CORPORATE TAX AVOIDANCE AND FIRM VALUE

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Abstract—Do corporate tax avoidance activities advance shareholder interests? This paper tests alternative theories of corporate tax avoidance using unexplained differences between income reported to capital markets and to tax authorities. OLS estimates indicate that the effect of tax avoidance on firm value is a function of firm governance, as predicted by an agency perspective on corporate tax avoidance. Instrumental variables estimates based on exogenous changes in tax regulations yield larger overall effects and reinforce the basic result, as do several robustness checks. The results suggest that the simple view of corporate tax avoidance as a transfer of resources from the state to shareholders is incomplete given the agency problems characterizing shareholder-manager relations.

I. Introduction

WHILE tax consequences are a motivating factor in many corporate decisions, managerial actions designed solely to minimize corporate tax obligations are thought to be an increasingly important feature of U.S. corporate activity.[1] Do such activities advance shareholder interests? If avoidance activities are costless to investors, the question is trivial, as avoidance activity results in a transfer of value from the state to shareholders. Indeed, this has been the presumption in the large literature on the effects of taxes on financial decision making. Corporate tax avoidance activity, however, may be costly on several margins. Aside from the direct costs of engaging in such activities, managers typically have to ensure that these actions are obscured from tax authorities. In the process, such machinations may afford managers increased latitude to pursue self-serving objectives. Can the latter effect be significant enough to change the simple answer that investors fully capture the value of corporate tax avoidance activity?

Two small sample studies indicate that the valuation of tax avoidance activities may not conform to the simple story

of tax avoidance as a transfer of value to shareholders. First, corporate expatriations—transactions where U.S. firms invert their corporate structure so that a subsidiary in a tax haven becomes the parent entity—provide significant corporate tax savings with limited, if any, operational changes. However, markets do not react in a strongly positive fashion—and often react negatively—to U.S. firms' announcing such moves (e.g., Desai & Hines, 2002). Second, an event study of an episode of increased tax enforcement in Russia indicates that these enforcement actions are associated with positive market reactions (Desai, Dyck, & Zingales, 2007). These small sample studies are provocative but leave open questions about the nature of corporate tax avoidance activity generally and in larger samples.

This paper investigates the degree to which corporate tax avoidance activity is valued by investors in a large sample of U.S. firms. While the traditional view of corporate tax avoidance suggests that shareholder value should increase with tax avoidance activity, an agency perspective on corporate tax avoidance provides a more nuanced prediction. Specifically, firm governance should be an important determinant of the valuation of purported corporate tax savings. While tax avoidance per se should increase the after-tax value of the firm, this effect is potentially offset, particularly in poorly governed firms, by the increased opportunities for rent diversion provided by tax shelters. Thus, the net effect on firm value should be greater for firms with stronger governance institutions.

The relative merits of these two views of tax avoidance are evaluated using a data set with 4,492 observations on 862 firms over the period 1993–2001. This panel is drawn from the Compustat and Execucomp databases, merged with data on institutional ownership of firms from the CDA/Spectrum database. Firm value is measured using Tobin's q, and governance quality is proxied for by the level of institutional ownership, reflecting the ability of institutional owners to monitor managerial performance more aggressively. Tax avoidance is measured by inferring the difference between income reported to capital markets and tax authorities—the book-tax gap—and controlling for accruals and other measures of earnings management. The analysis demonstrates that this measure takes on higher values when a firm is involved in litigation relating to aggressive tax sheltering activity.

OLS results indicate that controlling for a variety of other relevant factors including firm and year fixed effects, the effect of the tax avoidance measure on q is positive but not significantly different from 0. As predicted by the agency perspective on corporate tax avoidance, the effect is positive for those firm-years with high levels of institutional ownership. The interpretation of these results, however, is complicated by the possibility of measurement error in the proxy

[1] See, for example, U.S. Department of the Treasury (1999), Bankman (2004), and Slemrod (2004). The extensive literature on the effects of taxes on firms' behavior, as surveyed in Auerbach (2002) and Graham (2003), does not typically consider corporate tax avoidance. The literature on individual tax avoidance and evasion, as surveyed in Slemrod and Yitzhaki (2002), is extensive. Despite the differences between the individual and corporate contexts stressed by Slemrod (2004), there has been relatively little theoretical modeling of tax compliance decisions by corporations. Chen and Chu (2005) and Crocker and Slemrod (2005) analyze the distinct question of the nature of the optimal incentive contract when managers can engage in tax evasion on behalf of the firm.

for tax avoidance and by the potential endogeneity of tax avoidance activity. Specifically, it is possible that firms that are performing worse for exogenous reasons may be more likely to engage in tax avoidance.[2] Fortunately, a 1997 regulatory change unintentionally and significantly changed the costs of tax sheltering differentially across firms. This source of exogenous variation permits the implementation of an instrumental variables strategy that can be used to address these concerns and to investigate the causal effect of tax avoidance on firm value.

The check-the-box regulations were designed to enable small firms to choose their organizational form for tax purposes. Altshuler and Grubert (2005) and various practitioners have observed that these regulations also had the unintended consequence of lowering the costs of tax avoidance for firms. Specifically, hybrid entities became increasingly common. These entities are classified as separately incorporated subsidiaries under the tax rules of one country while simultaneously being treated as unincorporated branches under the tax rules of another country. This flexibility in entity classification creates a sizable tax avoidance opportunity for firms with incentives to capitalize on these regulatory changes. The central idea underlying the identification strategy is that for a given incentive to engage in tax avoidance, a firm will engage in more actual tax avoidance after the check-the-box regulations were adopted. A crucial determinant of the incentives to engage in tax avoidance is the availability of tax shields. Thus, instruments for tax avoidance are constructed by interacting a dummy variable for the period after the check-the-box regulations with variables (at the firm-year-level) that proxy for the availability of tax shields: net operating loss (NOL) carryforwards and two different measures of debt.

