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**Tax Avoidance, Corporate Transparency, and Firm Value**

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**Tax Avoidance, Corporate Transparency, and Firm Value**

**by**

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## **Dedication**

To my parents and my husband

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# Tax Avoidance, Corporate Transparency, and Firm Value

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Tax avoidance that reduces transfers from shareholders to the government is traditionally viewed as value enhancing to shareholders. The agency perspective of tax avoidance, however, suggests that opportunistic managers may exploit the obfuscatory nature of tax avoidance to mask rent extraction. To shed light on these conflicting views, I use a self-constructed opacity index and multiple measures of tax avoidance to examine how corporate transparency relates to tax avoidance. I find that more transparent firms, which potentially have less severe agency problems, avoid more tax relative to their opaque counterparts. This result suggests that in a large section of the economy, tax avoidance is mainly engaged in by managers to enhance shareholder wealth. Further, I find that investors place a value premium on tax avoidance, but the price premium decreases with corporate opacity. This is consistent with the notion that corporate transparency facilitates the monitoring of managerial actions and thus alleviates outside investors' concern with the hidden agency costs associated with tax avoidance.

## Table of Contents

List of Tables .....	x
Chapter 1 Introduction .....	1
Chapter 2 Literature Review .....	8
2.1 Research on Tax Avoidance .....	8
2.2 Research on Corporate Transparency .....	16
Chapter 3 Sample and Descriptive Statistics .....	24
3.1 Sample Selection.....	24
3.2 Measure of Tax Avoidance.....	25
3.3 Measure of Corporate Transparency.....	26
3.4 Descriptive Statistics.....	28
Chapter 4 Do Transparent Firms Avoid More or Less Tax? .....	33
4.1 Hypothesis Development and Research Design .....	33
4.2 Univariate Tests .....	38
4.3 Empirical Results .....	39
4.4 Additional Analysis .....	42
Chapter 5 The Valuation Implications of Tax Avoidance .....	46
5.1 Hypothesis Development and Research Design .....	46
5.2 Empirical Results .....	49
5.3 Additional Analysis .....	51
Chapter 6 Concluding Remarks .....	53
Appendix A Variable Definitions .....	81
Appendix B Estimate Discretionary Accruals .....	83
Bibliography .....	84

## **List of Tables**

Table 1:	Sample Selection.....	55
Table 2:	Industry Distribution of Main Variables of Interests.....	58
Table 3:	Descriptive Statistics.....	60
Table 4:	Correlation Matrix of Key Variables .....	62
Table 5:	Tax Avoidance and Transparency: Univariate Analysis.....	63
Table 6:	Tax Avoidance and Transparency: Multivariate Analysis.....	65
Table 7:	Tax Avoidance and Components of Corporate Transparency.....	69
Table 8:	Firm-level Analysis of Tax Avoidance and Transparency .....	73
Table 9:	The Valuation Impact of Tax Avoidance: Multivariate Analysis.....	75
Table 10:	The Valuation Impact of Tax Avoidance: Monitoring Effect of Components of Corporate Transparency.....	79



## **Chapter 1: Introduction**

This dissertation examines the relation among tax avoidance, corporate transparency and firm value. In chapter 2, I conduct a detailed review of two emerging streams of research: tax avoidance and corporate transparency. Chapter 3 discusses the sample selection and provides summary statistics. In chapter 4, I address the first research question: do transparent firms avoid more or less tax than their opaque counterparts? In chapter 5, I examine the second research question: is tax avoidance associated with firm valuation, and if so, does the strength of the relation depend on the extent of corporate transparency? Chapter 6 concludes.

Income tax represents a significant cost to the firm and shareholders. Under the current tax regime, U.S. firms may need to transfer more than one-third of pre-tax profits to the federal, state, and local governments. Tax avoidance activities that reduce transfers from stockholders to the government should generally enhance shareholder wealth. However, an emerging stream of literature, which examines tax avoidance in an agency framework, suggests that opportunistic managers employ the technologies of tax avoidance to advance managerial, rather than shareholder, interests (e.g., Desai and Dharmapala 2009). To shield income from tax authorities, managers often attempt to obscure the underlying intent of tax avoidance transactions. The obfuscatory feature of tax avoidance can create a shield for insider (e.g., managers and controlling shareholders) expropriation. Thus, the agency perspective of tax avoidance suggests that tax avoidance may not always be desired by shareholders because the combined costs, which include costs directly related to tax avoidance activities (e.g., costs incurred for tax planning, tax penalties assessed by IRS, and additional compliance costs) and nontax costs, agency

costs in particular, may outweigh potential tax savings that accrue to shareholders. Agency costs, which specifically refer to price discounts imposed by shareholders, could substantially offset tax savings derived from tax avoidance transactions if outside shareholders believe the obfuscatory tax transactions are accompanied by managerial rent extraction.

Another stream of research indicates that corporate transparency, which is defined as the availability of firm-specific information to outside shareholders, influences firm value. Financial reporting transparency may increase the precision of publicly available information about management's investment and operating decisions (e.g., Healy and Palepu 2001; Bens and Monahan 2004; Francis and Martin 2010). External transparency, such as financial analyst following and press coverage, also plays a role in monitoring managerial behavior (e.g., Healy and Palepu 2001; Lang et al. 2004; Miller 2006). Thus, corporate transparency may reduce the risk premium associated with the potential expropriation of shareholder wealth by opportunistic managers (Bushman and Smith 2001, 2003).

Tax avoidance may imply either managerial value-maximizing behavior or a greater potential for agency conflicts between managers and shareholders. Since corporate opacity could be exploited by opportunistic managers to extract private benefits at shareholder expense, it offers potential for investors to infer the degree of coupling between tax avoidance and rent extraction. Specifically, a positive link between opacity and tax avoidance will suggest, on average, tax avoidance is more likely to be coupled with rent extraction. On the other hand, a negative link between opacity and tax avoidance will yield support for the view that tax avoidance is more likely to be engaged in by managers to enhance shareholder wealth.

A better understanding of the links among corporate transparency, corporate tax avoidance, and firm value are especially relevant for two reasons. First, the links between corporate transparency and tax avoidance may shed light on the prevalence of “complementarity” of tax avoidance and insider rent extraction. Management may engage in a variety of tax avoidance activities to reduce a firm’s tax burden. Such activities range from simply claiming favorable tax subsidies that are granted by the legislature, extensive tax planning that entails greater risks and uncertainty, to abusive tax shelters that have no business purpose other than tax avoidance. The proprietary and obfuscatory nature of tax avoidance, however, can potentially facilitate entrenched management to extract private benefits at shareholders’ expense.

“Project Steele” undertaken by Enron offers a real world example. Enron entered this tax transaction mainly to manage pre-tax accounting earnings so that its opportunistic managers could benefit from the temporarily inflated stock price.<sup>1</sup> In developing economies that are characterized by severe agency conflicts and weak investor protection, managerial rent diversion may take the form of direct theft of earnings. As a second example, Desai et al. (2007) revealed that, Sibneft, a Russian oil company, used various transfer pricing schemes and off-shore trading intermediaries to evade taxes and channel profits toward companies owned by Sibneft’s managers. The increases in tax enforcement by the Russian government not only led to the closing down of Sibneft’s various off-

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<sup>1</sup> As Enron would not be in a tax-paying position well into the future, “Project Steele”, a costly tax shelter allowing Enron to create \$133 million in pretax financial accounting income, was implemented mainly to inflate pre-tax accounting earnings. Opportunistic managers thus could extract private benefit (e.g., excess executive compensation and insider trading) from Enron’s temporarily inflated stock price.

shore trading intermediaries, but also coincided with an improved return for outside shareholders – Sibneft’s reported income soared and for the first time it issued dividends to shareholders.

Despite a handful of extreme tax avoidance transactions revealed by the media, there is little large-sample evidence to show which perspective of tax avoidance dominates. The lack of detail in publicly available tax disclosure (e.g., tax footnote disclosure in firms’ filed 10K reports) makes it extremely difficult for outside investors to judge the nature of tax avoidance activities and determine whether tax avoidance is accompanied by diversion of rents. This difficulty is further exacerbated by the complexity of tax rules and managerial intentional omission of details. To avoid the potential scrutiny by tax authorities, managers have incentives to reduce the level of tax related disclosure even for tax transactions undertaken to enhance shareholder wealth.<sup>2</sup> The link between tax avoidance and corporate transparency may suggest whether managers engage in tax avoidance transactions to enhance shareholder wealth or extract rent in a large section of the economy.

Second, as revealed by Enron and a few other high-profile scandals, the potential for value destruction is greater in firms that use aggressive tax activities to manufacture fake accounting earnings and to mask insider self-serving behavior. However, there are

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<sup>2</sup> Two studies directly examine tax related disclosures. In the mandatory disclosure context, Gleason and Mills (2002) find that firms often do not disclose material contingent tax liabilities as required by GAAP. In the voluntary disclosure setting, Schwab (2009) shows that managers are willing to disclose book-tax difference information in press releases when book-tax differences are primarily driven by tax avoidance. However, voluntary disclosure may not be a creditable mechanism to reveal managerial information especially when managers engage in tax avoidance to extract rent.

only a few small sample studies showing that investors respond negatively to certain extremely aggressive tax transactions but little evidence on how investors value tax avoidance activities in general. To fill this gap, I provide large sample evidence on how investors value tax avoidance in general, and more importantly, whether the valuation implications of tax avoidance vary with corporate transparency.

I rely on multiple measures to examine the relation between tax avoidance and corporate transparency. Specifically, I use cash effective tax rates and permanent book-tax differences to measure tax avoidance. I construct an opacity index that ranks the relative opaqueness/transparency of firms along the following dimensions: earnings quality (measured as the magnitude of discretionary accruals), private information acquisition (measured as the level of analyst following), information dissemination (measured as the level of press coverage), and information uncertainty and asymmetry among investors (measured as the average daily trading volume). My sample consists of S&P 1500 firms in the period 1994-2001, a period marked by aggressive tax planning (e.g., Desai 2003; Jennings et al. 2009). Regressing tax avoidance measures on my self-constructed opacity index, I find that the level of tax avoidance is positively related to corporate transparency. Specifically, transparent firms exhibit lower cash effective tax rates and larger permanent book-tax differences. These results still hold even after controlling for firm characteristics documented in prior studies that affect a firm's tax planning incentives and tax planning opportunities. The positive (negative) links between corporate transparency (opacity) and tax avoidance (i.e., transparent firms are more likely

to avoid tax) lend support to the dominance of the value enhancing role of tax avoidance, suggesting that tax avoidance is more likely to be engaged in by managers to enhance shareholder wealth.

