increases with ownership for tax rates below 50%. For tax rates above that, it decreases with ownership.

*Proof:* $\dfrac{d^2 CTR}{dt d\lambda} = -\dfrac{2t - 1}{\alpha + \gamma} > 0$ if $t < 0.5.$

*2.4.    Robustness and limitations of the model*

The model presented above abstracts from a number of considerations.  First, it does not explicitly consider perquisite consumption and empire-building, but only straight diversion. With respect to the model, perquisite consumption is formally equivalent to managerial diversion but empire-building is not.  As such, the model is more appropriate characterizing countries where large shareholders dominate and the main agency problem is the conflict between insiders and minority shareholders. Given the La Porta et al. (1999) findings that most countries have a very concentrated ownership structure, this does not seem a major limitation.  In our empirical work, we examine the robustness of our results to this emphasis on diversion by excluding countries with dispersed ownership structures.  For a study of the effects of corporate taxation on overinvestment in a country with disperse ownership, see Christie and Nanda (1994).

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Second, our model assumes that outsiders have no negotiating power in setting the level of diversion.   This is clearly an extreme assumption: outsiders could have some ability to restrain insiders even if they face significant costs of coordinating their actions. Introducing this possibility, however, does not substantially change the model. In fact, the power of outside shareholders can be subsumed in our framework through a company-specific $\gamma$. Where outsiders have more power, $\gamma$ will be higher, and insiders will divert less.

Third, in our model the state impacts the interaction between corporate insiders and outsiders only through taxes. In reality, there are many other channels. The threat of nationalization (or renationalization, as in the Russian case), for instance, is another important channel. Many of these interventions, however, can be easily introduced in the model. The threat of nationalization, for instance, is analogous to a higher expected tax rate and, as such, will induce insiders to divert more.

Fourth, our model does not consider the full contracting space. It is essentially a game involving three parties — the state, the insiders, and the outside shareholders — where we emphasize how some bilateral interactions (corporate governance and corporate taxation) have spillover effects on the third party. Yet we do not consider the possibility of side deals.  For example, we have not allowed insiders and outsider to coordinate their actions to reduce the corporate tax liability.  Similarly, we have not allowed insiders and the state to coordinate their actions at the expense of outside shareholders.

There is a simple rationale for not allowing insiders and outsiders to coordinate to evade taxes: there are significant transaction costs for outside shareholders to arrive at any decision, and even greater costs to coordinate with insiders.  In fact, these added transaction costs are a primary difference between publicly traded companies and privately held ones. In privately held companies, it is much easier for shareholders to reach an agreement to minimize their collective tax liability through mechanisms such as charging fictitious expenses. Shareholders then redistribute their tax savings among themselves with side contracts. Of course, this possibility is considerably more complicated when there are widely dispersed shareholders.

Collusion is considerably more likely between the state and insiders.  The state, for example, can demand higher payments from insiders (e.g., bribes) in exchange for overlooking

diversion from outside shareholders. While this might seem a remote possibility in the United States, it is not inconceivable in a variety of countries, including Russia. Such a strategy, however, has two limitations. First, nothing guarantees that insiders, after bribing the tax authority to avoid taxes, will not be subject to additional requests for bribes. The advantage of taxes is that the state can more credibly commit not to harass a company repeatedly. Second, the state faces an agency problem in its collection of taxes. In accepting bribes instead of official tax payments, the state could find it difficult to limit the skimming of proceeds by its delegated agents. Hence, collusion between the state and insiders at the expenses of outsiders has its own disadvantages and our model is more relevant where these disadvantages are sizable.

Finally, our basic model assumes that tax enforcement is exogenous. An alternative would be to endogenize enforcement as a function of the tax rate. In the literature on personal taxation (e.g., Slemrod and Yitzakhi, 2002), for instance, the expected cost of diversion is a function not of the income that is diverted but rather of the amount of taxes evaded (i.e., the product of income diverted and the tax rate). This functional relation could arise because the level of enforcement depends upon the lost tax revenues or because the financial penalties imposed on insiders are proportional to the taxes evaded. In the Appendix, we repeat our analysis with this alternative enforcement function. Our main results (that the introduction of a tax system can lower diversion, that diversion rises with the tax rate and declines with enforcement, and that the relation between tax rates and revenues can be hump-shaped) continue to hold for a range of parameter values, and most notably when the exogenous parameter for tax enforcement is not too high. This finding implies that our model's results are more likely to apply to developing countries, where, ceteris paribus, tax enforcement is weaker.

## 3.     *Political economy considerations*

Thus far, we have only analyzed the effect of a pervasive institution (corporate taxation) on corporate governance and the potential feedback effect that corporate governance can have on the functioning of the corporate taxation system. These institutions, however, are not exogenously given, but —  as a growing literature is showing — are likely the result of a political economy game, which itself is shaped by some rules or initial conditions. As mentioned earlier, Pagano and Volpin (2005) provide one illustration, showing how the type of the electoral system (majoritarian vs. proportional) affects the nature of the prevailing political coalition

(among workers, managers, and shareholders) and thus the quality of investor protection. Perotti and Von Thadden (2006) take the distribution of wealth in society as a given and derive endogenously the degree of investor protection. And Acemoglu (2003) endogenizes taxes and entry barriers as a function of the political regime, either more democratic or oligarchic.

The ultimate goal is to understand the relation between governance outcomes, more easily altered institutions such as the tax system, and slower-moving institutions such as features of the political system. We regard our work as a necessary first step to integrating corporate taxation and corporate governance into a political economy analysis. While a full integration is beyond the scope of this paper, we have considered some simple extensions of the model that explore how our results can be affected by endogenizing the choice of tax rates and enforcement.

The simplest (or most naïve) extension has a benevolent social planner maximizing a weighted average of tax revenues and corporate governance. In this setting, we show that tax rates and enforcement are positively correlated, because a high level of enforcement reduces the corporate governance cost of higher tax rates and thus induces the social planner to work more on that margin (see Desai, Dyck, and Zingales, 2005, Section 3.3).