Instrumental variables (IV) estimates using the instruments described above lead to results that are in the same direction as the OLS results but are considerably stronger. The interaction between institutional ownership and tax avoidance is positive and significant, as predicted by the agency perspective on tax avoidance. This result is robust to the inclusion of various additional control variables and a variety of extensions to the model. The exclusion restriction underlying the IV results may be invalid if the effect on firm value of the tax shield variables changed over time for reasons unrelated to the check-the-box regulations. Reassuringly, the basic result is robust to including interactions between these variables and time trends in the model. Overall, the substantially larger effects found using the IV approach suggest that the OLS results are significantly affected by attenuation bias due to measurement error in the tax avoidance proxy or by the endogeneity of tax avoidance.

The paper proceeds as follows. Section II presents the alternative views of corporate tax avoidance. Section III describes the data and the measure of corporate tax avoidance. Section IV presents the OLS results, while section V describes the IV methodology and results. Section VI concludes.

II.   Theories of Corporate Tax Avoidance

The purported growth in corporate tax avoidance activity has given rise to two alternative perspectives on the motivations and effects of this activity. Several studies investigate corporate tax avoidance as an extension of other tax-favored activity, such as the use of debt. In particular, Graham and Tucker (2006) construct a sample of firms involved in 44 corporate tax shelter cases over the period 1975–2000. By comparing these firms with a matched sample of firms not involved in such litigation, they identify characteristics (such as size and profitability) that are positively associated with the use of tax shelters and argue that tax shelters serve as a substitute for interest deductions in determining capital structure. This paper is representative of the common view that corporate tax shelters are merely tax-saving devices without any other agency dimensions.

An alternative theoretical approach emphasizes the interaction of these tax avoidance activities and the agency problems inherent in publicly held firms. According to this view, obfuscatory tax avoidance activities can create a shield for managerial opportunism and the diversion of rents. This perspective underlies several recent studies, including Desai and Dharmapala (2006) and Desai et al. (2007), and forms part of an emerging paradigm that emphasizes the links between firms' governance arrangements and their responses to taxes.[3] In this view, corporate tax avoidance not only entails distinct costs, but these costs may outweigh the benefits to shareholders, given the opportunities for diversion that these vehicles provide. Desai and Dharmapala (2009) discuss examples of the interaction between tax shelters and various forms of managerial opportunism, illustrating that straightforward diversion and subtle forms of earnings manipulation can be facilitated when managers undertake tax avoidance activity.

While the traditional view of corporate tax avoidance suggests that shareholder value should increase with tax avoidance activity, the alternative view provides a more nuanced prediction. Specifically, firm governance should be an important determinant of the valuation of purported corporate tax savings. While the direct effect of tax avoidance is to increase the after-tax value of the firm, these

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[2] Unlike the study of tax evasion by Fisman and Wei (2004), where prices of goods are observed more directly, the measure employed here is indirect. While the validation check provides reassuring evidence, controlling for various measures of accruals may not sufficiently isolate tax avoidance from earnings management.

[3] For example, Chetty and Saez (2005) show that increases in dividend payments in response to the 2003 dividend tax cut were most pronounced among firms with high levels of managerial ownership, as well as those with high levels of institutional ownership. Managers with large stock option holdings, however, were less likely to respond to the tax change (Brown, Liang, & Weisbenner, 2004). Each of these papers indicates that tax incentives interact with ownership and governance institutions in important ways.

TABLE 1.—SUMMARY STATISTICS

	Mean	Standard Deviation	Number of Observations
Tobin's q (excluding deferred tax expense)	2.3537	2.2885	4,492
Tobin's q (including deferred tax expense)	2.3123	2.0011	4,062
Market value (scaled)	1.7825	2.2881	4,470
Book-tax gap (scaled)	−0.0074	0.1077	4,492
Total accruals (scaled)	−0.0432	0.0787	4,492
Ratio of value of stock option grants to total compensation for top five executives	0.4066	0.2542	4,492
Value of stock option exercises by top five executives (scaled)	0.0061	0.0257	4,492
Sales (millions of $)	3.5831	8.3074	4,492
Volatility (Black-Scholes measure)	0.4021	0.1864	4,492
NOL carryforwards (scaled)	0.0351	0.2074	4,492
Foreign income or loss (absolute value; scaled)	0.0327	0.0401	4,492
R&D expenditures (scaled)	0.0475	0.0666	4,492
Long-term debt (scaled)	0.1748	0.1537	4,492
Debt in current liabilities (scaled)	0.0387	0.0608	4,492
Deferred tax expense (scaled)	0.0256	0.0345	4,062
Future sales growth (fraction)	0.1077	0.2984	4,328
Capital expenditures (scaled)	0.0674	0.0505	4,433
Pretax income (scaled)	0.0544	0.1363	4,492
Governance Index, 1998	9.2650	2.8387	3,906
Institutional ownership (fraction)	0.5853	0.1768	4,492

Note: These variables are defined as in the text. Scaled variables are deflated by the contemporaneous book value of assets.

effects are potentially offset, particularly in poorly governed firms, by the increased opportunities for managerial rent diversion. Thus, the net effect on firm value should be greater for firms with stronger governance institutions.

III. Measuring Firm Value, Governance, and Corporate Tax Avoidance

The data used to test the hypothesis described above are drawn from three sources. Financial accounting data are drawn from Standard and Poor's Compustat database, executive compensation data (and certain other control variables) from Standard and Poor's Execucomp database, and data on institutional ownership of firms from the CDA/Spectrum database. Merging these variables leads to a data set with 4,492 observations at the firm-year level on 862 firms over the period 1993–2001. The variables are described in detail below; summary statistics are reported in table 1.

In emphasizing the value implications of corporate tax avoidance, this paper builds on the extensive literature in corporate finance on the determinants of firm value. Within this literature, it has become standard since Demsetz and Lehn (1985) to use Tobin's q to measure firm value. The definition of q used in Kaplan and Zingales (1997) and Gompers, Ishii, and Metrick (2003) is employed in the analysis below, with one modification: deferred tax expense is not included in the definition of q used in the basic results below, as current tax avoidance activity may result in changes to future tax liabilities and thus create a mechanical

correlation between the dependent variable and the measure of tax avoidance.[4] While q is the primary dependent variable used in the analysis, alternative measures of firm value lead to consistent results, as discussed in section V.