To address the differential valuation implications of tax avoidance between transparent and opaque firms, I examine whether the interaction of tax avoidance and corporate transparency/opacity influences firm value as measured by Tobin's  $q$ . The results indicate that on average investors place a price premium on tax avoidance, and this premium, however, decreases with the level of corporate opacity. These results continue to hold after controlling for other governance mechanisms (e.g., institutional investor monitoring and executive incentive compensation) that affect tax avoidance and firm value.

My paper contributes to the literature in the following ways. First, it contributes to the emerging literature examining agency cost implications of corporate tax avoidance. Specifically, I find that transparent firms avoid more tax and investors place greater value premium on tax avoidance for transparent firms. These results suggest that in the large section of the economy that I examine, the value enhancing effect of tax avoidance dominates.

Second, my study also furthers our understanding of cross-sectional variation in tax avoidance by documenting how information environment has a significant impact on firm tax avoidance behavior. The positive links between corporate transparency and tax

avoidance suggest that firms operating in an opaque information environment tend to avoid less tax due to their concerns about potential price discounts imposed by investors.

Lastly, my study also contributes to the corporate transparency literature (e.g., Bushman and Smith 2001, 2003) by examining the impact of corporate transparency on tax avoidance behavior. I use corporate tax management practice, a unique setting in which opportunistic managers could exploit the obfuscatory nature of tax avoidance activities to pursue their private benefit and a setting where outside investors face severe informational problems to assess such activities, to explore whether corporate transparency facilitates the monitoring of managerial behavior. The results suggest that corporate transparency plays a monitoring role in disciplining management tax avoidance activities.

## **Chapter 2: Literature Review**

This study is primarily related to two streams of research – tax avoidance and corporate transparency. In section 2.1, I review the emerging literature that examines determinants and consequences of tax avoidance of publicly-traded firms. In section 2.2, I review research on corporate transparency, especially studies examining the impact of corporate transparency on real activities undertaken by corporate managers and the related effects on market valuations.

### **2.1 TAX AVOIDANCE**

#### **2.1.1 Background**

Following Hanlon and Heitzman (2009), I broadly define tax avoidance as the reduction of explicit taxes per dollar of pre-tax accounting earnings. However, there is no universally accepted definition of tax avoidance in the accounting literature.<sup>3</sup> Under this broad definition, tax avoidance represents a continuum of tax planning strategies, encompassing activities that are perfectly legal (e.g., municipal bond investments) and more aggressive transactions that fall into the grey area (e.g., abusive tax shelters).<sup>4</sup>

Tax avoidance activities are traditionally viewed as tax saving devices that transfer resources from the state to shareholders and thus should increase after-tax firm value. An emerging literature in financial economics, however, emphasizes the agency

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<sup>3</sup>For example, while Rego (2003) defines tax avoidance as using tax-planning methods to legally reduce income tax payments, Desai and Dharmaplala (2006) view tax avoidance as identical to abusive tax shelters.

<sup>4</sup>Tax evasion, tax noncompliance, and tax shelters are concepts related to tax avoidance and frequently used in the financial economics literature. Tax shelters refer to very complicated transactions promoted to corporations and wealthy individuals to explore tax loopholes and provide large, unintended benefits (U.S. General Accounting Office 2003). Tax evasion refers to corporate tax reporting behavior that would, if discovered, be subject to civil or criminal sanctions (Crocker and Slemrod 2005). Tax noncompliance refers to corporate income tax that is legally owed but is not reported or paid (Slemrod 2004).



cost implications of tax avoidance and suggests that tax avoidance may not always enhance outside shareholder wealth. Under this alternative view, obfuscatory tax avoidance activities can facilitate managerial rent extraction in various forms.<sup>5</sup> Since the combined costs, which include costs directly related to tax planning activities, additional compliance costs, and non-tax costs (e.g., agency costs in particular), may outweigh the tax benefits to shareholders, tax avoidance activities can potentially reduce after-tax firm value.

Slemrod (2004), Crocker and Slemrod (2005), and Chen and Chu (2005) provide the theoretical foundation for understanding corporate tax avoidance within an agency framework. Slemrod (2004) argues that the separation of ownership and control in public corporations demands a different conceptual framework to understand tax reporting behavior of large publicly-held companies. The small existing literature on corporate tax noncompliance typically assumes that firm owners make tax reporting decisions rather than delegate decision makings to their agents, and such an assumption is certainly not true for large public companies. Thus, shareholders need to set up appropriate compensation and penalty structures to align managers' interest with shareholders' interest. In such a setting, to motivate managers to make value-enhancing tax reporting decisions, managerial compensation packages should be tied, explicitly or implicitly, to after-tax corporate profit. In addition, the penalty structure for corporate tax evasion should also take into account the separation of ownership and control (Crocker and Slemrod 2005).

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<sup>5</sup>Managerial rent extraction is also broadly defined. It ranges from theft of corporate earnings, non arms-length related party transactions, perquisite consumption, and excessive executive compensation. It also includes earnings manipulation (e.g., engaging in tax shelters to manufacture accounting earnings/operating cash flows as revealed by the Enron and Dynegy cases.), which temporarily inflates stock price and thus allows insiders to extract private gains.

Desai and Dharmapalala (2006) examine corporate tax avoidance behavior in a setting where the manager decides the level of tax sheltering engaged by the firm and can also enjoy private benefits of control through the diversion of rents. In this setting, they investigate how incentive compensation affects the level of corporate tax sheltering. The key insight provided by their model is that the net impact of the use of incentive compensation on the level of tax sheltering critically depends on the relationship between tax sheltering and rent diversion. The rationale is as follows. Since higher-powered incentives (e.g., stock options) generally better align managers' interests with shareholders' interests, they should increase the level of corporate tax sheltering and reduce the extent of managerial rent diversion. However, if tax sheltering and rent diversion are complements (e.g., tax sheltering may facilitate managerial rent diversion), then change in the level of one activity may change the cost of engaging in the other. Thus, the direct effect of incentive compensation on tax sheltering (e.g., increase in incentive compensation leads to increase in tax sheltering) could be offset by the positive feedback effect between tax sheltering and rent diversion (e.g., reduced diversion is accompanied by reduced sheltering). Their model also predicts that the impact of incentive compensation on tax sheltering may differ between firms with strong corporate governance and firms with weak corporate governance. Empirically, they find a negative association between the level of incentive compensation and the level of tax sheltering, and this negative association is primarily driven by poorly governed firms. The negative association between high-powered incentives and tax avoidance suggests that for poorly governed firms, the tendency toward more tax aggressiveness is offset by the fact that reduced diversion is associated with reduced sheltering.

Desai and Dharmaplala (2006) suggest that the strength of the positive feedback effect between tax sheltering and rent diversion may differ for firms in different information environment. Thus, transparent firms may engage in different level of tax sheltering than do opaque firms. Desai and Dharmaplala (2006) further indicate that as the extent to which tax sheltering and rent diversion are complementary may vary among firms, tax avoidance transactions may have different value implications for transparent firms than for opaque firms.

### **2.1.2 Determinants and consequences of tax avoidance**

Over the past two decades, several studies provide interesting insights into why some firms avoid more tax than others. Early studies show that firms' effective tax rates (ETRs) are associated with a range of firm characteristics. For example, Zimmerman (1983) finds that corporate effective tax rates are positively associated with firm size. This suggests that political costs play a role in determining corporate tax burdens.<sup>6</sup> Extending prior studies, Gupta and Newberry (1997) examine the association between corporate effective tax rates and firm characteristics beyond firm size. They find that ETRs are associated with a firm's capital structure, asset mix, and profitability, but there's no reliable association between ETRs and firm size. Rego (2003) examines whether economies of scale exist for investment in tax planning. She finds that more profitable firms and multinational firms with more extensive foreign operations have lower worldwide ETRs. Thus, economies of scale can significantly affect a firm's ability to avoid tax. In sum, these early studies focus on firm characteristics as proxies for

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<sup>6</sup>The focus of Zimmerman (1983), however, is not how firms avoid tax, but rather how political costs affect firms' tax burden. His finding is consistent with the notion that large firms are subject to more scrutiny or more wealth is transferred from large firms (arguably more successful firms) to the government relative to other firms.

opportunities, incentives and resources for tax planning to explain why some firms avoid more tax than others.

Several recent studies extend this line of research by examining how incentive compensation, ownership structure, and organizational form affect corporate tax avoidance.

Using survey data, Phillips (2003) examines whether the use of after-tax accounting earnings in CEO and business-unit manager bonus plans leads to more effective tax planning. Consistent with the argument that managers need to be appropriately compensated for making optimal tax planning decisions, Phillips (2003) finds that firms have lower effective tax rates when they tie business-unit managers' bonus plans to after-tax accounting earnings. However, he does not find such a link for CEO bonus plan.

Desai and Dharmapala (2006) investigate the impact of higher-powered incentive, such as option-based executive compensation, on corporate tax sheltering. They find a negative link between the level of option-based compensation and the level of tax sheltering, and this negative link is primarily driven by poorly governed firms (e.g., firms with lower level of institutional ownership and more anti-takeover provisions). Thus, Desai and Dharmapala (2006) show that both incentive compensation and other governance mechanisms play an important role in corporate tax avoidance.

Using a proprietary dataset, Armstrong et al. (2010) examine the link between tax directors' incentive compensation plans and various firm-level tax attributes. They find that executive compensation plans incentivize tax directors to effectively manage financial effective tax rates but bears no relation with cash effective tax rates. Rego and Wilson (2008) examine the impact of tax aggressiveness on executive compensation.

They find that executives are rewarded for being tax aggressive; they further show that this positive link reflects efficient contracting rather than rent extraction. Robinson et al. (2010) examine the link between the structure of corporate tax departments (profit center vs. cost center) and tax planning effectiveness. They find that corporate tax departments structured as profit centers are more effective in reducing financial ETRs but not cash ETRs.

