Corporate Tax Avoidance and High Powered Incentives

Mihir A. Desai
Harvard University and NBER

Dhammika Dharmapala
University of Connecticut

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Abstract

This paper analyzes the links between corporate tax avoidance, the growth of high-powered incentives for managers, and the structure of corporate governance. We develop and test a simple model that highlights the role of positive feedback effects between tax sheltering and managerial diversion in determining how high-powered incentives influence tax sheltering decisions. The model generates the testable hypothesis that firm governance characteristics determine how incentive compensation changes sheltering decisions. In order to test the model, we construct an empirical measure of corporate tax avoidance - the component of the book-tax gap not attributable to accounting accruals - and investigate the link between this measure of tax avoidance and incentive compensation. We find that, for the full sample of firms, increases in incentive compensation tend to reduce the level of tax sheltering, suggesting a complementary relationship between diversion and sheltering. As predicted by the model, the relationship between incentive compensation and tax sheltering is a function of a firm's corporate governance. Our results may help explain the growing cross-sectional variation among firms in their levels of tax avoidance, the "undersheltering puzzle," and why large book-tax gaps are associated with subsequent negative abnormal returns.

1. Introduction

The extensive literature on how taxes influence firm financial decisionmaking, as reviewed in Graham (2003), has considered the effect of taxes on financing choices, organizational form and restructuring decisions, payout policy, compensation policy and risk management decisions. In this literature, taxes are viewed as one of many factors that shape these decisions. In contrast, firms also appear to engage in a variety of transactions that, in the words of Michael Graetz, are deals "done by very smart people that, absent tax considerations, would be very stupid." These activities, broadly labeled corporate tax shelters, are believed to have proliferated so greatly that, according to some observers, they now constitute "the most serious compliance issue threatening the American tax system today."[1]

What induces firms and managers to engage in transactions exclusively designed to minimize taxes? Alternatively, given the low perceived probabilities of detection, why don't all firms engage in these transactions? How are shareholders affected by transactions that are nominally motivated by tax savings? Previous analyses of tax avoidance and evasion have emphasized the behavior of individuals (as in the literature reviewed in Slemrod and Yitzhaki (2002)), rather than corporations. Recently, Slemrod (2004) has stressed the differences between individual and corporate tax compliance, arguing that the latter should be analyzed in a principal-agent framework. This paper develops a simple theoretical framework that embeds the sheltering decision within a managerial agency context and emphasizes the importance of interactions between rent diversion and tax sheltering. In order to test this model, we construct an empirical measure of corporate tax avoidance – the component of the book-tax gap not attributable to accounting accruals – and investigate its determinants, linking sheltering decisions by US firms to their incentive compensation and corporate governance arrangements.

The basic premise of the model is that decisions about corporate tax avoidance are made by firms' managers. The analysis of these decisions is thus embedded in an agency framework,

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[1] "Tackling The Growth of Corporate Tax Shelters"; Treasury Secretary Lawrence H. Summers, in remarks to the Federal Bar Association, Washington, DC, February 28, 2000. For a review of typical tax shelter transactions and the policy issues, see U. S. Department of the Treasury (1999). One very crude metric of the possible magnitude of such activities is provided by the U.S. General Accounting Office (2004), which documents that (i) from 1996 to 2000, approximately one-third of large U.S. corporations reported zero tax liability, (ii) that share increased steadily over the period, and (iii) by 2000, 53% of large U.S. corporations reported tax liabilities lower than $100,000. For these purposes, large corporations are those with a minimum of either $250 million in assets or $50 million in gross receipts.

where managers may also be able to enjoy private benefits of control, for instance through the diversion of rents. Decisions about tax sheltering and rent diversion are made simultaneously and are potentially interdependent. In particular, the level of one activity may change the cost to the manager of engaging in the other. For reasons elaborated below, it is possible that engaging in sheltering may make diversion more costly or less costly from the manager's viewpoint. We show that the relationship between the two activities is a critical determinant of how the increased use of incentive compensation changes sheltering decisions.

Typically, higher-powered incentives will induce the manager both to reduce her diversion of rents and to engage in more tax sheltering activity. Greater incentive compensation helps align the incentives of agents and principals and leads managers to be more aggressive about increasing firm value through tax avoidance. However, interactions between sheltering and diversion can overturn this result. Specifically, when there are positive feedback effects or "complementarities" between diversion and sheltering, the tendency toward more aggressive sheltering may be offset by the fact that reduced diversion will be associated with reduced sheltering. If the positive feedback effects are sufficiently important, then the manager's reduced diversion of rents may be accompanied by a *reduction* in tax sheltering activity. This latter possibility is initially somewhat counterintuitive but a detailed example illustrating this intuition is provided below and other evidence for this view is presented in Desai, Dyck and Zingales (2004) and Desai (2004).

While the model's predictions for the effect of higher-powered incentives on tax avoidance are ambiguous, it generates a testable hypothesis about the *interaction* between higher-powered incentives and governance. For a given relationship between diversion and sheltering, well-governed firms will provide less scope than poorly-governed firms for reductions in diversion, and hence for the offsetting reductions in sheltering (as initial diversion levels are lower, by definition, for well-governed firms). Consequently, the impact of higher-powered incentives in leading to greater tax avoidance should be greater in well-governed firms than in firms with weaker governance structures. The model is thus consistent with either a positive or negative relationship between high-powered incentives and tax avoidance but is unambiguous about the role of the governance environment in mediating those effects.

The empirical analysis that follows estimates the level of tax sheltering activity for a large sample of corporations, using financial accounting data from the Compustat database. We

first generate estimates of the book-tax gap for these firms, following the methodology of Manzon and Plesko (2002). Then, we use data on accruals to isolate the component of the book-tax gap that is attributable to earnings management activity. The residual book-tax gap is identified as the level of tax sheltering activity for each firm in each year of our sample period. We use a variety of proxies from the Execucomp database for the prevalence of incentive compensation at these firms. The quality of corporate governance is measured by the index constructed by Gompers, Ishii and Metrick (2003). Clearly, the empirical analysis requires the use of three proxies – for tax sheltering, managerial compensation structure, and governance characteristics – that are inherently imperfect. We have sought, however, to use measures that are widely accepted within each of the relevant literatures.

Merging the data on tax sheltering, managerial compensation, and corporate governance yields a panel of 658 firms over the period 1993-2002. Focusing on within-firm variation, we find that for the full sample of firms, increases in incentive compensation tend to reduce the level of tax sheltering in a manner that is consistent with complementarities between sheltering and diversion. As predicted by the model, the link between incentive compensation and sheltering is mediated by the corporate governance characteristics of the firm. The observed average relationship does not hold for the subsample of well-governed firms, for which the evidence suggests a minimal or a weak positive effect. These results are robust to a variety of extensions and specification checks, including consideration of the role of stock option deductions and the introduction of a lag structure.

This analysis suggests that the simple intuition that increased alignment of shareholder and manager interests would lead to greater tax sheltering activity is theoretically only a special case, and empirically not operative. While the underlying rationale for our interpretation – that sheltering and diversion are complementary – may appear counterintuitive, it is consistent, as discussed below, with a growing body of legal and anecdotal evidence. The results are also consistent with a notable aggregate feature of our tax sheltering measure – the growing cross-sectional variation among firms in their levels of tax avoidance over our sample period.[2] While the growth of incentive compensation has affected virtually all firms, its divergent effects on tax sheltering by different types of firms can potentially explain this observed pattern. Our results

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[2] Cross-sectional variation across firms in their use of tax shelters has been noted in the accounting literature (e.g. Hanlon, 2003a, p. 10, fn. 3), using legal and practitioner-based evidence.

may also shed some light on what Weisbach (2002) calls the "undersheltering puzzle" – i.e. why firms do not use tax shelters more extensively, given their ease and low expected costs. It may well be the case that shareholders do not want managers to engage in tax sheltering, despite the obvious gains in after-tax firm value, because doing so may also create greater opportunities for managerial diversion of rents. Indeed, the evidence in Lev and Nissim (2002) and Hanlon (2003a) that large book-tax gaps are associated with subsequent negative abnormal returns similarly suggests that tax-motivated activities by firms do not necessarily lead to greater shareholder value.

This paper makes a number of contributions. First, it provides a simple theoretical framework for understanding the interaction between tax avoidance and corporate governance. It also constructs a quantitative measure of the inherently elusive phenomenon of tax avoidance. Using this measure, it presents empirical results that illuminate how incentive compensation affects tax sheltering and how this relationship is mediated by governance institutions. More generally, we provide new evidence in favor of the emerging paradigm that links taxation and corporate governance as proposed in Desai, Dyck and Zingales (2004) and, in particular, we find evidence for the existence of positive feedback effects between diversion and sheltering. We also contribute to the large and growing literature on the effects of incentive compensation. Finally, like Crocker and Slemrod (2003), we extend the traditional tax avoidance and evasion literature on individuals to encompass the corporate sector.

The rest of the paper proceeds as follows. Section 2 reviews the related literature. Section 3 develops a model that relates incentive compensation to tax avoidance, and presents a detailed example. Section 4 describes the data, methodology and empirical framework. Section 5 presents the basic results and a series of extensions and robustness checks. Section 6 considers alternative interpretations and issues of causality, and Section 7 concludes.

2. *Related Literature*

This paper is related to research on the effects of incentive compensation, firms' reporting responses to tax incentives, and the interactions between taxation and corporate governance. In this section, we briefly review these literatures, emphasizing recent work that is most closely related to our paper.

The growth of stock-based incentive compensation is among the most notable developments in corporate practices in recent years (see Hall and Murphy (2003) for an overview), and a vast literature has developed on its determinants and effects. As one example of the beneficial effects of incentive compensation, Mehran (1995) finds that firms with a larger fraction of outside directors on the board are more likely to use incentive compensation, and that its use improves firm performance.[3] More recently, concerns have arisen about the potentially negative aspects of the use of high-powered incentives, as reviewed in Bebchuk and Fried (2003). For example, Erickson, Hanlon and Maydew (2003) analyze firms that were accused of accounting fraud by the SEC during 1996-2003 and find that incentive compensation significantly increases the likelihood that a firm is accused of fraud. This paper extends the literature on how incentive compensation shapes manager and firm behavior, particularly with respect to tax planning.[4]

The tremendous growth in incentive compensation during the 1990s coincided with an increased disconnect between the profits reported to capital markets and the profits reported to tax authorities. Manzon and Plesko (2002) conclude that the explanatory factors relevant for explaining this gap have not changed over time. In contrast, Desai (2003) argues that the growing divergence between the two during the 1990's is not attributable to the factors that account for the book-tax gap in the earlier part of this period – the differential treatment of depreciation, foreign source income, and employee option grants in the reporting of book and tax income – and that it cannot be fully explained by increased levels of earning management over this period.[5] Lev and Nissim (2002) and Hanlon (2003a) analyze the link between book-tax gaps and future returns in a further effort to understand if these gaps represent earnings manipulation, finding that book-tax gaps predict future negative abnormal returns. This paper extends the

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[3] See Core, Holthausen and Larcker (1999) for an alternative view of the relationship between board structure and compensation.

