

# **The Protecting Hand: Taxation and Corporate Governance**

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First Draft: March 2003

This Draft: April 2003

## **Abstract**

This paper analyzes the previously unexplored relationship between corporate governance and corporate taxation. We show that a higher tax rate increases the level of managerial diversion, while stronger tax enforcement reduces it. We also show that when the corporate governance system is ineffective (i.e., when it is easy to divert income) or when ownership concentration levels are high, an increase in the tax rate can actually reduce tax revenues generating a corporate version of the Laffer-curve. Finally, we show that an increase in tax enforcement can increase (rather than decrease) the stock market value of a company. We test some of the predictions of this model in a panel of countries. Consistent with the model, we find that corporate tax rate changes have smaller (in fact, negative) effects on revenues when ownership is more concentrated and corporate governance is worse. This corporate governance role of corporate taxes provides a new rationale for the existence of a low, well-enforced tax at the corporate level.

\* We thank Kent McNellie, Bill Simpson, and James Zeitler for their valuable research assistance. Desai and Dyck thank the Division of Research at Harvard Business School and Zingales the Center for Research on Security Prices and the George Stigler Center at the University of Chicago for financial support.

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.

- William H. Taft, President of the United States, June 16, 1909<sup>1</sup>  
(*Defense of introduction of the first US federal corporate excise tax*)

The state, thanks to its tax claim on cash flows, is *de facto* the largest minority shareholder in almost all corporations. Yet, its actions are not part of the standard analysis of corporate governance, nor does corporate governance enter the standard analysis of corporate taxation. The aim of this paper is to integrate these two dimensions. In doing so, the paper emphasizes the interaction between the corporate tax system and the amount of income diverted by the controlling shareholder. In order to understand the links between corporate tax avoidance and managerial malfeasance, we start by analyzing the recent events at Tyco, a company where managerial diversion is documented in legal documents. The analysis suggests that active tax management strategies employed by Tyco enhanced the ability of managers to divert funds.

Based on this evidence, we build a simple model of optimal income sheltering, where the income that is sheltered becomes less visible to outsiders and thus more easily appropriable by the controlling shareholder. Income sheltering, however, is costly because managers that are caught avoiding corporate taxes are fined or jailed.<sup>2</sup> Within this simple framework we analyze how the corporate tax system affects the level of tax sheltering and diversion. We show that a higher tax rate increases the level of diversion, while stronger tax enforcement reduces it. The intuition is fairly straight-forward. A higher tax rate increases the return to tax avoidance strategies and hence the amount of sheltered income. Since controlling shareholders can more

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<sup>1</sup> See Kornhauser (1990) for a discussion of the publicity rationales for the initial imposition of a corporate excise tax in the U.S.

<sup>2</sup> Clearly, some degree of income sheltering is legal. In such cases, the cost we have in mind is an effort cost. More aggressive income sheltering, however, is legally dubious and can result in such penalties.

easily appropriate sheltered income, this will also lead to an increase in the amount of private benefits. By contrast, increased levels of tax enforcement reduce the return to sheltering income and, by the same logic, it will reduce the amount of private benefits. Most interestingly, for low levels of statutory tax rates, an increase in the extent of tax enforcement increases the amount minority shareholders will receive (even accounting for the higher amount of taxes paid). Hence, an increase in tax enforcement can increase (rather than decrease) the stock market value of a company.

Much as the structure of taxation affects corporate governance, the paper also demonstrates that corporate governance affects the working of the taxation system. When the corporate governance system is ineffective (i.e., when it is easy to divert income) an increase in the tax rate can actually reduce tax revenues, generating a hump-backed relation between corporate tax rates and corporate tax revenues, i.e., a corporate version of the Laffer-curve. By contrast, when corporate governance is effective such a possibility does not arise. The reason is that when it is easy to divert income, the manager will behave as a residual claimant, accentuating his incentive to shelter income to avoid taxation. This effect exacerbates the reduction in corporate income in response to a rate increase.

Finally, there exists an interaction between ownership concentration, the corporate governance system, and the equilibrium level of tax avoidance. In poor corporate governance environments, a controlling shareholder with little equity ownership will have too strong incentives to shelter income from the tax authorities from the point of view of minority investors, because he can steal more from the sheltered income. By contrast, in a good corporate governance environment, a controlling shareholder with little equity ownership will have too little incentive to shelter income, from the point of view of minority investors, because he takes some personal risk in sheltering income but benefits very little from it. This result explains why on average U.S. corporations exploit tax shelters too little, but their tax sheltering increases with an increase in ownership concentration or an increase in pay-per performance sensitivity.<sup>3</sup>

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<sup>3</sup> The puzzle of undersheltering is posed by Weisbach (2001). Evidence on the link between sheltering and pay-for performance sensitivity is provided by Desai, Dharmapala, Jenter and Park (2003).

We test these relations between the shape of the corporate Laffer curve and corporate governance and ownership in a panel of countries. As predicted by the model, we find that corporate tax rate increases lead to lower tax revenues in countries characterized by weaker corporate governance and higher levels of ownership concentration. In particular, the empirical estimates suggest that in environments with no controlling blocks or strong corporate governance, corporate tax rate increases do lead to corporate tax revenue increases. These tax revenue increases, however, are offset and ultimately outweighed by increased evasion as control premia rise past twenty percent or as ownership levels of the top three shareholders rises past fifty percent.

In a separate paper (Desai, Dyck, and Zingales (2003)) we conduct a clinical study of the valuation implications of our model in an environment (Russia) where both managerial diversion and tax evasion are rampant. We study the effect of an increase in tax enforcement following the election of Vladimir Putin on corporate valuations and on control premia. As predicted by our model, the stock market value of companies targeted by the enforcement actions increases and the voting premium for these stocks decreases in a manner that is consistent with the model. Furthermore, our detailed analysis of Sibneft, one of the worst tax evaders, suggests that the increased tax enforcement leads to substantial organizational changes that make managerial diversion more difficult.

These results, together with the cross-country evidence contained in Dyck and Zingales (2003) that private benefits of control are smaller in countries with better tax enforcement, have several implications. First, they provide a novel justification for the existence of a low, well-enforced corporate tax rate. A separate rate on corporate profits generates an incentive for the Government to verify the income produced, ameliorating the agency problem between insiders and outside shareholders. Not only is this corporate governance view of taxation able to explain why a corporate tax exists, it also explains why it is designed so to make interest payments tax deductible. Since interest payments do not need any additional certification by the government, they have no reason to be subject to this “certification” tax.

Second, our results provide a rationale for the undersheltering puzzle (Weisbach (2001)), i.e., that the typical U.S. company uses too few sheltering opportunities. They also explain

observed variations in sheltering behavior in the United States: sheltering increases with an increase in ownership concentration or an increase in pay-per performance sensitivity (Desai, Dharmapala, Jenter and Park (2003)).

Third, the results in the paper suggest a clear direction for reforms in emerging markets. An increase in tax enforcement provides payoffs to both governments and minority shareholders, as it generates greater revenue and higher minority share values.<sup>4</sup>

Finally, our results suggest that the fiscal effects of any corporate tax reform cannot be assessed without looking at the pre-existing corporate governance situation and prevailing levels of ownership concentration.

The rest of the paper proceeds as follows. Section 2 discusses the Tyco example to illustrate the links between corporate tax avoidance and managerial diversion. Section 3 presents a model of the relationship 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 4 tests the effects of corporate governance and ownership concentration on the impact of corporate tax changes in a panel of countries. Section 5 concludes.

## **2. *The Tyco Inversion and Managerial Malfeasance***

Both tax avoidance and managerial diversion are phenomena difficult to document. In fact, enormous efforts are undertaken to ensure that they are not easily observable. Thus, to get a sense of how they interact we rely on a case study of a company, Tyco International, where court documents provide evidence of managerial diversion. Interestingly, Tyco is also one of a handful of US companies that chose to reincorporate in Bermuda to minimize its tax liability. As we argue below these two phenomena are not unrelated, as corporate tax avoidance activities enhanced the scope for managerial diversion.

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<sup>4</sup> The coincidence of interests between minority shareholders and tax authorities is also evident in the Desai, Foley and Hines (2003). In the multinational firm setting, it is shown that local minority shareholders deter aggressive transfer pricing practices of majority multinational firms in a way that advances their interests and those of the state.

## 2. 1. *Tax avoidance strategies at Tyco*

Tyco International, a diversified U.S. company with annual revenues of \$34 billion dollars in 2001,<sup>5</sup> elected to become a Bermuda company in 1997.<sup>6</sup> In doing so, nothing material changed at the operational level as the worldwide operations of the company, including those in the U.S., were left unchanged. Furthermore, reporting requirements did not change, since the firm remained listed on the NYSE, subject to SEC regulation. One thing that did change, and the likely motivation of such a reincorporation (also known as an inversion), was the tax treatment of Tyco income. Prior to its reincorporation, Tyco was taxed on its worldwide income by U.S. authorities, while subsequently Tyco only owed U.S. taxes on U.S. source income.<sup>7</sup>

The centrality of the inversion to Tyco's financial performance and tax planning strategies was evident through the late 1990s. Figure 1 details the evolution of four financial ratios through the 1990s for Tyco. The first two ratios – the ratio of foreign revenues and pretax income to worldwide revenues and pretax income – measure the degree to which Tyco relied on non-U.S. regions for revenues and pretax income. The second two ratios – an average foreign tax rate and an average overall tax rate – measure the tax burden on foreign income and worldwide income for Tyco. Figure 1 demonstrates that these ratios for the seven years prior to the inversion in 1997 are remarkably steady. After the inversion, Tyco experienced a limited change in the degree to which the share of worldwide revenue were located in non-U.S. locations as it ranged from 34% in the early 1990s to approximately 40% in the late 1990s. Nonetheless, the share of pretax income generated by foreign sources mushroomed from an average below 10% in the early 1990s to 82%, 52% and 77% in 1999, 2000, and 2001, respectively. The dramatic change in the degree to which profits were characterized as non-U.S. coincides almost precisely with the inversion.

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<sup>5</sup> Tyco International's major business units include Electronics (40% of 2001 revenue), Healthcare & Specialty Products (26%), Fire & Security Services (22%), and Engineered Products & Services (12%). The company employs over 250,000 people and operates in more than 100 countries.

<sup>6</sup> When Tyco acquired ADT Security Systems, a Bermuda-based corporation, in 1997, the transaction was structured as a reverse merger so that Tyco acquired the status of Bermuda company.

<sup>7</sup> The motivations for such inversions, consequently, are to circumvent US taxation generated by the treatment of foreign source income and potentially to remove income from US operations through "income stripping." See Desai and Hines (2002) for a fuller treatment of these incentives.