Chen et al. (2010) investigate how ownership structure affects differential tax aggressive behavior between family firms and non-family firms. While other empirical studies examine agency problems between management and shareholders, Chen et al. (2010) focuses on how agency conflicts between dominant shareholders and minority shareholders affect family firms' tax avoidance behavior. They find that family firms are less tax aggressive than their non-family counterparts. This is consistent with the notion that to protect themselves from family owners' potential expropriation masked by tax aggressiveness, minority shareholders may price discount family firms that pursue aggressive tax planning. Thus, family owners would rather forgo potential tax savings to avoid potential price discounts.

Taken together, these studies significantly extend the line of research on corporate tax avoidance by shifting its focus from firm characteristics (e.g., proxies for tax planning opportunities) to various aspects unique to publicly-held firms (e.g., executive compensation and ownership structure) as determinants of corporate tax avoidance. The findings of this line of research, however, are mixed and incomplete. For example, incentive compensation plans seem to be more effective in motivating tax managers to manage financial ETRs than cash tax payments. There's no conclusive evidence on whether CEOs or tax directors are more important in shaping corporate tax avoidance

policies. Thus, it's not clear whether the board should write incentive compensation plans at the top executive level or business-unit manager (including tax director) level to achieve optimal tax avoidance. In addition, these studies also suggest that there are largely unexplored areas to explain why public firms exhibit differential tax avoidance behavior.

While corporate tax avoidance may affect various stakeholders, the focus of my review is on shareholder wealth effects of tax avoidance. Tax avoidance activities are traditionally viewed as tax saving devices that transfer resources from the state to shareholders and thus should increase after-tax firm value, an emerging literature in financial economics emphasizes the agency cost implications of tax avoidance and suggests that tax avoidance may not always enhance outside shareholder wealth. Consistent with the agency cost view of tax avoidance, several recent studies find that investors do not always value corporate tax avoidance activities.

Using the portion of book-tax gap unrelated to accounting accruals to proxy for corporate tax avoidance and using Tobin's  $q$  to proxy for firm value, Desai and Dharmapala (2009) find that the average effect of tax avoidance on firm value is not significantly different from zero, but positive for firms with higher levels of institutional monitoring or lower level of anti-takeover protection. Their results suggest that investors do not always value tax avoidance activities given the potential severe agency problems inherent in poorly governed firms.

Two recent studies investigate whether tax sheltering activities enhance shareholder wealth. Hanlon and Slemrod (2009) examine the market reaction to news about tax shelter involvement. They find that such news announcements on average affect a firm's stock price negatively. The price decline is more pronounced for retail

firms and firms with low cash effective tax rates. Thus, their small sample event study also shows that tax aggressiveness does not always increase firm value. Although primarily focusing on firm characteristics of corporate tax shelter participants, Wilson (2009) also sheds light on whether tax sheltering creates wealth for shareholders or facilitates managerial opportunism by examining stock return performance of tax shelter firms. He finds that tax sheltering firms with low anti-takeover protection outperform non-sheltering firms during each of the 24-month periods: pre-sheltering, active-sheltering, and post-sheltering. This is consistent with the notion that tax sheltering creates wealth for well governed firms.

Several small sample studies examine investors' reaction to specific corporate tax avoidance activities. For example, Desai and Hines (2002) and Cloyd et al. (2003) examine the market reaction to firms' inversion announcements. These studies find that the market does not respond positively, and often responds negatively, to these announcements, which at least suggests that investors interpret the potential tax savings derived from this type of tax avoidance activity in a complex manner.<sup>7</sup>

In sum, the above studies present preliminary evidence challenging the simple value enhancing view of tax avoidance. The valuation effect of corporate tax avoidance seems to exhibit considerable cross-sectional variation. While opportunistic managers

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<sup>7</sup>In the 1990s, a handful of high profile firms undertook "corporate inversion" or "expatriation" transactions by moving the legal domiciles of their parent corporations to a foreign country, typically a tax-haven country like Bermuda or Cayman. They claim these transactions can save many millions of dollars in future US corporate income taxes. While Desai and Hines (2002) interpret their results as consistent with the notion that managers maximize shareholder wealth rather than share prices (e.g., managers engage in inversion transactions if the expected net tax benefits from inversions exceed the current capital gain tax liabilities), Cloyd et al. (2005) suggest that the lack of positive responses to these inversion decisions could be due to significant nontax costs offsetting potential tax savings from such transactions. Such nontax costs could arise from fewer investor protection rights and thus more severe managerial expropriation in tax haven countries.

may employ the technology of tax avoidance to extract rents, managers at well governed firms are more likely to pursue value-enhancing tax avoidance. The existing research on economic consequences seems to mainly focus on some extremely aggressive tax avoidance strategies adopted by a handful of firms, but little evidence exists on the shareholder wealth effect of corporate tax avoidance in a large section of the economy.

My study extends tax avoidance research in two ways. First, I examine whether corporate transparency is an important determinant of corporate tax avoidance. Second, I add to this line of research by providing large sample evidence on the valuation effects of corporate tax avoidance. Most importantly, I show how the valuation effect varies with corporate transparency, a mechanism relatively less explored but potentially important in affecting corporate real activities, including the complex tax management practice.

## **2.2 CORPORATE TRANSPARENCY**

In this study, I construct a corporate opacity index to measure a firm's overall information environment in the U.S. setting. This index is built upon the conceptual framework for corporate transparency developed by Bushman, Piotroski, and Smith (2004). In section 2.2.1, I present an overview of this conceptual framework; in section 2.2.2, I provide a review of research on corporate transparency with focus on its impact on corporate real activities and the related market valuation effects.

### **2.2.1 A Framework for corporate transparency**

Corporate transparency, which is defined as the availability of firm-specific information to those outside publicly-traded firms, plays a central role in the efficient allocation of resources in the economy. Bushman, Piotroski, and Smith (2004) developed a framework (BPS framework) for conceptualizing and measuring corporate transparency



at the country level (also see Bushman and Smith 2001). In the BPS framework, information mechanisms of enhancing corporate transparency are broadly classified into three categories: corporate reporting, private information acquisition, and information dissemination.

Corporate reporting involves periodic disclosure of firm-specific information on a voluntary or mandatory basis. Extensive and high quality disclosures provide useful and timely information to outside investors and thus are expected to enhance corporate transparency. Information intermediaries like accounting regulators and auditors may also promote reporting transparency by setting high-quality accounting standards and adding credibility to disclosures prepared by the management. Hence, in the BPS framework, reporting transparency is measured based on the following aspects: intensity and timeliness of mandatory disclosures (e.g., number of items disclosed in annual reports and the frequency of interim reports), quality of accounting principles, and the use of high-quality auditors. BPS constructs their transparency measures in a cross-country setting and certain aspects of their measures (e.g., quality of accounting standards) may be less applicable in a single country setting.<sup>8</sup>

The private information acquisition component of corporate transparency refers to the information gathering and processing activities performed by financial analysts and private investors. Financial analysts and sophisticated investors (e.g., institutional investors) have the expertise and resources to better interpret publicly available information and acquire additional information through other sources. Bushman et al. (2004) use three measures of private information acquisition – the number of analysts

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<sup>8</sup> Bushman et al. (2004) measure corporate transparency for approximately 1000 large industry firms across forty plus countries. Their measures of reporting transparency are constructed based on Center for Financial Analysis and Research's International Accounting and Auditing Trends.

following the firm, the average ratio of the value of pooled institutional investment to gross domestic product, and the existence of insider trading laws.

In the BPS framework, the third component of corporate transparency is information dissemination, which is measured as the average rank of countries' per capita number of newspapers and televisions. They argue that a well-developed communication structure facilitates the flow of information among economic agents. Recent research, however, suggests that besides its rebroadcasting role, the media also analyzes and evaluates information acquired from various sources. More discussion on this point is provided in the next section.

### **2.2.2 Prior research on corporate transparency**

A large body of research examines the capital market consequences of corporate transparency. That is, how transparency or a particular component of transparency affects liquidity and cost of capital. For example, several studies indicate that financial reporting quality is an important determinant of cost of equity and cost of debt. Francis et al. (2004) find that various earnings attributes (e.g., accrual quality, earnings persistence, smoothness, value relevance, and timeliness) are associated with cost of equity, and accrual quality has the largest cost of equity effect. Francis et al. (2005) find that firms with lower quality accruals have a higher cost of debt. Lang, Lins and Maffett (2009), which employ a comprehensive set of measures of corporate transparency (e.g., earnings management, accounting standards, quality of auditor, analyst following, and analyst forecast accuracy), find that in a cross-country setting, firms with greater transparency have lower transaction costs, greater liquidity, lower implied cost of capital, and higher valuation. These effects are especially pronounced in weak investor protection environments.

However, the economic impact of corporate transparency is not limited to these more general capital market consequences; corporate transparency can also directly contribute to economic performance by disciplining corporate insiders in better selection of investments, more efficient management of assets in place, and reduced expropriation of minority shareholders' wealth (e.g., Bushman and Smith 2001). This line of argument suggests that corporate transparency can affect specific real corporate activities. The effect of corporate transparency on specific corporate policies, however, is less well understood relative to its general role in the capital markets. Hence, the following review primarily focuses on the links among corporate transparency, firm real activities, and the related economic consequences.

Several recent studies shed light on how corporate transparency enhances firm performance through its monitoring and disciplining roles. Francis and Martin (2010) examine the monitoring role played by conservative accounting earnings in the acquisition context. They find that firms with more timely loss recognition make more profitable acquisitions and are less likely to engage in post-acquisition divestitures. Other studies along this line show that firms with higher financial reporting quality (e.g., accruals contain less estimation errors) are found to deviate less from predicted investment levels and exhibit less investment-cash flow sensitivity (e.g., Biddle and Hilary 2006, and Biddle et al. 2009). In contrast, firms with opaque financial reporting engage in suboptimal actions. Using an external indicator as a proxy for opaque financial reporting, McNichols and Stubben (2008) find that firms alleged to have manipulated earnings (e.g., firms investigated by the SEC for accounting irregularities, firms sued by their shareholders for improper accounting, and firms that restated financial statements)

overinvest during the manipulation period, and such over-investment is eliminated once earnings are no longer manipulated.

Bens and Monahan (2004) document a positive association between the excess value of diversification and the quality of voluntary disclosure (measured as analyst ratings of voluntary disclosures developed by AIMR). This is consistent with the notion that commitment from managers to disclose provides shareholders with a means of monitoring management's behavior and thus mitigating management's penchant for cross-subsidizing underperforming segments.