[4] As one example of such an interaction, Gupta and Swenson (2003) find that incentive compensation encourages lobbying by firms for tax benefits. More generally, Beatty (1995), Core and Guay (2001) and Graham, Lang and Shackelford (2004) all consider how a firm's tax characteristics shape incentive compensation plans. This paper turns this question on its head and considers how incentive compensation plans shape a firm's tax characteristics.

[5] For studies on earnings management, see e.g. Healy (1985), Jones (1991) and Dechow, Sloan and Sweeney (1995); for a recent theoretical perspective, see Goel and Thakor (2003). Other studies on the discrepancies between book and tax reporting include Plesko (2002) and Mills and Newberry (2001).

literature by developing a measure of the tax sheltering component of the book-tax gap, and investigating its determinants.[6]

Finally, the issue of corporate tax avoidance has previously been linked to the structure of corporate governance. Specifically, Desai, Dyck and Zingales (2004) analyze and test a model of the interaction between tax sheltering activity and the diversion of rents by managers. They argue that strong positive feedback effects between the two activities may exist, so that increased levels of tax enforcement may raise firm value, despite the firm's increased tax payments. Moreover, a corporate Laffer curve may exist that is a function of the governance environment and levels of insider ownership. Evidence from a recent crackdown in tax enforcement in Russia supports the former prediction, and cross-country evidence on the revenue effects of tax rate changes supports the latter prediction. The model presented below demonstrates that this interaction between sheltering and diversion is critical to understanding how the increased use of incentive compensation may be linked to tax sheltering, and how this phenomenon may be operative in the U.S. setting.[7]

3. *A Simple Model and Example*

The effects of high-powered incentives on tax sheltering activity can be analyzed using a simple model of managerial behavior. The aim here is to present a reduced-form specification of the manager's objective function, and to derive the conditions under which increasing the power of the manager's incentives will induce the manager to engage in increased or decreased levels of tax sheltering.[8] A theoretical literature has recently begun to analyze the nature of the optimal

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[6] Of course, this literature is a subset of the much larger literature on how tax factors interact with reporting decisions. There are two somewhat distinct bodies of work on this issue. The accounting literature (reviewed in Shackelford and Shevlin (2001) and Maydew (2001)) has emphasized the interaction of tax costs or benefits and other reporting costs or benefits. Separately, a large literature (reviewed in Hines (1999)) exists on how multinationals distort reported profits and investment in response to tax rate differences.

[7] There are a variety of ways in which tax policy influences ownership structures and governance outcomes in the U.S. setting. For example, Morck (2003) investigates the role of the tax treatment of intercorporate dividends in shaping the structure of business groups, and Desai and Gentry (2003) and Maydew, Schipper and Vincent (1999) examine how corporate cross-holdings and divestiture decisions are influenced by tax factors. Aside from cross-holdings, incorporation and reincorporation decisions can also reflect tax considerations, as in Mackie-Mason and Gordon (1997) and Desai and Hines (2002).

[8] One of the thorny questions we sidestep in our model is precisely what a tax shelter is. We rely on the intuition provided by Graetz in the quote at the start of the paper and that is now embodied in the "economic substance" doctrine – specifically, a transaction that has no associated business purpose. In the stark setting of the model, that corresponds to underreporting of true profits to tax authorities without any particular emphasis on the means by which this is accomplished. The definition of a shelter is obviously a legal question and our interest lies in understanding managerial motivations for transactions that serve fundamentally to reduce tax liabilities.

incentive contract when managers can engage in tax evasion or avoidance (Crocker and Slemrod, 2003; Chen and Chu, 2003). This formulation does not address these issues in detail, but is sufficiently flexible to capture in reduced form any kind of employment contract that may be feasible.

3.1. *Assumptions*

We assume that a firm generates exogenous earnings of $Y > 0$, observable only to the manager. The manager chooses a level of income to reveal to shareholders (denoted Y^S), and a level of income to report to the tax authorities (denoted Y^T), where Y^S, $Y^T \in [0, Y]$.[9] We restrict attention to the case where $Y^S \geq Y^T$ (i.e. where the book-tax gap ($Y^S - Y^T$) is nonnegative). This constraint simplifies the analysis, but does not fundamentally affect the qualitative response of the manager to changes in the structure of compensation. The manager is assumed to gain utility $w(D)$ from the amount of earnings $D = Y - Y^S$ diverted (i.e. not reported to shareholders), and consumed by the manager as rents:[10]

A1: $w'(D) > 0, w''(D) < 0$ (i.e. $w(D)$ is increasing and concave)

The manager is also assumed to care about firm value as represented by the after-tax *cum dividend* value of the firm, or $(Y^S - tY^T)$, where t is the corporate tax rate. The manager places a weight θ on firm value; θ captures the extent to which the manager's outcomes are tied to firm performance (e.g. through incentive compensation).[11]

Engaging in diversion and sheltering activity involves costs for the manager, captured in reduced-form by a loss function $L(Y - Y^S, Y - Y^T)$, or equivalently $L(D, Z)$, where $Z = Y - Y^T$ is

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[9] In the absence of diversion and sheltering ($Y^S = Y^T = 0$), the firm's reported book income and its reported taxable income will each be equal to Y. It thus appears that we are modeling a system characterized by book-tax conformity. However, this assumption does not affect the results. In particular, we could introduce different values of "true" book income (say, Y^B) and "true" taxable income (say, Y^X), but these constants would not fundamentally change the solution to the manager's optimization problem.

[10] There are also some interesting issues associated with the reporting of artificial profits to shareholders, i.e. settings where $Y^S > Y$ (as explored in Erickson, Hanlon and Maydew (2004)). Given that our emphasis is on the interaction of sheltering and diversion, the model follows the convention of the private benefits literature (e.g. Zingales, 1995; Shleifer and Wolfenzon, 2002), where insiders divert income.

[11] Note that this is a static one-period model, where the manager engages in the avoidance of current taxes in order to raise after-tax firm value. In a dynamic setting, however, firm value would depend on the present value of tax savings. Thus, managers can also raise after-tax firm value by reducing future tax liabilities. In the empirical analysis, Y^T is operationalized using current tax expense (see Eq. (8) below) to be consistent with the model. However, the empirical analysis controls for changes in future tax liabilities, using deferred tax expense, as explained in Section 5.1 below.

the amount of income sheltered from the tax authorities. $L(\cdot,\cdot)$ is increasing and convex in each argument:

A2: $L_S(\cdot,\cdot)$, $L_T(\cdot,\cdot) < 0$ and $L_{SS}(\cdot,\cdot)$, $L_{TT}(\cdot,\cdot) > 0$

where $L_S(\cdot,\cdot)$ denotes the derivative of L with respect to Y^S and $L_T(\cdot,\cdot)$ denotes the derivative of L with respect to Y^T. These costs to the manager may be either *ex ante* (e.g. the effort and resources expended in diverting and sheltering the firm's earnings) or *ex post* (e.g. sanctions imposed upon managers when sheltering or diversion are detected).[12]

The formulation here allows for interdependencies between the costs of sheltering and the costs of diversion. As argued in Section 3.3 below, and by Desai, Dyck and Zingales (2004), positive feedback effects between sheltering and diversion may exist in some circumstances; then, $L_{ST}(\cdot,\cdot) < 0$. Alternatively, sheltering and diversion may be substitutes, i.e. $L_{ST}(\cdot,\cdot) > 0$. We return below to the significance of the assumptions about the cross-partial $L_{ST}(\cdot,\cdot)$. Assuming an additive form for these various components, the manager's program can be expressed as:

$$\underset{Y^S, Y^T}{Max}\, U = w(Y - Y^S) + \theta(Y^S - tY^T) - L(Y - Y^S,\, Y - Y^T) \tag{1}$$

subject to the constraints that Y^S, $Y^T \in [0, Y]$ and $Y^S \geq Y^T$.

3.2. Results

The equilibrium choices D^* and Z^* can be characterized using the first order conditions:

$$- w'(D^*) + L_S(D^*, Z^*) + \theta = 0 \tag{2}$$

$$- t\theta + L_T(D^*, Z^*) = 0 \tag{3}$$

Our primary interest is in the comparative static analysis of small changes in θ in the neighborhood of the equilibrium values. Differentiating the first order conditions:

$$\begin{bmatrix} \dfrac{\partial Y^S}{\partial \theta} \\[2mm] \dfrac{\partial Y^T}{\partial \theta} \end{bmatrix} = \begin{bmatrix} w''(\cdot) - L_{SS}(\cdot,\cdot) & -L_{ST}(\cdot,\cdot) \\ -L_{ST}(\cdot,\cdot) & -L_{TT}(\cdot,\cdot) \end{bmatrix}^{-1} \begin{bmatrix} 1 \\ -t \end{bmatrix} \tag{4}$$

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[12] The latter costs may, for example, include civil, criminal and/or reputational sanctions resulting from the detection of diversion by shareholders and/or regulators. The detection of tax sheltering activity by the tax authorities through audits may also lead to pecuniary sanctions or adverse professional consequences, if the legality of the shelter is successfully challenged by the tax authorities.

The second order condition for D^* and Z^* to maximize the manager's objective function is satisfied (i.e. the Hessian matrix is negative semidefinite) if:

$$[L_{ST}(D^*, Z^*)]^2 > -[w''(D^*) - L_{SS}(D^*, Z^*)]L_{TT}(D^*, Z^*) \tag{5}$$

Applying Cramer's Rule,

$$\text{sign} \left(\frac{\partial Y^S}{\partial \theta}\right) = -\text{sign} \left[-L_{TT}(\cdot,\cdot) - tL_{ST}(\cdot,\cdot)\right] \tag{6}$$

$$\text{sign} \left(\frac{\partial Y^T}{\partial \theta}\right) = -\text{sign} \left[-t(w''(D) - L_{SS}(\cdot,\cdot)) + L_{ST}(\cdot,\cdot)\right] \tag{7}$$

The following condition ensures that increases in θ to lead to *both* reduced diversion and increased sheltering:

Condition 1: $L_{ST}(D^*, Z^*) > \text{min} \{-(1/t)L_{TT}(D^*, Z^*), t(w''(D^*) - L_{SS}(D^*, Z^*))\}$

As both expressions on the right-hand side are negative, this condition entails that $L_{ST}(\cdot,\cdot)$ is nonnegative, or (if negative) "sufficiently large." The result can be stated as follows:

Proposition 1: If the second-order condition (Eq. (5)) is satisfied and assumptions A1 and A2 and Condition 1 hold, then an infinitesimal increase in θ leads to a decrease in diversion, an increase in sheltering, and an increase in the book-tax divergence ($Y^S - Y^T$):

$$\text{i.e.} \quad \frac{\partial Y^S}{\partial \theta} > 0, \quad \frac{\partial Y^T}{\partial \theta} < 0, \text{ and } \frac{\partial (Y^S - Y^T)}{\partial \theta} > 0$$

Proof: Follows directly from the assumptions, and Eqs. (6) and (7). As Y^S increases and Y^T decreases, it follows straightforwardly that ($Y^S - Y^T$) must increase.