In such an important issue as corporate tax policy, however, the government is unlikely to behave as a benevolent central planner, particularly in countries with weak democratic institutions and highly concentrated wealth, as emphasized in the emerging literature on political determinants of financial structures discussed above. Once we consider a more realistic setting, several scenarios are possible.

One possibility is that politicians design tax policy to maximize the bribes they can extract (see De Soto, 1989; and Shleifer and Vishny, 1993). If this is the case, the strategy that maximizes the rents to bureaucrats is to set very high tax rates and very discretionary levels of enforcement. Hence, in this case we should observe a negative correlation between tax rates and enforcement.

Another possibility is that corporate interests will weigh heavily in executive decision-making (Morck, Wolfenzon and Yeung, 2005; Pagano and Volpin, 2005; Rajan and Zingales, 2003). For a given level of fiscal pressure, insiders are better off with higher tax rates and lower enforcement, because both of these conditions will lead to higher diversion and hence higher

private benefits (see section Desai, Dyck, and Zingales, 2005, Section 3.3). Hence, to the extent corporate insiders control the political agenda, they will advocate for lower enforcement and they will be more willing to settle for higher taxes. Under this possibility, a political economy view again suggests a negative correlation between tax rates and enforcement.

The existence of a political economy link, however defined, does not weaken the model's implications that changing tax rates and/or tax enforcement can improve governance. This perspective does, however, raise concerns that our empirical tests might face two related problems. First, what insures that the institution that we are taking as exogenous (the taxation system) is not the effect (rather than the cause) of poor corporate governance? Second, what insures that another omitted variable is not the cause of both the governance environment and the tax system? To resolve these problems, La Porta et al. (1998) use legal origin as an instrument for the quality of the law. Since we cannot use the same strategy (we are unaware of strong a priori reasons why different legal systems lead to different approaches to corporate taxation), we attack the two problems separately in our cross-country analysis. We control for omitted factors by inserting country fixed effects and we deal with the potential endogeneity by instrumenting for changes in the tax rates with changes in the ideology of the party in power.

## *4.*     *Tests — corporate governance implications*

Testing the corporate governance implications of the model is not straightforward. The prediction that is easiest to test (i.e., that an increase in tax rates reduces stock prices) is not unique as the same implication also follows from a traditional view of taxes. By contrast, the predictions that are unique to this approach (the effect of enforcement on stock prices and control premia) require us to measure variables that are difficult to quantify (tax enforcement) or even to observe in a systematic way (control premia).  Dyck and Zingales (2004) exploit cross-country variation in tax enforcement and control premia to show that — consistent with Corollary 4 — higher levels of tax enforcement lead to lower control premia, even controlling for national differences in legal protections for investors.

In this context, however, we want to provide more disaggregated, within-country evidence. For this reason, we focus on Russia, a country where both tax avoidance and managerial diversion are extreme. The substantial increase in tax enforcement following Putin's

election in 2000, which occurred without an immediate change in tax rates, provides a natural setting to test these predictions.

## 4.1.    A case study

To understand how tax evasion and diversion can interact, we begin with a case study of Sibneft, the fifth largest Russian integrated oil company and one of the first to be indicted for tax evasion.

Under President Yeltsin, high tax rates and low levels of tax enforcement encouraged Russian firms to shelter income aggressively.  In the oil industry, taxes included not only the traditional value-added and corporate profit taxes, but also excise taxes, export duties, and specific geology and royalty taxes on net income assessed at production subsidiary level. These multiple taxes meant that tax obligations could exceed profits.  Company executives were not shy about how this tax burden affected their behavior. As Yukos Oil CEO Khodorkovsky argued, "As long as the tax regime is unjust, I will try to find a way around it" (S. Pirani, "Oligarch? No, I'm just an oil magnate," *Observer*, June 4, 2000).

A popular scheme to evade taxes and expropriate minority shareholders was to sell oil at below-market prices to outside trading companies. To get a sense of the magnitude of the manipulation in transfer pricing, analyst reports indicate that Sibneft's production subsidiary was selling oil at just $2.20/ barrel, considerably below the average export price (net of export costs and excise taxes) of $13.50, and also well below the average domestic price (net of taxes) of $7.20/ barrel ("Oil Production Subsidiaries," *Troika Dialog Research Report*, February 2000). Unsurprisingly, company financial reports revealed an effective corporate tax rate of just 2.6%, far below the statutory rate of 30%. Sibneft acknowledges in public filings, for example, that for "tax and cash flow optimization purposes, the Company uses third party intermediaries in its refining and distribution process" (Sibneft Bond Offering Prospectus, March 1, 2002, p. F-8).[3]

The use of "third party intermediaries" to shelter income also provided controlling shareholders with sizable opportunities for self-enrichment at the expense of outside shareholders.  To shelter income from tax authorities, most if not all the profits have to be shifted

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[3] "These arrangements have primarily comprised of using certain trading companies in certain Russian regions and, taken together, have reduced the amount of taxable income Sibneft reports," (Sibneft Bond Offering Prospectus, December 3, 2002, pp. 16-17).

to an intermediary located in an offshore or onshore tax haven. In the case of Sibneft, prior to 1998, the primary company was Runicom SA registered in the tax haven of Switzerland, and in 1999 and 2000, it was Runicom Ltd, registered in the tax haven of Gibraltar. Runicom accounted for the vast majority of Sibneft's foreign sales through 2000 and for a significant fraction of total sales (38% in 1999 and 40% in 2000). Shifting profits to Runicom benefits Runicom shareholders at the expense of the shareholders of Sibneft and its separately listed production and refining subsidiaries. Since the controlling management of Sibneft can choose the intermediary to trade with, there are obvious opportunities for taking advantage of the situation and channel the profits toward a company the managers personally owns. This opportunity is enhanced by the opacity in the ownership structure of Russian companies. In this particular case, Runicom was a significant Sibneft shareholder[4], but not vice versa, as would have made sense if the goal was to equitably share the benefits of tax sheltering.