Taken together, these studies show that financial reporting transparency reduces information asymmetry between managers and outside investors and constrains managerial opportunistic behavior by facilitating monitoring. Opaque reporting not only exacerbates moral hazard problems but may also distort information used by internal decision makers and lead to sub-optimal actions.

Prior literature suggests that financial analysts also serve as external monitors to corporate managers (e.g., Jensen and Meckling 1976; Chung and Jo 1976). Consistent with this notion, Lang et al. (2004) find that increased analyst coverage is associated with higher firm value, and this relation is especially strong for firms with potential severe internal governance problems (e.g., concentrated insider control) and operating in relatively low investor protection environments. Taking a more direct approach to investigate financial analysts' monitoring role, Yu (2008) examines the relation between a firm's financial analyst coverage and its earnings management behavior. He finds that firms with a higher level of analyst coverage engage in less accrual-based earnings management. Collectively, these studies suggest that financial analysts also act as independent monitors and provide important scrutiny over management's actions.

With regard to the “information dissemination” component of corporate transparency, an emerging literature on media coverage provides some of the first evidence that the press may play an important role in corporate governance. Miller (2006) investigates the role of the press as an information intermediary in the context of accounting frauds. He finds that the press plays both a rebroadcasting role and an original investigative role in the coverage of accounting frauds. The study also indicates that the business-oriented press is more likely to undertake original analysis of accounting frauds and provide incremental information to the financial markets. Core et al. (2008) explore how the press monitors and influences executive compensation policies. They find that negative press coverage of CEO compensation is associated with excess annual pay, but does not bear a significant relation to total annual pay. This suggests that the press interprets CEO compensation in a sophisticated manner. However, they find no evidence that negative press coverage has material impact on the over-paid CEOs’ subsequent compensation policies or their career outcomes. This indicates that the monitoring effect of the press is quite limited in the U.S. executive compensation setting. Dyck et al. (2008), however, finds the media is an effective outside monitor in corporate governance. For a sample of Russian firms with known corporate governance violations, they find that coverage of those violations in the international press increases the probability that such violations are corrected. This suggests that the press is an effective monitor because it can impose significant international reputation costs on violating firms.

All the above studies examine specific types of news articles (e.g., accounting fraud, CEO compensation and corporate governance violations) and present some early evidence on the monitoring role played by the press. In this study, I use the number of articles that mention the firm across all topics and across major U.S. news papers to

measure the overall firm-level press coverage. This is consistent with the idea that the media play its monitoring role by aggregating and creditably communicating information to the public. This will reduce the costs of collecting and evaluating information for various economic agents. Further, press coverage may increase management reputation costs and lead to regulator intervention for its identified wrong doings.

Collectively, these studies show that corporate transparency can enhance shareholder wealth. My study extends this line of research in three ways. First, while prior studies measure a specific component of corporate transparency or measure transparency in an international setting, I develop a firm-level measure of overall information environments in the U.S setting. Second, I use a unique setting, corporate tax avoidance, to examine the monitoring effect of corporate transparency. This setting offers several advantages. The extent and nature of corporate tax avoidance is probably one valuable piece of information that the management wishes to withhold from the public. On the one hand, increased disclosure about corporate tax avoidance may provide the roadmap for IRS scrutiny. On the other hand, recent research suggests that tax avoidance could be accompanied by managerial rent extraction (e.g., Desai and Dharmapala 2006). Thus, management may face agency costs of tax related disclosures if such disclosures reveal that managers engage in value destroying tax avoidance activities. Third, while most of existing studies (e.g., except for Anderson et al. 2009 and Lang et al. 2009) examine the economic impact of a specific information mechanism, I examine how a firm's overall information environment, which comprises of several interrelated

information mechanisms, monitors management behavior and influences shareholder wealth.<sup>9</sup>

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<sup>9</sup>Anderson et al. (2009) measure corporate opacity as the number of analysts following the firm, analyst forecast error, trading volume, and bid-ask spread. They examine the relation between ownership structure and corporate transparency. The purpose of their study is to shed light on whether family owners act as monitors or expropriate minority shareholders' wealth.

## Chapter 3: Sample and Descriptive Statistics

### 3.1 SAMPLE SELECTION

My sample consists of firms that were members of the S&P 1500 index over the period 1994-2001. Specifically, the empirical analysis is performed on firms that were listed on the S&P 1500 index either on December 31, 1996 or on December 29, 2000. My sample starts from the mid 1990s, primarily because tax avoidance activities, especially those arising from corporate tax shelters, are believed to have proliferated greatly over this period (e.g., Desai 2003; Jennings et al. 2009).<sup>10</sup> My sample ends in 2001 due to tax environment changes during the early 2000s that potentially affect corporate tax avoidance behavior. The enactment of the Sarbanes-Oxley Act (SOX) in 2002 has increased the scrutiny of the corporate tax function and altered the cost of being tax aggressive (Jimenez-Angueira 2009).

Data comes from various sources as described below. Financial accounting data is drawn from COMPUSTAT database, stock price and trading data are from CRSP, executive compensation data is from ExecuComp, and data on institutional ownership is from Thomson Reuters Institutional (13f) Holdings. Data on the number of analysts who provide earnings per share forecasts is obtained from IBES. All press coverage searches

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<sup>10</sup> Book-tax difference is often viewed as an indicator of tax shelters. There was a brief convergence of book-tax difference in the early 1990s, largely attributable to certain measures enacted in the Tax Reform Act of 1986 (TRA 1986) that were designed to align book income and taxable income closely and the implementation of SFAS 109 in 1992 that changed the manner in which corporate tax liabilities were reported for financial reporting purpose (e.g., Plesko 2004). As the practice of using tax planning to enhance shareholder value became prevalent in the mid-1990s, the gap between taxable income and book income widened again. A large portion of the book-tax difference in the 1990s, however, cannot be explained by traditional factors (e.g., depreciation, foreign operations, and stock option deductions), suggesting that increased sheltering activities are at least partially responsible for book-tax differences arising in this period (Desai 2003). While primarily focusing on the impact of TRA 1986 on the corporate level implicit taxes, Jennings et al. (2009) find that the level of tax advantage of firms with high preferences in the pre-TRA86 regime started rising again in the 1990s and peaked around 2000. Thus, their findings also suggest that in the post-TRA86 era, firms rely more on aggressive tax planning strategies to lower their tax burden.



are performed on Factiva. I specifically examine four major U.S. newspapers, namely *Wall Street Journal*, *New York Times*, *Washington Post*, and *U.S.A Today*.

### **3.2 MEASURES OF TAX AVOIDANCE**

Following prior literature, I use three measures of tax avoidance. My first measure of tax avoidance is annual cash effective tax rate (*CETR*), the ratio of income taxes paid (#317) over pre-tax income (#170). Cash effective tax rate overcomes several major limitations associated with traditional effective tax rate. First, while traditional (accrual-based) effective tax rate excludes potential tax savings resulting from tax avoidance activities that create temporary book-tax differences (e.g., accelerating expense deduction and delaying revenue recognition), cash effective tax rate reflects tax savings from tax planning strategies that create both temporary and permanent book-tax differences. Second, traditional effective tax rate includes tax contingencies (“cushion”) associated with uncertain tax positions taken on tax returns and may understate a firm’s tax aggressiveness. In contrast, tax reserves have no impact on cash effective tax rate, which could more accurately reflect a firm’s tax avoidance on the tax-return basis. However, cash effective tax rate also contains some measurement errors. For instance, it does not control for nondiscretionary items (e.g., depreciable and amortizable assets and the stock option deductions) that cause book-tax differences and thus may overstate tax aggressiveness for certain firms. Annual cash effective tax rate also contains measurement errors related to tax refunds for prior years, settlements of government audits, and estimated tax payments for future years.

To mitigate the measurement error caused by the mismatch of the numerator and denominator, I also use long-run cash effective tax rate (*LCETR*), which is the ratio of the sum of cash tax payments (#317) over a five-year horizon divided by the sum of pre-

tax income (#170) over the same five-year period, to measure tax avoidance (Dyreg et al. 2008).

I also employ a book-tax difference based measure of tax aggressiveness. Mills (1998) finds that large book-tax difference is positively associated with IRS audit adjustments and Wilson (2009) finds that firms engaging in tax shelters exhibit large book-tax differences during active tax shelter years. This suggests that large book-tax differences could signal tax aggressiveness. Several studies, however, suggest that many other factors, such as aggressive financial reporting (e.g., upward earnings management) and general business conditions, could also contribute to large tax-book difference (e.g., Phillips 2003; Hanlon 2005; Seidman 2009). To mitigate the measurement error contained in book-tax differences attributable to earnings management, I choose permanent book-tax difference (*PBTD*) as a proxy for tax aggressiveness. *PBTD* is computed as the difference between pre-tax book income (#170) and the adjusted taxable income  $((\#63+\#64-\#50)/.35)$ , scaled by the beginning total assets (Frank et al. 2009). As the deferred portion of tax expenses has been purged out, this measure captures only tax avoidance strategies resulting in permanent book-tax differences.

### **3.3 MEASURES OF CORPORATE TRANSPARENCY**

I develop an index that ranks the relative opacity/transparency (*OPACITY*) of each firm in the sample. Specifically, I rank four individual proxies for opacity (earnings quality, analyst following, press coverage, and trading volume) into deciles with the most opaque firms taking a value of ten and the most transparent firms assuming a value of one.<sup>11</sup> The individual ranks are then summed and scaled by total possible points to derive

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<sup>11</sup> Other mechanisms that likely affect corporate transparency include accounting standard and auditor choices (e.g., Lang et al. 2009). However, these measures are not particularly interesting in this study since

an index ranging from 0.1 to 1.0. Lower values denote more transparent firms and higher values denote more opaque firms. Next, I describe how I measure various components of corporate transparency.

I use an accruals-based metric (*EARNOPACITY*) to measure financial reporting transparency. Accrual-based metrics have been widely used in the accounting literature as a proxy for earnings quality.<sup>12</sup> Specifically, *EARNOPACITY* is measured as the absolute value of discretionary accruals based on the modified Jones model derived from Dechow et al. (1995) (e.g., Jones 1991; Dechow et al. 1995). The large unsigned values of abnormal accruals are reflective of high deviations between a firm's earnings and operating cash flows. Whether large accruals result from managers' intentional manipulations of earnings or unintentional estimation errors, they make it difficult for outside decision makers to judge a firm's fundamental performance (Hutton et al. 2009). I employ a cross-sectional version of modified Jones model to estimate the normal level of total accruals and define the abnormal accruals as the difference between a firm's actual level and the expected level of total accruals. Measurement details are provided in Appendix B.