This decrease in diversion is presumably the direct and intended consequence of the increase in θ (e.g. through the increased use of high-powered incentives). The novel element here is the possibility of tax sheltering activity by the manager. In these circumstances, an increase in θ also leads to an increase in tax sheltering of income from the tax authorities, as this provides the manager with an alternative means of increasing after-tax firm value.

However, when Condition 1 does not hold, it is possible that an increase in θ may lead to a decrease in sheltering:

Proposition 2: Assume that the second-order condition (Eq. (5)) is satisfied, and that assumptions A1 and A2 hold. Suppose also that $t(w''(D^*) - L_{SS}(D^*, Z^*)) > - (1/t)L_{TT}(D^*, Z^*)$, and that $L_{ST}(D^*, Z^*) \in (- (1/t)L_{TT}(D^*, Z^*), t(w''(D^*) - L_{SS}(D^*, Z^*)))$ (i.e. Condition 1 does not hold). Then, an infinitesimal increase in θ leads to decreases in diversion and sheltering, and the effect on the book-tax divergence is ambiguous:

$$\text{i.e. } \frac{\partial Y^S}{\partial \theta} > 0 \text{ and } \frac{\partial Y^T}{\partial \theta} > 0$$

Proof: Follows directly from the assumptions, and Eqs. (6) and (7).

Intuitively, when θ rises, the manager's optimal choice of Y^S* increases in response. If the costs of sheltering are higher when the level of diversion is lower, then the manager's optimal choice of Y^T* will rise (i.e. the level of sheltering will fall) on account of the increase in Y^S*. Thus, sufficiently large positive feedback effects can lead to falls in both diversion and sheltering in response to higher-powered incentives.

As this discussion makes clear, our model does not provide an unambiguous prediction concerning the effects of changes in θ on the level of tax sheltering (as this depends on an unobservable technological relationship). Nonetheless, an unambiguous testable prediction can be derived from the model. This concerns the *relative* effects of changes in θ on tax sheltering for firms with different governance characteristics (we identify stronger governance characteristics with lower initial levels of diversion). In order to conceptualize the role of the governance of firms, it is useful to consider a polar example. Consider a firm with a governance environment that is sufficiently strong that the manager finds any diversion to be prohibitively costly ($D = 0$). Now suppose that there is an increase in the power of managerial incentives (i.e. a higher θ). The manager will respond by seeking to increase firm value. Given that there is no scope to further reduce D, the manager will engage in a higher level of tax sheltering regardless of the value of $L_{ST}(\cdot,\cdot)$. In other words, sheltering and diversion cannot *locally* have strong positive feedback effects around the neighborhood of $D = 0$, regardless of the global shape of the $L(.)$ function. More formally, we can assume in such circumstances that $\lim_{D \to 0} L_{ST}(D, Z) \geq 0$.

In contrast, consider the same firm (with an identical $L(.)$ function) in a relatively weak governance environment (where $D > 0$). An increase in θ will induce the manager to increase

firm value, and thus have the direct effect of increasing both *D* and *Z*. If the *L*(.) function exhibits positive feedback effects in the relevant range of *D*, then there will also be an indirect effect on *Z*: the reduction in diversion will be associated with reduced sheltering. This indirect effect will tend to counteract the direct effect. Hence, there will be a smaller net increase (or a larger net decrease) in *Z* in the weak governance environment than in the strong governance environment (where there is no indirect effect to counter the direct effect of an increase in *Z*).

 If we assume that all firms face the same *L*(.) function (or at least that this function is independent of the firm's governance characteristics), the argument above implies that the response of tax sheltering activity by well-governed firms to increases in *θ* will be greater than the analogous responses of less well-governed firms. Intuitively, while the direct effect of increases in *θ* is to induce managers to increase *Z*, the manager of a well-governed firm does not face (at least to the same degree) the counteracting tendency created by the positive feedback effects between *D* and *Z*. This logic extends beyond this polar example. Note that, if *D* is not close to zero even in relatively well-governed firms, than the effect of increases in *θ* on *Z* may be negative even for these firms. Even so, it can be expected to be less negative than for firms with relatively worse governance characteristics.

As such, the differential response of sheltering to changes in incentive compensation based on the governance of environment provides a testable hypothesis of the relevance of the model:

Hypothesis 1: Suppose that there exist sufficiently strong positive feedback effects; then, a small increase in *θ* will lead to a larger positive (or smaller negative) effect on *Z* for well-governed firms, relative to the effect for less well-governed firms.

3.3.   The Case of Dynegy

Given that the model's predictions depend on the interactions between diversion and sheltering, it is useful to develop some intuition for how tax sheltering can interact with managerial actions that are not in shareholder interests. This subsection explores the case of Dynegy, Inc., a large energy firm. This example suggests that the complementarities emphasized above are not merely a theoretical possibility, but correspond to the real world to a significant

degree. The legal proceedings in this example provide an opportunity for the detailed examination of these interactions that are otherwise hidden.[13]

In late 1999, Arthur Andersen (AA) developed a new tax shelter, labeled a "Commodity Basis Enhancement Strategy" (CBES). An AA client in Chicago (ICA, Inc.) had significant tax losses and AA approached Dynegy in early 2000 to explore the possibility of ICA and Dynegy forming a partnership to transfer the benefits of those losses to Dynegy. In effect, the two firms would form a partnership that would enter into financial contracts to buy gas from a counterparty and sell gas on the spot market. For the first nine months of the transaction, the partnership would buy gas at below-market rates and sell that gas on the open market, creating gains that would be fully absorbed by ICA, the firm with pre-existing losses. Subsequently, ICA's interest in the partnership would effectively transfer to Dynegy, and the partnership would buy gas at above market rates for the next 51 months. The resulting losses would be used only by Dynegy, the tax paying entity. The provider of the losses would receive a fee, AA was provided a commission, the counterparty would be made indifferent through the choice of prices, and Dynegy would receive the benefit of the losses in reducing effective and cash tax rates. These early discussions between AA and Dynegy did not consider the financial accounting treatment of the transaction.

While initially interested, Dynegy discontinued discussions on CBES with AA in April 2000 due to the publication of an article by an influential columnist in a leading tax newsletter.[14] Similar columns by this author had resulted in IRS notices that disallowed the transactions featured in those columns. However, in late September 2000, the publication of an article in the *Wall Street Journal* led Dynegy to revisit this transaction. The article drew attention to the rapid rise in earnings at energy trading companies – particularly Dynegy – that were largely associated with risk management activities and not matched by increases in cash flows. In essence, energy traders were using proprietary forecasts of future commodity prices to mark-to-market long term

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[13] This description draws on the transcript, the associated exhibits, and various press accounts of *United States of America vs. Jamie Olis* argued in the Southern District of Texas, United States District Court. Philip West of Steptoe & Johnson drew our attention to the case of Dynegy, and Nathan Koppel of *American Lawyer* magazine was kind enough to provide copies of the associated documents. While the outcome of this case was extreme (a sentence for Jamie Olis of twenty-four years), the insights from this detailed example regarding how managers make sheltering decisions when other agency motives are operative are, we believe, more widely applicable. Specifically, the fraud perpetrated in this particular case need not be present for a wide variety of the dynamics we analyze in our model.
[14] Lee Sheppard wrote of this transaction in *Tax Notes* on April 17, 2000.

contracts. This allowed them to book large increases in earnings without any improvements of cash flow and generated concerns about the quality of those earnings. Within Dynegy, this problem became known as the "disconnect" between earnings and cash flows.

Prompted by these concerns over this disconnect, Dynegy returned to AA and asked if the CBES transaction could be structured so that the large cash inflows from the initial stage of the swap could be characterized as operating cash flows on Dynegy's financial statements, rather than as a loan or a financing cash flow. Anderson agreed, with the stipulation that the parties had to preserve some risk exposure so that the transaction was not a sham. Dynegy was excited by this prospect and sought out the help of Citibank to arrange the funding for the transaction. Citibank representatives, who had pitched various funding ideas to Dynegy, were "surprised to be pitched a transaction by a client" and were asked by Dynegy to create a credit-linked note structure to couple with the CBES. Rather than create a syndicate of banks with equal access to all the details of the transaction, Citibank devised a structure that would allow other banks to jointly fund the transaction without actually providing the details of the transaction to them. In short, Citibank and this note structure stood between the transaction and its funders. According to Citibank lawyers, this transactional feature was motivated by Dynegy's desire to "keep all the details inside the kimono because of the tax benefits."[15]

As the deal was being finalized in early 2001, the transaction size was determined by the amount of proceeds that would allow for a $300 million increase in operating cash flow to offset what would have otherwise been a negative adjustment. A complication arose in mid-March when an AA representative happened upon legal documents related to a variety of hedge agreements that eliminated all risk exposures in the transaction, thereby vitiating the tax benefits and the accounting treatment from AA's perspective. Heated discussions between AA and Dynegy followed, resulting in a somewhat narrower opinion by AA relying on Dynegy's stipulations (regarding the preservation of risk exposures) rather than a fuller analysis of the transaction.

In fact, a full set of hedges eliminating all risks were in place, as this had been critical to secure the participation of the banks. However, Dynegy now requested that the legal documents

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[15] These quotes are drawn from the testimonies of Patrick Boaltinghouse of Citibank and Frank Puleo of Milbank, Tweed.

for these hedges be carved out into separate documents. Citibank lawyers who thought this unusual were assured that this was "important to preserve the tax benefits of the deal." Dynegy, without the knowledge of other participants, began maintaining two sets of documents – one for AA and another for the other parties – in order to ensure that the transaction could close.

The transaction closed in April 2001 and provided for $300 million in operating cash flow and a 12% rise in net income from the tax benefits for fiscal year 2001. During the rest of 2001, Dynegy took some steps to consider another deal with similar properties, given the desire to continue increasing operating cash flows. However, on April 3, 2002, the *Wall Street Journal* published an exposé of the transactions, based on leaked documents. The article's details on the hedges prompted AA to reverse its opinion, and instigated an SEC investigation of this transaction. According to contemporaneous press accounts, subsequent concerns and disclosures about the transaction were the primary cause of a loss of 97% of Dynegy's market value from April 1 to September 30, 2002. Several Dynegy employees cooperated with criminal investigators and admitted to federal fraud and conspiracy charges related to disguising a loan as operating cash flow and one employee was convicted of those charges. Separately, the SEC pursued federal securities fraud charges as well.

Of course, any one example is insufficient to prove a particular relationship between sheltering and diversion. Nonetheless, the Dynegy example does motivate some intuition for how sheltering activities might give rise to opportunities for managers to pursue activities designed to mislead investors. First, a tax-oriented transaction became desirable when it morphed into a vehicle for misleading the capital markets. Second, features of the transaction designed to make it more opaque to the capital markets were justified on the basis of secrecy, supposedly necessitated by tax objectives. Finally, actions that served as the origins of the conspiracy to mislead the auditors were also justified on this same basis. While there is no evidence of managerial diversion in this example, it does illustrate how misrepresentations destructive to shareholders can be facilitated by tax avoidance. This provides some insight into how increased costs of sheltering might also serve to raise the costs of self-serving misrepresentations by managers. Conversely, it also suggests that increased costs of such misrepresentations may serve to discourage the use of tax shelters when the two activities are as closely intertwined as in this example.