In addition to drawing on financial statement data, the analysis here requires a measure of firm governance. The primary measure of governance used in testing the paper's main hypothesis is the fraction of the firm's shares owned by institutional investors (from the CDA Spectrum database, based on Schedule 13F filings with the SEC by large institutional investors). This fraction (which is reported quarterly) is averaged over each firm-year and is denoted by $I_{it} \in [0, 1]$ for firm i in year t. The basic motivation underlying this proxy is that institutional investors have greater incentives and capacity to monitor managerial performance. Thus, the higher is I_{it}, the greater the degree of scrutiny to which managerial actions are subjected, and the less important are agency problems between managers and shareholders. In addition, a different measure—the index of anti-takeover provisions constructed by Gompers et al. (2003)—is used in robustness checks. While this captures a quite different aspect of governance than does I_{it} (namely, managerial entrenchment rather than the quality of monitoring), its use leads to highly consistent results, as discussed in section V.

Given the efforts undertaken to obscure such activities, tax avoidance is difficult to measure. The analysis in this paper adopts an indirect approach, constructing a measure of corporate tax avoidance that takes as its starting point the gap between financial and taxable income. The difference between income reported to capital markets, using Generally Accepted Accounting Principles (GAAP) and to the tax authorities—the so-called book-tax gap—has attracted considerable interest in recent years and has been related to measures of corporate tax avoidance (Manzon & Plesko, 2002; Desai, 2003, 2005). Given that tax returns are confidential, income reported to tax authorities cannot be observed directly and must be inferred using financial accounting data, as described in Manzon and Plesko (2002) and implemented in Desai and Dharmapala (2006). This approach uses firms' reported current federal tax expense and "grosses up" this tax liability by the U.S. federal corporate tax rate.[5] For firms with positive current federal tax expense,

[4] Using the Compustat data item numbers, q_{it} for firm i in year t is defined as follows:

$$q_{it} = \frac{(\#6)_{it} + ((\#24)^*_{it}(\#25)_{it}) - (\#60)_{it}}{(\#6)_{it}}.$$

Note, however, that using the standard definition (Kaplan & Zingales, 1997) that includes deferred taxes leads to consistent results, as described in section V.

[5] The exclusion of foreign taxes and income from this calculation avoids problems associated with inferring the applicable foreign tax rates. However, foreign activities can affect U.S. tax liability under the worldwide system of taxation that applies to U.S. corporations. Thus, the regression analysis includes a control variable that proxies for foreign activity (the absolute value of foreign income or loss, as described below).

the graduated structure of corporate tax rates is used in this calculation. For firms with negative current federal tax expense, the top statutory rate of 35% is used.

Given this inferred value of the firm's taxable income, the book-tax gap can be estimated by simply subtracting inferred taxable income from the firm's reported pretax (domestic U.S.) financial income.[6] To control for differences in firm scale and because the dependent variable is deflated by the book value of assets, the inferred book-tax gap is also scaled by the book value of assets. This yields the measure of the book-tax gap used in the analysis below (denoted BT_{it} for firm i in year t).[7]

The book-tax gap does not necessarily reflect corporate tax avoidance activity, so any measure of tax avoidance must control for other factors. In particular, the overreporting of financial income (known in the accounting literature as earnings management) may contribute to the measured book-tax gap.[8] Studies of earnings management (e.g., Healy, 1985) have argued that such manipulation is most likely to occur through the exercise of managerial discretion in determining accounting accruals (i.e., adjustments to realized cash flows that are used in calculating the firm's net income). The basic intuition underlying the measure of tax avoidance used here is that book-tax gaps are attributable to either earnings management or tax avoidance activity. Accordingly, adjusting for earnings management with an ac-

cruals proxy isolates the component of the gap that is due to tax avoidance. In the regressions reported below, BT_{it} is used as a proxy for tax avoidance activity, while earnings management is controlled for by including a measure of total accruals (denoted TA_{it} for firm i in year t) as a control variable.[9]

Given the confidentiality of tax returns, this procedure yields the best measure of corporate tax avoidance that can be obtained using publicly available data. However, in view of the limitations associated with inferring taxable income, and as there are alternative explanations for book-tax gaps, it is useful to implement a validation check of the book-tax gap as a measure of corporate tax sheltering activity before proceeding to determine its valuation effects.

Graham and Tucker (2006) construct a sample of firms involved in 44 cases of tax shelter litigation over the period 1975–2000, using publicly available court records and press articles. The validation check undertaken here uses a data set compiled using a similar methodology. This information can be used to construct a variable that indicates whether tax sheltering activity was alleged in any given firm-year. Specifically, let the indicator variable L_{it} be equal to 1 if firm i was alleged to have used a tax shelter in year t, and 0 otherwise. This variable is merged with data on the book-tax gap and a set of control variables from the merged Compustat-Execucomp data set in order to examine the relationship between involvement in tax shelter litigation and book-tax gaps. The regression specification (for the case of a linear probability model) is

$$L_{it} = \beta_1 BT_{it} + \beta_2 TA_{it} + \mathbf{X}_{it}\boldsymbol{\gamma} + \varepsilon_t + \nu_{it}, \tag{1}$$

where ε_t is a year fixed effect and ν_{it} is the error term. $\mathbf{X}_{it}$ is a vector of control variables that includes measures of firm size (assets, sales, and market value) and the structure of executive compensation.