The 2000 election of Putin brought a sudden regime change. One important dimension of this change is an increase in tax enforcement with no change (at least for the first two years) in tax rates. Putin signaled his intentions to crack down on tax evasion by releasing a memorandum with a list of the worst corporate tax offenders (July 28, 2000) where Sibneft was singled out as paying the lowest tax rate in the oil industry. While some of these crackdowns later appeared to be politically motivated (as with the imprisonment of Khodorkovsky), initially they seemed designed exclusively to raise tax revenues that the government desperately needed. Since it is always difficult to identify an effect purely from the time series, to identify the effect of enforcement we focus on the cross-sectional variation.

The following month (August 2000), the tax police raided the offices of Sibneft and its export trading arm, leading to criminal charges against the company. In November, the tax police announced proposals aimed at closing channels for tax avoidance by oil companies, including a threat to reduce oil company revenues by auctioning space on government-owned pipelines (rather than allocating them at a price that covered costs). Finally, on January 25, 2001, Putin met with the oligarchs to discuss ending tax avoidance schemes and the passage of new tax laws designed to shut off such schemes. Sibneft remained a target of government action, with the

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[4] Runicom bought a 12.22% stake in Sibneft in 1996, and held 27% of Sibneft's shares at the end of 2000, (A. Higgins,"EBRD Slams Russian Courts In Loan Dispute With Oil Firm — Lender Says Case Will Test Putin's Pledge to Strengthen Legal System --- The Rule of Law vs. the Rule of `Oligarchs',"*Wall Street Journal Europe*, 11 February 2000, p. 2).

filing of additional criminal and civil actions in the spring and summer of 2001. (We focus on these enforcement actions, which appeared to be targeted at increasing government revenue, rather than some other events involving tax police that commentary at the time suggested was more politically than economically motivated).

Not surprisingly, this increase in enforcement targeted at the oil industry in general, and Sibneft in particular, coincided with a dramatic increase in tax payments by Sibneft. Production-based taxes increased tenfold and the reported effective corporate tax rate for Sibneft as a whole jumped from 2.6% to 10.4%. More interestingly, following the pressure from government officials, Sibneft announced that it would no longer be trading with Runicom but would trade with a newly created subsidiary, SibOil, whose results would be reported in the holdings consolidated income statements. Lukoil, Tyumen Oil Co, and Yukos made similar announcements of plans to increase transparency by shifting exports away from trading companies controlled by controlling shareholders (see, e.g.,"Umbrella – Yukos Blends Offshore Trading Arms into One," *NEFTE Compass*, December 21, 2000). Furthermore, in July 2001 Sibneft announced that it would acquire two previously undisclosed intermediaries located in Russian domestic tax havens, Vester and Olivesta, that reported profits of $300 million in 2000, for a mere $1,800 in Sibneft stock ("CorporateGovernance Actions," Troika Dialog, *Weekly Bulletin #113*, July 13, 2001, p. 6). Shortly thereafter, Sibneft announced the closing of yet more subsidiaries and a commitment to market oil through fully owned subsidiaries not located in these tax havens.[5]

Most importantly — from our point of view — these enforcement actions coincided with an improved return for outside shareholders. Reported company income soared and, for the first time, Sibneft paid dividends: $53 million in November 2000 and close to $1 billion in 2001, an amount equal to 67% of the total market capitalization of Sibneft before the increase in enforcement. Consequently, Sibneft's share price rose well in excess of industry trends. Although such returns cannot be interpreted as causal, since many other factors could be driving returns aside from changes in tax policy, they do suggest that tax changes have not lowered returns for minority investors.

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[5] For example, Sibneft later purchased Terra in a deal reported to have roughly the same effect of increasing reported income by $300 million ("Terra Firma – Sibneft Brings its Profits Back Home," *NEFTE Compass*, October 11, 2001).

By narrowing the time period, and focusing specifically on a few notable tax enforcement events, we can control for some of these other factors. Table 1 reports Sibneft excess returns in the days surrounding the most crucial enforcement events. In all cases but one, Sibneft stock outperformed the Russian market index and, in spite of the very high volatility of Russian excess returns, in a few instances these excess returns are more than two standard deviations away from zero. The more astute local observers were quick to draw a causal link between increased tax enforcement and greater shareholder returns. As the *Financial Times* reported, companies like Sibneft "have begun closing offshore subsidiaries and consolidating their operations within Russia. To comply with the law, they have to declare higher profits and pay higher taxes. They must also show the true extent of their financial operations to outside shareholders, who are just as keen to have a share of the proceeds as the tax inspector" (A. Jack, *Financial Times*, September 17, 2001).

*4.2.    Cross- industry test*

Given the many changes taking place in Russia during this time, the above evidence alone is unconvincing. To attempt to separate out the effect of tax enforcement changes from other changes, we look at differences in tax enforcement across industries and across companies in the most targeted industry — the oil and gas sector.

As Fig. 1 shows, in the 18 months surrounding this regime change the oil and gas industry, which bore the brunt of the enforcement, witnesses a dramatic increase in stock prices. Over such a long window, however, there are too many possible factors driving the changes. For this reason, we focus on voting premia. The price differential between voting and nonvoting shares is related to the value of control through the probability that a vote will be pivotal (see Zingales, 1994, 1995). If this probability, which is a function of the existing ownership structure, remains relatively constant over time, changes in the voting premia are a good estimate of the changes in the value of control.[6]   Hence, Corollary 4 implies that, during this period, voting premia should drop more in the oil and gas industry than in the other industries. The advantage

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[6] Goetzmann et al. (2002) claim that in Russia this voting premium is too high to be justifiable solely on the value of control. They attribute it more broadly to the risk that nonvoting stock could be discriminated against in future corporate transactions (a corporate governance discount). Even if we accept this interpretation, changes in the voting premium over short time periods are a pretty reliable indicator of changes in the degree to which majority shareholders take advantage of their position at the expense of outside ones.

of this test is that it perfectly controls for any variation in the fundamental value of these companies.

To conduct this test, we collect from the Datastream sample of Russian securities a sample of all the companies that have two classes of stocks with differential voting rights (124 firms). To obtain meaningful voting premia, we restrict our attention to companies with some trading in both classes in event windows prior to and following what we view to be the most important indicators of increased tax enforcement (59 firms).