4.   *Data and Methodology*

Several different data sources are integrated in order to analyze the phenomenon of corporate tax avoidance empirically, and to test Hypothesis 1. We begin by simulating the book-tax gap for a large sample of firms from Standard and Poor's Compustat database, using a procedure developed by Manzon and Plesko (2002). Then, we construct an empirical measure of tax sheltering activity, by adjusting the book-tax gap for measures of earnings management arising from accrual accounting. Next, we construct measures of managerial incentives, using data from Standard and Poor's Execucomp database. Then, this data is linked to an index of the quality of corporate governance, developed by Gompers *et al*. (2003). In this section of the paper, we describe the data and each of these steps in detail.

4.1.   *Measuring Tax Sheltering*

By its very nature, tax sheltering activity is extremely difficult to measure. In order to construct a proxy, we begin with the book-tax gap ($Y^S - Y^T$), operationalized as the difference between the book income reported by a firm to its shareholders and the SEC (using Generally Accepted Accounting Principles (GAAP)), and the tax income reported to the IRS. Because firms' tax returns are confidential, tax income must be estimated using simulations based on the available data. A methodology for doing so is developed in Manzon and Plesko (2002). We follow their approach, as described below. We use current Federal tax expense (hereafter, CFTE; Compustat data item #63) to estimate Y^T. Assuming that the firm faces a tax rate τ, it follows that CFTE $= \tau Y^T$.[16] Thus, the firm's estimated taxable income $\hat{Y}^T$ is simply:

$$\hat{Y}^T = \frac{CFTE}{\tau} \tag{8}$$

The (domestic US) taxable income estimated in Eq. (8) can be subtracted from the firm's (domestic US) financial statement income, to obtain the book-tax gap (e.g. Manzon and Plesko, 2002, p. 192), which we denote by *BT*:

$$BT = Y^S - \hat{Y}^T \tag{9}$$

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[16] We adjust τ for the different tax rates resulting from the progressivity of the corporate income tax rate structure; the effect of this, however, is very minor for large firms.

As described below, the book-tax gap for firm i in year t ($BT_{i,t}$) is scaled by the lagged value of the firm's assets when we construct the tax sheltering measure.

Firms with zero or negative taxable income are presumed to have attenuated incentives, at the margin, to engage in tax sheltering activity (even though net operating loss carryforwards and carrybacks can make tax savings potentially valuable for loss-making firms). Thus, in the analysis below, we restrict our sample to firm-years for which inferred taxable income is positive ($\hat{Y}^T > 0$). This is operationalized in our analysis by including only observations for which Compustat #63 > 0.

Obviously, estimating taxable income in this manner is fraught with several important measurement problems that are well-known in the literature.[17] For our purposes, it is very important to stress that the use of nonqualified stock options (NQO's) by firms does *not* affect the book-tax gap estimated using this methodology. The accounting treatment of NQO's entails that the deduction taken by firms for this form of employee compensation reduces tax liability, but does not reduce the reported tax expense (instead, there is an increase in contributed capital). As a result, the approach outlined above will overestimate taxable income for firms that use NQO's. However, reported financial income is not reduced by the use of NQO's; thus, our estimate of the book-tax *gap* is valid. Consequently, there is no mechanical reason why a firm's use of incentive compensation in the form of stock options will affect the $BT_{i,t}$ estimated by this methodology (see Manzon and Plesko (2002) for more details). In our analysis below, we include a measure of the value of stock option grants as an explanatory factor, but this is intended to capture a behavioral effect, rather than a mechanical one.

The book-tax gap $BT_{i,t}$ has grown in recent years beyond the levels that would be expected purely on the basis of differences in tax and GAAP rules. However, this gap need not represent increasing levels of tax sheltering. Specifically, earnings management – the smoothing of reported income over time in order to reach bonus targets, to avoid reporting losses, and to achieve other aims – might have contributed to the growing gap. Research analyzing earnings

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[17] First, financial income and tax reporting are subject to different rules for determining when related entities can be consolidated for reporting purposes. Thus, the entity that files a tax return need not correspond to the entity that reports financial income. Second, for firms that have net operating losses (NOLs), the current tax benefit from these NOLs is limited to the tax paid in the previous three years. Thus, if current operating losses exceed these potential tax benefits, then the above procedure will underestimate current taxable loss. Finally, the estimated book-tax gap may be understated for firms that repatriate foreign-source income when the foreign tax credit limit is not binding. For more discussion of the difficulties of inferring taxable income from financial statements, see Hanlon (2003b).

management has focused on accruals – i.e. adjustments to realized cash flows that are used in calculating the firm's net income. In order to quantify the degree to which earnings management is responsible for the gap, we adopt the following approach. We use data on accruals to isolate the component of $BT_{i,t}$ that is attributable to earnings management. The remaining orthogonal component of $BT_{i,t}$, which cannot be explained by earnings management, is inferred to be a measure of tax avoidance activity. In the results that follow, we use total accruals as a proxy for earnings management activity (as in e.g. Healy (1985)), but the results are consistent when "abnormal" (or discretionary) accruals (e.g. Jones, 1991; Dechow, Sloan and Sweeney, 1995) are used (see Section 5).

In deriving our measure of tax sheltering activity, we first construct a measure of total accruals for each of the firms in our sample for each year over this period, using the approach sketched above. Compustat data is used, with the sample restricted to those firm-years for which Execucomp data on managerial compensation is also available (this constrains the time period to 1993-2002). We obtain values of total accruals $TA_{i,t}$ for each firm i in each year t. To account for the component of the book-tax gap that is attributable to earnings management, we then run the following OLS regression, using firm fixed effects:

$$BT_{i,t} = \beta_1 TA_{i,t} + \mu_i + \epsilon_{i,t} \tag{10}$$

where:

$BT_{i,t}$: book-tax gap for firm i in year t, scaled by the lagged value of assets

$TA_{i,t}$: total accruals for firm i in year t, scaled by the lagged value of assets

μ_i: the average value of the residual for firm i over the sample period 1993-2002

$\epsilon_{i,t}$: the deviation in year t from firm i's average residual μ_i

The residual from this regression – i.e. the component of $BT_{i,t}$ that cannot be explained by variations in total accruals (and hence by earnings management) - can be interpreted as a measure of tax sheltering activity. We denote this measure by $TS_{i,t}$, where:

$$TS_{i,t} = \mu_i + \epsilon_{i,t} \tag{11}$$

We interpret this residual book-tax gap as a more precise measure of tax sheltering activity. In the basic analysis below, we use the estimate of $TS_{i,t}$ from Eq. (8) as our dependent variable.[18]

Because it is estimated as a residual, $TS_{i,t}$ is constrained by the regression procedure to sum to zero over all firms and all years (while $\epsilon_{i,t}$ is constrained to sum to zero for firm i over all years). Thus, neither $TS_{i,t}$, nor its components μ_i and $\epsilon_{i,t}$, can be interpreted as the dollar amount of income sheltered from taxes by firm i in year t. Similarly, it is not possible to aggregate $TS_{i,t}$ across all firms to obtain a measure of aggregate tax sheltering in the economy in year t. For our purposes, this does not matter. As described below, we use panel data regressions with firm fixed effects, so we only require a measure that proxies adequately for variations in tax sheltering activity *within* a firm over time.[19]

Figure 1 plots $TS_{i,t}$, averaged across all firms in the sample for each year from 1993-2002 (summary statistics for the tax sheltering measure are provided in Table 1). Because $TS_{i,t}$ is derived as a residual, Figure 1 cannot be used to address questions about whether the aggregate amount of tax sheltering has grown over this period. The variability of $TS_{i,t}$ across firms in each of these years is also represented, using measures of $TS_{i,t}$ for firms one standard deviation from the mean in each of these years. The most notable feature is the substantial increase in the variation of this measure across firms since the mid-1990's. Although our analysis relies only on within-firm variation, the explanatory factors for tax sheltering that we identify within firms over time can also shed light on this increase in variation across firms.

4.2. *Measures of Managerial Incentives*

Our analysis requires some empirical proxy for the theoretical parameter of interest θ (the degree to which managerial incentives are aligned with shareholder interests). Data on the structure of executive compensation is available for a large sample of firms from Standard and

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[18] The inferences we make, however, are conditional on using the true $TS_{i,t}$, rather than an estimate. An alternative approach that avoids this problem involves replacing our two-stage procedure with a single regression, using $BT_{i,t}$ as the dependent variable, while controlling for $TA_{i,t}$ by including it as a regressor. As discussed in Section 5.3, the two approaches lead to consistent results, indicating that the corrections to the standard errors involved are minimal. As the inferences are unaffected, and the results are easier to interpret when a direct measure of tax sheltering is used as the dependent variable, we use the two-stage procedure below.

[19] Note that these fixed effects absorb the time-invariant firm-specific component μ_i, so only the time-varying residual $\epsilon_{i,t}$ is used as a measure of tax sheltering.

Poor's Execucomp database for the period 1993-2002.[20] Execucomp data is provided at the manager-year level – i.e. the unit of observation is an individual manager in a particular year. Typically, the data includes observations on 5 top managers for each firm in the sample, although the precise number differs across firms. We aggregate the managerial compensation measures across all managers in a given firm in a given year, to obtain measures at the firm-year level that proxy for the prevalence of incentive compensation at that particular firm in that year.

We use these data to calculate measures of stock-based compensation that are widely employed in the literature on incentive compensation (e.g. Mehran, 1995; Erickson, Hanlon and Maydew, 2003).[21] Our primary measure is the value of stock option grants to executives as a fraction of total compensation, denoted by $STKMIXGRANT_{i,t}$, which is calculated as follows. For firm i in year t, the Black-Scholes value of stock options granted to each executive j (Execucomp variable Blk_valu, which we denote by $BLKVAL_{j,i,t}$) is summed across all the firm's managers. Salary and bonus for that firm's executives in that year (Execucomp variables $Salary$ and $Bonus$, which we denote $SALARY_{j,i,t}$ and $BONUS_{j,i,t}$, respectively) are summed in an analogous way. $STKMIXGRANT_{i,t}$ is the ratio of the sum of the values of stock options to total compensation (defined as the sum of the value of stock options, salary and bonus):

$$STKMIXGRANT_{i,t} = \frac{\sum_j BLKVAL_{j,i,t}}{\sum_j BLKVAL_{j,i,t} + \sum_j SALARY_{j,i,t} + \sum_j BONUS_{j,i,t}} \tag{12}$$

where j indexes executives, i indexes firms, and t indexes years. Summary statistics for this and all the other compensation variables are shown in Table 1.

We also calculate a measure of restricted stock grants (Execucomp variable $Rstkgrnt$) as a fraction of total compensation in a manner analogous to Eq. (12), and denote this by $STKMIXREST_{i,t}$. Summing option grants and restricted stock grants yields an overall measure of stock-based compensation as a fraction of total compensation, denoted by $STKMIX_{i,t}$. We also

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[20] The Execucomp data begins in 1992, but we choose 1993 as our starting point to ensure more complete coverage of firms.