The relocation of these pretax profits to non-U.S. sources also coincided with a dramatic reduction in the tax burden on non-U.S. income. The average foreign tax rate faced by Tyco through the early 1990s was greater than 50% suggesting that it operated in a variety of countries characterized by high tax rates. The inversion was associated with a dramatic decline in the nature of the tax burdens faced by income characterized as foreign as average foreign tax rates were below 20% by 1999. The combination of much greater pretax income being characterized as foreign and a rapidly declining average foreign tax rate led to a rapid reduction in the overall tax rate faced by Tyco. By 2000, the average overall tax rate for Tyco was lower than 20% – a marked difference from other diversified conglomerates to which Tyco was routinely compared.

From public sources, it becomes clear that two primary means were employed by Tyco to achieve this enhanced financial performance through tax avoidance. The first mechanism was a web of intercompany loans used to relocate profits and the second was a web of affiliates in tax haven countries that served as a destination for pretax profits from around the world. As outlined in Figure 2, the holding company structure allowed for the relocation of profits from the operating subsidiaries to financial subsidiaries through intercompany loans, particularly through a Luxembourg subsidiary named Tyco International Group (TIG). Figure 2, drawn from an analyst report extolling Tyco's active tax management strategies, demonstrates that TIG would borrow from the broader capital markets and operating subsidiaries would borrow from TIG. As described by the analyst, "the subsidiaries are highly levered and incur interest expense that reduces their taxable income in countries with high income tax rates....In effect, this structure allows the company to shift income from high-tax countries to countries with no income taxes."

The actual magnitudes of these amounts were not apparent until December 2002 when the Tyco 10-K provided the detailed balance sheets and income statements of TIG, some of which is detailed in Table 1. The vast majority of external borrowing was accomplished at the parent and TIG level. In turn, TIG would lend money through intercompany loans to the operating subsidiaries. For 2001, more than 10% of operating income of the operating

subsidiaries was paid to TIG as interest expense and, by 2002, more than \$21 billion in intercompany loans were used by Tyco to relocate profits from operating subsidiaries to TIG.<sup>8</sup>

The other primary mechanism for tax avoidance would appear to be the proliferation of subsidiaries in a variety of tax havens as detailed in Table 2. Prior to the inversion in 1996, Tyco had one subsidiary in a tax haven although they had significant international operations in 32 countries with 154 foreign subsidiaries. By 2001, Tyco had 165 subsidiaries in tax havens, which represented 9.4% of all Tyco foreign subsidiaries. The combination of intercompany loans and the ability to locate profits in tax havens combined for an apparently active tax management strategy the resulted in sharply declining average tax rates for Tyco overall and tremendous flexibility with regard to tax payments.

## ***2. 2. The links between corporate tax avoidance and managerial malfeasance at Tyco<sup>9</sup>***

Accounts of managerial malfeasance at Tyco read as a litany of abuses. The various accounts suggest that the pattern of diversion by CEO Dennis Kozlowski and CFO Mark Swartz began in earnest after the inversion in late 1997,<sup>10</sup> rapidly accelerated after 1999, and continued through till their departure in 2002. These accounts suggest several different types of diversion<sup>11</sup> - i) abuse of corporate funds for personal purposes, ii) the abuse of loan programs, iii) unauthorized compensation, iv) a variety of Tyco subsidiaries transacted with Kozlowski and Swartz at distorted prices, particularly with regard to real estate in Florida and New York; v) Kozlowski and Swartz failed to disclose a variety of trading in Tyco stock particularly at a time when they claimed not to be selling any Tyco stock.<sup>12</sup>

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<sup>8</sup> Intercompany loans receivable for TIG grew very rapidly from 1999 to 2002 as the figure was only \$8.3 billion in 1999.

<sup>9</sup> This section relies on three primary sources: the 8-K filed by Tyco on September 20 [?], 2002 also know as the Boies Report that is the firms own investigation of the malfeasance; the indictment by the District Attorney of New York filed on September 12, 2002; and the indictment by the State of New Jersey filed on November [?], 2002. The indictments are not legal findings but allegations and the Boies report relies on the internal investigation of the new management at Tyco.

<sup>10</sup> There is only transgression cited prior to the inversion. Specifically, it is alleged that Koslowski instituted a generous relocation program in 1995 to facilitate moving to New York. Unlike later abuses, this allegation is not related to the abuse of that program for unrelated uses but simply for its generosity.

<sup>11</sup> In order to focus on the primary misdoings of Tyco executives, this discussion does not cover the allegations against board member Frank Walsh and Chief Counsel Mark Belnick.

<sup>12</sup> First, the use of corporate funds for personal purposes included lavish expenditures on various living expenses and the authorization of up to \$100 million of Tyco funds in donations to charitable organizations, much of which was provided in Kozlowski's name. Second, the abuse of loan programs involved two relocation loan programs and the

The active tax management strategies Tyco employed at the corporate levels appear to have enhanced the ability of managers to divert funds in at least three distinct ways. The first, and most obvious, is that the complexity created by the tax avoidance strategies facilitated the centralization of power by the Swartz and Kozlowski. Accounts of the Tyco transgressions make clear that only a handful of individuals actually understood the full workings of Tyco and that Kozlowski and Swartz used this complexity to their advantage in obscuring other transactions and in gaining authorization for a variety of transactions.

The second link is that the ambiguity over what tax obligations were at Tyco allowed another degree of freedom for managers to obscure their own diversion. In particular, as illustrated in Figure 1, the precise amount of income attributed to foreign source moved wildly from 1998 to 2001 (from 38% to 82% to 52% to 77%) while the revenue share was relatively constant. The ability to “manufacture” post-tax profits at relatively low cost through pretax profit shifting to foreign source obscured true underlying business profitability and allowed Kozlowski and Swartz to divert funds without appearing to have compromised operational performance. One specific example of the advantages of this ambiguity was the use of the balance sheet item “Accrued Federal Income Taxes” – otherwise used as a reserve account for taxes owed to U.S. tax authorities – to facilitate the concealment of \$41 million paid to executives as part of the TyCom bonus scheme.<sup>13</sup>

While the previous two links between corporate tax avoidance and managerial diversion are somewhat indirect, the final link is that the exact vehicles employed to accomplish corporate tax avoidance were directly used by Kozlowski and Swartz to obscure their dealings from

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Key Employee Loan (KEL) program that was meant to assist employees with the tax obligations associated with the vesting of shares. Kozlowski and Swartz received up to \$95 million in relocation loans and close to \$300 million in KEL loans largely for purposes not associated with the intent of these programs. Third, Kozlowski and Swartz authorized the forgiveness of various parts of these loans. In addition to this form of unauthorized compensation, Kozlowski and Swartz designed three special bonus programs – the TyCom Forgiveness Program, the ADT Automotive Bonus, and accelerated vesting through the Flag transaction – that cost Tyco more than \$167 million resulting in income to Kozlowski of more than \$67 million in twelve months alone. In each of these cases, corporate transactions such as an equity offering or a merger were used to facilitate the concealment of transfers of funds to senior managers. Fourth, a variety of Tyco subsidiaries transacted with Kozlowski and Swartz at distorted prices, particularly with regard to real estate in Florida and New York. Finally, Kozlowski and Swartz failed to disclose a variety of trading in Tyco stock particularly at a time when they claimed not to be selling any Tyco stock.<sup>13</sup> Specifically, of the \$97.4 million used in the TyCom bonus scheme, \$44.6 was improperly marked as part of offering expenses for the TyCom offering, \$41 million was charged improperly against the reserve account of

shareholders. Specifically, the sales of Tyco stock by Kozlowski and Swartz during Tyco's 2001 fiscal year amounted to more than \$100 million and were made while, according to the indictment by the State of New Jersey, "Kozlowski was falsely touting his supposed practice of retaining nearly all of his Tyco stock...[he] stated in December 2000 that 'I'm paid in Tyco stock... We, the board, everybody feel the best way to keep management's interests aligned with shareholders is to keep 100 percent of our net worth in Tyco's stock.'" The link to the corporate tax avoidance strategies employed by Tyco stems from the fact that "Kozlowski and Swartz made a significant portion of those sales to Tyco subsidiaries based in bank secrecy jurisdictions such as the Jersey Islands and the Bahamas. Because of that unusual characteristic of the sales made by Kozlowski and Swartz, they were able to conceal those sales from investors until year-end, a fact that advanced the ability of Kozlowski and Swartz to conceal their fraudulent conduct from investors." The same offshore subsidiaries that shielded Tyco's corporate profits facilitated the concealment of insider sales by managers.

### ***3. A Simple Model of Tax Evasion and Managerial Diversion***

This section develops a simple model that examines the links between tax evasion and diversion by a controlling shareholder. In doing so, the model formalizes the intuition behind the link between managerial diversion and tax sheltering apparent in the Tyco example and provides empirical predictions that are tested in Section 4. While there is a growing attention to the optimal contracts in the presence of sheltering opportunities (e.g., Chen and Chu (2003) and Crocker and Slemrod (2003)), the link between sheltering and diversionary opportunity has not been formally analyzed.<sup>14</sup>

#### *3.1 Model setup*

Let  $s \in [0, 1]$  be the proportion of income that is sheltered from tax authorities. We assume income sheltering is costly to the controlling shareholder, as she has to exert effort to do so and, more importantly, because she runs a personal risk if her strategy is deemed illegal. We model this cost with the following quadratic function:

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accrued federal income taxes, and \$12 million was charged improperly against the reserve account of accrued G&A expenses.

$$C(s) = \frac{\alpha}{2} s^2$$

where  $\alpha$  is a parameter that captures the quality of the tax enforcement regime. The higher the enforcement, the more likely it is that a controlling shareholder is caught in excessive tax sheltering and thus the higher is the personal penalty for her.<sup>15</sup> The benefit of income sheltering is that sheltered income avoids corporate taxes, while non-sheltered income is taxed at rate  $t$ .

The model relies critically on the assumption that sheltered income can be more easily appropriated by the controlling shareholder. As the Tyco example illustrates, the ambiguity over the true nature of sheltered income facilitates greater diversion out of those amounts. We capture this idea by assuming that the controlling shareholder diverts a higher fraction of the sheltered income than of the income declared to tax authorities. If  $\gamma$  is the fraction of non-sheltered income appropriated by the controlling shareholder, then the fraction of sheltered income appropriated will be  $\beta = \gamma + \delta$ , with  $\delta > 0$ . Since the larger  $\gamma$  is, the worse corporate governance is,  $(1 - \gamma)$  is an index of the quality of corporate governance and  $\delta$  is a measure of the degree to which sheltered income is more easily diverted relative to non-sheltered income.