Consistent with Corollary 4, Panel A of Table 2 shows a decline in the voting premium during the period of increased tax enforcement, from 57% to 46%. The composition of the sample, however, changes. Thus, a more appropriate comparison, limited to companies that were traded at both the beginning and the end of the sample period, is provided in Panel B, Column 1. It shows an average decline in the voting premium of 7.8 percentage points, which is significant at the 5% level.

Why did it decline? If, as we think, this decline is associated with increased tax enforcement, then it should be more pronounced for the companies most affected by this enforcement. Since Putin initially focused on the extractive industries (because this is where the money is), we examine how much of this decline is concentrated in these industries. As Panel B shows, the decline (13.7%) is entirely concentrated in these extractive industries. The mean decline for the other companies (2.6%) is not statistically different from zero. This decline, therefore, cannot be explained by a general improvement in the Russian corporate governance situation, which would have affected all companies similarly. Only something that differentially affected extractive industries, such as tax enforcement, could have caused it.

An alternative explanation is that the decline of the control premia is due to Putin's hostility toward foreign acquisitions of natural resource industries. This would have caused a reduction of the control premium mostly focused in (if not restricted to) the oil and gas industry. While we cannot completely rule out such an alternative explanation, it is inconsistent with the overall rise of non-voting Russian oil stocks relative to the World Oil Index (as documented in Fig. 1), nor does it square with the within-industry test provided below.

*4.3.    Within-industry comparisons*

Our model predicts that the impact of an increase in enforcement will not be the same for all companies.  Specifically, those companies that were avoiding taxes more aggressively should be affected more. In general, it is very difficult to get a reliable indicator of tax avoidance, but in the oil industry such an indicator exists: revenue per barrel of oil. Since a barrel of oil has a world price, lower revenues per barrel indicate more tax avoidance.  Desai, Dyck, and Zingales (2005, Table 3) present evidence on the enormous variation in revenue per barrel of oil, as reported by investment analysts based on filings of firms during 1999.  Komineft, a subsidiary of KomiTEK, sold its oil at an average price of $7.60 a barrel, while Tomskneft (a subsidiary of Yukos) at only $1.10 a barrel!  These reports of aggressive tax avoidance correlate strongly with government evaluations of levels of tax avoidance across the integrated oil companies in Russia.

If Corollaries 3 and 4 are correct, companies that were selling their oil at lower prices (i.e., engaging in massive diversion) should experience a greater price appreciation and greater reduction in voting premia during this period of increased tax enforcement. Unfortunately, the intersection of companies for which oil pricing data are available, those with dual class stocks, and those for which we have data is an almost empty set. Thus, we cannot really test the value-of-control implications. But we can do some mini-event studies around the four major enforcement actions that took place between July 2000 and January 2001.  Again, we are focusing on those enforcement actions targeted at the industry as a whole, rather than more recent enforcement actions targeted at specific companies such as Yukos, where political factors are important in singling out firms for action. For announcement returns, we use excess returns (defined as the cumulative excess return) over a ten-day window (t-1 to t+9) surrounding the announced enforcement action. The sample is based on all integrated Russian oil companies with traded stock over these intervals that also have measures of tax avoidance.  While this results in relatively few observations, these companies account for the majority of all oil production in Russia. In our excess return calculations, we use the RTS index (the ruble index when the security is quoted in rubles and the dollar index when the share price quoted in dollars). The announcement returns over the four events are regressed on the average selling price per barrel of oil, which is our indicator of tax avoidance. As Table 3 shows, companies that were avoiding taxes the most (and hence had lower revenues per barrel) experience the higher market returns around the announcement of higher tax enforcement. Results

are stronger if we restrict ourselves solely to the sample with the average 1999 selling price, but this reduces our sample to just nine observations.

These results, although limited by the underlying availability of data, are consistent with the predicted importance of the corporate governance dimension of taxes. Private benefits of control, as measured using dual class voting shares, not only decline when tax enforcement increases but they decline by a greater amount in extractive industries relative to other Russian industries. Similarly, the oil companies that were more aggressive in avoiding taxes experience greater returns when tax enforcement increases.

## 5.    *Tests — corporate tax implications*

The corporate governance dimension of taxes emphasized in this paper indicates that the responsiveness of tax revenues to changes in the corporate tax rate should be a function of the corporate governance environment. In this section, we test this prediction using a panel data set and attempt to control for various alternative institutional factors and political dynamics that might conflate our results.

### 5.1.    *Empirical approach*

We construct a panel data set that combines information on corporate tax revenues, top corporate marginal rates, ownership concentration, and a measure of corporate governance.  For corporate tax rate information, we utilize the data recently assembled by the Office of Tax Policy Research (OTPR) at the University of Michigan.[7]  From the International Monetary Fund (IMF), we obtain data on corporate tax revenues, total tax revenues (available from the *Government Finance Statistics* yearbook), and nominal GDP (from the *International Finance Statistics* yearbook*)*.[8]  The data on tax rates are available for a large cross-section of countries only after 1979.  Thus, our sample starts in 1979 and ends in 1997, the last year for which this information

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[7] These data are available at www.otpr.org.
[8] Specifically, data on corporate tax revenues are provided as variable g8h1aa in the GFS database and total tax revenues as variable g8h1y in the GFS database.  Several countries that have variables from the Dyck and Zingales (2004) and La Porta et al. (1998) databases do not provide corporate tax revenues collection statistics, further narrowing the relevant sample.  These countries include Chile, Hong Kong, Mexico, New Zealand, Nigeria, Philippines, Singapore, Taiwan, and Venezuela.  For countries with data on tax rates but no data on corporate tax revenues, we conduct additional data searches of country sources (including the finance ministry, tax authorities, IMF Article IV statistical appendices, and other sources) and obtain additional data for Hong Kong and Taiwan. The electronic version of the GFS variables available at time of writing was not yet updated past 1997.

is available. From the original set of countries in our sample, we exclude major oil-producing countries given the distinctive dynamics of corporate tax revenues in these settings.[9]

The primary specification is as follows:

$$Log\left(Corporate\ Tax\ Revenues_{it}\right) = \alpha_i + \beta_i\left(Log\ GDP_{it}\right) + \eta\tau_{it} + \varepsilon_{it}$$

where $i$ indexes countries, $t$ is a time subscript, and $\tau$ is the top marginal corporate tax rate; $\eta$ provides the average slope of the corporate tax revenues curve and $\alpha_i$ are country-fixed effects that should absorb any country-specific institutional characteristic. This specification also includes the log GDP to capture the fact that tax revenues are influenced by corporate profits, which are highly correlated with the business cycle. To allow for differences in the size of the business sector, we let the coefficient of log GDP differ across countries. In the empirical tests reported below, standard errors are clustered at the country level.