[21] Mehran (1995) also uses a measure of the fraction of the firm owned by managers. However, there is relatively little time-series variation in managerial stock ownership, and so it appears inappropriate for our longitudinal analysis. Moreover, Morck, Shleifer and Vishny (1988) argue that high levels of managerial share ownership may lead to "entrenchment," with managers enjoying greater freedom to divert rents. If so, then higher levels of managerial share ownership may be associated with *lower*, rather than higher, values of θ.

construct an analogous measure of the value of stock option exercises by executives as a ratio of total compensation, denoted $STKMIXEXER_{i,t}$. However, there are serious problems of interpretation associated with this variable. In particular, an executive who exercises her stock options achieves greater diversification and thereby reduces the degree to which she internalizes shareholder interests. Thus, exercises may be associated with lower, rather than higher, values of θ. In addition, there is a potentially serious endogeneity problem with $STKMIXEXER_{i,t}$: an exogenously large tax sheltering residual $TS_{i,t}$ may raise the firm's market value, and induce executives to exercise their options. Thus, we focus primarily on $STKMIXGRANT_{i,t}$.[22]

4.3.   The Governance Index

We use the governance index developed by Gompers *et al.* (2003) to test Hypothesis 1. This index, denoted by G, is based on listings produced by the Investor Responsibility Research Center (IRRC) of the takeover defenses adopted by a large sample of major corporations. The IRRC tracks 22 antitakeover provisions. Gompers *et al.* (2003) combine this data with the coverage of these corporations under state antitakeover statutes to produce an index that summarizes the extent to which each firm in the sample is protected by 24 distinct corporate or state antitakeover provisions. The index is simply the number of these provisions that apply to a given firm, and so can take on integer values from 0 to 24. Lower values of G are associated with a better quality of corporate governance - in particular, with a lower degree of insulation of incumbent managers from hostile takeovers (for more details regarding these provisions, see Gompers *et al.* (2003, Appendix 1)).

Gompers *et al.* (2003) construct values of G for a large sample of firms for various years beginning in 1990. G is relatively stable for most firms over this period, providing little time-series variation. Moreover, it is difficult to interpret what variation exists because the cardinal properties of G are unclear: some antitakeover provisions may be more important than others. Accordingly, we simply use G in 1998 as our measure of governance.[23] In our analysis, G is thus firm-specific and time-invariant (i.e. $G_{i,t} = G_i$), but is not absorbed by the firm fixed effects because it is interacted with time-varying variables. In addition, the cardinality issue is less

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[22] We do not explicitly include measures of the costs to managers of engaging in tax sheltering activity (e.g. enforcement variables such as the audit probability and the probability that tax shelters are found to be illegal). While it is difficult to find precise data on these factors, our firm and year effects can capture variations in enforcement variables across firms and industries, or over time.

[23] This provides the widest coverage of firms as the IRRC significantly expanded its sample in that year.

relevant for our analysis, because we use *G* simply to divide the sample into relatively well-governed and less well-governed firms.

Another potential concern is the relationship between this index and various other characteristics of firms. Gompers *et al.* (2003, Table V) show that *G* is positively correlated with factors such as firm size and institutional ownership, and negatively correlated with past sales growth. It is possible that the distinctive effects for well-governed and poorly-governed firms that we find below may be due, not to their governance institutions *per se*, but rather to these associated characteristics. To the extent that these factors are constant over time, however, they will be absorbed by the firm fixed effects. In addition, we include controls for factors related to firm size – assets, market value, and sales – in order to capture the potential effects of changes in these characteristics over time. In the reported results below, these controls are in logs. However, as explained in Section 5.3 below, the basic results are unchanged when the controls are included in linear form, or excluded altogether.

5. *Results*

In order to examine the empirical relevance of our model, we first consider the links between incentive compensation and tax sheltering, and then refine the analysis by examining the role of governance. Several alternative explanations of these results are also examined and tested.

5.1. *Tax Sheltering and Incentive Compensation*

Our basic empirical specification seeks to estimate the marginal effect of changes in θ on tax sheltering. As discussed above, our model does not have an unambiguous prediction on this coefficient. The model, however, does provide a framework in which the results can be interpreted. As proxies for θ, we use (in separate regressions) each of the four measures of incentive compensation defined above. We also include firm fixed effects to capture unobserved heterogeneity across firms, and include year dummies. In some cases, we also include a vector of control variables. A set of size controls - assets, market value, and sales, all in logs - capture changes in the scale or size of the firm (and also proxy for the benefits of sheltering). We also include a control for changes in deferred tax expense. Taxable income was operationalized above using current tax expense (Eq. (8)). However, managers can also influence the firm's after-tax value through activities that change the firm's future tax liabilities. Because our tax sheltering

measure does not incorporate changes in future tax liabilities, we control for the effect of the latter by including deferred tax expense, scaled by assets, in our analysis.

The basic specification is the following:

$$TS_{i,t} = \beta_0 + \beta_1 IC_{i,t} + \text{Firm Fixed Effects} + \text{Year Dummies} (+ \text{Controls}) + v_{i,t} \tag{13}$$

where $IC_{i,t}$ is a measure of incentive compensation ($STKMIXGRANT_{i,t}$, $STKMIX_{i,t}$, $STKMIXREST_{i,t}$, or $STKMIXEXER_{i,t}$), and $v_{i,t}$ is the error term. The firm-year size controls are $LOGASSETS_{i,t}$, $LOGMKTVAL_{i,t}$ and $LOGSALES_{i,t}$, as discussed earlier.[24] The control variable for deferred taxes is Compustat #74 (deferred tax expense), divided by the book value of the firm's assets.

The sample we use to estimate Eq. (13) includes all firm-years with positive taxable income (as inferred using Eq. (8)) for which we have Execucomp data on $IC_{i,t}$. This yields a total of 4646 observations on 941 firms (or 4176 observations on 892 firms when all controls are included). The results are presented in Table 2 (note that these and all subsequent results use robust standard errors that, apart from those in Column 6, are clustered at the firm level). A clear pattern emerges from these results – option grants and the overall stock-based compensation measure have negative and significant effects on tax sheltering (Columns (1) and (2)). Restricted stock grants are insignificant, though also negative (Column (3)), suggesting that the effect of stock-based compensation is mostly driven by option grants. The significance of option grants is reinforced by the inclusion of firm-year size and deferred tax controls (Column (4)). Option exercises, on the other hand, have a positive and significant effect on tax sheltering (Column (5)). We do not interpret this as contradicting the other findings, however; as discussed above, exercises are best understood as reductions in θ. Thus, the positive effect of exercises reinforces the general impression that increases in θ tend to reduce the level of tax sheltering activity. However, because of the difficulties of interpretation noted earlier, we do not use option exercises in the subsequent analysis.

Tax avoidance activity by corporations is generally viewed as pro-shareholder. Thus, the negative effect of incentive compensation on tax sheltering that we find would appear to be counterintuitive. However, our model provides a framework in which we can make sense of

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[24] Employing firm fixed effects in this setting, of course, ensures that only firm-year variation in tax sheltering is used to identify sheltering. In effect, this forces our tax sheltering measure to be $\epsilon_{i,t}$ rather than $TS_{i,t}$.

these results. A negative effect is consistent with a situation in which positive feedback effects between sheltering and diversion are relatively strong. That is, the underlying quality of corporate governance is sufficiently low that any increases in the alignment of shareholder and manager interests will have the primary effect of inducing the manager to reduce the level of diversion. This in turn induces the manager to shelter less income, *via* the feedback effects.

In Section 3.3 above, we developed a detailed example of how positive feedback effects may operate in practice. More generally, as argued in Desai, Dyck and Zingales (2004), feedback effects are likely to be positive whenever a dollar of sheltered income is more easily diverted than a non-sheltered dollar. Thus, obfuscatory actions taken to shelter income from tax authorities (e.g. the use of offshore tax havens or the creation of complex structures involving tax-indifferent parties) will tend to facilitate diversion. In this vein, Desai (2004) argues that recent reports of corporate malfeasance at Tyco and Enron suggest that complex tax avoidance activities generated sufficient obscurity to allow for managerial self-dealing. Hence, it would appear that positive feedback effects reflect a fairly straightforward intuition.

If positive feedback effects are strong, then it would follow that poorly-governed firms would tend to have higher levels of tax sheltering in equilibrium, *ceteris paribus* (as their levels of diversion are higher, by definition). That is, $TS_{i,t}$ and G_i would be positively related. Of course, as G_i is time-invariant, it is impossible to test this in a fixed effects framework. Thus, we omit the firm effects, and use the following specification:

$$TS_{i,t} = \beta_0 + \beta_1 IC_{i,t} + \beta_2 G_i + \text{Industry Effects} + \text{Year Dummies} + \text{Controls} + v_{i,t} \quad (14)$$

where the industry effects are based on the firm's 2-digit SIC code. The sample is restricted to firms for which G_i is available (leaving 3484 observations on 658 firms). The results are presented in Column (6) of Table 2 (note that the standard errors are robust and clustered at the firm level). The effect of G_i on tax sheltering is positive and significant. This result should be interpreted with caution, as heterogeneity across firms cannot be fully controlled for. However, it provides additional evidence consistent with our interpretation.

5.2. *The Role of Corporate Governance*

In order to test Hypothesis 1, we estimate the effect of incentive compensation separately for well-governed firms and for less well-governed firms. While it would be possible to interact

G_i with our incentive compensation measures $IC_{i,t}$, we adopt a slightly different approach because of concerns about the cardinal properties of G_i. Specifically, we define a dummy variable $WELLGOV_i$, which takes on the value 1 for well-governed firms and 0 for less well-governed firms. In the reported results, we use $G_i \leq 7$ as our definition of a "well-governed" firm. As discussed below, however, the main results are robust to the use of alternative definitions with different values of G_i. The primary variable of interest is the interaction of $WELLGOV_i$ with $STKMIXGRANT_{i,t}$. Note, however, that we also include interactions of $WELLGOV_i$ with each of the other regressors (apart from the firm fixed effects). This ensures that the slope for each of the regressors is estimated separately for the well-governed and poorly-governed subsamples (the intercepts are firm-specific, and so can differ not only across the subsamples, but across firms). The specification is:

$$TS_{i,t} = \beta_0 + \beta_1 STKMIXGRANT_{i,t} + \beta_2(WELLGOV_i * STKMIXGRANT_{i,t}) + \text{Other Interaction}$$
$$\text{Terms + Firm Fixed Effects + Year Dummies + Controls} + v_{i,t} \qquad (15)$$

The results from this analysis are presented in Table 3 (this sample only includes those firm-years with positive inferred taxable income, and for which Execucomp data on incentive compensation and the governance data both exist – a total of 3484 observations on 658 firms). The first column simply uses the basic specification (Eq. (13)) on this restricted sample; the results are similar to those reported in Table 2. Column (2) of Table 3 reports the test of Hypothesis 1 using the interaction term (Eq. (15)). Our hypothesis is that the effect of option grants on tax sheltering for well-governed firms differs from (and is more positive or less negative than) that for less well-governed firms. In terms of Eq. (15), this entails that $\beta_2 > 0$. The results in Column (2) of Table 3 reveal that this is indeed the case, as the coefficient on the interaction term is positive and statistically significant. This implies that the effect of θ on tax sheltering for well-governed firms differs from (and in particular is less negative than) the corresponding effect for less well-governed firms. Thus, the pattern of results in Table 3 is consistent with Hypothesis 1.