Without loss of generality, we normalize the company's true profit (pre-tax, pre-sheltering, and pre-diversion) to 1. Then, a controlling shareholder who owns a fraction  $\lambda$  of the shares obtains a payoff of

$$(1) \quad V^C = \lambda[(1-s)(1-t)(1-\gamma) + s(1-\beta)] + (1-s)(1-t)\gamma + \beta s - \frac{\alpha}{2} s^2.$$

The first term in square bracket is the value a controlling shareholder obtains as a shareholder. The second and third terms, by contrast, are the amount she expropriates thanks to her controlling position. The minority shareholders collectively get

$$(2) \quad V^M = (1-\lambda)[(1-s)(1-t)(1-\gamma) + s(1-\beta)]$$

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<sup>14</sup> In their empirical study of private benefits of control, Dyck and Zingales (2003) document the effect of better tax enforcement on private benefits. They do not, however, formally analyze the relation between the two.

<sup>15</sup> Of course, sheltering income also imposes a cost on the company. For simplicity, however, we abstract from this aspect, since it does not change the flavor of our results.

as they do not receive diverted income and also do not bear the costs of sheltering.

### 3.2 *The optimal level of tax sheltering*

Given the concavity of equation 1, the optimal amount of sheltering for the controlling shareholder,  $s^*$ , can be derived from the first order condition. Assuming an interior solution, we have

$$s^* = \frac{[\beta + \lambda(1 - \beta)] - (1 - t)[\gamma + \lambda(1 - \gamma)]}{\alpha}$$

Note that in choosing the optimal level of sheltering the controlling shareholder will only look at her own benefits (equation 1) ignoring the impact on minority shareholders. This level of sheltering can be too much or too little with respect to what the minority shareholders would like.<sup>16</sup>

From a minority shareholders' point of view the optimal level of income sheltering trades off expropriation by the government through the tax system and expropriation by controlling shareholders through diversionary technologies. Any dollar of income that is sheltered avoids the corporate tax, but is "taxed" more heavily by the majority shareholder. In order to illustrate this further, it is useful to define a threshold level of the tax rate:

$$\hat{t} = \frac{\beta - \gamma}{1 - \gamma} = \frac{\delta}{1 - \gamma}$$

If  $t < \hat{t}$ , additional expropriation by controlling shareholders made possible by the sheltering of the income offsets any gains from reduced taxes and minority shareholders are better off when there is no sheltering. By contrast, when  $t > \hat{t}$ , the burden of corporate taxes is greater than the additional expropriation the controlling shareholder enjoys on sheltered income, so sheltering benefits minority shareholders.

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<sup>16</sup> The minority shareholder optimal level does not coincide with the first best level either. In considering the trade off, they ignore the cost of sheltering borne by the managers.

It is critical to note that  $\hat{t}$  is a function of the underlying corporate governance system. In a world where corporate governance is perfect ( $\beta = \gamma = 0$ ,  $\hat{t} = 0$ ), minority shareholders benefit unambiguously from sheltering since they bear no cost of sheltering and reap all the benefits. Clearly, the result would be less extreme if they bear some cost of the sheltering, but the fundamental tension between the interest of the controlling shareholder and that of the minority shareholder remains. Indeed, this is the common intuition of how shareholders benefit from increased tax sheltering. At the other extreme, if the corporate governance system is poor and the controlling shareholder is able to appropriate all the sheltered income ( $\beta = 1$ ), then minority shareholders would like that no income is sheltered. Similarly, the degree to which sheltered income is more easily diverted ( $\delta$ ) also matters critically for the preferences of minority shareholders over sheltering activity.

More generally, it is clear that the optimal level of sheltering depends critically on the available diversionary technology.

*Result 1:* The optimal amount of tax sheltering increases in the tax rate and decreases in the level of corporate governance ( $1 - \gamma$ ), tax enforcement  $\alpha$ , and, if  $t < \hat{t}$ , insider ownership  $\lambda$ . By contrast, if  $t > \hat{t}$  the optimal amount of tax sheltering increases in the level of insider ownership  $\lambda$ .

*Proof:*  $\frac{ds^*}{dt} = \frac{\gamma + \lambda(1-\gamma)}{\alpha} > 0$ . Substituting  $\beta = \gamma + \delta$ , we have  $\frac{ds^*}{d\gamma} = \frac{t(1-\lambda)}{\alpha} > 0$ .

$$\frac{ds^*}{d\alpha} = -\frac{[\beta + \lambda(1-\beta)] - (1-t)[\gamma + \lambda(1-\gamma)]}{\alpha^2} < 0;$$

$$\frac{ds^*}{d\lambda} = (1-\beta) - (1-t)(1-\gamma) < 0 \text{ if } t < \hat{t} \text{ and } > 0 \text{ if } t > \hat{t}.$$

The first result is obvious: a higher tax rate makes tax sheltering more advantageous and this will lead to a higher amount of diversion. The second result is more interesting in so much as it identifies an interaction between the incentives to shelter and the quality of the corporate governance system. A controlling shareholder captures only a fraction of the tax benefit of

sheltering (while in our model she bears all the cost). The worse the corporate governance system (and thus the more she can expropriate), the more she will internalize the benefit of tax sheltering, and hence the more she will shelter income. We return to this point below. The third result is more straightforward. If the personal cost borne by the manager to shelter income goes up (i.e., there is increased enforcement), the level of income sheltered goes down. The fourth result indicates that the relative importance of taxation versus expropriation drives the interaction between ownership and tax sheltering. A higher controlling stake makes the controlling shareholder internalize more the value distributed to all shareholders relative to the value of his private benefits. If  $t < \hat{t}$  the value distributed to all shareholders decreases with sheltered income, hence the controlling shareholder will shelter less when she owns more stock. The opposite is true, if  $t > \hat{t}$ .

Note that for a given statutory tax rate  $t$ , a better corporate governance system (low  $\gamma$ ) makes it more likely that  $t$  is above the threshold value of  $\hat{t}$ . Hence, in good corporate governance regimes, companies with a greater degree of insider ownership will be more aggressive in tax sheltering, while companies with low levels of insider ownership will not. By contrast, in bad corporate governance regimes companies with a greater degree of insider ownership will be less aggressive in tax sheltering, while companies with low level of insider ownership will be more aggressive.

### 3.3 *The effect of the tax system on the value of minority shares and on the value of control*

These results on the optimal level of sheltering and the preferences of minority investors over sheltering translate readily into results concerning the effect of changes in enforcement.

Result 2: If  $t < \hat{t}$ , the market value of a company increases when tax enforcement increases.

Proof: The market value of shares reflects the value of minority shares. Hence,

$$\frac{dV^m}{d\alpha} = \frac{\partial V^m}{\partial s} \frac{ds}{d\alpha} > 0 \text{ because } \frac{\partial V^m}{\partial s} = -(1-t)(1-\gamma) + (1-\beta) < 0, \text{ if } t < \hat{t} \text{ and}$$

$$\frac{ds}{d\alpha} = -\frac{[\beta + \lambda(1-\beta)] - (1-t)[\gamma + \lambda(1-\gamma)]}{\alpha^2} < 0. \text{ Hence, the result follows.}$$

Since the natural consequence of an increase in tax enforcement is an increase in the taxes paid by corporations, this result runs against the traditional view of taxes. How could shareholders be made better off by paying more corporate taxes? By reducing the amount of tax sheltering, an increase in tax enforcement not only increases the amount of taxes paid, but also reduces the amount appropriated by the majority shareholder. If  $t < \hat{t}$  the taxes paid on declared income are less than the additional income expropriated by the controlling shareholder. Hence, minority shareholders are better off. Since the market value of shares reflects the value minority shareholders receive, also the stock market value will go up.

Similarly, these results carry implications for control premia. In order to see this, define the absolute control premium (ACP) as the difference between the payoff controlling shareholders receive and the payoff minority shareholders receive, controlling for the different size of the blocks. This equals:

$$ACP = \lambda \left[ \frac{V^C}{\lambda} - \frac{V^M}{1-\lambda} \right]$$

The relative control premium (RCP), correspondingly, is the absolute control premium divided by the total value of the company computed at the price of minority shares:

$$RCP = \frac{\lambda \left[ \frac{V^C}{\lambda} - \frac{V^M}{1-\lambda} \right]}{\frac{V^M}{1-\lambda}} = (1-\lambda) \frac{V^C}{V^M} - \lambda .$$

Accordingly, we have

Corollary 1: If  $t < \hat{t}$ , the relative control premium declines with the level of tax enforcement.

Proof:  $\frac{\partial RCP}{\partial \alpha} = \frac{(1-\lambda)}{(V^m)^2} \left[ \frac{dV^C}{d\alpha} V^m - V^C \frac{dV^m}{d\alpha} \right]$ . By using the envelope theorem

$\frac{dV^C}{d\alpha} = \frac{\partial V^C}{\partial \alpha} = -\alpha s < 0$ . Since by Result 1  $\frac{dV^m}{d\alpha} = \frac{\partial V^m}{\partial s} \frac{ds}{d\alpha} > 0$ , the result follows.

The result is fairly intuitive. Higher tax enforcement increases the cost of sheltering income. This reduces the payoff of controlling shareholders ( $V^C$ ) and if  $t < \hat{t}$  increases the payoff of minority shareholders ( $V^m$ ). Hence, the relative control premium will drop.

In addition to these results on the effects of enforcement on share values, it is possible to consider the effects of tax rates on share values.

*Result 3:* An increase in the tax rate  $t$  reduces both the value of minority shareholders ( $V^m$ ) and the value of controlling shareholders ( $V^C$ ). The effect on the relative control premium is ambiguous.

*Proof:* By using the envelope theorem  $\frac{dV^C}{dt} = \frac{\partial V^C}{\partial t} = -[\gamma + \lambda(1-\gamma)] < 0$ .

$\frac{dV^m}{dt} = \frac{\partial V^m}{\partial t} + \frac{\partial V^m}{\partial s} \frac{ds}{dt}$ , where  $\frac{\partial V^m}{\partial t} = -(1-\lambda)(1-s)(1-\gamma) < 0$ ,  $\frac{\partial V^m}{\partial s} < 0$ , and

$\frac{ds}{dt} = \frac{\gamma + \lambda(1-\gamma)}{\alpha} > 0$ .  $\frac{\partial RCP}{\partial t} = \frac{(1-\lambda)}{(V^m)^2} \left[ \frac{dV^C}{dt} V^m - V^C \frac{dV^m}{dt} \right] =$

$\frac{(1-\lambda)}{(V^m)^2} \left\{ -V^m[\gamma + \lambda(1-\gamma)] - V^C[-(1-\lambda)(1-s)(1-\gamma) + [(1-\beta) - (1-t)(1-\gamma)] \frac{\gamma + \lambda(1-\gamma)}{\alpha}] \right\}$ .

### 3.4 The effect of the tax system on tax revenues – The corporate Laffer Curve

The opportunity to shelter income at an increasing cost generates the possibility that corporate tax revenues decrease when corporate tax rate increase. Given the strong analogy with the “Laffer” effect in income tax revenue, we will refer to it as the corporate Laffer curve.