I use the level of analyst coverage (*COVERAGE*) as a proxy for the private information acquisition component of corporate transparency. Specifically, *COVERAGE* is measured as the number of analysts providing earnings per share estimates as reported on I/B/E/S three quarters prior to the fiscal year end (e.g., Anderson et al. 2009).

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my sample firms are large U.S. firms, and arguably, they follow the same set of accounting standards and use high-quality auditors.

<sup>12</sup> Other proxies for earnings transparency include earnings timeliness and accounting conservatism (e.g., Bushman et al. 2004). In addition, Lang et al. (2009) use discretionary earnings smoothing to measure earnings management.

I use the level of press coverage (*NEWS*) as a proxy for the information dissemination component of corporate transparency. Specifically, *NEWS* is measured as the negative of the natural logarithm of the number of articles containing the company's name that appear in the major U.S. newspapers over the previous fiscal year. Following Francis et al. (2008), I examine four major U.S. newspapers: *Wall Street Journal* (both Weekday and Sunday Editions), *New York Times*, *Washington Post*, and *USA Today*.

The last input into the index, trading volume (*TURNOVER*), provides a proxy for information asymmetry among investors (e.g., Leuz and Verrecchia 2000). The intuition of including this component is as follows. First, to the extent that it captures willingness to transact in firm shares, trading volume should be inversely related to the existence of information asymmetry. Second, financial reporting transparency incorporates both earnings quality and non-earnings transparency. Studies show that firms appear to supplement opaque earnings with other disclosures (e.g., Chen et al. 2002). *TURNOVER* should reflect information acquired through the earnings component and the non-earnings aspects of financial reporting transparency. *TURNOVER* is defined as the negative of the natural logarithm of the mean daily turnover ratio (e.g., the number of shares traded divided by the total shares outstanding from the daily CRSP) during the previous fiscal year.

### **3.4 DESCRIPTIVE STATISTICS**

Table 1, Panel A, reports the sample selection procedures. I start with 14,355 firm-year observations for S&P 1500 firms over the period 1994-2001. I lose 4,896 firm-year observations because they do not have sufficient data to calculate tax avoidance measures. 3,216 observations are lost because they either have negative pre-tax income or

because they do not have data on income taxes paid.<sup>13</sup> 1,347 observations are lost because they do not have 5-year data to construct long-run cash effective tax rates. I further delete 934 observations because they do not have sufficient data to construct control variables and 2,255 observations because they do not have sufficient data to construct opacity index. My final main sample includes 6,720 firm-years for 1,344 unique firms.

Panel B of Table 1 reports the industry distribution of the firm-year observations. I describe the industry membership by using Fama and French (1997) classification scheme. The 6,270 firm-year observations represent 42 industries, with transportation, insurance, petroleum and natural gas, wholesale, chemicals, machinery, computers, electronic equipment, utilities, business services, and retail each having more than 200 or at least 3% of the sample observations.

Table 2 reports the distribution of my main variables (*TaxAgg* and *OPACITY*) of interest by industry. *TaxAgg* exhibits considerable variation across industries. Precious metals, candy & soda, petroleum and natural gas, and banking industries exhibit the lowest *LCETRs* (e.g., < 25%), and machinery, construction materials, consumer goods, wholesale, construction, defense, shipbuilding, and railroad equipment industries claim the highest *LCETRs* (e.g., > 35%). Firms in precious metals, pharmaceutical products, electronic equipment, measuring and control equipment, and recreation exhibit the largest book-tax differences; firms in candy & soda, personal services, transportation and wholesale industries exhibit the smallest book-tax differences. Firms in textile, construction materials, electrical equipment, and fabricated products exhibit the highest

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<sup>13</sup> Following prior research, I deleted firm-years observations with negative pre-tax income because loss firms have different financial reporting and tax planning incentives (Rego 2003).

levels of opacity, while firms in precious metals, aircraft, beer & liquor, and petroleum and natural gas industries are on average the most transparent.

Table 3 reports descriptive statistics for tax avoidance, corporate opacity, and other firm characteristics. Panel A describes the main variables of interest. The mean and median *CETR* are 0.308 and 0.297, respectively, while the mean and median *LCETR* are 0.316 and 0.318, respectively. These numbers are comparable to the mean and median values reported in Chen et al. (2010) and Dyreng et al. (2008). The mean and median levels of *PBTD* are 0.014 and 0.007, respectively, which are similar to those reported in Khurana and Moser (2009).

Opacity measures vary considerably across sample firms. The median firm has an opacity index value of 0.55; a firm at the 25<sup>th</sup> percentile has an opacity index of 0.425, compared to a firm at the 75<sup>th</sup> percentile, which has an opacity index of 0.675. Panel A reveals that various inputs into the opacity index also display a fair amount of variation. The level of discretionary accrual has a mean value of 6.8% of lagged total assets with an inter-quarter range of 6.3% of lagged total assets.

Turning to analyst coverage, the mean absolute value of *COVERAGE* is 1.73, suggesting that the average firm in the sample is followed by approximately 6 analysts; the absolute values of *COVERAGE* for firms at the 25<sup>th</sup> percentile and the 75<sup>th</sup> percentile are 2.40 and 1.10, respectively, corresponding to 11 and 3 analysts following. While firms at the 75<sup>th</sup> percentile do not receive any article counts, firms at the 25<sup>th</sup> percentile are covered by approximately 12 articles per year by the major U.S. news papers. The logarithm transformation of *TURNOVER* shows that firms at the 25<sup>th</sup> percentile have average daily turnover ratio of approximately 0.67%, and those at the 75<sup>th</sup> percentile have daily turnover ratio of 0.22%.

Panel B presents descriptive statistics for firm characteristics and other control variables. The average firm in the sample has total assets of \$1.2 billion (i.e., the natural logarithm of total assets is 7.072), leverage of 0.223, pre-tax return on equity of 0.301, market-to-book ratio of 3.551, and about 55.4% institutional ownership. A significant portion of top 5 executives' annual compensation comes from stock option grants with the mean (median) ratio of 0.327 (0.302). Tobin's Q, my measure of firm value, varies considerably across the full sample, with the average (median) firm having a Q ratio of 2.232 (1.698). In addition, approximately 17% of observations in the sample have net operating loss carryover at the beginning of the fiscal year.

Table 4 presents correlations among the key variables. Correlations among the various tax avoidance measures are significant at the 0.001 level. As expected, annual cash effective tax rate (*CETR*) and long-run cash effective rates (*LCETR*) are positively correlated with each other, but the magnitude of the correlation (i.e., 0.461) suggests that annual cash effective rate may contain some measurement errors due to the mismatch between the numerator and the denominator as discussed in the previous section. Second, the cash tax rate measures are negatively correlated with permanent book-tax difference (*PBTD*), and the magnitude (i.e., the correlation between *CETR* and *PBTD* of -0.22; the correlation between *LCETR* and *PBTD* of -0.171) confirms that these measures capture different aspects of tax avoidance strategies as explained in section 3.2. Thus, it's important to use multiple measures in the analysis, and similar results from different measures will lend more support to the inferences.

Table 4 also reveals that *OPACITY* exhibits a significant positive correlation with cash tax rate measures and a significant negative correlation with permanent book tax differences, suggesting that opaque firms are less tax aggressive than their transparent

counterparts. In terms of firm value, simple correlations show that tax aggressive firms appear to be valued more relative to less aggressive firms; opaque firms also have lower market valuations than transparent firms.



## **Chapter 4: The Association between Tax Avoidance and Corporate Opacity**

In this chapter, I address the first research question: do transparent firms avoid more or less tax? In section 4.1, I present hypothesis development and research design. Univariate analysis is presented in section 4.2. Section 4.3 reports the main empirical results and additional analysis is provided in section 4.4.

### **4.1 HYPOTHESIS DEVELOPMENT AND RESEARCH DESIGN**

#### **4.1.1 Hypothesis development**

Tax rules are notoriously complex by nature. To avoid potential scrutiny by tax authorities, managers have incentives to obscure the underlying intent of tax avoidance transactions and reduce the level of tax related disclosures. Both federal income tax reporting and U.S. GAAP require some disclosure of book-tax disparity, arguably an indicator for tax aggressiveness (Mills 1998), but the amount of detail required and reported is rather limited during my sample period.<sup>14</sup> In addition, firms may not provide sensitive tax information as required by GAAP in their filed 10K reports.<sup>15</sup> Thus, it's

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<sup>14</sup>For example, Enron's accounting reports and the tax footnote disclosure in particular, show that significant reconciling items that cause Enron's GAAP effective tax rate to differ from the statutory rate of 35% include basis and stock sale differences, foreign tax rate differential, and cash value in life insurance. But the lack of details in the tax disclosure makes it almost impossible for investors to learn the nature of transactions behind these line items. As the Joint Committee Report on Enron (U.S. Congress, Joint Committee on Taxation, 2003b) revealed, Enron engaged in several tax transactions (e.g., Project Tanya and Project Condor, corporate-owned life insurance (COLI) policies, and the use of subsidiaries (250) in low-tax (haven) countries) that generate significant large book-tax differences (McGill and Outslay 2004).

<sup>15</sup>The insufficient tax disclosure is not limited to firms that are involved in high-profile scandals or the recent accounting scandal period. For example, using confidential IRS data and publicly available tax footnote data, Gleason and Mills (2002) find that large U.S. firms often do not disclose material contingent tax liabilities as required by GAAP.

extremely difficult for outside investors to judge the underlying purpose of tax avoidance and the degree of complementarities between tax avoidance and diversion of rents.