To study the effect of corporate governance on the relation between tax rates and revenues, we interact the corporate tax rate with a measure of corporate governance. For these purposes, we use the Dyck and Zingales (2004) estimates of control premia in different countries. Since this is a measure of how much controlling shareholders appropriate for themselves, it is directly related to $\gamma$ from the model. When we examine ownership concentration we use the average percentage of common shares owned by the three largest shareholders in the ten largest nonfinancial, privately owned, domestic firms as computed by La Porta et al. (1998).

The panel structure of the sample is central to our empirical strategy because within-country variability over time allows us to estimate the slope of the relation between corporate tax revenues and corporate tax rates, and cross-country variation allows us to identify how corporate governance influences the slope of this relation. Since the slope of the curve is estimated using within-country variation, it is important to have a sense of the magnitude and the direction of these variations. Fig. 2 plots the changes in corporate tax rates during our sample period. In this period, most of the changes, but not all, are tax rate reductions. Furthermore, most, if not all, of

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[9] Specifically we exclude OPEC members, affiliated non-members (Oman and Angola) and non-OPEC members among the top 10 oil-exporting countries; this last requirement, which excludes Norway, Mexico, and Russia, actually only eliminates Norway as corporate tax revenues for Mexico and Russia are not in our ownership or private benefit samples.

these reductions have been accompanied by a broadening of the tax base. Unfortunately, in the regressions we will be unable to control for base broadening. Thus, our sample is biased toward finding a negative-sloped curve. Our interest, however, is not in the average slope of this curve, but in how this slope changes with the quality of the corporate governance system. Since the coupling of base broadening and tax rate reductions appears to be widespread and not unique to countries with high ownership concentration or large private benefits, our cross-country results should not be affected by the inability to measure base broadening in a systematic way.[10]

The top section of Table 4 summarizes the data from the entire panel. The average ratio of corporate tax revenues to total tax revenues is 11.8% and the average top marginal rate over the sample is 36.4%. The governance variables vary considerably by country: the measure of private benefits averages 12.4% with a standard deviation of 14.6%. The bottom section summarizes the data collapsed by country. As a measure of tax enforcement we use an index from 0 to 6 developed by the World Competitiveness Report, which assesses the level of tax compliance. As a measure of the level of investor protection on the books we use the anti-directors' rights index developed by La Porta et al. (1998), which is an index varying from 0 to 6. As a measure of corruption, we use an index developed by Kaufman et al. (2005) which ranges from -2.5 to +2.5, with higher values corresponding to better governance outcomes based on enterprise, citizen, and expert survey respondents in industrial and developing countries.

As a proxy for political accountability we use the average democracy score for the period 1976-95 from Polity IV. This index measures the general openness of political institutions and ranges between 0 and 10, with a greater number indicating greater democracy. In addition to the raw data, we also report country-specific curve slopes. As described below, these slopes have been obtained by regressing the logarithm of corporate tax revenues on the logarithm of the GDP and the level of the corporate tax rate.

*5.2.    Results*

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[10] For surveys of the nature of tax reform during this period, see Cummins, Hassett, and Hubbard (1996) for the OECD and Thirsk (1997) for developing countries. There is no evidence, from such sources, that the likelihood of base broadenings being coupled with tax rate changes is correlated with income or ownerships concentration or corporate governance. In fact, from a political economy point of view, we believe the link is more likely to bias against finding results consistent with the corporate governance dimension of taxes. In countries with higher ownership concentration, owners should be more effective in lobbying against a base broadening that accompanies a tax rate reduction.

Column 1 of Table 5, Panel A reports results for a basic specification in which the effects of the corporate governance environment are not considered. In this specification, the coefficient on the tax rate can be interpreted as the effect of tax rates on revenues in the absence of any private benefits of control. On average, a tax increase raises corporate tax revenues but by a minimal amount: a ten percentage point increase in the tax rates (from 15% to 25%, for example) increases corporate tax revenues by 1%. The average effect, however, is not statistically different from zero. As discussed above, this average effect is likely to be downward biased, because in this period most of the changes have been tax reductions associated with base broadening.

Since Corollary 5 predicts a positive correlation between the sensitivity of tax revenues to changes in the tax rate and quality of corporate governance, we expect the coefficient of the interaction between tax rates and the measure of private benefits to be negative (because higher private benefits are an indicator of worse corporate governance). As expected, the interaction term is negative and statistically significant, i.e., countries with worse corporate governance have a lower sensitivity of tax revenues to tax increases. The threshold level of the control premium for a revenue-neutral relation between corporate tax rates and corporate tax revenues is approximately 20%. Stated differently, corporate tax rate increases in countries where the private benefits of control are above 20% generate a sufficient behavioral response to negate, and overcome, any additional revenue generated by the higher rate.

Since the model best suits countries with concentrated insiders' ownership, we investigate the robustness of our results to dropping countries with low ownership concentration. In one unreported regression we drop the United States and the United Kingdom. The interaction coefficient goes up and remains significant at the same level. To be more objective, we repeat the exercise dropping all the countries where the La Porta et al. (1998) measure of ownership concentration is below 0.25 (U.S., U.K., Japan, Korea, and Taiwan). The results are similar.