*Result 4:* For intermediate levels of tax enforcement, there is a Laffer curve for corporate tax revenues.

*Proof:* Corporate tax revenues (CTR) are given by  $t(1-s)$ . Differentiating this with respect to  $t$  we obtain

$\frac{\partial CTR}{\partial t} = (1-s) - t \frac{ds}{dt} = (1-s) - t \frac{\gamma + \lambda(1-\gamma)}{\alpha} = \frac{1}{\alpha} [\alpha - [\beta + \lambda(1-\beta)] + (1-t)[\gamma + \lambda(1-\gamma)] - t[\gamma + \lambda(1-\gamma)] =$   
 $\frac{1}{\alpha} [\alpha - [\beta + \lambda(1-\beta)] + (1-2t)[\gamma + \lambda(1-\gamma)]$ . If  $\alpha > [\beta + \lambda(1-\beta)] - [\gamma + \lambda(1-\gamma)] > 0$ , the

derivative is positive at  $t=0$ . If  $\alpha < [\beta + \lambda(1 - \beta)] + [\gamma + \lambda(1 - \gamma)]$ , then the derivative is negative at  $t=1$ .

*Corollary 2:* A higher level of insider ownership and a lower level of corporate governance (higher level of  $\gamma$ ) reduce the revenue maximizing tax rate. A higher level of tax enforcement increases the revenue maximizing tax rate.

*Proof:* The revenue maximizing level of taxation is given by  $t = \frac{1}{2} + \frac{\alpha - [\beta + \lambda(1 - \beta)]}{2[\gamma + \lambda(1 - \gamma)]}$ .

Differentiating this term with respect to  $\lambda, \gamma, \alpha$  and remembering that  $\beta = \gamma + \delta$ , delivers the results.

The three panels of Figure 3 illustrate this corporate Laffer curve. The top panel of Figure 3 examines the relationship between tax revenues and tax rates as a function of the size of the controlling shareholder's block size.<sup>17</sup> When there is no large shareholder there is no Laffer curve as revenues are increasing in tax rates. However, as the size of the controlling block increases, the typical Laffer effect appears. The revenue-maximizing tax rate, then, becomes decreasing in the controlling block size.

In the middle panel of Figure 3, we show that the shape of the Laffer curve depends also on the quality of the governance system.<sup>18</sup> Specifically, as governance deteriorates the revenue-maximizing tax rates decreases for the reason discussed above. Finally, the bottom panel of Figure 3 traces the effects of changes in enforcement on the revenue-maximizing rate. Again, as enforcement decreases, the revenue-maximizing also decreases. These results suggest that in environments characterized by imperfect tax enforcement and potential diversion by controlling shareholders, the revenue-maximizing rates may be considerably lower than anticipated, due to the interaction between tax sheltering and managerial diversion.

### 3.5 *The effect of personal taxes*

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<sup>17</sup> In this simulation, alpha is held at 0.7, gamma is 0.1, and delta is 0.2.

<sup>18</sup> In this simulation, alpha is held at 0.7 and the controlling block size is held at 0.5.

Thus far, we have not factored in the analysis of personal taxes. Of course, both controlling and minority shareholders care about their after tax income. The effect of a personal income tax, however, depends upon which income is subject to personal taxes. We assume that all the income distributed to shareholders is taxed at  $tp$ , while the remaining income, which is diverted by the manager, is tax free. This captures the idea that diverted income is channeled through tax havens and as such is not subject to income taxes, while dividends distributed to all shareholders cannot avoid taxation. Then, the payoff to the controlling shareholder and to the minority shareholders becomes

$$(1^*) \quad V^C = (1-tp)\lambda[(1-s)(1-t)(1-\gamma) + s(1-\beta)] + (1-s)(1-t)\gamma + \beta s - \frac{\alpha}{2}s^2$$

and

$$(2^*) \quad V^M = (1-\lambda)(1-tp)[(1-s)(1-t)(1-\gamma) + s(1-\beta)].$$

Accordingly, the optimal amount of sheltering then becomes

$$s^{*'} = \frac{[\beta + \lambda(1-tp)(1-\beta)] - (1-t)[\gamma + \lambda(1-tp)(1-\gamma)]}{\alpha}$$

The introduction of personal taxes de facto reduces the controlling shareholder's stake  $\lambda$ . Hence, from *Corollary 2* we derive

*Corollary 3:* If  $t < \hat{t}$ , the level of tax sheltering increases with the level of personal taxes and hence the level of corporate tax revenues decreases with the level of personal taxes. The opposite is true if  $t > \hat{t}$ .

This result suggests that the amount of *corporate* tax revenues is affected by the level of *personal* tax rates and this interaction is driven by the quality of the corporate governance system and by the level of the corporate tax rate itself.

#### 4. *A Test of the Effects of Corporate Governance on Corporate Tax Revenues*

Our model shows how the characteristics of the corporate taxation system affect the amount of managerial diversion and, thus, companies' valuation. It also shows how the characteristics of the corporate governance system affect the responsiveness of tax revenues to changes in tax rates (a corporate version of the Laffer curve). Given the difficulty in measuring the level of managerial diversion, the first set of implications are better analyzed through a clinical study of an enforcement action in a setting where both sheltering and managerial diversion are large and visible. Desai, Dyck, and Zingales (2003) show that the increases in tax enforcement in Russia instigated by Putin increased the value of shares and reduced the control premia, particularly in companies that were evading taxes the most, as predicted by our model.

The second set of predictions emphasize the importance of corporate governance and ownership concentration for the relation between corporate tax revenues and corporate tax rates. As Figure 3 shows, corporate tax revenues can start to decline when corporate tax rates are at 40% to 45%, a common level in many countries during the last two decades. Given that the model generates predictions for such effects at reasonable parameter values, we investigate the relevance of a corporate version of the Laffer-curve at the aggregate level.

#### 4.1 *The traditional Laffer-curve and the corporate Laffer-curve*

The intuition that income tax revenues might decline in response to increases in the tax rate is popularly known as a Laffer-curve, suggesting the presence of a revenue-maximizing tax rate below 100%.<sup>19</sup> While initial investigations relied on the intuition that labor supply responsiveness to individual income tax schedules could lead to such effects, Lindsey (1987) and Feldstein (1995) expanded the underlying mechanism contributing to Laffer-curve effects beyond labor supply. In particular, they focus on the flexibility high-earners have on the forms of compensation they take, reducing the effectiveness of tax increases. Finally, compliance might suffer with higher tax rates leading to further reductions in taxable income as rates rise.<sup>20</sup>

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<sup>19</sup> While associated with Arthur Laffer the idea goes back to, at least, Adam Smith. Interestingly, Smith's interpretation of such effects hinges, in part, on the notion of theft much as our model does. In *The Wealth of Nations*, he states, "High taxes, sometimes by diminishing the consumption of the item taxed and sometimes by encouraging smuggling, frequently afford a smaller revenue to government than what might be drawn from more modest taxes."

<sup>20</sup> See Goolsbee (1999) for a recent effort that emphasizes high-income earners and the distinction between temporary and permanent responses to tax rate changes.

In addition to these studies that employ micro data of individual tax returns, a few studies have focused on the revenue consequences at the aggregate level by investigating the response of aggregate tax revenues to tax rate changes through case studies of countries enacting tax reforms.<sup>21</sup>

Our model identifies the possibility of a *corporate* Laffer-curve and suggests that the slope of such curves will depend on the corporate governance environment and levels of ownership concentration. While we are not aware of any discussion of a *corporate* Laffer curve, its basic idea is not dissimilar from the initial motivations for the empirical investigations of a Laffer curve with respect to individual tax rates. In particular, the degree to which an individual might reclassify compensation or evade taxes has an obvious analogue in our model of how a majority shareholder might shelter and divert in response to tax rate changes. A key difference in the corporate setting is the presence of minority shareholders and the divergence of interest between the optimal level of sheltering from the majority shareholder point of view and from the minority shareholder's one.

In this respect, the contribution of our model is not so much in raising the possibility of a corporate Laffer curve, but in establishing its policy relevance at reasonable tax rate levels and, most importantly, in showing how the shape of the hump is affected by the level of ownership concentration and by the quality of the corporate governance system.

#### 4.2 *The Data*

This latter predictions are eminently cross-country, thus they can best be tested by pooling data across countries. Our panel combines data 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.<sup>22</sup> From the IMF, we obtain data on corporate tax

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<sup>21</sup> In particular, Ebrill (1987) finds limited evidence of revenue increases following tax reforms in Jamaica and India in the 1980s, IMF (2002) explores the possibility of Laffer effects in Russia following individual income tax reforms and is inconclusive regarding their presence and Irwin (1998) finds that the tariff reductions widely debated in the U.S. in 1888 would have led to revenue decreases counter to some political claims at the time of Laffer like effects. See also the works profiled in IMF (2002) and the edited volume, Gandhi (1987).

<sup>22</sup> This data is available at [www.otpr.org](http://www.otpr.org).

revenues, total tax revenues (available from the *Government Finance Statistics* yearbook) and nominal GDP (from the *International Finance Statistics* yearbook).<sup>23</sup>

As a measure of ownership concentration we use the average percentage of common shares owned by the three largest shareholders in the 10 largest nonfinancial, privately owned domestic firms in a given country as computed by La Porta et al. (1998). As a measure of corporate governance, we use the control premium in negotiated control block sales, as computed by Dyck and Zingales (2003). Consistent with the spirit of our model, the Dyck and Zingales' measure capture the amount of private benefits extracted by the controlling shareholder.

Table 3 summarizes these variables for the countries in the sample. The top panel of Table 3 summarizes the data from the entire panel. The average ratio of corporate tax revenues to total tax revenues is 10.3% and the average top marginal rate over the sample is 38.1%. The governance and ownership variables vary considerably by country: ownership concentration averages 44.8% with a standard deviation of 13.9%. Similarly, the measure of private benefits averages 13.5% with a standard deviation of 16.0%. The bottom panel of Table 3 summarizes the data collapsed by country. In addition to the raw data, we also report country-specific Laffer-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.

### 4.3 Results

To identify how corporate governance and ownership concentration influence the relation between corporate tax revenues and corporate tax rates, we capitalize on within-country variation in the unbalanced panel. To test for the influence of tax rate changes, we use country fixed effects. By interacting variables that characterize the governance environment with tax rates, we examine if rate changes have differential effects in poor governance and high ownership concentration environments. Initially, we constrain the coefficient on tax rates to be the same

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<sup>23</sup> 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 (2003) and LLSV (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,

across all countries and then subsequently generate country-specific Laffer-curve slopes. In controlling for the level of GDP, we provide for the least restrictive relationship between GDP and corporate tax revenues by interacting country fixed effects with log GDP thereby allowing country-specific slopes.<sup>24</sup> Our basic specification, then, is as follows:

$$\text{Log}(\text{Corporate Tax Revenues}_{it}) = \alpha_i + \beta_i (\text{Log GDP}_{it}) + \eta\tau_{it} + \varepsilon_{it}$$

where  $i$  indexes countries,  $t$  is a time subscript and  $\tau$  is the top marginal corporate tax rate.  $\eta$  provides the slope of the corporate Laffer-curve. We account for possible cross country differences in the slope of the Laffer-curve by including an interaction of  $\tau_{it}$  with a measure of governance or ownership concentration.