Estimating this relationship using a logit model results in a positive coefficient on BT_{it}, as reported in column 1 of table 2: the book-tax gap tends to be larger, other things equal, in firm-years in which tax sheltering is alleged.[10] Probit and linear probability models also yield positive coefficients. Any conclusions from this validation check are

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[6] One particular concern with this approach may be the following. A firm's taxable income is reduced by the value of the compensation at the time that employees exercise stock options. However, under the applicable accounting rules, the reported tax expense is unaffected. It should be remembered, though, that reported financial income is not reduced by employees' stock option exercises either. Thus, the exclusion of stock option exercises from both tax expense and financial income does not bias the measure of the book-tax gap (see Manzon & Plesko, 2002, or Desai and Dharmapala, 2006, for more details). Nonetheless, some concerns may remain that the valuation of tax avoidance may be affected by the tax shield available to a firm from stock option exercises. This issue is addressed by including the value of observed stock option exercises as a control in robustness checks.

[7] Using the Compustat data item numbers, BT_{it}, for firm i in year t is defined as follows:

$$BT_{it} = \frac{(\#272)_{it} - \dfrac{(\#63)_{it}}{\tau}}{(\#6)_{it}},$$

where τ is the U.S. federal corporate tax rate. As defined here, BT_{it} includes elements that are innocuous from the perspective of the governance issues analyzed in this paper, such as book-tax differences arising from the treatment of depreciation or from the investment tax credit. The extent to which BT_{it} can be corrected for these factors is limited by the unavailability of information (e.g., on tax depreciation) in Compustat. However, controlling for depreciation expense and investment tax credits in robustness checks leads to consistent results (see section V). Note also that tax deductions (such as those for interest expense or pension expense) that are treated symmetrically for book and tax purposes (i.e., also deducted from financial income) do not mechanically affect BT_{it}.

[8] Lev and Nissim (2004) and Hanlon (2005) investigate how book-tax gaps predict the quality of future earnings, essentially interpreting the entire book-tax gap as being due to earnings management activity. They analyze the consequences of these managed earnings for subsequent accounting and market outcomes, but do not focus on the contemporaneous valuation of the tax avoidance component of the book-tax gap.

[9] Some component of TA_{it} may be positive even in the absence of earnings management. Several alternative measures of "abnormal" or "discretionary" accruals (e.g., Jones, 1991; Dechow, Sloan, and Sweeney, 1995; Dechow, Richardson, & Tuna, 2003) have been developed to better isolate the components of accruals that are truly under managerial control. Using these alternative proxies for earnings management instead of TA_{it} leads to very similar results. An alternative approach to calculating accruals (Hribar & Collins, 2002) uses information on cash flows; this approach also gives consistent results. The results are also robust to including a control for another measure of earnings management, proposed by Phillips, Pincus, and Rego (2003), namely deferred tax expense (see section V).

[10] Note that firm fixed effects cannot be used in table 2, because the fixed-effects logit model does not use for identification any observations for firms for which L_{it} is always 0 or always 1. Thus, given that the vast majority of firms are never alleged to use shelters, the remaining sample in a fixed-effects model would be extremely small.

TABLE 2.—BOOK-TAX GAPS AND TAX SHELTER LITIGATION

Dependent Variable	Indicator (=1) for Alleged Tax Shelter Activity
Book-tax gap (scaled)	3.7185*
	(1.9377)
Accruals measure (scaled)	−5.6702***
	(0.9005)
Controls for changes in sales, assets, market value, and the ratio of the value of stock option grants to total compensation for top 5 executives?	Y
Number of firms	1,018
Number of observations	4,985
Pseudo-R^2	0.0671

Note: The dependent variable is an indicator variable = 1 in any firm-year in which the firm was subsequently alleged to be engaging in aggressive tax sheltering. The sample includes all firms in the merged Compustat and Execucomp databases for which the required data are available. The estimates use a logit model. The sample period is 1993–2001. The specifications include year effects and the set of controls specified. Robust standard errors that are clustered at the firm level are presented in parentheses; * and *** denote significance at the 10% and 1% levels, respectively.

necessarily tentative, given the small number of firms that have been involved in tax shelter litigation. Nonetheless, it appears that the measure of tax avoidance employed below captures a critical element of tax sheltering activity, as it takes on higher values for those firm-years for which there is some independent evidence for alleged tax shelter activity.

IV. OLS Approach and Results

While the central hypothesis of the paper concerns the interaction of governance institutions and tax avoidance activity, the question of whether tax avoidance tends to be associated with increases or decreases in firm value is also of considerable interest. This is addressed using the following specification:

$$q_{it} = \beta_1 BT_{it} + \beta_2 TA_{it} + \mathbf{X}_{it}\boldsymbol{\gamma} + \mu_i + \varepsilon_t + \nu_{it}, \quad (2)$$

where the variables BT_{it} and TA_{it} are as defined above, μ_i and ε_t are firm and year fixed effects, respectively, and ν_{it} is the error term (note that all regressions reported in this paper use both firm and year fixed effects).

$\mathbf{X}_{it}$ is a vector consisting of the following control variables. Changes in firm size over time are controlled for using sales.[11] The value of stock option grants to executives as a fraction of total compensation[12] is included because a substantial literature (e.g., Morck, Shleifer, & Vishny, 1988; Mehran, 1995) finds stock-based compensation to be a determinant of firm value, presumably through incentive-alignment effects. In addition, the structure of executive compensation plays a central role in Desai and Dharmapala

[11] Assets and market value enter into the definition of q and so would be mechanically correlated with the dependent variable.

[12] This is calculated from data at the manager-year level in the Execucomp database and is defined as the ratio of the Black-Scholes value of stock option grants to total compensation (i.e., the sum of the value of stock options, salary, and bonus). This is similar to the stock-based compensation measures used in Mehran (1995) and in a large subsequent literature. Adding a measure based on stock option exercises (defined analogously) does not affect the results.

(2006). To control for changes over time in the risk associated with a firm's stock price, a measure of volatility is also included.[13] As NOL carryforwards are not taken into account in the measure of tax avoidance (and because NOLs can affect the incentives to engage in tax avoidance), NOL carryforwards scaled by assets (with missing values treated as zeroes) are also included.