To test further the robustness of this result, in Columns 2 through 5 we split the sample by the measure of governance. In Columns 2 and 3, we divide the sample on the basis of the median level of the control premium and in Columns 4 and 5 we divide the sample based on a control premium of 10%, to highlight the differences in countries with more extreme governance difficulties. In countries where the control premium is below the median, the coefficient of the tax rate is positive as predicted by the model, while in countries where the control premium is

above the median, the coefficient on the tax rate is less and in fact negative.  This effect is more pronounced the more severe are the governance difficulties, as seen by comparing Columns 3 and 5.

One potential concern regards our dependent variable. By letting the data dictate the relation between tax revenues and GDP, the basic specification adopts the most flexible form. Nevertheless, in Columns 6 and 7 we reestimate it by using alternative normalizations. In Column 6 we use the ratio of corporate tax revenues to GDP, and in Column 7 we use the ratio of corporate tax revenues to total tax revenues.  These alternative specifications produce qualitatively similar results.

As discussed above, it is possible that the coefficient on the interaction between corporate governance and tax rates might reflect other attributes of the institutional environment that would dictate the responsiveness of tax revenues to rate changes.  In a country where there is no enforcement of taxes, for instance, changes in the tax rates might have very little effect on tax revenues, reducing the slope of the tax revenue curve.  If countries with low tax enforcement are also countries with worse corporate governance — a possibility we highlighted above in Section 3 — the results might reflect this spurious effect.

To check this possibility, in Column 1 of Table 5b, Panel B, we insert in our basic specification the interaction between the tax rate and our time invariant measure of tax compliance.  Controlling for cross-country differences in tax enforcement in this way does not eliminate the impact of governance differences on the sensitivity of tax revenues to tax increases. The coefficient on the interaction between governance and tax rates remains virtually unaltered and the standard error in fact declines.

Another possibility is that weak corporate governance might be capturing the effect of weak legal institutions. Perotti and Volpin (2005), for example, argue that in weak democracies incumbents are more successful in weakening investor protection, preventing the development of efficient capital markets. To check for this possibility we insert in our basic specification the interaction between the tax rate and the measure of democracy strength used in Perotti and Volpin (2005). Column 2 of Table 5, Panel B, shows, this additional interaction term has a positive coefficient, which is marginally statistically significant at the 10% level. Stronger

democracies thus raise more taxes when they raise the tax rates. Our coefficient of interest, however, remains substantially unchanged, both in levels and in statistical significance.

There are other possible measures of the quality of institutions. One is the degree of corruption. In Column 3, we insert an interaction between the tax rate and the World Bank's indicator of corruption. Our main result remains statistically significant, with a slightly lower coefficient (4.0). Another measure is the quality of investor protection on the books. In Column 4 we insert an interaction between the tax rate and the La Porta et al. (1998) index of shareholder protections. Including this control increases the point estimate (9.04) and leaves the statistical significance unchanged. Finally, in Column 5 we incorporate an interaction with log GNP per capita as the broadest measure of institutional weakness. Again, the result on the interaction of corporate governance and tax rates remains highly significant, (in an unreported regression, we also check whether countries with a stronger tradition of law and order have a more sloped curve; this effect is not statistically significant, while the effect of corporate governance remains statistically significant).

We also explore alternative specifications (not reported) that attempt to capture the secular decline in corporate tax rates over the last couple of decades. We first introduce year dummies, and then examine country-specific time trends. In both cases, our main results remain statistically significant and quantitatively similar, with the coefficient on governance having values of 4.83 and 5.40, respectively (results omitted for brevity, but available from the authors upon request).

The political economy link between tax rates and enforcement discussed in Section 3 raises several complications for our analysis. The major problem is that since we do not have any measure of changes in enforcement, we might incorrectly attribute changes in tax enforcement or, even more problematically, changes in the underlying political economy equilibrium to changes in the tax rate.[11] Fortunately, the political economy link between tax rates and enforcement is likely to be strongest in the cross-section, since both are the outcomes of some unobservable country characteristics that determine the political equilibrium. But all these

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[11] We attempted to construct a time series of enforcement levels for our panel of countries, but the source used for the tax avoidance levels lacks similar data for earlier periods of time and there was no other source with comparable enforcement data for the sample period

institutional features are absorbed by the country-fixed effects. Hence, our estimates, which exploit only the time-series variation, are less subject to this problem.

Nonetheless, one could argue that time-series changes in tax rates might be due to underlying shocks in the political system, which could affect both rates and enforcement. To address this problem we use the ideology of the party in power as an instrument. It is reasonable to expect that, for ideological reasons, left-wing parties will tend towards both higher tax rates and higher enforcement, while right-wing parties will tend towards lower tax rates and lower enforcement. By using the ideology of the party in power as an instrument we achieve two goals. First, we can sign the direction of the bias. If changes in tax rates driven by changes in the ideology of the party in power are accompanied by changes in enforcement, they are accompanied by changes in enforcement in the same direction. Since in our model an increase in enforcement has the opposite effect on governance than an increase in tax rates, our failure to measure changes in enforcement will bias our results downward. So our IV estimate underestimates the true effect of taxes on tax revenues. Second, by using an instrument we address other possible endogeneity concerns.

The Database of Political Institutions (Beck et al., 2001) classifies the ideological orientation of a country's chief executive into four categories: left, right, center, and other. In our sample we have 32% of country-years with left-wing chief executives, 43% of country-years with right-wing chief executives, and 25% of country-years with other types of executives. As instruments for the tax rate we use two dummies: a dummy for left-wing chief executives and a dummy for right-wing chief executives. The F-test of the joint significance of the coefficients is significant at the 1% level. Column 5 of Table 5, Panel B, reports the results of this instrumental variable regression. Our main result does not change: the interaction of private benefits with tax rates comes in negative and highly significant.

Finally, the predictions on the effects of ownership on the tax revenue sensitivity to tax rate changes are more nuanced (Corollary 6). The sign of the coefficient depends upon the level of the tax rate. Furthermore, at an aggregate level, ownership concentration (defined as in LaPorta, et al., 1998) is highly correlated with private benefits, so when we put both in the regression (not reported) it is impossible to distinguish the effect of one from the effect of the other.