The specification in Eq. (15) is essentially equivalent to running separate regressions for well-governed and less well-governed firms, as the slopes are allowed to differ across the two subsamples (and the intercepts are always firm-specific). However, to reinforce the interpretation, we also report the results from running Eq. (13) separately on each subsample. The results using stock option grants are presented in Column (3) (for the well-governed

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subsample of 203 firms, with a total of 978 observations) and Column (4) (for the poorly-governed subsample of 455 firms, with a total of 2506 observations). Clearly, the effect of *STKMIXGRANT*$_{i,t}$ on tax sheltering is negative and significant for poorly-governed firms. In contrast, the coefficient on *STKMIXGRANT*$_{i,t}$ is positive for well-governed firms (indicating that increases in θ increase tax sheltering), but is insignificant.

Our result that the generally negative effect of incentive compensation on tax sheltering does not apply to well-governed firms is consistent with our main testable hypothesis. Increases in incentive compensation do not affect tax sheltering for well-governed firms; if anything, there may be a weak positive relationship. The divergent impact of incentive compensation on tax sheltering for different types of firms may help to explain the phenomenon that we highlighted in our discussion of Figure 1. The most notable feature of our measure of tax avoidance activity is the growing divergence across firms. This has occurred despite the fact that the growth of incentive compensation has been a widespread phenomenon, affecting most major firms. The solution suggested by our results is that the growth in incentive compensation has had different effects on different firms. For relatively well-governed firms, it has either increased tax sheltering or had no impact. For less well-governed firms, it has reduced tax sheltering activity. This would account for the pattern of growing divergence shown in Figure 1.

5.3.   Some Checks for Robustness

The basic results reported in Tables 2 and 3 may be influenced by several conflating factors including the imprecise measurement of governance, changing incentives for tax avoidance over the sample period, and the fact that governance measures may reflect unobserved heterogeneity. We address these concerns in this subsection.

The results reported in Table 3 rely on a definition of a well-governed firm as one for which $G_i \leq 7$, but are generally robust to varying this definition (by, for instance, categorizing firms for which $G_i \leq 5$, $G_i \leq 6$, or $G_i \leq 8$ as well-governed). We also divided the "less well-governed" subsample further (into "moderately well-governed" firms, for which $G_i \in \{8, 9, 10\}$, and the most poorly-governed firms, for which $G_i \geq 11$). No major differences between these two subsamples were found, suggesting that the most important distinction is between well-governed firms and the rest of the sample. Further exploiting the variation in G_i to partition the sample more finely leads to subsamples that are too small to produce significant results.

Our sample period (1993-2002) covers both the boom of the 1990's, and the subsequent years, when many firms experienced reduced profits or losses. As discussed above, we exclude from our sample all firm-years where inferred taxable income is zero or negative. Nonetheless, it is possible that the incentives for tax sheltering may have differed over these two periods. To address this concern, we estimated our regression models using only data for the period 1993-99. The results (not shown) are basically consistent with those in Tables 2 and 3. The effect of stock option grants on tax sheltering is negative and statistically significant for poorly-governed firms. The coefficient on the interaction term is positive; while only marginally significant, the pattern of results for the well-governed and poorly-governed subsamples is very similar to that in Table 3.[25]

The results in Table 3 are obtained using controls for firm size and related characteristics. Specifically, we include $LOGASSETS_{i,t}$, $LOGMKTVAL_{i,t}$ and $LOGSALES_{i,t}$, which are the log values of firm i's assets, market value, and sales in year t. As noted in Section 4.3, there is a potential concern that our results may be affected by systematic differences between the well-governed and poorly-governed subsamples of firms that are not related to their governance structure *per se*. The inclusion of these controls is intended in part to address this concern. To explore this issue further, we estimate the models with the same controls entering in linear form, and also with these controls excluded. Although the standard errors become slightly larger, in both cases, the option grant measure is negative and remains statistically significant for poorly-governed firms. Similarly, the coefficient on the interaction term continues to be positive. This coefficient is significant with linear controls. While only marginally significant without the controls, the pattern of results for the well-governed and poorly-governed subsamples is very similar to that in Table 3. Thus, the basic results are not fundamentally affected by excluding the size controls, or including them in linear form.

The results so far use total accruals ($TA_{i,t}$) as the proxy for earnings management activity. However, accruals perform a valuable function by providing a more informative portrayal of the firm's economic circumstances than would realized cash flows alone. Thus, some component of $TA_{i,t}$ is likely to be "normal" even in the absence of earnings management. The accounting literature has consequently come to view the discretionary (or "abnormal") component of $TA_{i,t}$ as

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[25] It is difficult to find significant results for the 2000-02 period, given the use of firm fixed effects.

a more precise proxy for earnings management activity. Discretionary accruals can be isolated as follows (Jones, 1991). The nondiscretionary component of $TA_{i,t}$ is estimated as a function of assets, revenues, and the gross value of plant, property and equipment in the firm's industry. The residual generated by this estimation (using OLS within each industry) is inferred to be the discretionary component of accruals, denoted $DA_{i,t}$. Using $DA_{i,t}$ rather than $TA_{i,t}$ to proxy for earnings management leads to results that are highly consistent with those in Table 3. Thus, it appears that our basic results are not driven by the use of total, rather than discretionary, accruals as our proxy for earnings management.

The discussion in Section 4.1 foreshadowed an econometric issue related to our use of a two-stage procedure. We first estimate $TS_{i,t}$ using Eq. (8), and then estimate Eq. (15). However, the inferences from the latter regression are conditional on using the true value of $TS_{i,t}$, rather than an estimate. We address this issue by combining the two stages into a single regression, where the book-tax gap is the dependent variable, and $TA_{i,t}$ is included as a regressor:

$$BT_{i,t} = \beta_0 + \beta_1 STKMIXGRANT_{i,t} + \beta_2(WELLGOV_i * STKMIXGRANT_{i,t}) + \beta_3 TA_{i,t}$$

$$+ \beta_4(WELLGOV_i * TA_{i,t}) + \text{Other Interaction Terms} + \text{Firm Fixed Effects}$$

$$+ \text{Year Dummies} + \text{Controls} + v_{i,t} \qquad (16)$$

Intuitively, we use the book-tax gap as a proxy for tax sheltering, but correct for earnings management activity by including accruals as a control variable (note that $DA_{i,t}$ could be used, rather than $TA_{i,t}$, without substantially affecting the results). Eq. (16) leads to results that are consistent with those in Table 3. This suggests that the results obtained in Table 3 are only minimally affected by the use of an estimate of $TS_{i,t}$. As the interpretation is more straightforward with a direct measure of tax avoidance, we have retained our original two-stage approach in presenting the basic results, as correcting for this potential problem does not affect the basic results.[26,27]

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[26] It is worth noting that the accruals measure in Eq. (16) tends to be highly significant. This suggests that an important component of the book-tax gap is attributable to earnings management, rather than to tax sheltering. In the previous literature, the (uncorrected) book-tax gap has sometimes been used as a proxy for tax avoidance (e.g. U.S. Department of the Treasury (1999)). It thus appears that the paper's measure of tax avoidance activity – correcting the book-tax gap for earnings management activity – leads to a more precise proxy of this activity.

[27] The measure of the book-tax gap obtained in Eq. (9), and used so far in our analysis, can be refined further by adjusting the reported Y^S for expenses that are tax-deductible, and subtracting income that is tax-exempt (Manzon and Plesko (2002) emphasize equity in earnings of nonconsolidated subsidiaries and state and other income taxes).

5.4.   *Tax Exhaustion and the Role of Stock Option Deductions*

When employees exercise NQO's, the firm is allowed a tax deduction for the value of the compensation. Thus, option exercises reduce the firm's taxable income, and potentially attenuate the incentives for tax sheltering activity. Option grants *per se* do not give rise to a tax deduction. However, grants that are not yet exercised may affect current taxable income through loss carrybacks from future years in which employees exercise their options. Thus, it is possible that the use of incentive compensation and tax shelters are alternative tax planning strategies that may be substitutes for each other.[28] This would constitute an alternative explanation for our finding of a negative relationship between the two. Addressing this issue of "tax exhaustion" is important: Graham, Lang and Shackelford (2004) find that the tax savings from employee stock options for a sample of Nasdaq 100 and S&P 100 firms appear to be substantial. Moreover, the marginal tax rates faced by the former are significantly reduced by options deductions.

In the analysis so far, we have excluded from our sample all firm-years with zero or negative taxable income, as inferred using Eq. (8). This estimate does not fully take into account any tax deductions the firm may have available due to stock option exercises by its employees. The reason is that, while the firm's taxable income is reduced by the value of the compensation when employees exercise their options, the reported tax expense is not affected. Our procedure in Eq. (8) thus may overestimate taxable income for firms with stock option deductions, and our sample may include some loss firms - corporations for which we estimate positive taxable income, but which in fact have stock option deductions that exceed this income.

This tax exhaustion issue is addressed using the following approach. While there is no data on the amount of stock option deductions claimed by firms, Execucomp reports the dollar value of stock option exercises by each of the firm's top 5 managers. For each firm-year, we sum these amounts across the executives to obtain an aggregate dollar value of stock option exercises. Of course, this is likely to be an underestimate of the firm's total stock option deductions for that year, as it does not include exercises by all employees. However, aggregate stock option deductions estimated using this approach constitute about 8% of firms' pretax income, which is

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Employing such a measure reduces our sample size by one-quarter but provides results that are broadly consistent, but slightly weaker, than those presented in Table 3. The coefficient on the interaction term remains positive and is significant at the 10% level despite the reduced sample size.

[28] This is one version of the more general issue analyzed in Graham, Lemmon and Schallheim (1998).

very similar to the 10% figure reported by Graham, Lang and Shackelford (2004) for their sample of S&P 100 firms. We adjust our earlier estimate of taxable income (inferred using Eq. (8)) as follows. For a given firm-year (i, t), we calculate the adjusted taxable income:

$$Adjusted \ \hat{Y}^T = \hat{Y}^T - \sum_j SOPTEXER_j \qquad\qquad (17)$$

where $SOPTEXER_j$ is the dollar value of stock options exercised by executive j at firm i in year t. Then, we exclude from our sample not only those firm-years for which $\hat{Y}^T < 0$, but also those for which $Adjusted \ \hat{Y}^T < 0$. The results reported in Table 4 for this restricted sample of 3,413 observations on 653 firms are very similar to those in Table 3 – option grants are negative and significant, and the interaction term is positive and significant. The reduction in the number of observations due to our adjustment may appear small, but as noted above, our estimated magnitude of option deductions is consistent with that calculated in Graham, Lang and Shackelford (2004). The tax exhaustion hypothesis is an important alternative explanation for our results. However, these efforts to correct for the effects of stock option deductions, while obviously imperfect, do not appear to detract from the basic results.