The tax avoidance measure is restricted to domestic U.S. tax expense and U.S. federal taxes, but tax liabilities and the incentives for tax avoidance may be influenced by foreign activity under the U.S. system of worldwide taxation. Thus, a proxy for foreign activity—the absolute value of foreign income or loss—is included in $\mathbf{X}_{it}$. As tax shields can affect the value of engaging in tax avoidance, changes in firms' leverage are controlled for by including measures of long-term debt and debt in current liabilities. Changes in intangibles that affect q but are imperfectly measured in the book value of assets are proxied for by research and development (R&D) expenditures. A number of additional control variables are used in robustness checks, as described below. Note also that because firm fixed effects are employed in the specification described below, many of the sources of cross-sectional variation in q across firms that have been discussed in the literature are effectively controlled for here.

The specification used to test whether the valuation of corporate tax avoidance is dependent on firm governance extends equation (2) as follows:

$$q_{it} = \beta_1 BT_{it} + \beta_2 TA_{it} + \beta_3 I_{it} + \beta_4 (I_{it}^* BT_{it}) + \mathbf{X}_{it}\boldsymbol{\gamma}$$
$$+ \mu_i + \varepsilon_t + \nu_{it}, \quad (3)$$

where I_{it} is the measure of institutional ownership defined above. The hypothesis in section II implies that $\beta_4 > 0$: the effect of tax avoidance on q is greater in firm-years in which institutional ownership is higher (and governance is stronger).

The results using OLS estimation on equations (2) and (3) are reported in table 3; note that all results reported in this paper use robust (White, 1980) standard errors clustered at the firm level. Column 1 presents the results from the estimation of equation (2).[14] The overall effect on firm value of the proxy for tax avoidance is positive but insignificant. The test of the hypothesis using equation (3) is reported in column 2. Here, the coefficient on the interaction term $(I_{it}^* BT_{it})$—β_4 in equation (3)—is positive, consistent with the paper's hypothesis, and is of borderline statistical significance. The intuition can be reinforced by running equation (2) separately for firm-years with high and low levels of institutional ownership (columns 3 and 4, respectively),

[13] Using a firm's beta (calculated using CRSP monthly data for the preceding five years) instead of the volatility measure has no effect on the results.

[14] The sample is restricted to firm-years for which the CDA/Spectrum data on institutional ownership are available (although that variable is not used in equation (2)), for comparability with the other columns of table 3.

TABLE 3.—TAX AVOIDANCE, FIRM VALUE, AND GOVERNANCE INSTITUTIONS: OLS RESULTS

	Tobin's q			
	(1)	(2)	(3)	(4)
			Firm-Years with High Institutional Ownership	Firm-Years with Low Institutional Ownership
Dependent Variable	All Firms	All Firms		
Book-tax gap (scaled)	0.5776	−2.1655	2.7624*	0.2718
	(0.5590)	(1.4957)	(1.5394)	(0.3678)
Book-tax gap interacted with institutional ownership		5.6687*		
		(3.3307)		
Institutional ownership		0.7706**		
		(0.3287)		
Total accruals (scaled)	1.3267**	1.2689**	0.5313	1.1159*
	(0.3811)	(0.3613)	(0.5676)	(0.5892)
Ratio of value of stock option grants to total compensation for top 5 executives	0.4391**	0.4371**	0.5627**	0.2253
	(0.1208)	(0.1202)	(0.2004)	(0.1745)
Sales	0.0442*	0.0471*	0.0195	0.0592
	(0.0249)	(0.0250)	(0.0158)	(0.0404)
Volatility	−2.114006**	−1.9465**	−3.8771**	−1.0303*
	(0.6682)	(0.6466)	(1.2553)	(0.5697)
Controls for tax shields (NOLs, long-term debt, and current debt)	Y	Y	Y	Y
Controls for foreign income/loss and R&D	Y	Y	Y	Y
Year and firm effects?	Y	Y	Y	Y
Number of firms	862	862	583	614
Number of observations	4,492	4,492	2,324	2,168
R^2	0.6483	0.6500	0.7765	0.6213

Note: The dependent variable is Tobin's q, as defined in section III. The sample (over the period 1993–2001) is drawn from the merged Compustat and Execucomp databases and is restricted to firm-years for which CDA/Spectrum data on institutional ownership are available. All specifications include year effects, firm fixed effects, and the controls listed. In column 3, the sample is restricted to firm-years with institutional ownership > 0.6. In column 4, the sample is restricted to firm-years with institutional ownership ≤ 0.6. Robust standard errors that are clustered at the firm level are presented in parentheses; * and ** denote significance at the 10% and 5% levels, respectively.

where "high" institutional ownership is defined as being a fraction that exceeds 0.6, which is approximately the mean of the sample. For well-governed firm-years, the effect of tax avoidance on q is positive and of borderline significance. For less well-governed firm-years (with institutional ownership below 0.6), the effect is also positive but statistically insignificant and considerably smaller in magnitude. Thus, while the estimated overall effect of tax avoidance on firm value is indistinguishable from 0, the effect appears to be more positive for well-governed firm-years than for poorly governed firm-years. This finding is consistent with the hypothesis that agency problems mitigate the benefits to shareholders of corporate tax avoidance.

V. Instrumental Variables Approach and Results

A. Instrumental Variables

OLS estimation of equations (2) and (3) gives rise to two types of potential problems.[15] The first is measurement error

in the proxy for tax avoidance, particularly if the extent of measurement error differs by governance institutions. For example, if the proxies used for earnings management are incomplete, the remaining component of the book-tax gap may be mischaracterized as tax avoidance when it actually represents earnings management. Accordingly, it is possible that the results are driven by differential market reactions to earnings management by well-governed and poorly governed firms. The second is the potential endogeneity of tax avoidance activity. For example, firms that are performing worse for other reasons may be more likely to engage in tax avoidance.