The preceding analysis constrains the tax revenue curve to be identical across all the countries (with the exception of the effect of corporate governance). In order to confirm the strength of our findings, we have also estimated country-specific slopes by employing the same specification country-by-country. Such a procedure, of course, comes at considerable cost since we estimate many more parameters with the same number of observations. In an unreported analysis (see Desai, Dyck, and Zingales, 2005 Table 7) we examine the relation between country-specific tax revenue slopes and governance levels, weighting each observation by the precision of each estimate (the inverse of the variance of the estimated slope). As predicted by the model, the value of control premia is negatively related to the sensitivity of tax revenues to tax rates and this finding is robust to the inclusion of ownership concentration as another variable.

## 6. Conclusion

This paper begins with the simple observation that tax authorities and outside shareholders have a common goal: reducing managerial diversion. By focusing on this natural alignment of interests, we provide a new way of looking at corporate taxation. This approach delivers two main insights and corroborating empirical evidence.

First, the characteristics of the corporate tax system affect the amount of diversion that takes place in a country and the valuation of firms: higher tax rates worsen corporate governance, while a strong enforcement of tax claims can strengthen it. We provide evidence consistent with these predictions: increased tax enforcement in Russia enhanced the value of targeted companies and reduced their control premia. As predicted by the model, the magnitude of these changes in value and control premia is a function of prior levels of diversion.

Second, as corporate taxation influences corporate governance, the quality of corporate governance plays an important role in determining the sensitivity of tax revenue to tax rate changes. Consistent with this prediction, we find that the relation between tax rates and revenues depends upon the underlying governance environment with a greater responsiveness to rate changes in good governance environments, and a lower (in fact, negative) relation in bad governance countries. This result is robust to various controls for the quality of the institutional

environment (tax enforcement, strength of democratic institutions, etc.) and to instrumenting the changes in the tax rates with the ideology of the party in power.

Our approach can also be used to provide a new rationale for the very existence of a separate tax rate on corporate income. Since minority shareholders face a free rider problem in monitoring, the corporate tax can be seen as a payment for certification services provided by the tax authorities. While this rationale might seem odd today, when there are a lot of alternative mechanisms to achieve this goal, it was not odd in 1909 when corporate taxation was first introduced in the United States. In fact, President William H. Taft supported its introduction by saying:

> *Another merit of this tax [the federal corporate excise tax] is the federal supervision which must be exercised in order to make the law effective over the annual accounts and business transactions of all corporations. While the faculty of assuming a corporate form has been of the utmost utility in the business world, it is also true that substantially all of the abuses and all of the evils which have aroused the public to the necessity of reform were made possible by the use of this very faculty. If now, by a perfectly legitimate and effective system of taxation, we are incidentally able to possess the Government and the stockholders and the public of the knowledge of the real business transactions and the gains and profits of every corporation in the country, we have made a long step toward that supervisory control of corporations which may prevent a further abuse of power*
> ("Defense of introduction of the first U.S. federal corporate excise tax," June 16, 1909).

Indeed, the introduction of this tax increased the publicly available information on corporate profitability (at the time, corporate tax filings were public records) and, since tax returns were audited, increased the reliability of all the information provided. In addition, the tax generated a need for a standard definition of income and other accounting variables, prompting the development of uniform accounting standards introduced in 1917: "The introduction of corporate income taxes not only spurred businessmen to keep better accounting records and take a more active interest in financial accounting, but also led directly to the adoption of certain valuation practices for corporate accounting. For instance, the acceptance of the 'last in first out' method of valuing inventory for tax purposes resulted directly in its widespread adoption in industrial financial reports" (D. Hawkins, 1963, p. 153). All of this took place against the backdrop of an absence of national securities regulation and weak and unreliable enforcement of listing standards in the nation's stock exchanges.

This certification role of corporate taxes has not necessarily disappeared with the development of other mechanisms to monitor corporate insiders, as shown by the fact that managers continue to be willing to pay taxes on false earnings in order to reduce the probability of being monitored by the IRS (Erickson, Hanlon, and Maydew, 2004).

**Appendix**

In this appendix we analyze the robustness of our main results to the specification of the tax enforcement function. In the public finance literature on personal tax avoidance, a common alternative specification specifies a probability of detection and assumes that the financial penalty if detected is proportional to the avoided taxes (This setup does not translate directly to our setting as our enforcement function is a reduced form that integrates the probability of detection and penalties associated with detection). This leads to the adoption of functional forms where the expected cost of tax avoidance is an increasing function of the taxes that are avoided ($td$) rather than the income that is diverted ($d$). In this specification, when there is no tax there is no enforcement, and the extent of enforcement is an increasing function of the tax rate. While these features are appealing for low tax rates, they become unrealistic for very high tax rates, when the political support for enforcement breaks down and the probability of enforcement (and with it the expected cost) might decrease (but certainly not increase) with the tax rate.

Nevertheless, in this appendix we show that if we adopt this alternative formulation, our main results continue to hold for a wide range of parameter values. For expositional ease, we often present sufficient conditions, as necessary conditions are more difficult to specify. Our results are weakened only at very high tax rates and/or when enforcement is very strong.

In this alternative view the costs increase with the extent of avoided taxes:

$$C_2(d) = \frac{\alpha t^2 d^2}{2}.$$

The total payoff to insiders, then, becomes

$$\lambda(1-d)(1-t) + d - \frac{\alpha t^2 + \gamma}{2} d^2,$$

And the optimal amount of diversion

(2')  $$d^{**} = \min(\frac{1 - \lambda(1-t)}{\alpha t^2 + \gamma}, 1).$$

Result 1 becomes:

*Result 1':* In countries with a low level of enforcement, a higher tax rate will cause higher levels of diversion.  This effect is stronger where tax enforcement is weaker.