5.5.   Introducing a Lag Specification

In the analysis so far, only contemporaneous variables are employed. This approach is intended to reflect our understanding of the contemporary tax shelter industry, as discussed below. However, it is possible that adjustment lags characterize the adoption of shelter technologies. In this subsection, our basic specification is extended to allow for this possibility, by incorporating option grants in the previous two years as well as the current year. Of course, it is possible that past grants are mechanically correlated with current and future exercises. Thus, we also include current, future, and lagged exercises as control variables. Huddart and Lang (1996) show that employees tend to exercise in-the-money options soon after vesting, with a spike in the fourth year of the option. Thus, we include future option exercises up to year (t + 3), to ensure that we fully control for the mechanical relationship for grants made in years (t - 2) and (t - 1). The comprehensive lag specification generalizes Eq. (15) as follows:

$$TS_{i,t} = \beta_0 + \beta_1 STKMIXGRANT_{i,t} + \beta_2(WELLGOV_i*STKMIXGRANT_{i,t})$$
$$+ \beta_3 STKMIXGRANT_{i,t-1} + \beta_4(WELLGOV_i*STKMIXGRANT_{i,t-1}) + \beta_5 STKMIXGRANT_{i,t-2}$$
$$+ \beta_6(WELLGOV_i*STKMIXGRANT_{i,t-2}) + Exercises + Other \ Interaction \ Terms + Firm$$

Fixed Effects + Year Dummies + Controls + $v_{i,t}$ (18)

(the controls for option exercises are given by $STKMIXEXER_{i,t+k}$, where $k \in \{-1, 0, 1, 2, 3\}$).

Table 5 shows that contemporaneous grants remain negative and significant in this lag specification, whereas both the lagged option grant measures are insignificant (Column (1)). The interaction term for contemporaneous grants remains positive, consistent with Hypothesis 1 (Column (2)) and approaches significance at the 10% level, despite the reduced sample size. Moreover, when the well-governed and poorly-governed subsamples are considered separately (Columns (3) and (4)), the pattern of results is very similar to that in Table 3 – contemporaneous option grants are negative and significant for poorly-governed firms, while being insignificant for well-governed firms. The lagged option grant measures are insignificant in both subsamples. Overall, there is little evidence to suggest that lagged option grants play a significant role in current tax avoidance decisions. This finding is consistent with descriptions of the contemporary market for tax shelters; it is generally emphasized that standardized tax shelter products are widely available, as asserted in Bankman (2004). It would appear that managers are able to use such "off-the-shelf" products with little delay to adjust their firms' taxable income in response to current incentives. Indeed, even in the Dynegy transaction, which was considered novel and highly complex, the deal closed in less than six months.

6. Discussion

6.1. Some Caveats

Our specifications assume that the various measures of incentive compensation that we use are exogenous. However, it is possible that the level of tax sheltering may affect the form that managerial compensation takes. For instance, suppose that when managers engage in a low level of tax sheltering, boards offer them more high-powered incentives in order to induce them to shelter more income. This would tend to create a negative relationship between incentive compensation and tax sheltering. This mechanism, however, seems unlikely. Tax sheltering constitutes a relatively small component of the overall firm value that shareholders and boards are presumably concerned about. Moreover, this story presumes that there is an underlying direct positive effect of incentive compensation on tax sheltering. If this were not the case, then boards would not use incentive compensation to motivate managers to avoid taxes. But then, in order to

account for our results, the reverse causality effect would have to be sufficiently large to dominate this direct incentive effect; this seems exceedingly unlikely.

Another issue that may bear on the causal interpretation of our findings is the role of managerial power in setting compensation. In contrast to the emphasis on the agency problem between shareholders and managers, the "managerial power" approach to incentive compensation (see e.g. Bebchuk and Fried (2003) for an overview, and Bertrand and Mullainathan (2001) for empirical evidence) highlights an agency problem between shareholders and the board of directors. It is argued that boards are effectively captured by the CEO so that powerful managers are able to extract rents in the form of higher compensation.[29] If managers' personally optimal level of tax sheltering is lower than that favored by shareholders, then the following alternative explanation of our results may be possible: an increase in managerial power may result in both an increase in incentive compensation and a decrease in the level of tax sheltering.

It is entirely possible that managerial power plays an important role in corporate decisionmaking. However, this alternative explanation for our findings requires in addition that *changes* in managerial power within a firm over time can generate the substantial and significant effects that we observe. This seems highly unlikely, especially as there is little evidence to suggest large changes in managerial power within firms over our sample period (for example, the governance index of Gompers *et al.* (2003) is very stable for most firms since 1990). Stable differences in the level of managerial power across different firms would be absorbed by the firm fixed effects in our model. Thus, we do not regard this alternative explanation as compelling.[30]

Of course, to address the causality issues fully, we would need a valid instrument, or a natural experiment, neither of which appears to be available. One possibility worth mentioning is Section 162(m) of the IRC, which limited the ability of firms to deduct for tax purposes compensation for employees in excess of $1 million per year, with an exception for "performance-based" compensation. This provision may seem to provide a possible source of

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[29] Of course, risk-averse managers would prefer to take the higher compensation in the form of cash, but it is argued that higher compensation can only be obtained in incentive-based forms because of "outrage costs" and the desire for "camouflage."

[30] It is possible that there are other factors that could affect both tax sheltering and incentive compensation. For instance, Slemrod (2004) suggests that firms' "corporate culture" may affect both. However, this is offered as a possible explanation for a simultaneous growth of incentive compensation and tax sheltering. It does not seem to fit our finding of a negative relationship for the typical firm.

exogenous variation in the prevalence of incentive compensation. However, the law took effect in 1994, so there is a very limited amount of pre-162(m) data. Moreover, Rose and Wolfram (2002) conclude that the effects of Section 162(m) on the magnitude and composition of executive compensation were extremely small.[31]

6.2.   *Some Implications for the "Undersheltering Puzzle"*

As noted previously, the "undersheltering puzzle" highlighted by Weisbach (2002) poses the question of why firms have traditionally failed to use tax shelters to any significant degree. Our results imply that positive feedback effects between sheltering and diversion are important for the typical firm. Thus, while unexploited opportunities for tax sheltering with little or no risk of penalties may exist, increasing tax avoidance would create greater opportunities for managerial diversion. If managers cannot credibly commit to overlooking those opportunities, then shareholders may prefer that managers not engage in tax sheltering activity. They may indeed infer from the existence of such activity that managers are also engaging in diversion. This may lead to the stock market discounting the value of such a firm, with negative consequences for the manager. It may thus be better from the manager's point of view to leave the opportunities for tax avoidance unexploited. In effect, problems of moral hazard and lack of commitment prevent a policy that would be mutually beneficial for managers and shareholders.

This explanation may also help reconcile the results in this paper with recent accounting research on the effects of book-tax gaps on earnings persistence and earnings quality. Hanlon (2003a) and Lev and Nissim (2002) show that higher book-tax gaps are associated with a reduced degree of earnings persistence, and hence lower future returns. In the accounting literature, this phenomenon has been attributed to earnings management. Book-tax gaps are explained as being due to the intertemporal smoothing of income by managers; thus, higher current reported earnings that raise the book-tax gap lead investors to expect lower future income. Such "managed" earnings are thus of lower quality and are less likely to persist in the future than are "true" earnings. Our results suggest an alternative explanation of this phenomenon. To the extent that book-tax gaps are due to tax sheltering rather than earnings management, increases in the book-tax gap may suggest to investors that managers are also engaging in higher levels of diversion (at least for those firms for which positive feedback effects

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[31] See Perry and Zenner (2001) for an alternative view.

between sheltering and diversion are likely to be large), and lead them to reduce expectations of future earnings. This account is supported by our results on the effects of governance characteristics on the relationship between tax sheltering and high-powered incentives.

7. Conclusion

The literature on taxes and financial decision-making has emphasized financing decisions where taxes are a factor but has underemphasized the importance of purely tax-motivated transactions that appear to be growing in importance. Similarly, extensive discussions of corporate tax shelters have taken place largely in the absence of analysis of the level and determinants of tax sheltering activity. Yet, as Weisbach (2002) points out, any response to the question of corporate tax shelters must be predicated on an understanding of the determinants of these activities. This paper attempts to rectify these oversights. Our simple theoretical model highlights the link between the weight placed by managers on firm value and their choices regarding tax avoidance, with particular emphasis on the role of corporate governance. The empirical measure of tax sheltering activity that we construct for a large sample of firms over the period 1993-2002, by correcting the estimated book-tax gaps to take account of accounting accruals, allows us to investigate the relevance of our framework.

Incentive compensation appears to be a significant determinant of tax avoidance activity. In particular, higher-powered incentives are associated with lower levels of tax sheltering for the typical firm, in a manner that is consistent with positive feedback effects between sheltering and diversion. This relationship, as predicted by the model, is mediated by firms' governance institutions, and does not hold for a subsample of well-governed firms. These findings help explain the growing cross-sectional variation among firms in their levels of tax avoidance over our sample period. In addition, "undersheltering" may be less puzzling in light of our results, which suggest that interactions between tax sheltering and managerial diversion of rents are a significant issue, at least for firms that are less well-governed. Finally, the perspective in the paper helps rationalize the seemingly anomalous evidence that book-tax gaps predict negative abnormal returns, as shareholders may not benefit from sheltering in the presence of positive feedback effects between sheltering and diversion.

Tax avoidance activities appear to be increasingly central to corporate financial decision-making. Financial innovations, the integration of capital markets, and an increasingly

complicated corporate tax code provide opportunities for firms to capitalize on differences in tax rates, tax preferences, and tax status in more and more elaborate ways. Understanding how such opportunities are exploited, how they interact with other financial decisions, and their consequences for shareholder welfare represents an important challenge for academic research. Hopefully, the theoretical framework and empirical measure of tax avoidance developed in this paper provides a foundation for such research.