If the agency cost view of tax avoidance dominates, which suggests that tax avoidance creates a shield for managerial opportunistic behavior, then prior research suggests that firm opacity (e.g., opaque accounting and low level coverage by information intermediaries) will facilitate managerial opportunism. Thus, the dominance of agency cost view of tax avoidance will predict the following:

***H1 (a): opaque firms exhibit a higher level of tax avoidance relative to their transparent counterparts.***

On the other hand, income taxes represent a significant cost of doing business and reduce cash flows available to the firm. Managers whose interests are appropriately aligned with shareholders' will engage in effective tax management to increase after-tax firm value. The complexity of tax rules and proprietary information about a firm's tax positions, however, make it difficult for outside investors to gauge key driving forces of firms' tax avoidance. As discussed in section 2, prior research suggests that corporate transparency allows outside investors to better monitor managerial opportunistic behavior (e.g., Lang et al. 2004, Francis and Martin 2010). With respect to firm tax management behavior, managers of transparent firms are more likely to engage in tax avoidance to enhance after-tax firm value and less likely to use abusive tax shelters to mask insider rent extraction. Hence, the dominance of value enhancing view of tax avoidance would predict the opposite sign for the relation between tax aggressiveness and corporate transparency:

***H1 (b): opaque firms exhibit a lower level of tax avoidance relative to their transparent counterparts.***

Of course, there's a third possibility that no relationship exists between tax avoidance and corporate opacity. If managers of some firms engage in tax avoidance primarily to extract rent, while others invest in tax planning to promote shareholder wealth, then the agency cost effect and the value enhancing effect of tax avoidance would coexist and cancel each other out. Thus, whether there's a link between tax avoidance and corporate opacity is ultimately an empirical question.

#### 4.1.2 Research design

I examine whether opaque firms avoid more or less tax using the cross-section of firm-year observations. Specifically, I estimate the following regression model:

$$TaxAgg_{i,t} = \beta_0 + \beta_1 Opacity_{i,t} + \sum \beta_k Control\ Variables_{i,t} + Year\ Dummies + Industry\ Dummies + \varepsilon_{i,t} \quad (1)$$

where  $i$  indexes firm,  $t$  indexes year, the dependant variable  $TaxAgg$  is the level of tax avoidance measured as cash effective tax rate ( $CETR$ ), long-run cash effective tax rate ( $LCETR$ ), or permanent book-tax difference ( $PBTD$ ), and  $Opacity$  is the value of the opacity index (see section 3.2 and section 3.3 for variable measurement). The control variables included in the model are:  $ROE_{i,t}$  return on equity, measured as operating income (#170-#192) scaled by beginning common equity (#60);  $LEV_{i,t}$  leverage measured as the sum of long-term debt (#9) and debt in current liabilities (#34) scaled by total assets (#6);  $NOL_{i,t-1}$  an indicator variable coded as 1 if loss carryforward (#52) is positive at the beginning of the year and 0 otherwise;  $\Delta NOL_{i,t}$  change in loss carryforward

(#52) scaled by beginning total assets (#6);  $FI_{i,t}$  pre-tax foreign income (#273) scaled by beginning total assets (#6);  $PPE_{i,t}$  the net property, plan, and equipment (#8) scaled by beginning total assets (#6);  $INTANG_{i,t}$  intangible assets (#33) scaled by beginning total assets (#6);  $UNCON_{i,t}$  equity income in earnings (#55) scaled by beginning total assets (#6);  $ASSETS_{i,t-1}$  natural logarithm of beginning total assets (#6);  $MB_{i,t-1}$  the market-to-book ratio measured as beginning market value of equity (#199×#25) scaled by beginning common equity (#60); *Age*, firm age, measured as the natural logarithm of one plus the number of years the firm has been in Compustat.  $ICOPTION_{i,t-1}$  the ratio of the Black-Scholes value of stock options granted to top five managers to the value of total compensation;  $IHPERCENT_{i,t-1}$  the average ratio of shares owned by institutional investors in the previous year.

The primary variable of interest is *Opacity*. The agency cost view of tax avoidance predicts a positive link between tax avoidance and corporate opacity. Thus I expect a positive coefficient ( $\beta_1$ ) on *Opacity*.<sup>16</sup> Conversely, the value enhancing view of tax avoidance predicts an opposite sign on the relation between tax aggressiveness and corporate opacity. If the value enhancing view dominates, I would expect a negative coefficient ( $\beta_1$ ) on *Opacity*.

I control for firm characteristics that are documented in prior literature to represent the presence of a firm's tax planning opportunities. The rationale for including

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<sup>16</sup> For ease of reading, I use transformed annual cash effective rate (e.g., from CETR to 1-CETR) or long-run cash effective rate (e.g., from LCETR to 1-LCETR) as a proxy for tax avoidance in the multivariate analysis. This way, larger values of all measures of tax avoidance represent higher levels of tax avoidance.

these variables in the regression model is that the extent of tax planning is limited by a firm's opportunities to take actions to either decrease taxable income or increase tax credits (e.g., Phillips 2003). Following prior literature, I include leverage (*LEV*), foreign operations (*FI*), capital intensity (*PPE*), intangible intensity (*INTAN*) in equation (1) to control for a firm's tax planning opportunities. Prior research shows mixed results on the relation between leverage and measures of tax avoidance, thus I do not predict a sign on *LEV* (e.g., Gupta and Newberry 1997 and Chen et al. 2010). As firms may choose to locate significant operations in low-tax foreign jurisdictions, I predict a positive sign on *FI* (e.g., Chen et al. 2010).<sup>17</sup> Consistent with prior studies, I expect a positive sign on *PPE* (e.g., Gupta and Newberry 1997 and Chen et al. 2010).<sup>18</sup> I include *INTANG* in the regression model but do not predict a sign on this variable for two reasons: first, the extent of intangible intensity may affect a firm's opportunities to shift income; second, the book and tax treatment for intangible assets may differ (Grubert and Slemrod 1998 and Chen et al. 2010).

The second set of control variables that I include in the regression model are profitability (*ROE*), growth (*MB*), firm size (*ASSETS*), firm age (*AGE*), equity earnings (*UNCON*), and the presence of net operating losses (*NOL* and *CNOL*). Prior research yields mixed results on the relation between profitability and attributes of tax avoidance,

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<sup>17</sup>Specifically, firms may choose to locate foreign subsidiaries in low-tax jurisdictions and defer repatriations of foreign earnings. For financial reporting purpose, they may take a position that foreign earnings are permanently reinvested.

<sup>18</sup>The level of capital intensity may affect the attributes of tax avoidance in a couple of ways. First, capital-intensive firms may lower their tax payments by taking accelerated depreciation for tax reporting purposes; second, capital-intensive firms may have more incentives to strategically locate their assets and thus lower their tax burden.

thus I do not predict a sign on *ROE* (Gupta and Newberry 1997, Chen et al. 2010).<sup>19</sup> Prior research suggests that growth firms may place less emphasis on tax planning, and thus I expect a negative sign on *MB* (Bankman 1994, Chen et al. 2010, and Robinson et al. 2010). I don't predict the sign on *ASSETS* because prior research yields mixed results on this variable. For example, as a proxy for political cost, *ASSETS* would bear a negative relation to the level of tax avoidance (e.g., Zimmerman 1983); as a proxy for tax sophistication, *ASSETS* should be positively related to the level of tax avoidance (e.g., Chen et al. 2010). *Age* is included as another control for tax sophistication.

I predict a positive sign on *NOL* and *CNOL* because firms can utilize net operating losses carried forward from prior years to lower their current year's tax burden. To control for the differential treatment of equity earnings for financial reporting and tax reporting, I also include *UNCON* in the regression model.

I expect that the level of tax avoidance varies across years and sectors of the economy. To capture these effects, I include industry and year dummies in the regression model. I estimate equation (1) using ordinary least square (OLS). I adjust the standard errors for heteroskedasticity and time-series correlation by using robust standard errors clustered at the firm level (Petersen, 2009).

## **4.2 UNIVARIATE TESTS**

As a first step in examining the relation between firm-level opacity and tax avoidance, I separate the firm-year observations into three groups based on the value of

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<sup>19</sup>A positive sign on *ROE* will be consistent with the notion that more profitable firms have more incentives and resources to engage in sophisticated tax strategies, and thus avoid more tax.

opacity index (e.g., firms in the 1<sup>st</sup> tercile are the most transparent, and the most opaque firms are in the 3<sup>rd</sup> tercile). Table 5, panel A, reports the mean and median level of tax avoidance for each group. The statistics show that transparent firms (e.g., firms in the 1<sup>st</sup> tercile) avoid more tax than opaque firms (e.g., firms in the 3<sup>rd</sup> tercile) across all three tax avoidance measures. While the mean (median) annual cash effective rate (*CETR*) for the most transparent firms is 29.5% (28.3%), the most opaque firms have mean (median) annual cash effective tax rate of 32.5% (31.4%) (*p-values for differences=0.000*). When tax avoidance is measured by long-run cash effective tax rate (*LCETR*), we also see that the most opaque firms tend to avoid less tax than the most transparent ones. Similarly, when tax avoidance is measured by permanent book-tax differences (*PBTD*), the most transparent firms exhibit significantly larger book-tax differences than the most opaque ones (e.g., mean, 0.016 vs. 0.013, *p-value for difference=0.002*; median, 0.008 vs. 0.006, *p-value for difference=0.000*). Taken together, these univariate results suggest that tax avoidance tends to be lower for the most opaque firms.

With respect to control variables, transparent firms exhibit higher valuations (*Q*), greater profitability (*ROE*), higher growth (*MB* and *GROWTH*), greater size (*ASSETS*), and higher stock return volatility (*RISK*) relative to opaque firms. Transparent firms have higher level of foreign operations (*FI*) and more incidences of net operating losses (*NOL*) at the beginning of the year, though transparent firms and opaque firms are not significantly different in leverage (*LEV*), capital intensity (*PPE*), or the existence of intangible assets (*INTANG*).<sup>20</sup> Transparent firms also have a higher level of institutional holdings (*IHPERCENT*) and use more stock options in their executive compensation

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<sup>20</sup> Since firms with negative pre-tax income are excluded from the sample, the existence of net operating loss carryforward suggests that firms may utilize acquired net operating losses to offset taxable income and thus reduce tax liabilities.

packages (*ICOPTION*). Since prior research shows that profitability, size, leverage, and other firm characteristics are likely correlated with tax avoidance measures, I primarily rely on multivariate analysis to examine the relation between corporate opacity and tax avoidance to ensure that the results are not driven by other fundamental differences between opaque firms and transparent firms.