Column one of Table 4 reports estimates of this basic specification. Interestingly, on average increases in the tax rates do not increase corporate revenues. In fact, the point estimate of the effect of the tax rate is negative: a 10% increase in the top marginal rate (from 15% to 25%, for example) is associated with a 3.4% reduction in corporate tax revenues. The average effect, however, is not statistically different from zero. Corollary 2, however, has specific predictions on how the shape of the corporate Laffer curve will differ across countries. The first prediction regards the effect of ownership concentration. A higher level of insider ownership should reduce the revenue maximizing tax rate. Hence, in countries with a higher level of ownership concentration the coefficient on the tax rate should be more negative. We test this prediction by interacting the tax rate with the level of ownership concentration as measured by the percentage owned by the three largest shareholders.

As suggested by the model, the coefficient on this interaction is negative and highly statistically significant. Taken literally, this coefficient suggests that, in the absence of controlling blocs, a 10% tax rate increase would result in a 27% (the 2.69 coefficient on tax rates) increase in corporate tax revenues. As the size of controlling blocs increases, however,

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Singapore, Taiwan, and Venezuela. Furthermore, the electronic version of the GFS variables currently available are not updated past 1997 yet.

<sup>24</sup> We also test the more restrictive specification where the corporate tax revenues are divided by the GDP, the results are the same. This country-specific relationship between GDP changes and corporate tax revenue changes also has the advantage of implicitly controlling for different growth rates in the corporate sector given different stages of development.

this effect is diminished. In particular, when the three largest shareholders on average own 47% of the stock, increases in the tax rate no longer generate any increase in revenues [ $2.69 + (.47)(-5.74) = 0$ ]. Finally, where controlling blocks are above 47%, tax rate increases are associated with decreases in corporate tax revenues. Hence, ownership concentration appears to be an important determinant of the shape of the Laffer curve as predicted by the model.

To test the robustness of these results, we re-estimate the basic specification in two subsamples with varying levels of ownership concentration (columns 3 and 4). In countries with low (below the median) ownership concentration, the coefficient on tax rates is positive and statistically significant, while the coefficient on tax rates is negative and statistically significant for countries with high (above the median) ownership concentration. The difference is statistically different from zero, suggesting distinctive dynamics for tax revenues in countries characterized by low and high ownership concentrations.

Obviously, changes in the corporate tax rate do not happen in a vacuum and it is conceivable that accompanying reforms, such as base broadenings, might conflate these results. For these results to be spurious, however, it must be the case that the relation between tax changes and changes in the tax base is systematically correlated with the level of ownership concentration. As most of the changes in corporate tax rates were rate reductions during this period, it would have to be the case that rate reductions were more associated with a broadening of the tax base in countries with a high level of ownership concentration in order for these results to be spurious. We do not see why that should be the case.

Another possible confounding effect is that changes in tax rates are accompanied by changes in tax enforcement or by other changes in the fiscal structure. We can address this problem by scaling corporate tax revenues by total tax revenues.<sup>25</sup> We then repeat all the previous regressions using this dependent variable (columns 5 through 8 of Table 4). The results are consistent with the results presented in columns 1 through 4, as the interaction of tax rates and ownership concentration carries a negative and statistically significant coefficient. According to these estimates, an increase in tax rates starts to have no effect on tax revenues

when the size of the controlling bloc reaches 35%. This effect is still evident when we divide the sample according to the levels of ownership concentration. In countries with low ownership concentration the coefficient of the tax rate is positive and not statistically significant, while in countries with high ownership countries, the coefficient is negative and statistically different from zero. The difference between the coefficients in the two samples is also statistically different from zero.

Corollary 2 also has implications in terms of the levels of corporate governance: worse levels of corporate governance (higher level of  $\gamma$ ) reduce the revenue maximizing tax rate. We can test this prediction directly by using the Dyck and Zingales (2003) estimates of control premia in different countries as a measure of corporate governance. Since it is a measure of how much controlling shareholders appropriates for themselves, it is directly related to  $\gamma$ .

Column 1 of Table 5 presents the estimate of our basic specification, where we have inserted the interaction between corporate tax rate and level of control premium. As predicted by the model, the interaction term is negative and statistically significant. In this case, the threshold level of the control premium for a revenue-neutral relationship between corporate tax rates and corporate tax revenues is 20%. In columns 2 and 3 we divide the sample on the basis of the median level of control premium. As predicted by the model, in countries where control premium is below the median the coefficient of the tax rate is positive, while in countries where control premium is above the median, the coefficient of the tax rate is negative. Although these two coefficients are not statistically different from zero, their difference is (at the 10% confidence level).

The model predicts that for low levels of corporate governance (high levels of control premium) the relation between corporate tax revenues and corporate tax rates might turn negative. It does not say, however, at what specific levels of corporate governance this relationship begins to have particular relevance. In particular, there is no reason (except symmetry) to divide the sample according to the median level. Given that the median level of

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<sup>25</sup> An alternative normalization for corporate tax revenues is to scale it by the GDP. Results for the interaction term with ownership concentration in an otherwise-similar specification is consistent with the results discussed above but is only significant at the ten percent level.

control premium (7%) is quite low, it is useful to consider alternative partitionings of the sample to emphasize the effects of control premia more clearly.

For this reason, we experiment by dividing the sample at a higher threshold of control premium (10%), which still leaves sufficient observations in the set of countries with high control premia. As columns 4 and 5 of Table 5 show, the difference between the slope of the Laffer curve is much greater between the two samples, not only in statistical terms, but also in economic terms. The coefficients have the same order of magnitude, but the opposite sign. Finally, columns 6 to 10 repeat the same exercise with the ratio of corporate tax revenues to total tax revenues as a dependent variable. The results are qualitatively similar, although the level of statistical significance drops.

Thus far, we forced the slope of the Laffer curve to be identical across all the countries (but for the effect of ownership concentration or corporate governance). Now, we redo our analysis estimating country-specific slopes by employing the same specification country-by-country. Such a procedure, of course, comes at considerable cost since we have to estimate many more parameters with the same number of observations. Figure 4 plots the country-specific slopes against the levels of ownership concentration and corporate governance variables. Figure 4a has slopes from country-specific regressions where the dependent variable is log corporate tax revenues, while Figure 4b has slopes from country-specific regressions where the dependent variable is the share of corporate tax revenues in total tax revenues.<sup>26</sup> While these plots are necessarily crude they do suggest that the revenue effect of a tax rate increase decreases in the level of ownership concentration and in the level of private benefits of control.

Such plots are necessarily unable to capture the relative estimation precision of the underlying country-by-country regressions. This can be done in a regression framework. Table 6 looks at the relation between country-specific Laffer-curve slopes and ownership concentration (and governance levels) weighting each observation by the precision of each estimate (the inverse of the variance of the estimated slope). Columns 1 through 3 employ slopes estimated using the logarithm of corporate tax revenues as dependent variable, while columns 4 through 6

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<sup>26</sup> In both Figure 4a and 4b, one extreme value is censored in order to highlight the relationship for the vast majority of observations. No censoring is done for the results in Table 6.

employ slopes estimated using corporate tax revenue share as dependent variable. As predicted by the model both the level of ownership and the value of control premia are negatively related to the slope of the Laffer-curve estimated using the logarithm of corporate tax revenues as a dependent variable (columns 1 and 2), albeit the coefficient is marginally significant only for the control premia.

Thus far we only looked at one effect at the type, while the model predicts that both effects should be present simultaneously. Thus, in column 3 we insert both the level of ownership and the value of control premia as explanatory power. Given the limited number of observations, the high degree of correlation between the variables and the country-specific slope measurement procedure, this is asking a lot from the data. Including both measures strengthens the result on control premia, but the coefficient of ownership concentration becomes insignificant and positive. In columns 4 to 6 we redo the same analysis using the corporate tax revenue share as a dependent variable. All the coefficients have the expected sign, but they are not statistically significant.

Given the small sample and the inefficiency of the country-by-country approach, it is not surprising that statistical significance of the results is weaker. Overall, however, even these results support the predictions of the model: the relation between corporate tax revenues and corporate tax rates is deeply influenced by levels of ownership concentration and by the degree of protection of minority investors.

## **5. Conclusion**

This paper analyzes the interaction between corporate governance and corporate taxation. As our analysis of managerial malfeasance at Tyco suggests, this interaction arises because sheltered income is more easily diverted by managers. Based on this assumption, our simple model shows how the characteristics of the corporate taxation system affect corporate governance and the valuation of firms. It also shows how the characteristics of the corporate governance system affect the responsiveness of tax revenues to changes in tax rates, generating a corporate version of the Laffer curve. We then test the effect of corporate governance on the shape of the corporate Laffer curve by using a panel of countries. Consistent with the model's

predictions we find evidence that higher ownership concentration and weaker corporate governance reduce the tax revenues consequences of an increase in corporate tax rate.

While we regard this evidence as encouraging, we are conscious of the need for additional validation by testing the corporate governance implications of corporate taxation. These implications, however, are more difficult to test given the difficulties in measuring tax sheltering, diversion, and levels of tax enforcement. Some evidence in this direction is provided in Dyck and Zingales (2003). They document that countries with better tax enforcement have lower private benefits. Similarly, Desai, Dyck and Zingales provides confirmatory, if anecdotal, evidence from an environment (Russia) where both tax sheltering and managerial diversion are prevalent and where the election of Putin brought a dramatic and sudden change in the level of tax enforcement.

If further research confirms the empirical relevance of our theoretical results, several implications follow. First, our analysis suggests that improving the corporate tax system – through simplification and increased enforcement – may well substantially improve overall corporate governance. This new way is particular appealing in light of the difficulties associated with the current alternative: a major overrule of the legal system. At the same time, our model highlights the existence of a corporate Laffer curve, whose shape depends crucially on corporate governance and ownership concentration. In particular, we show that the revenue-maximizing level of corporate tax rates decreases in the level of ownership concentration and in the size of the control premia. Given that imperfect corporate governance and large shareholders characterize many settings today, these results carry implications for the nature of corporate tax policy.