In order to address these concerns, an exogenous source of variation in firms' opportunities for tax avoidance is required. Fortunately, a 1997 regulatory change with unrelated objectives lowered the costs of tax avoidance for a subset of firms. In late 1996, the Treasury issued what are known as the check-the-box (CTB) regulations. These regulations enable firms to choose their organizational form for tax purposes—for example, whether to be taxed as a C-corporation or as a pass-through entity such as a partnership or sole proprietorship—by filing a one-page form on which they simply check the appropriate box. In replacing a complex set of rules by which the IRS determined firms' tax status, the CTB regulations were intended to reduce the administrative burdens for small firms. Researchers

[15] Another alternative explanation for the paper's findings (that is not entirely addressed by the IV approach) is that the differences in the valuation of tax avoidance between the well-governed and poorly governed subsamples relate to differences in the types of tax shelters used by these firms. It is possible that the smaller effect for poorly governed firms is due to these firms' investing in riskier shelters that are discounted at higher rates or in shelters with shorter expected lives. If this alternative explanation is true, the tax avoidance measure would be expected to exhibit lower autocorrelation for poorly governed firms relative to well-governed firms. However, computing simple autocorrelation coefficients for $BT_{i,t}$ in the two subsamples of firm-years shows that the degree of autocorrelation is actually larger (more positive) for less well-governed firm-years. This is not consistent with poorly governed firms' using tax

shelters with shorter expected lives. While this is by no means a definitive test, the available evidence does not appear to support the alternative explanation.

studying international taxation argue that the CTB regulations also had the unintended consequence of facilitating tax avoidance by large U.S.-based multinational firms through the use of what are known as hybrid entities (see in particular Altshuler & Grubert, 2005). Hybrid entities are classified in two distinct ways: as separately incorporated subsidiaries under the tax rules of one country and as unincorporated branches under the tax rules of another country.[16]

The instruments for tax avoidance involve interacting a dummy variable for the post-CTB time period (the years since 1997) with firm-year-level variables that capture the incentive to engage in tax avoidance. The central idea underlying the identification strategy is that for a given incentive to engage in tax avoidance, a firm will engage in more actual tax avoidance after the CTB regulations were adopted than it would have before, other things equal. A crucial determinant of the incentives to engage in tax avoidance is the availability of tax shields (tax deductions from other sources, such as interest deductions or NOL carryforwards resulting from losses in previous years). For instance, Graham and Tucker (2006) emphasize the substitutability of tax shelters and other kinds of tax shields. Instruments for tax avoidance can thus be constructed by interacting a dummy variable for the period after the CTB regulations with each of the following variables: NOL carryforwards and two different measures of debt (long-term debt and debt in current liabilities).

The IV approach involves instrumenting for the endogenous variable BT_{it} in equation (2) using as the set of instruments the variables listed above, each interacted with a dummy variable for the post-CTB period. Let P_t be the dummy for the post-CTB period, NOL_{it} be the NOL carryforwards for firm i in year t, DL_{it} be long-term debt for firm i in year t, and DC_{it} be debt in current liabilities for firm i in year t. Then the instruments for BT_{it} are $(P_t^*NOL_{it})$, $(P_t^*DL_{it})$, and $(P_t^*DC_{it})$. The first-stage regression (reported in column 1 of table 4) shows that these instruments are indeed strongly related to BT_{it}. Specifically, the coefficients are negative, as expected: lower values of tax shields (which imply a greater incentive to engage in tax avoidance) are associated with larger values of BT_{it} after the CTB regulations than before, controlling for other factors. The instruments are jointly significant at the 5% level.

TABLE 4.—BOOK-TAX GAPS, TAX SHIELDS, AND THE CHECK-THE-BOX REGULATIONS: FIRST-STAGE IV RESULTS

Dependent Variable	Book-Tax Gap	
	(1)	(2)
PostCTB × (NOL carryforwards)	−0.0349**	−0.0162
	(0.0139)	(0.0356)
PostCTB × (long-term debt)	−0.0127	−0.0474
	(0.0160)	(0.0384)
PostCTB × (current debt)	−0.0879*	−0.3103**
	(0.0507)	(0.1197)
PostCTB × (NOL carryforwards) × (institutional ownership)		−0.0579
		(0.1341)
PostCTB × (long-term debt) × (institutional ownership)		0.0548
		(0.0570)
PostCTB × (current debt) × (institutional ownership)		0.4149**
		(0.1644)
F-statistic for joint significance of the instruments (p-value)	3.33**	3.00***
	(0.0189)	(0.0063)
Controls for total accruals, executive compensation, sales, volatility, foreign income/loss, and R&D	Y	Y
Controls for tax shields (NOLs, long-term debt, and current debt)	Y	Y
Control for institutional ownership	N	Y
Year and firm effects?	Y	Y
Number of firms	862	862
Number of observations	4,492	4,492
R^2	0.5993	0.6009

Note: The dependent variable is the book-tax gap, as defined in the text. "PostCTB" is an indicator variable for years after the check-the-box regulations were introduced (1997–2001). The sample (over the period 1993–2001) is drawn from the merged Compustat and Execucomp databases and is restricted to firm-years for which CDA/Spectrum data on institutional ownership are available. All specifications include year effects, firm fixed effects, and the controls listed. 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.

In equation (3), there are effectively two endogenous variables—BT_{it} and $(I_{it}^*BT_{it})$—and the set of instruments thus includes interactions with I_{it}. In particular, the instruments for BT_{it} and $(I_{it}^*BT_{it})$ are the following: $(P_t^*NOL_{it})$, $(P_t^*DL_{it})$, $(P_t^*DC_{it})$, $(I_{it}^*P_t^*NOL_{it})$, $(I_{it}^*P_t^*DL_{it})$, and $(I_{it}^*P_t^*DC_{it})$. The first-stage results (presented in column 2 of table 4) show the expected negative relationship between each of the first three of these instruments and BT_{it}; the full set of instruments is also strongly jointly significant.[17]

The basic rationale for this IV approach is that a given incentive to engage in tax avoidance should lead to more actual tax avoidance after the CTB regulations than before. The crucial exclusion restriction underlying the use of these instruments is the following. The underlying tax shield variables (NOLs and the debt measures) used in constructing the instruments may directly affect firm value; this direct effect is controlled for by including the tax shield variables in the specification. However, the tax shield variables should not affect firm value differently after the CTB regulations other than through their influence on incentives for tax avoidance. This restriction is conditional on the controls included in the model. For example, even if firm valuations were in general higher in the late 1990s, the year dummies included in the specification would account for