### 4.3 EMPIRICAL RESULTS

Table 6 presents the estimates of the relation between corporate opacity and tax avoidance. The analysis is conducted by using three proxies to capture the extent of tax aggressiveness: annual cash effective tax rate (model 1-3), long-run cash effective tax rate (model 4-6), and permanent book-tax differences (model 7-9). For ease of interpreting the results, I use the transformed cash effective tax rates (e.g.,  $TCETR=1-CETR$  and  $TLCETR=1-LCETR$ ) to capture tax avoidance in the regression analysis such that larger values indicate more tax avoidance for both cash effective tax rate based measures and the book-tax difference based measure. The base models 1, 4, and 7 control for firm characteristics that represent the availability of firm-level tax planning opportunities; models 2, 5, and 8 include the percentage of option holdings in senior executives' compensation packages to control for the incentive alignment effect; models 3, 6, and 9 include the level of institutional ownership to control for the impact of outside investors' monitoring on tax aggressiveness. Untabulated results show that inferences do not change when both sets of governance variables are included in the model.

Across all nine models, I find that opaque firms are significantly less tax aggressive than transparent firms. In model 1, where tax avoidance is captured by annual cash effective tax rate, the coefficient on *OPACITY* shows that all else equal, one-standard deviation increase in *OPACITY* implies a decrease in annual cash effective rate



by approximately 1% ( $-0.059 \times 0.158$ ). In model 4, where the long-run cash effective rate replaces the annual cash effective rate as a proxy for tax avoidance, *OPACITY* shows a even larger economic impact on tax avoidance (i.e., one-standard deviation increase in *OPACITY* is accompanied by 1.8% decrease in the long-run cash effective tax rate). When tax avoidance is measured by permanent book-tax differences as in model 7, a firm moving from the 25<sup>th</sup> percentile to the 75<sup>th</sup> percentile of the opacity index will see a reduction in permanent book-tax differences of 0.3% of assets ( $-0.013 \times 0.021$ ).

Overall, the control variables have the expected signs and are generally significant. For example, the results indicate that profitable firms, capital-intensive firms, and firms with extensive foreign operations exhibit higher levels of tax avoidance, suggesting that these firms have stronger incentives and more opportunities to engage in tax planning activities. I find mixed evidence on the relation between firm growth and tax avoidance: models 1-3 show that growth firms are less tax aggressive, consistent with the expectation that high growth firms place less emphasis on tax planning; other models, however, show that the level of tax avoidance is positively related to firm growth as measured by market-to-book ratio (*MB*).

In the remaining models, where either the percentage of stock options or the percentage of institutional holding is included in the multivariate analysis to control for the impact of incentive or external monitoring on tax avoidance, the coefficients on *OPACITY* are still of similar magnitude and remain statistically significant. The coefficients on *ICOPTION* in model 3, 6 and 9 are all significant at above the 5% level. Consistent with stock options' incentive alignment effect, the results show that firms granting a high level of stock options to senior executives also avoid more tax. The coefficients on *IHPERCEN*, however, are not significant in model 2, 5, and 8.

Overall, the above analysis indicates that opaque firms exhibit a lower level of tax aggressiveness relative to their transparent counterparts. These results are inconsistent with the notion that tax avoidance activities are mainly engaged in by opportunistic managers to extract rents; instead, the results suggest that managers of transparent firms, where outside investors are better able to monitor managers' actions, engage in more tax avoidance activities to enhance shareholder wealth.

#### **4.4 ADDITIONAL ANALYSIS**

##### **4.4.1 The monitoring role of components of transparency**

In my analysis of the link between tax avoidance and corporate transparency, I generally contend that corporate transparency is a monitoring tool that disciplines managerial tax avoidance behavior. Thus, I assume that tax aggressiveness is a function of corporate opacity. However, opacity may instead flow from tax avoidance. As revealed by the high-profile tax shelter “Project Steele”, Enron implemented this tax strategy primarily to inflate its financial earnings. This suggests that tax avoidance activities could lead to opaque earnings performance. Although table 6 reveals that there is a negative link between tax avoidance and the overall opacity index value, tax avoidance might bear a significant positive relation with the earnings component of corporate opacity.

As a first step to address this potential reverse causality concern, I separate the opacity index into an internal component (earnings opacity) and an external component (market scrutiny) and examine their respective association with tax avoidance. The internal component of opacity, over which managers have relatively more control, is constructed by ranking firms into deciles based on the level of discretionary accruals and

dividing their rankings by a factor of 10 to provide an index value ranging from 0.1 to 1.0. The relatively more exogenous external component of opacity, which assumes an index value ranging from 0.1 to 1.0, is constructed similarly by using the other three components of the original opacity index: analyst following (*COVERAGE*), trading volume (*TURNOVER*), and press coverage (*NEWS*).<sup>21</sup> If tax avoidance is used as a technology to obscure firm performance (e.g., a tool for earnings management), then the level of tax avoidance should bear a significant relation to the level of discretionary accruals. Thus, consistent with this reverse causality story, I expect that there is at least a positive link between tax avoidance and earnings opacity.

Table 7 provides regression results based on the two opacity components. In models 1-3, I use transformed *CETR* to measure tax avoidance. Model 1, where the value of opacity index is replaced by the internal component of opacity, shows that after controlling for other factors, internal opacity is negatively associated with tax avoidance. This negative link between earning opacity and tax avoidance does not support the notion that aggressive tax activities lead to opaque financial performance. Model 2, where corporate opacity is gauged by the market scrutiny component, also shows that tax avoidance is negatively related to the level of external opacity, suggesting that firms with intense market scrutiny pursue aggressive tax planning activities. Model 3 includes both the internal and external components in the regression, and both components exhibit significant a negative relation to the level of tax avoidance. Models 4-6 replicate the analysis after substituting long-run cash effective tax rate as the measure of tax avoidance, and the same inferences still hold. Models 7-9, where tax avoidance is

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<sup>21</sup> Of course, one may also argue that financial analysts are less inclined to follow tax aggressive firms and tax aggressiveness may limit investors' willingness to transact in firm shares. This argument, however, seems unlikely. Tax transactions constitute only a relatively small part of the overall firm activities.

measured by permanent book-tax differences (*PBTD*), show that tax avoidance exhibits a significant negative relation to the market scrutiny component of opacity, but is not significantly related to earnings opacity. The positive but insignificant coefficient on earnings opacity provides no support for the reverse causality story.

I also employ a simultaneous equation approach to address the potential endogeneity problem. Specifically, the first equation models tax avoidance as a function of opacity and a set of firm-specific factors as discussed in section 4.1.2; the second equation models opacity as a function of tax avoidance and a set of control variables that have been documented in the literature to affect various components of corporate transparency (e.g., operating cycle, cash flow volatility, stock return volatility, size, profitability, and growth). Untabulated results show that opacity significantly impact tax avoidance in the regressions of tax avoidance on opacity; tax avoidance, however, does not have a significant impact on opacity in most regressions of opacity on tax avoidance (e.g., the only exception is in the regression of opacity on annual cash effective tax rate, where tax avoidance has a marginally significant impact on opacity).

Taken together, these results suggest that firms with more transparent earnings exhibit a higher level of tax avoidance. This does not support the alternative explanation that tax avoidance is used as a technology to obscure firm performance. In addition, tax aggressiveness also exhibits a significant negative association with the market scrutiny component of corporate opacity (e.g., firms with intense market scrutiny avoid more tax), which is inconsistent with the argument that aggressive tax avoidance transactions may reduce information intermediaries' interests of following the firm and decrease the attractiveness of transacting in firm shares by investors.

#### 4.4.2 Firm-Level analysis

Since firms' tax avoidance and opacity status may both experience little change over time, I conduct a firm-level analysis to address the potential concern of serial dependence in my data. Specifically, the firm-level *CETR* is measured as the aggregate cash tax paid divided by aggregate pre-tax income over the sample period; the firm-level *PBTD* is the mean *PBTD* over the sample period; for firm-level control variables that are ratios, I aggregate the numerators and denominators first before calculating the ratios; other firm-level control variables are the simple averages over the sample period. Table 8 reports the regression results for the firm-level analysis of the link between tax avoidance and opacity. Models 1 and 2 report results where the dependent variable is firm-level *CETR* and models 3 and 4 report results where the dependent variable is firm-level *PBTD*. Consistent with the results in the firm-year level analysis, tax avoidance bears a significant negative relation to opacity across all four models, and the results are even stronger in the firm-level analysis. For example, in model 1 and 2, where tax aggressiveness is measured by cash effective tax rates, firms with one-standard deviation increase in opacity index value see a reduction in tax rate of approximately 2%-3%.

## **Chapter 5: The Valuation Implications of Tax Avoidance**

In this chapter, I examine the valuation implications of tax avoidance. Specifically, I examine the role of corporate transparency in moderating the relation between tax avoidance and firm value. In section 5.1, I present hypothesis development and research design. In section 5.2, I report the empirical results, and additional analysis is provided in section 5.3.

### **5.1 HYPOTHESIS DEVELOPMENT AND RESEARCH DESIGN**

#### **5.1.1 Hypothesis development**

Section 2.2.2 suggests that corporate transparency potentially plays an important role in moderating the relation between corporate tax aggressiveness and firm value. Prior studies find that corporate transparency facilitates investor monitoring and thus constrains managerial opportunistic behavior (e.g., unprofitable acquisitions and empire building). If tax avoidance creates a shield by managers to expropriate outside investors, then tax aggressiveness would be a manifestation of severe agency problems. Since the hidden agency costs may substantially outweigh any potential tax savings from tax avoidance activities, outside investors will discount those firms for being tax aggressive. Corporate opacity will provide another layer of protection for insider rent extraction, facilitating related-party asset transfers, excessive perquisite consumption or outright theft of earnings. Corporate opacity exacerbates the hidden costs associated with tax aggressiveness. The agency cost view of tax avoidance suggests a negative relation between tax aggressiveness and firm value as corporate opacity increases. Even if tax avoidance activities are predominantly tax savings devices employed by managers to increase after-tax firm value, corporate transparency could help alleviate outside

investors' concern about potential agency problems underlying tax aggressiveness. Thus, the value enhancing view of tax avoidance suggests a positive relation between tax aggressiveness and firm value as corporate transparency increases. In sum, both views of tax aggressiveness suggest that corporate transparency increases the value of being tax aggressive. This leads to my second hypothesis:

***H2: price discount (premium) of being tax aggressive decreases (increases) with the level of corporate transparency.***

### 5.1.2 Research design

Section 2.2.2 suggests that corporate transparency potentially plays an important role in moderating the relation between corporate tax aggressiveness and firm value.