Finally, our results suggest an alternative explanation for the very existence of a corporate tax.<sup>27</sup> While traditional explanations focus on the corporate tax as a backstop to the personal income tax or as compensation for the limited liability form, this analysis suggests that,

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<sup>27</sup> This explanation is somewhat related to Kanda and Levmore (1991) and Arlen and Weiss (1995) but distinct in several ways. Specifically, Kanda and Levmore (1991) argue that the presence of a two-tier system of corporate tax helps align managers and shareholders with potentially different preferences over tax-motivated transactions. That is, if managers and shareholders face different tax incentives, this can result in a further agency problem that is mitigated by an additional layer of taxation. Arlen and Weiss (1995) argue that the persistence of a two-tier tax

much as Taft argued in defending the creation of the corporate tax in the U.S., the corporate tax is a *certification tax*, helping minority shareholders ascertain the value created by their company and, thus, helping them claim a fraction of it.<sup>28</sup> Interestingly, what matters is not just the disclosure forced by the tax system, but also the incentives for the state to certify the figure disclosed, which is embedded in a corporate tax system. This argument advocates a low, well-enforced corporate tax.

As the current U.S. debate on the benefits of forced reconciliation between book and tax accounting suggests, this argument is not limited to developing countries with weak corporate governance mechanisms.<sup>29</sup> If corporate tax systems provide certification benefits, then departures from book-tax conformity, which prevents shareholders from reconciling income reported to shareholders and tax authorities, undercut these very certification benefits.

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relates to the differential preferences, and consequent lobbying efforts, of managers and shareholders over tax policy.

<sup>28</sup> Since interest payments do not need any additional certification by the government, they have no reason to be subject to this “certification” tax suggesting a rationale for the deductibility of interest as well.

<sup>29</sup> Desai (forthcoming) demonstrates that the late 1990s were characterized by a decoupling of the income reported to shareholders and tax authorities just as instances of corporate malfeasance became more and more widespread. Lenter, Shackelford and Slemrod (2003) detail the historical concerns over disclosure of tax returns in the U.S. from legal, accounting and economic perspectives.

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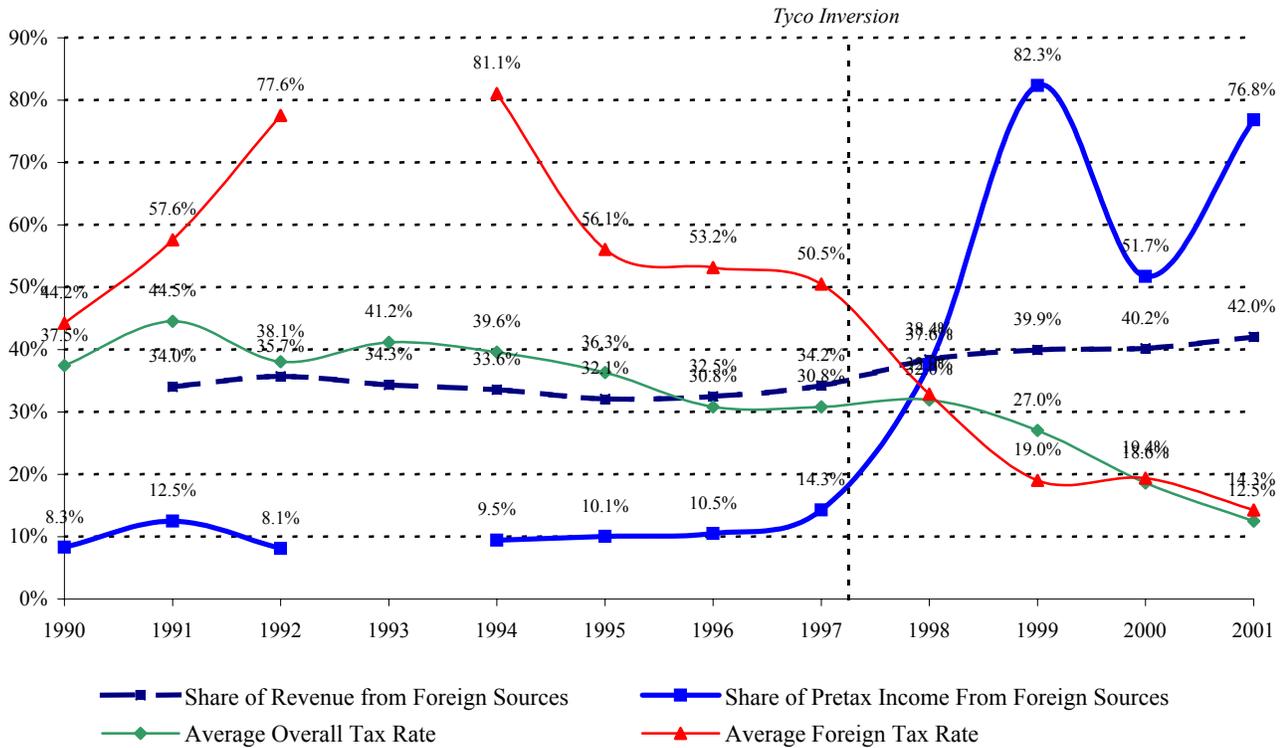
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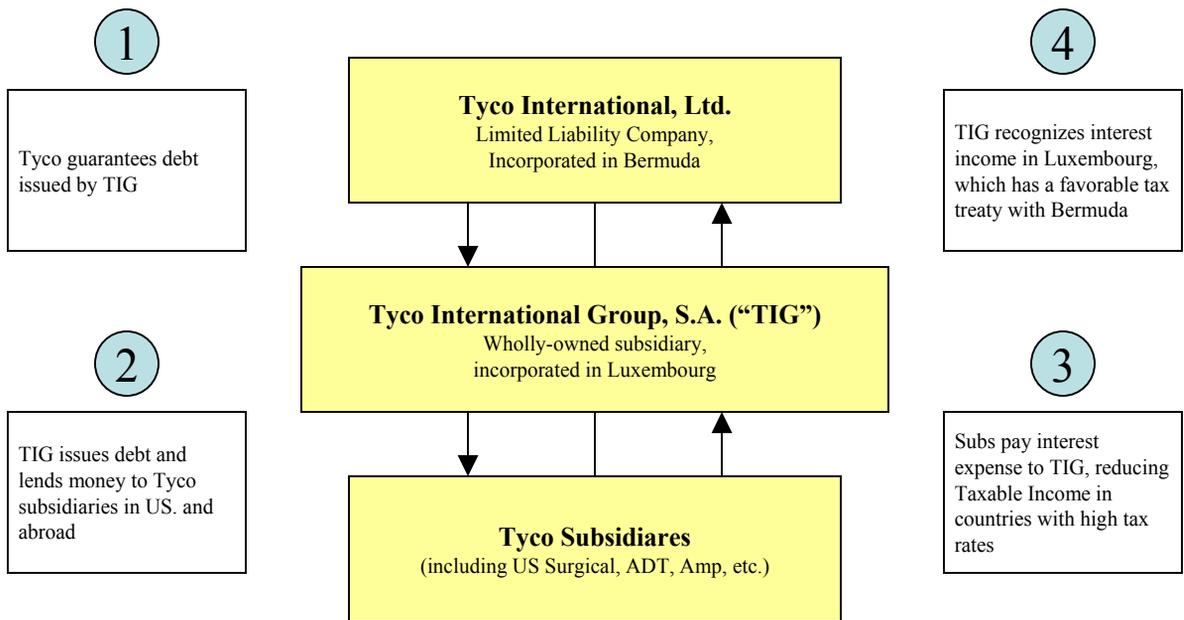
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**Figure 1: Tyco's Global Operations and Tax Avoidance Strategies, 1990-2001**



Notes: The figure depicts the evolution of four financial and operational ratios for Tyco from 1990 to 2001 based on several years of Tyco 10-K reports. The "Share of Revenue from Foreign Sources" is the ratio of non-U.S. revenue to worldwide revenue. The "Share of Pretax Income from Foreign Sources" is the ratio of non-U.S. pretax income to worldwide pretax income. The "Average Foreign Tax Rate" is the ratio of foreign taxes paid to foreign pretax income. The "Average Overall Tax Rate" is the average rate of taxation, as measured by the current provision for taxes, on overall income.

**Figure 2: Intercompany Transactions at Tyco, Corporate Structure**

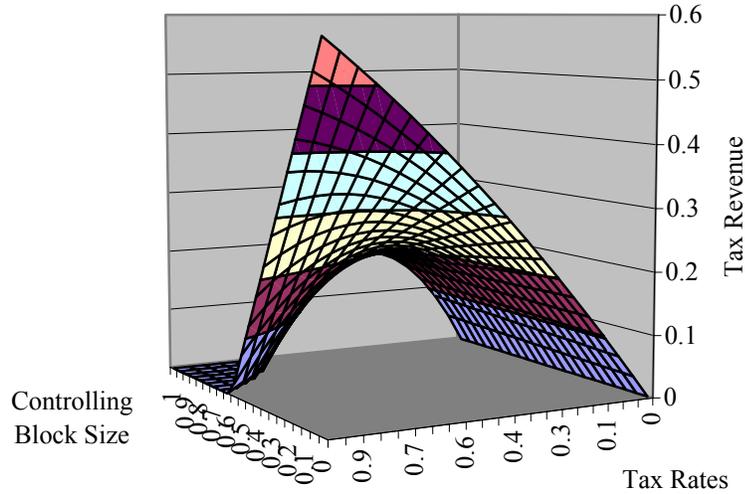


Source: Banc of America Securities research report, 2000.

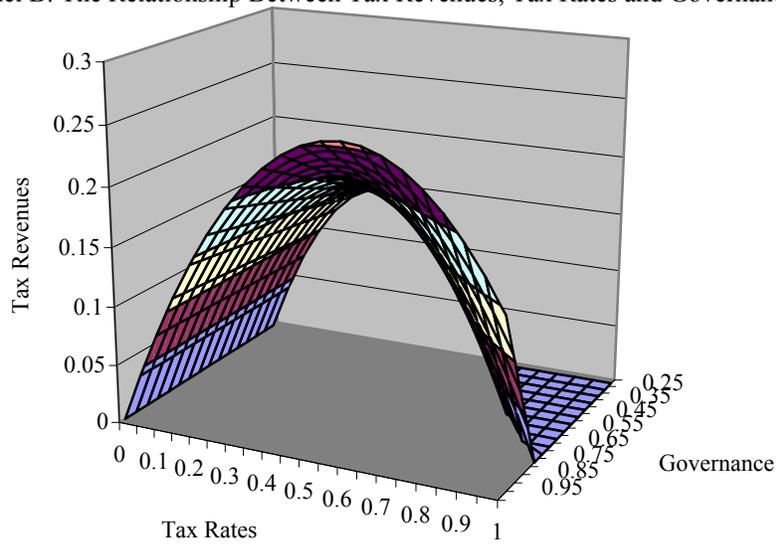
Note: In detailing this corporate structure, the BoA analyst outlined the following interpretation of the ways in which Tyco avoided taxes. "Tyco's incorporation in Bermuda allows the company to take advantage of certain financial and tax benefits. In the diagram below, we illustrate the basic corporate mechanism that allows Tyco to take advantage of financial and tax benefits available to companies incorporated in Bermuda. As shown in the table above, Tyco issues debt through TIG, a Luxembourg corporation, which lends money to Tyco's subsidiaries. We believe the subsidiaries are highly levered and incur interest expense that reduces their taxable income in countries with high income tax rates. TIG earns interest income in Luxembourg, which has a favorable tax treaty with Bermuda. Tyco eliminates the intercompany interest income and expense in the corporate-level consolidation. In effect, this structure allows the company to shift income from high-tax countries to countries with no income taxes."