*Proof:* $\dfrac{\partial d}{\partial t} = \dfrac{\gamma\lambda - \alpha(\lambda t^2 + 2t(1-\lambda))}{\alpha + \gamma} > 0$ if $\alpha < \dfrac{\gamma\lambda}{2-\lambda}$.

$$\frac{\partial^2 d}{\partial t \partial \alpha} = \frac{-(\lambda t^2 + 2t(1-\lambda))(\alpha t^2 + \gamma)^2 - [\gamma\lambda - \alpha(\lambda t^2 + 2t(1-\lambda))](2\alpha t^4 + 2\gamma t^2)}{(\alpha t^2 + \gamma)^4} < 0 \text{ if } \alpha < \frac{\gamma\lambda}{2-\lambda}.$$

*Result 2':* The market value of a company increases with tax enforcement.  The market value of a company decreases with the tax rate if $t < \dfrac{-\alpha(1-\lambda) + \sqrt{\alpha^2(1-\lambda)^2 + \alpha\lambda^2\gamma}}{\alpha\lambda}$.

*Proof:* The market value is driven by the value minority shareholders can capture, which in turn is given by $V^m = (1-d)(1-t)$.  Since $\dfrac{\partial V^m}{\partial d^{**}} < 0$ and $\dfrac{\partial d^{**}}{\partial \alpha} = -\dfrac{1-\lambda(1-t)}{(\alpha t^2 + \gamma)^2} t^2 < 0$, then $\dfrac{dV^m}{d\alpha} > 0$.

Since $\dfrac{\partial V^m}{\partial t} < 0$ and $\dfrac{\partial V^m}{\partial d} < 0$, $\dfrac{\partial d^{**}}{\partial t} = \dfrac{\lambda(\alpha t^2 + \gamma) - 2\alpha t(1-\lambda(1-t))}{(\alpha t^2 + \gamma)^2} > 0$ if

$0 < t < \dfrac{-\alpha(1-\lambda) + \sqrt{\alpha^2(1-\lambda)^2 + \alpha\lambda^2\gamma}}{\alpha\lambda}$.  It then follows that a sufficient condition for $\dfrac{dV^m}{dt} < 0$ is

that $0 < t < \dfrac{-\alpha(1-\lambda) + \sqrt{\alpha^2(1-\lambda)^2 + \alpha\lambda^2\gamma}}{\alpha\lambda}$.

*Corollary 3':*   Following an increase in enforcement, companies that were previously diverting more will experience a larger increase in price.

*Proof:*

$$\frac{\frac{dV^m}{d\alpha}}{V^m} = \frac{(1-t)\frac{1-\lambda(1-t)}{(\alpha t^2+\gamma)^2}2t}{(1-t)(1-\frac{1-\lambda(1-t)}{\alpha+\gamma})} > 0.$$

*Corollary 4':* The value of control decreases with tax enforcement.

*Proof:* $\frac{\partial CP}{\partial \alpha} = \frac{(1-\lambda)}{(V^m)^2}[\frac{dV^i}{d\alpha}V^m - V^i\frac{dV^m}{d\alpha}]$. By using the envelope theorem $\frac{dV^i}{d\alpha} = \frac{\partial V^i}{\partial d}\frac{\partial d}{\partial \alpha} = 0$.

Since by Result 2' $\frac{dV^m}{d\alpha} = \frac{\partial V^m}{\partial d}\frac{\partial d}{\partial \alpha} > 0$, the result follows.

*Result 3':* If $\lambda > \max[\gamma-1, 1-\gamma]$ and $\alpha < \frac{1}{2}[-1-2\gamma+\lambda+\sqrt{1+8\gamma-2\lambda+\lambda^2}]$ then corporate tax

revenues as a function of corporate tax rates are hump-shaped. That is, it can be shown that

under these conditions $\frac{\partial CTR}{\partial t}\Big|_{t=0} > 0$ and $\frac{\partial CTR}{\partial t}\Big|_{t=1} < 0$ and therefore, CTR must be a decreasing

function over some interval of $t$ for $0 \le t \le 1$.

*Proof:* Corporate tax revenues, CTR, are given by $t(1-d) = t - t[\frac{1-\lambda(1-t)}{\alpha t^2+\gamma}]$. Differentiating this

with respect to $t$ we obtain $\frac{\partial CTR}{\partial t} = 1 - \frac{1-\lambda(1-t)}{\alpha t^2+\gamma} - t\frac{\lambda(\alpha t^2+\gamma)-(1-\lambda(1-t))}{(\alpha t^2+\gamma)^2}$. Sufficient conditions

to demonstrate that the function is hump-shaped are that this is an increasing function at t=0 and

a decreasing function at t=1.

When t=0, $\frac{\partial CTR}{\partial t}\Big|_{t=0} = \frac{\gamma+\lambda-1}{\gamma} > 0$ because $\lambda+\gamma \ge 1$.

When t=1, $\frac{\partial CTR}{\partial t}\Big|_{t=1} = \frac{\alpha^2+\gamma(\gamma-1-\lambda)+\alpha(1+2\gamma-\lambda)}{(\alpha+\gamma)^2}$. Since the denominator is positive, we

focus on the numerator which is a quadratic function of $\alpha$ with two roots,

$\frac{1}{2}[-1-2\gamma+\lambda\pm\sqrt{1+8\gamma-2\lambda+\lambda^2}]$, so when $\alpha_L<\alpha<\alpha_U\Rightarrow\frac{\partial CTR}{\partial t}\Big|_{t=1}<0$, note that $\alpha_L<0$,

so we just have to check $\alpha_U=\frac{1}{2}[-1-2\gamma+\lambda+\sqrt{1+8\gamma-2\lambda+\lambda^2}]$, and when

$\lambda>\gamma-1\Rightarrow\alpha_U>0$, so there is an interval of $\alpha$ such that $\frac{\partial CTR}{\partial t}\Big|_{t=1}<0$.

*Corollary 5':* The sensitivity of tax revenues to tax rate changes increases with the quality of the corporate governance system $\gamma$ if $t<0.5$.

*Proof:* $\frac{d^2CTR}{dtd\gamma}=1-(1-\lambda(1-t))>0$ if $t<0.5$.

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