[16] The following is a simple example of how these entities can be used to reduce tax liabilities. Suppose that a U.S.-based multinational (A) sets up a tax haven subsidiary (B) that provides loans to another subsidiary (C) in a high-tax foreign country. The interest on these loans is tax deductible in the high-tax foreign country, to the government of which B is reported to be a separately incorporated entity from C. Prior to 1997, the interest received by B (while untaxed by its tax haven location) would have been subject to immediate U.S. taxation under the Subpart F rules relating to interest payments from one Controlled Foreign Corporation (CFC) to another. However, the CTB regulations made it possible for A to elect (for U.S. tax purposes) to have B treated as an unincorporated branch of C. This makes the interest payments received by B "invisible" to the U.S. tax system and so facilitates the avoidance (or at least deferral until repatriation) of U.S. tax on the interest income paid by C to B.

[17] The instruments are also of borderline significance in the first-stage regression for $(I_{it}^*BT_{it})$.

TABLE 5.—TAX AVOIDANCE, FIRM VALUE, AND GOVERNANCE INSTITUTIONS: SECOND-STAGE IV RESULTS

Dependent Variable	Tobin's q (1)	Tobin's q (2)	Market Value (scaled) (3)	Tobin's q (4)
Book-tax gap (scaled)	14.523	−5.8710	−6.9313	−4.2465
	(12.288)	(5.1474)	(4.9001)	(4.0640)
Book-tax gap interacted with institutional ownership		32.8204**	31.4461**	21.4885**
		(13.0267)	(12.8540)	(10.8603)
Institutional ownership		1.0331**	1.0593**	0.9614**
		(0.4376)	(0.4250)	(0.3976)
Total accruals (scaled)	−2.8305	−1.3588	−0.4447	−0.2585
	(3.6467)	(2.3935)	(2.3651)	(1.8085)
Ratio of value of stock option grants to total	0.3495	0.4839**	0.5532**	0.4732***
compensation for top 5 executives	(0.3092)	(0.2142)	(0.1919)	(0.1609)
Sales	0.0434	0.0473*	0.0581	0.0418
	(0.0276)	(0.0264)	(0.0245)	(0.0255)
Volatility	−1.0221	−1.2096	−1.2202	−1.5364**
	(0.9795)	(0.7703)	(0.7869)	(0.7227)
Controls for tax shields (NOLs, long-term debt, and current debt)	Y	Y	Y	Y
Controls for foreign income/loss and R&D	Y	Y	Y	Y
Interactions between tax shield variables and time trends	N	N	N	Y
Year and firm effects?	Y	Y	Y	Y
Number of firms	862	862	862	862
Number of observations	4,492	4,492	4,470	4,492

Note: The dependent variable in columns 1, 2, and 4 is Tobin's q, as defined in section III. The dependent variable in column 3 is market value (scaled by the book value of assets), as defined in section V. The sample (over the period 1993–2001) is drawn from the merged Compustat and Execucomp databases and is restricted to firm-years for which CDA/Spectrum data on institutional ownership are available. All specifications include year effects, firm fixed effects, and the controls listed. The book-tax gap variable and the interaction between the book-tax gap and institutional ownership are instrumented, 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.

this. Of course, the validity of the exclusion restriction depends on there being no other changes over time in the effect of the tax shield variables on firm value. To test for possible violations of this exclusion restriction, interactions between the tax shield variables and time trends are included in the model as a robustness check.

B. Instrument Variables Results

The second-stage results from the IV analysis are presented in table 5. Column 1 reports the results from estimating equation (2), using the instruments for BT_{it} described above. The overall estimated effect of tax avoidance on firm value is substantially larger than in the OLS results in table 3. Column 2 reports the results from estimating equation (3), using the instruments for BT_{it} and $(I_{it}^* BT_{it})$ described above. The coefficient β_4 of the interaction between governance and tax avoidance is positive and highly significant, consistent with the paper's main hypothesis. The IV results thus support the notion that the benefits to shareholders from corporate tax avoidance depend on firms' governance institutions.

The results in table 5 are in the same direction as the OLS results in table 3 but are considerably stronger. The coefficients from tables 3 and 5 can be interpreted as reflecting an expected duration of a particular tax shelter or the ability to engage in tax planning for a given period. Suppose a firm unexpectedly increases its book-tax gap by $1.00. The current-year tax benefit (including federal and state tax benefits) would be approximately $0.40. Market reactions are given by the coefficient on the book-tax gap and should incorporate an expectation of how long tax sheltering ac-

tivity will continue in the future. With reasonable discount rates used, the estimated coefficient (2.76) for the well-governed sample in the OLS specification (column 3 of table 3) would correspond to an expected life of tax savings of seven to nine years for well-governed firms. However, interpreting this OLS coefficient in this manner is complicated by the identification concerns discussed above and the marginal significance of the coefficient in table 3.

The IV estimate in column 3 of table 5 can be used to overcome these difficulties. For a firm with a mean value of institutional ownership, these coefficients imply that the market interprets an increase in the book-tax gap as a quasi-permanent change in tax obligations. As such, changes in the book-tax gap are not interpreted as transitory items associated with particular shelters but as signals of general tax planning ability.[18] The larger effects using the IV approach suggest that measurement error in the tax avoidance proxy may lead to attenuation bias in the OLS estimates. Alternatively, the OLS estimate of the effect of tax avoidance on firm value may be biased toward zero by the form of endogeneity noted above, where firms that are performing poorly for other reasons are more likely to engage in tax avoidance.[19]

[18] In the data set on corporate tax shelter cases constructed by Graham and Tucker (2006, table 1), the active life of alleged tax shelters ranges up to 10 years. The active life in the Graham-Tucker sample refers only to the longevity of specific tax sheltering strategies. As such, the IV estimates imply that current tax avoidance activity signals general tax planning ability, which may be expected to persist even beyond the life of any particular strategy.