**Figure 3: Corporate Laffer Curves: The Relationship between Tax Revenues and Controlling Block Size, Corporate Governance, and Enforcement**

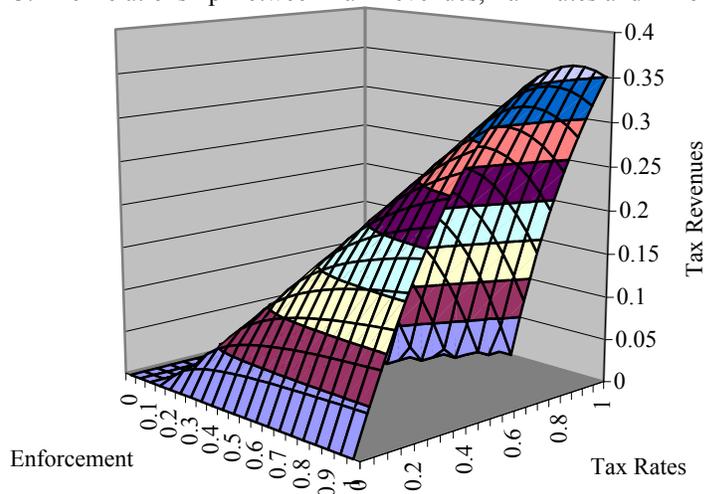
Panel A: The Relationship Between Tax Revenue, Tax Rates and Controlling Block Size



Panel B: The Relationship Between Tax Revenues, Tax Rates and Governance

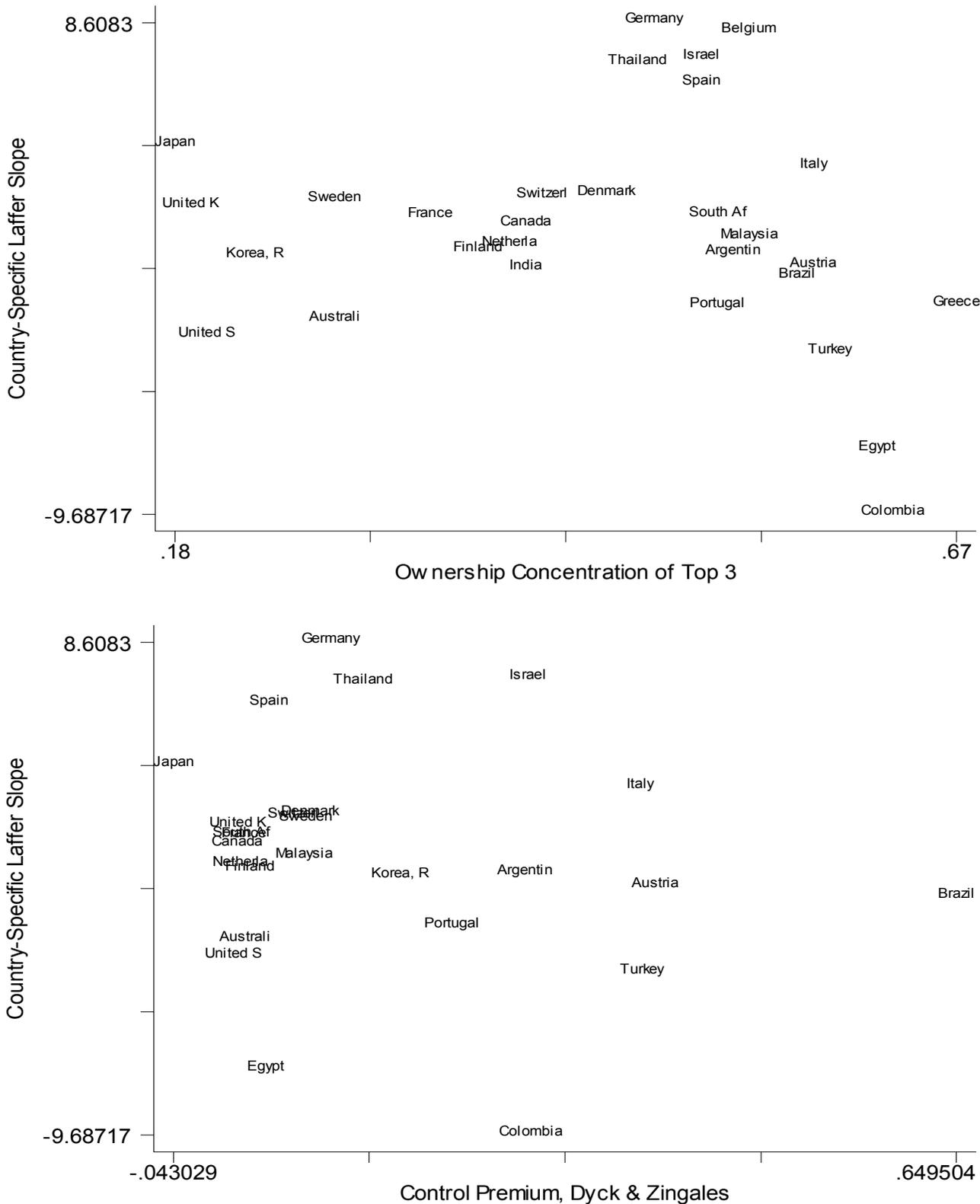


Panel C: The Relationship Between Tax Revenues, Tax Rates and Enforcement



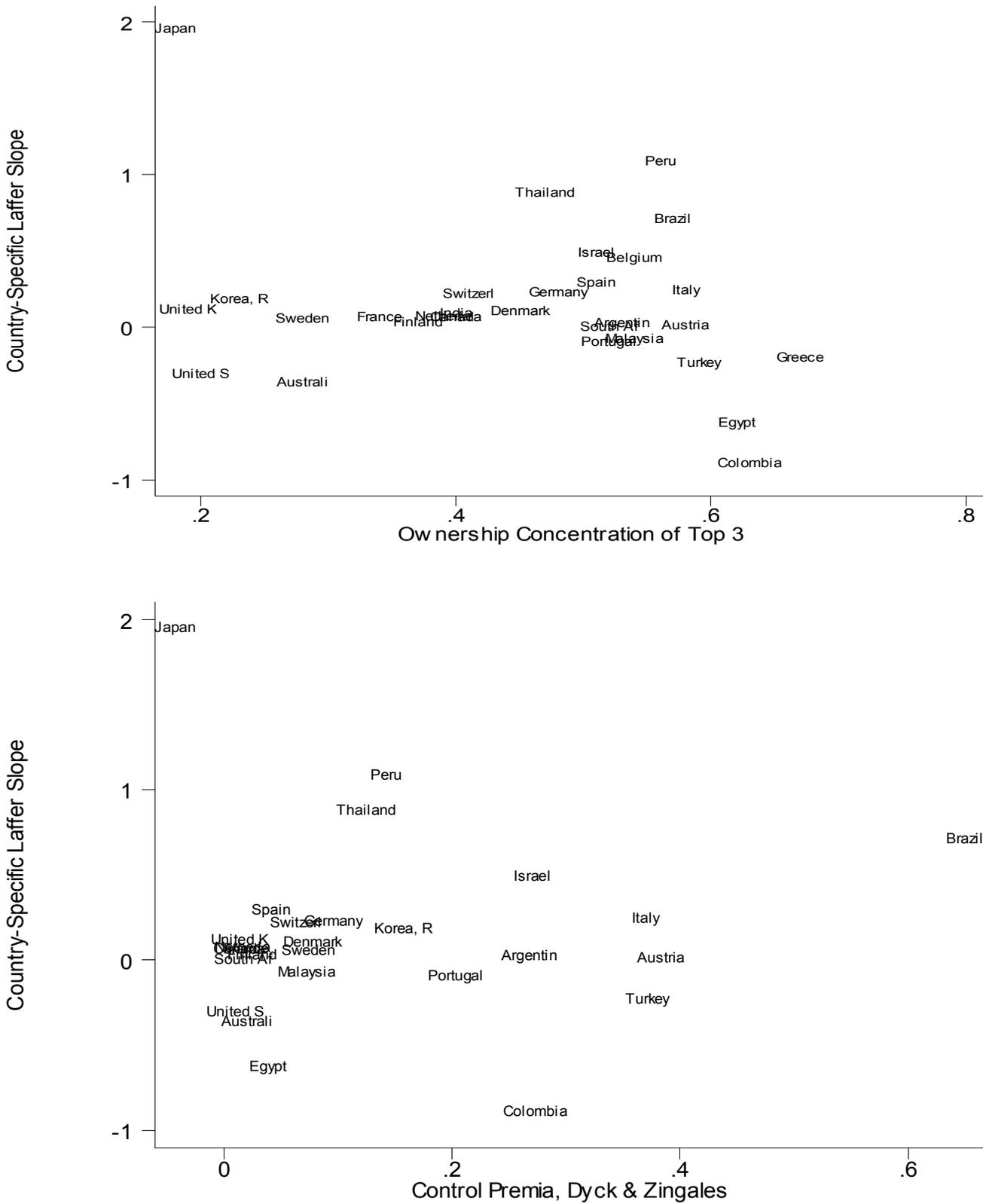
Notes: For this figure, baseline values are an enforcement parameter ( $\alpha$ ) of 0.7, a governance index ( $1 - \gamma$ ) of 0.9, and a controlling block size ( $\lambda$ ) of 0.5.

**Figure 4a: The Relationship between Country-Specific Laffer Curves, Control Premia and Ownership Concentration, Using Log Corporate Revenues**



Note: The two panels depict the relationship between country-specific Laffer-curve slopes (generated from country-specific regressions of the log of corporate tax revenues on log GDP and statutory tax rates) versus the average ownership of the top three holders in the ten largest non-financial firms as reported in LLSV (1998) and the control premium estimated in Dyck & Zingales (2003).

**Figure 4b: The Relationship between Country-Specific Laffer Curves, Control Premia and Ownership Concentration, Using Corporate Revenue Shares**



Note: The two panels depict the relationship between country-specific Laffer-curve slopes (generated from country-specific regressions of the share of corporate tax revenues in total tax revenues on log GDP and statutory tax rates) versus the average ownership of the top three holders in the ten largest non-financial firms as reported in LLSV (1998) and the control premium estimated in Dyck & Zingales (2003).