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Figure 1: The Evolution of Tax Avoidance Residuals, 1993-2001
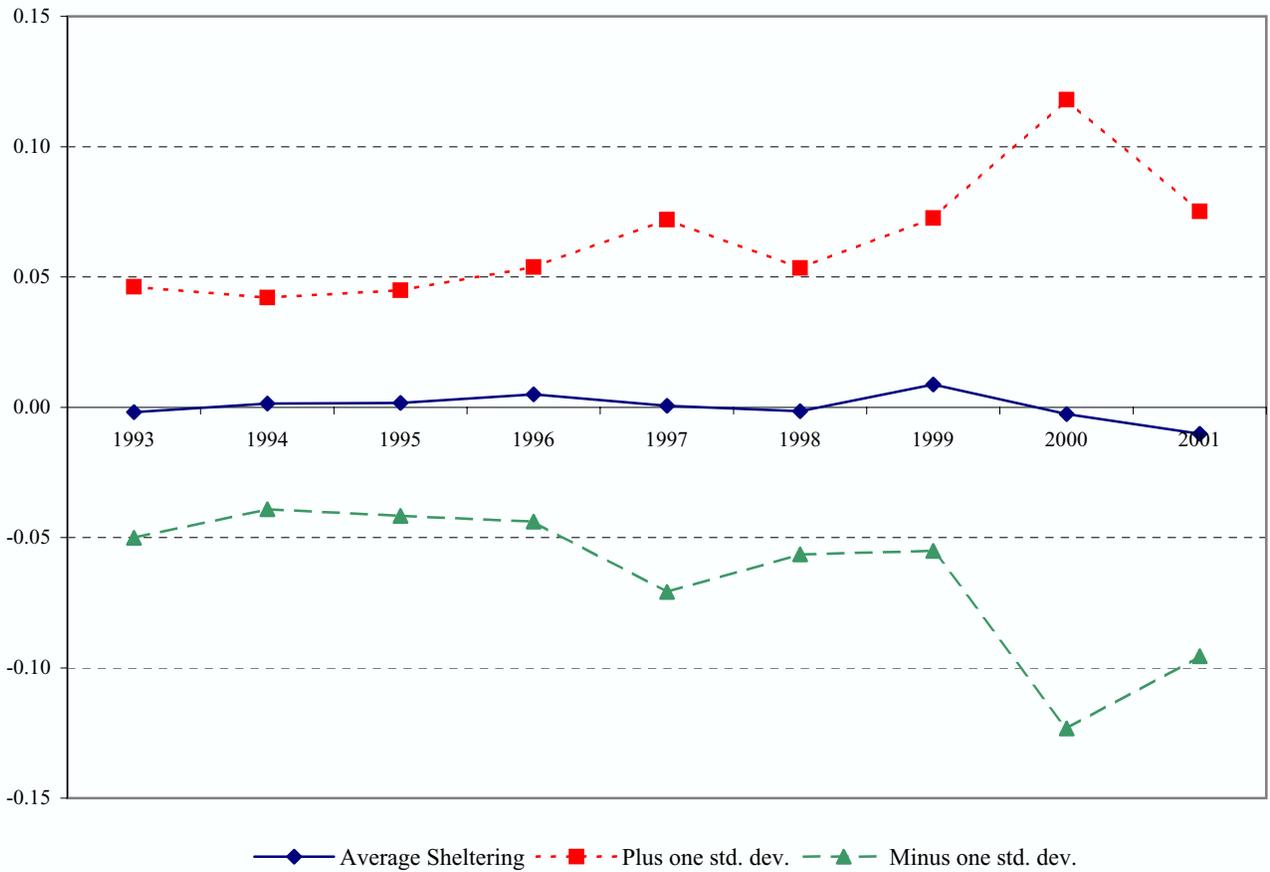
Note: The figure plots the mean average tax sheltering measure discussed in the text from 1993 to 2001 along with the mean plus and minus one standard deviation of that tax sheltering measure.

Table 1
Summary Statistics

	Mean	Median	Standard Deviation	Number of Observations
Tax Sheltering Residual	(0.0001)	(0.0021)	0.0727	6,816
Ratio of Value of Stock Option Grants to Total Compensation for Top 5 Executives	0.4116	0.4032	0.2748	6,816
Ratio of Value of Stock Option and Restricted Stock Grants to Total Compensation for Top 5 Executives	0.4419	0.4439	0.2699	6,816
Ratio of Value of Restricted Stock Grants to Total Compensation for Top 5 Executives	0.0729	0.0000	0.1587	6,816
Ratio of Value of Stock Option Exercises to Total Compensation for Top 5 Executives	0.2232	0.0762	0.2825	6,816
Governance Index, 1998	9.0816	9.0000	2.8117	5,367

Note: "Tax Sheltering Residual" is the firm-year measure of the book-tax gap not attributable to total accruals as described in the text. The various ratios scale components of compensation by total compensation for the top five executives as described in the text. "Governance Index, 1998" is the index described in Gompers *et al*. (2003).

Table 2

Tax Sheltering and Managerial Compensation Structure

Dependent Variable:	Tax Sheltering Residuals					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.0138 *	0.0147 **	0.0085	0.0813 *	0.0004	0.0046
	(0.0073)	(0.0074)	(0.0066)	(0.0436)	(0.0066)	(0.0104)
Ratio of Value of Stock Option Grants to Total Compensation for Top 5 Executives	-0.0131 * (0.0068)			-0.0148 ** (0.0071)		-0.0208 *** (0.0059)
Ratio of Value of Stock Option and Restricted Stock Grants to Total Compensation for Top 5 Executives		-0.0138 ** (0.0067)				
Ratio of Value of Restricted Stock Grants to Total Compensation for Top 5 Executives			-0.0122 (0.0115)			
Ratio of Value of Stock Option Exercises to Total Compensation for Top 5 Executives					0.0279 *** (0.0064)	
Governance Index (G)						0.0011 ** (0.0005)
Year Effects?	Y	Y	Y	Y	Y	Y
Firm Fixed Effects?	Y	Y	Y	Y	Y	N
Firm-Year Size and Deferred Tax Controls?	N	N	N	Y	N	Y
Industry Effects?	N	N	N	N	N	Y
No. of Firms	941	941	941	892	941	658
No. of Obs.	4,646	4,646	4,646	4,176	4,646	3,484
R-Squared	0.6123	0.6124	0.6119	0.6558	0.6154	0.0747

Note: The dependent variable is the tax sheltering residual described in the text. The sample is drawn from the merged Compustat and Execucomp databases, and is limited to those firm-years with positive inferred taxable income. All specifications include year effects, and all except column 6 include firm fixed effects. The specifications in columns 4 and 6 include controls for firm size (as measured by the log value of sales, assets and market value) and deferred taxes. Column 6 includes industry effects based on the 2-digit SIC code. Each of the independent variables measures a component of compensation for the top five executives of a firm in a given year, as described in the text. Robust standard errors that are clustered at the firm level are presented in parentheses; *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Table 3

Tax Sheltering, Managerial Compensation Structure and Firm Governance

Dependent Variable:	Tax Sheltering Residuals			
	(1)	(2)	(3)	(4)
	All Firms	All Firms	Well-Governed Firms	Poorly-Governed Firms
Constant	0.0672	0.0615	0.1669 **	0.0203
	(0.0475)	(0.0504)	(0.0675)	(0.0647)
Ratio of Value of Stock Option Grants to Total Compensation for Top 5 Executives	-0.0138 *	-0.0256 **	0.0127	-0.0256 **
	(0.0077)	(0.0102)	(0.0110)	(0.0101)
Grant Ratio Interacted with Dummy for Better Governed Firms		0.0382 **		
		(0.0148)		
Year, Firm, Firm-Year Size and Deferred Tax Controls?	Y	Y	Y	Y
No. of Firms	658	658	203	455
No. of Obs.	3,484	3,484	978	2,506
R-Squared	0.4415	0.4455	0.5077	0.4137

Note: The dependent variable is the tax sheltering residual described in the text. The sample is drawn from the merged Compustat and Execucomp databases, and is restricted to those firms for which data on the Governance Index is available. It is also limited to those firm-years with positive inferred taxable income. All specifications include year effects, firm fixed effects and controls for firm size (as measured by the log value of sales, assets and market value) and deferred taxes. The dummy for better governed firms is equal to one if the Governance Index is lower than 7 and zero otherwise. The specification in column 2 includes interactions of the dummy for better governance with all controls. In column 3, the sample is restricted to firms with a Governance Index with a value lower than 7. In column 4, the sample is restricted to firms with a Governance Index with a value higher than 7. Robust standard errors that are clustered at the firm level are presented in parentheses; *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Table 4

Tax Sheltering, Managerial Compensation Structure and Firm Governance - Robustness for Stock Option Deductions

Dependent Variable:	Tax Sheltering Residuals			
	(1)	(2)	(3)	(4)
	All Firms	All Firms	Well-Governed Firms	Poorly-Governed Firms
Constant	0.0697	0.0599	0.1772 ***	0.0146
	(0.0472)	(0.0494)	(0.0673)	(0.0632)
Ratio of Value of Stock Option Grants to Total Compensation for Top 5 Executives	-0.0143 *	-0.0237 **	0.0084	-0.0237 **
	(0.0075)	(0.0098)	(0.0104)	(0.0098)
Grant Ratio Interacted with Dummy for Better Governed Firms		0.0321 **		
		(0.0142)		
Year, Firm, Firm-Year Size and Deferred Tax Controls?	Y	Y	Y	Y
No. of Firms	653	653	200	453
No. of Obs.	3,413	3,413	952	2,461
R-Squared	0.4624	0.4665	0.5339	0.4350

Note: The dependent variable is the tax sheltering residual described in the text. The sample is drawn from the merged Compustat and Execucomp databases, and is restricted to those firms for which data on the Governance Index is available. It is also limited to those firm-years with positive inferred taxable income, net of inferred stock option deductions. All specifications include year effects, firm fixed effects and controls for firm size (as measured by the log value of sales, assets and market value) and deferred taxes. The dummy for better governed firms is equal to one if the Governance Index is higher than 7 and zero otherwise. The specification in column 2 includes interactions of the dummy for better governance with all controls. In column 3, the sample is restricted to firms with a Governance Index with a value lower than 7. In column 4, the sample is restricted to firms with a Governance Index with a value higher than 7. Robust standard errors that are clustered at the firm level are presented in parentheses; *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Table 5

Tax Sheltering, Managerial Compensation Structure and Firm Governance: Lag Specification

Dependent Variable:	Tax Sheltering Residuals in year t			
	(1)	(2)	(3)	(4)
	All Firms	All Firms	Well-Governed Firms	Poorly-Governed Firms
Constant	0.0892	0.1025	0.2271	0.0625
	(0.1134)	(0.1174)	(0.1889)	(0.1419)
Ratio of Value of Stock Option Grants to Total Compensation for Top 5 Executives in Year t	-0.0212 **	-0.0317 **	0.0016	-0.0317 **
	(0.0103)	(0.0129)	(0.0189)	(0.0127)
Ratio of Value of Stock Option Grants to Total Compensation for Top 5 Executives in Year (t-1)	0.0011	0.0056	-0.0099	0.0056
	(0.0113)	(0.0144)	(0.0225)	(0.0142)
Ratio of Value of Stock Option Grants to Total Compensation for Top 5 Executives in Year (t-2)	-0.0039	-0.0153	0.0191	-0.0153
	(0.0159)	(0.0173)	(0.0392)	(0.0170)
Grant Ratio in Year t Interacted with Dummy for Better Governed Firms		0.0333		
		(0.0221)		
Controls for Stock Option Exercises?	Y	Y	Y	Y
Year, Firm, Firm-Year Size and Deferred Tax Controls?	Y	Y	Y	Y
No. of Firms	460	460	124	336
No. of Obs.	1,469	1,469	357	1,112
R-Squared	0.5078	0.5187	0.6457	0.4850

Note: The dependent variable is the tax sheltering residual described in the text. The sample is drawn from the merged Compustat and Execucomp databases, and is restricted to those firms for which data on the Governance Index is available. It is also limited to those firm-years with positive inferred taxable income. All specifications include year effects, firm fixed effects, controls for firm size (as measured by the log value of sales, assets and market value) and deferred taxes, and controls for stock option exercises. The stock option exercises measures are the ratios of the value of stock option exercises to total compensation for the top 5 executives in years (t-1), t, (t+1), and (t+2). The dummy for better governed firms is equal to one if the Governance Index is higher than 7 and zero otherwise. The specification in column 2 includes interactions of the dummy for better governance with all controls. In column 3, the sample is restricted to firms with a Governance Index with a value lower than 7. In column 4, the sample is restricted to firms with a Governance Index with a value higher than 7. Robust standard errors that are clustered at the firm level are presented in parentheses; *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.