[19] It is possible that the apparent effects of tax avoidance are in fact attributable to managerial incentives (noting that Desai & Dharmapala,

C. Robustness of the IV Results

These IV results appear to be robust to concerns regarding the measurement of the book-tax gap, governance, and firm value. For instance, the basic result in column 2 of table 5 is robust to the (unreported) inclusion of additional variables—specifically, deferred tax expense,[20] depreciation expense, investment tax credits, interest expense, pension expense, and a proxy for employees' stock option exercises[21]—that control for the potential mismeasurement of the book-tax gap. It is also robust to adding lagged tax avoidance activity to the model; this does not change the effect of contemporaneous tax avoidance (interacted with I_{it}), and the effect of the lagged variable is small and insignificant. Thus, there is no evidence to suggest a substantial delayed market reaction to firms' tax avoidance activity.

The results are also robust to using alternative measures of governance. Specifically, the findings are unaffected when I_{it} is replaced by the index of anti-takeover provisions constructed by Gompers et al. (2003). This index represents a count of anti-takeover provisions that apply to a firm (through either its corporate charter or state law).[22] It takes on values up to 18, with lower values indicating better governance. As the cardinal properties of this index are unclear, the robustness check involves constructing an indicator variable for better-governed firms by dividing the sample at the mean (with values of 9 or lower corresponding to "well-governed" firms). The interaction between this indicator variable for well-governed firms and BT_{it} is very similar in magnitude and significance to that in column 2 of table 5. This suggests that the results are robust to alternative notions of governance, as the Gompers et al. (2003) index measures managerial entrenchment rather than the quality of monitoring. Moreover, this also indicates that the results are unaffected by the potential endogeneity of I_{it}, where institutional investors may choose to buy firms that are expected to increase in value. This is less applicable to the Gompers et al. index, as its values were predominantly determined in the 1980s and generally do not change during the sample period.

While the baseline specification in table 5 includes an extensive set of controls, it is possible that unobserved changes in firms' investment opportunities or expected future performance may affect q. To address these concerns, it is possible to include capital expenditures and future revenue growth as additional controls; including these controls leads to consistent results. Furthermore, although Tobin's q is a standard measure of firm value in the literature, it is nonetheless important to consider alternative proxies. As q takes account of the book as well as market value of equity and the value of debt, a simpler measure is the market value of common stock (Execucomp variable $MKTVAL$, the closing share price for the fiscal year multiplied by the number of common shares outstanding). This is scaled by the book value of assets in order to conform to the scaling of the independent variables. As shown in column 3 of table 5, using this variable instead of q leads to essentially identical results.

Finally, the identification strategy used depends on the validity of the exclusion restrictions. In particular, it requires that there are no changes over time in the effect on firm value of the tax shield variables used in constructing the instruments (other than the change due to the impact of the CTB regulations on tax avoidance activity). This assumption may be violated if there are trends unrelated to the CTB regulations in the effect of the tax shield variables on q. This possibility can be tested for by adding to the model interactions between a time trend and each of the tax shield variables. Specifically, these additional control variables are $(NOL^*_{it}(t - 1997))$, $(DL^*_{it}(t - 1997))$, and $(DC^*_{it}(t - 1997))$, where t is the year (1997, the midpoint of the sample period, is used as the base year). The second-stage IV results with the addition of these controls are presented in column 4 of table 5. While the coefficient of the interaction term of interest is somewhat smaller, it remains significant at the 5% level. Thus, it does not appear that the effect of the instrumental variables is driven by time trends in the impact of the tax shield variables on firm value. Rather, the results seem to depend on only the discontinuous change in the effect of tax shields on firm value associated with the CTB regulations.

VI. Conclusion

Although there is an extensive literature on how firms respond to taxes, little analysis of activities has been designed solely or primarily to reduce tax liabilities. This paper contributes to the emerging literature on this topic by investigating whether such activities advance shareholder interests, using evidence on how markets capitalize these activities. The simple presumption that corporate tax avoidance represents a transfer of value from the state to shareholders does not appear to be validated in the data. Rather, the patterns in the data are more consistent with the agency perspective on corporate tax avoidance, which emphasizes the mediating role of governance. The basic result that

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2006, find a relationship between managerial incentives and tax avoidance activity). However, adding an interaction term between the executive compensation measure and tax avoidance to the model leaves the results essentially unchanged.

[20] Recall that deferred tax expense was omitted from the computation of q, while taxable income was inferred using only current tax expense. This omission could be important because current tax sheltering activity may take the form of deferring tax liabilities to the future. Also, a focus on current tax avoidance ignores current actions by the firm that reduce its future tax liabilities, and hence increase the present value of the firm. Note that adding deferred tax expense to the definition of q, as in Kaplan and Zingales (1997), leads to results that are highly consistent with those in table 5.

[21] The value of stock option exercises by the top five executives (scaled by the book value of assets) is used as a proxy for these deductions. On the importance of stock option deductions for certain firms, see Graham, Lang, and Shackelford (2004).

[22] See Gompers et al. (2003, appendix 1) for more details.

higher-quality firm governance leads to a larger effect of tax avoidance on firm value is reinforced by using an exogenous source of variation due to changes in tax regulations to construct instrumental variables for tax avoidance activity. The results are robust to a wide variety of tests for alternative explanations.

The findings of this paper shed new light on what Weisbach (2002) terms the "undersheltering puzzle": why firms do not engage in sheltering activity more extensively, given the widespread availability of shelters and the low risk of penalties. Undersheltering may not be as puzzling as it first appears, given that investors doubt the value of such activities in the absence of good governance. More generally, the result that the valuation of tax avoidance is a function of firm governance suggests that tax avoidance and managerial efforts to divert value from shareholders may be intertwined. This paper thus shows that incorporating agency issues into the analysis of corporate tax avoidance leads to theoretical and empirical conclusions that are substantially different from those that would be predicted by a model where managers are perfect agents. These findings open up several lines of inquiry, including the implications of this agency perspective for the analysis of tax policy, which we leave for future research.

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