**Table 1: Intercompany Transactions at Tyco, Selected Financial Statistics, 2000-2001**

Years Ending September 30,	Tyco International Ltd.		Tyco International Group S.A.		Other Subsidiaries		Consolidating Adjustments		Total	
	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001
<b><u>Income Statement Items</u></b>										
Net Revenues	-	-	-	-	35,644	34,037	-	-	35,644	34,037
Operating (Loss) Income	(52)	(14)	0	4	(1,527)	6,196	-	-	(1,579)	6,187
Interest (Expense) Income, Net	(117)	(51)	(894)	(724)	51	(1)	-	-	(960)	(777)
Equity In Net (Loss) Income of Subsidiaries	(8,724)	4,140	1,807	2,609	-	-	6,917	(6,749)	-	-
Intercompany Interest and Fees	(522)	(104)	861	750	(339)	(646)	-	-	-	-
Net (Loss) Income	(9,412)	3,971	1,807	2,609	(8,724)	4,140	6,917	(6,749)	(9,412)	3,971
<b><u>Balance Sheet Items</u></b>										
<i>Assets</i>										
Property, Plant and Equipment, Net	5	6	0	1	9,964	9,963	-	-	9,970	9,970
Investment in Subsidiaries	40,534	48,325	32,220	31,608	-	-	(72,754)	(79,933)	-	-
Intercompany Loans Receivable	218	218	21,001	16,672	13,335	9,610	(34,554)	(26,501)	-	-
<i>Liabilities</i>										
Intercompany Payables	3,435	4,296	515	739	379	529	(4,328)	(5,564)	-	-
Long-Term Debt (current portion included)	3,519	3,499	19,487	15,950	1,200	2,170	-	-	24,206	21,619
Intercompany Loans Payable	9,315	9,610	4,020	-	21,219	16,891	(34,554)	(26,501)	-	-

Note: The table provides selected income statement and balance sheet items for Tyco International Ltd. (the parent entity in Bermuda), Tyco International Group SA (the financing arm in Luxembourg), and all other subsidiaries along with consolidating adjustments for 2001 and 2002. These figures are drawn from the Tyco 2002 10-K.

Table 2: The Growth of Tyco Subsidiaries, 1991-2001

	<u>2001</u>	<u>1999</u>	<u>1996</u>	<u>1991</u>
<b>Total U.S. Subsidiaries</b>	648	309	30	29
<b>Foreign Countries with Operations</b>	84	69	32	20
<b>Total Foreign Subsidiaries</b>	1,750	1,019	154	81
<b>Subsidiaries in Selected Tax Havens</b>				
Bahamas	6	2	0	0
Barbados	39	13	0	0
Bermuda	84	21	1	0
Cayman Islands	6	3	0	0
Gibraltar	6	6	0	0
Jersey	6	0	0	0
Luxembourg	18	7	0	0
<b>Total:</b>	165	52	1	0
<b>Haven Share of Foreign Subsidiaries:</b>	9.4%	5.1%	0.6%	0.0%

Notes: This table lists the number of subsidiaries in the U.S. and abroad for Tyco with greater detail on subsidiaries in selected tax havens for 1991, 1996, 1999 and 2001.

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**Table 3: Descriptive Statistics for Corporate Laffer Curve Specifications**

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	<b>No of Obs.</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<i>Panel Variables</i>						
Log Corporate Tax Revenues	798	2.1308	2.4730	3.6941	-8.5172	12.1562
Corporate Tax Revenues/Total Tax Revenues	774	0.1027	0.0781	0.0951	0.0000	0.7227
Marginal Tax Rates	798	0.3814	0.4000	0.1140	0.0000	0.7500
Ownership Concentration	442	0.4227	0.4100	0.1404	0.1800	0.6700
Measure of Private Benefits	417	0.1047	0.0629	0.1359	-0.0430	0.6495
<i>Cross-Sectional Variables</i>						
Country-Specific Laffer Slopes Using Log Corporate Tax Revenues	28	4.2364	0.8327	19.2868	-9.6872	100.4001
Country-Specific Laffer Slopes Using Corporate Tax Revenue Shares	28	0.4169	0.0449	1.8191	-0.9143	9.3383
Ownership Concentration	28	0.4393	0.4600	0.1429	0.1800	0.6700
Measure of Private Benefits	25	0.1240	0.0629	0.1648	-0.0430	0.6495

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Notes: The table provides descriptive statistics for variables employed in the regressions in Tables 4 to 6. The top panel of the table provides descriptive statistics for variables from the unbalanced panel while the bottom panel provides variables from the cross-section of country when the Laffer equations are run country-by-country. "Log Corporate Tax Revenues" is the natural log of corporate tax revenues as measured in local currency and as provided in the Government Finance Statistics (GFS) electronic database. "Corporate Tax Revenues/Total Tax Revenues" is the ratio of corporate tax revenues to total tax revenues as provided in GFS. "Marginal Tax Rates" are the top corporate statutory rates as provided in the OTPR database. "Ownership Concentration" is the average percentage of common shares owned by the three largest shareholders in the 10 largest nonfinancial, privately owned domestic firms in a given country as computed by La Porta et al. (1998). The "Measure of Private Benefits" is the average control premium in negotiated control block sales in each country, as computed by Dyck and Zingales (2003).

**Table 4: Corporate Laffer Curves For Ownership Concentration**

	<b>Dependent Variable: Log of Corporate Tax Revenues</b>				<b>Dependent Variable: Corporate Tax Revenues/Total Tax Revenues</b>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Countries	All Countries	Low Ownership Concentration Countries	High Ownership Concentration Countries	All Countries	All Countries	Low Ownership Concentration Countries	High Ownership Concentration Countries
Marginal Tax Rates	-0.3367 (0.3177)	2.6986 (0.8576)	1.0950 (0.3818)	-0.8681 (0.3941)	-0.0007 (0.0261)	0.1323 (0.0828)	0.0261 (0.0387)	-0.0928 (0.0347)
Marginal Tax Rates Interacted with Ownership Concentration		-5.7497 (1.9117)				-0.3695 (0.1852)		
No Obs.	798	442	257	185	774	434	251	183
Adj. R-Squared	0.9920	0.9945	0.9915	0.9966	0.9191	0.9185	0.8770	0.9556
Country Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y
Log GDP Interactions with Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y
Number of Countries	72	31	15	16	72	31	15	16

Note: The dependent variable in columns 1-4 is the log of corporate tax revenues and the dependent variable in columns 5-8 is the ratio of corporate tax revenues to total tax revenues. "Marginal Tax Rates" are the top corporate statutory rate as provided in the OTPR database. The "Marginal Tax Rate Interacted with Ownership Concentration" is the product of the tax rate and the average percentage of common shares owned by the three largest shareholders in the 10 largest nonfinancial, privately owned domestic firms in a given country as computed by La Porta et al. (1998). All specifications employ country fixed effects and the interactions of those country fixed effects with log GDP. Columns 1 and 5 employ the full sample and the remaining columns partition the sample into subsamples based on the measure of ownership concentration.

**Table 5: Corporate Laffer Curves For Corporate Governance**

	Dependent Variable: Log of Corporate Tax Revenues					Dependent Variable: Corporate Tax Revenues/Total Tax Revenues				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All Countries	Low Private Benefit Countries (<7.6%)	High Private Benefit Countries (>7.6%)	Lower Private Benefit Countries (<10.0%)	Higher Private Benefit Countries (>10.0%)	All Countries	Low Private Benefit Countries (<7.6%)	High Private Benefit Countries (>7.6%)	Lower Private Benefit Countries (<10.0%)	Higher Private Benefit Countries (>10.0%)
Marginal Tax Rates	1.2164 (0.4009)	0.8593 (0.3898)	-0.1917 (0.4301)	1.1266 (0.3615)	-1.1558 (0.4423)	0.0424 (0.0491)	0.0273 (0.0540)	-0.0125 (0.0298)	0.0360 (0.0474)	-0.0471 (0.0373)
Marginal Tax Rates Interacted with Measure of Private Benefits	-5.9502 (2.1003)					-0.2397 (0.2606)				
No Obs.	417	267	150	298	119	409	261	148	292	117
Adj. R-Squared	0.9953	0.9932	0.9970	0.9924	0.9980	0.9509	0.9509	0.9020	0.9533	0.8876
Country Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Log GDP Interactions with Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Countries	31	16	15	18	13	31	16	15	18	13

Note: The dependent variable in columns 1-5 is the log of corporate tax revenues and the dependent variable in columns 6-10 is the ratio of corporate tax revenues to total tax revenues. "Marginal Tax Rates" are the top corporate statutory rate as provided in the OTPR database. The "Marginal Tax Rate Interacted with Measure of Private Benefits" is the product of the tax rate and the country average control premium in negotiated control block sales, as computed by Dyck and Zingales (2003). All specifications employ country fixed effects and the interactions of those country fixed effects with log GDP. Columns 1 and 6 employ the full sample and the remaining columns partition the sample into subsamples based on the measure of private benefits.

**Table 6: The Importance of Corporate Governance and Ownership Concentration for Country-Specific Laffer Curve Slopes**

	Dependent Variable: Country Specific Laffer Curve Slopes using Log of Corporate Tax Revenues			Dependent Variable: Country Specific Laffer Curve Slopes using Corporate Tax Revenues/Total Tax Revenues		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.2647 (1.9790)	0.9140 (0.6160)	0.0705 (2.0485)	0.1351 (0.0790)	0.0269 (0.0316)	0.0528 (0.1366)
Ownership Concentration	-5.5299 (4.3635)		2.2358 (4.4744)	-0.2932 (0.1624)		-0.0782 (0.4530)
Measure of Private Benefits		-6.2377 (3.5193)	-7.4503 (3.5320)		-0.1314 (0.0931)	-0.0801 (0.3420)
No Obs.	28	25	25	28	25	25
Weighted by the Inverse of the Variance of the Measured Slope?	Y	Y	Y	Y	Y	Y
R-Squared	0.0765	0.1791	0.1844	0.0763	0.0336	0.0347

Note: The dependent variable in columns 1-3 is the country-specific Laffer-curve slope generated by regressing the log of corporate tax revenues on log GDP and the corporate statutory rates. The dependent variable in columns 4-6 is the country-specific Laffer-curve slope generated by regressing the share of corporate tax revenues in total tax revenues on log GDP and the corporate statutory rates. "Ownership Concentration" is the average percentage of common shares owned by the three largest shareholders in the 10 largest nonfinancial, privately owned domestic firms in a given country as computed by La Porta et al. (1998). The "Measure of Private Benefits" is control premium in negotiated control block sales, as computed by Dyck and Zingales (2003). All specifications are weighted least squares regressions where observations are weighted by the inverse of the variance of the measured slopes from country-specific regressions.