I employ the following regression model to test my second hypothesis - whether the interaction of tax aggressiveness and corporate transparency influences shareholder wealth:

$$Q_{i,t} = \beta_0 + \beta_1 TaxAgg_{i,t} + \beta_2 Opacity_{i,t} + \beta_3 (TaxAgg_{i,t} * Opacity_{i,t}) + \sum \beta_k Control\ Variables_{i,t} + Year\ Dummies + Industry\ Dummies + \varepsilon_{i,t} \quad (2)$$

where i indexes firm, t indexes year, the dependant variable  $Q_{i,t}$ , firm value, measured as the market value of assets (#6+#199\*#25-#60) divided by the book value of total assets (#6). I use an indicator variable to capture tax aggressiveness  $TaxAgg_{i,t}$ , which is coded as one if a firm is in the bottom *CETR/LCETR* tercile or top *PBTD* tercile.  $Opacity_{i,t}$  is the value of the opacity index (see section 3.2 and section 3.3 for variable measurement).  $TaxAgg_{i,t} * Opacity_{i,t}$  is the interaction term of opacity and the various measures of tax avoidance as described above. The control variables included in the model are:  $ROE_{i,t}$  return on equity, measured as operating income (#170-#192) scaled by beginning common equity (#60);  $RISK$ , firm risk, measured as the standard deviation of monthly

stock returns over the previous 36 months;  $Growth_{i,t}$ , 3-year average sales (#12) growth from year t-2 to year t;  $LEV_{i,t}$  leverage measured as the sum of long-term debt (#9) and debt in current liabilities (#34) scaled by total assets (#6);  $NOL_{i,t-1}$  an indicator variable coded as 1 if loss carryforward (#52) is positive at the beginning of the year and 0 otherwise;  $\Delta NOL_{i,t}$  change in loss carryforward (#52) scaled by beginning total assets (#6);  $FI_{i,t}$  foreign income (#273) scaled by beginning total assets (#6);  $PPE_{i,t}$  the net property, plant, and equipment (#8) scaled by beginning total assets (#6);  $INTANG_{i,t}$  intangible assets (#33) scaled by beginning total assets (#6);  $UNCON_{i,t}$  equity income in earnings (#55) scaled by beginning total assets (#6);  $ASSETS_{i,t-1}$  natural logarithm of beginning total assets (#6);  $Age$ , firm age, measured as the natural logarithm of one plus the number of years the firm has been in Compustat.

Following prior literature, I use Tobin's Q ( $Q$ ) to proxy for firm value and control for other factors that have been demonstrated to affect firm value, corporate transparency, and tax aggressiveness (e.g., Lang et al. 2004; Desai and Dharmapala 2009; Anderson et al. 2009). My primary variable of interest is the interaction of tax aggressiveness and transparency ( $TaxAgg*Opacity$ ), and I expect a negative coefficient on this interaction term. While implicit taxes may have an impact on firm valuation, in this study I assume the magnitude of any implicit tax effect is too small to affect the inferences. The implicit tax effect should be less of a concern in my sample period given the finding that there is a sharp decline in implicit taxes at the corporate level following TRA86 (Jennings et al. 2009).

I include firm size ( $ASSETS$ ), growth opportunities ( $GROWTH$ ), leverage ( $LEV$ ), performance ( $ROE$ ), and firm risk ( $RISK$ ) in the regression model because prior studies show that large, risky and highly-leveraged firms have low Q ratios, and high-growth



firms and firms with good past performance exhibit high valuations (e.g., Andersen et al. 2009). In addition, I also include *NOL*, *CNOL*, *FI*, *PPE*, *INTANG*, *UNCON*, and *AGE*, which are significantly correlated with *TaxAgg* in equation (1).

Industry and year dummies are included in the equation to control for industry and year fixed effects. I estimate equation (2) using ordinary least square (OLS). I adjust the standard errors for heteroskedasticity and time-series correlation by using robust standard errors clustered at the firm level (Petersen, 2009).

## 5.2 EMPIRICAL RESULTS

Table 9 reports the regression analysis for the relations among tax avoidance, corporate opacity, and firm value. In Tobin's Q regression models, I use an indicator variable to capture tax aggressiveness. Specifically, the tax aggressiveness indicator is coded as one if a firm is in the bottom *CETR* (*LCETR*) tercile or the top *PBTD* tercile in a particular year. In models 1-3, I use annual cash effective tax rate to capture the extent of tax aggressiveness; In models 4-6, the extent of tax aggressiveness is captured by the long-run cash effective tax rate; In models 7-9, the permanent book-tax differences replace cash effective tax rate based measures to capture tax aggressiveness. The base models 1, 4, and 7 control for firm characteristics that have been documented to affect firm value, corporate transparency, and firm-level tax planning opportunities. The remaining models include additional control variables, the percentage of option grants in senior executives' compensation packages and the level of institutional ownership, which capture the impact of managers' incentive and outside investors' monitoring on tax aggressiveness.

In the base model 1, the negative coefficient estimates on the opacity index ( $\beta_2 = -0.793$ ,  $p \text{ value} < 0.01$ ) indicate that investors place large discounts on corporate opacity;

the coefficient estimate on the tax aggressiveness dummy is positive and significant ( $\beta_1=0.767$ ,  $p$  value  $< 0.01$ ), suggesting that investors place price premiums on tax avoidance. With regard to the primary variable of interest, the interaction term between opacity and tax avoidance, the significantly negative coefficient, indicates that as corporate opacity increases, tax avoidance exerts a negative effect on firm value ( $\beta_3=-0.978$ ,  $p$  value  $< 0.01$ ). From an economic perspective, a tax aggressive firm enjoys a price premium of approximately 5.0% relative to a less tax aggressive firm when both firms have average opacity; as corporate opacity increases by one standard deviation, the value premium enjoyed by the tax aggressive firm decreases to about 1.0%. The coefficients on the control variables are generally in the predicted direction, with Tobin's Q increasing in growth and profitability, and decreasing in size, risk, and leverage. Overall, the results provide some evidence that investors value tax aggressiveness, but they discount tax aggressiveness for opaque firms due to potential severe agency conflicts in those firms. These results are consistent with the view that the effect of tax avoidance on firm value differs between well governed firms and poorly governed firms (Desai and Dharmapala 2009).

The percentage of institutional holding and the percentage of stock option grants in senior executives' compensation packages are included in models 2 and 3, respectively, as a proxy for an internal and an external governance mechanism. The results show that the inferences do not change in model 2 and model 3. Tobin's Q bears a positive relation to tax aggressiveness, and is negatively related to opacity. In model 2 and model 3, the coefficients on *TaxAgg* are of similar magnitude as in the base model and significant at the 1% level. In model 2, the absolute value of the coefficient on *OPACITY* is larger relative to those in model 1 and model 3. More importantly, the

coefficients on the variable of interest, the interaction term between tax aggressiveness and opacity, exhibit similar magnitude and statistical significance as in the base model. Somewhat surprising, model 2 shows that Tobin's Q is decreasing with the level of institutional holding. In model 3, Tobin's Q is increasing with the percentage of stock option grants, suggesting that the incentive alignment effect of stock options has a positive impact on firm value. In both models, the control variables are still in the predicted direction.

Models 4-6 replicate the analysis substituting an indicator variable that equals 1 when firms are in the bottom *LCETR* tercile. Consistent with the results in models 1-3, investors value tax aggressiveness, but the value premium is decreasing with corporate opacity. To gauge the economic significance, for two firms with the mean opacity index value, the tax aggressive firm enjoys a value premium of 4.6% relative to its non-aggressive counterpart. When the opacity index value increases by one-standard deviation, the value premium enjoyed by the tax aggressive firm decreases to 2.2%. Models 7-9 replicate the same analysis by using the permanent book-tax difference indicator variable as the proxy for tax avoidance. All the main inferences do not change.

### **5.3 ADDITIONAL ANALYSIS**

Analysis in the prior section suggests that investors place a price premium on tax avoidance, and the premium increases with corporate transparency. The increasing premium indicates that the monitoring role played by corporate transparency alleviates investors' concern about potential agency cost of tax avoidance. To provide further insights into the mechanism that facilitates outside investors' monitoring, I examine the differential monitoring roles played by internal transparency and external transparency. Earnings transparency, over which management has more control, could be exploited by

opportunistic managers to hide true performance and extract rents. The price premium of tax avoidance is thus expected to be lower for firms with opaque earnings. Similarly, the lack of scrutiny by market participants and information intermediaries could facilitate managers pursuing value destroying tax avoidance. Table 10 tabulates regression results. In model 1, tax aggressiveness is captured by an indicator variable when firms are in the bottom cash effective tax rate tercile. In model 2, tax aggressiveness is captured by a long-run cash effective tax rate dummy. In model 3, the measure of tax aggressiveness is replaced by the permanent book-tax difference indicator dummy. Across all three models, the coefficients ( $\beta_5$ ) on the interaction of tax aggressiveness and external opacity are significantly negative, suggesting that firms lacking external scrutiny enjoy a smaller price premium for their tax avoidance activities. The interaction term of tax aggressiveness and earnings opacity, however, does not bear a significant relation to firm value. Taken together, these results suggest that the monitoring role is primarily driven by the external component of transparency. That is, firms intensely followed by information intermediaries have more creditable information available to outside investors and thus ensure managers to pursue tax avoidance activities mainly to enhance shareholder wealth. On the other hand, internal transparency, over which managers have relatively more control, provides limited information for outside shareholders to alleviate their concerns about the hidden agency costs associated with tax avoidance activities.

## **Chapter 6: Concluding Remarks**

This dissertation investigates the relations among tax avoidance, corporate transparency, and firm valuation. While corporate tax avoidance is traditionally viewed as value enhancing, an emerging stream of research indicates that investors may not always value tax avoidance due to potential agency costs associated with tax avoidance activities. My work suggests that corporate transparency plays an important role in understanding the determinants and economic consequences of tax avoidance. Using S&P 1500 firms from 1994 to 2001, I first examine the relation between corporate transparency and tax avoidance. Using multiple measures of tax avoidance constructed from financial statements and a self-constructed comprehensive measure of corporate transparency, a firm-level opacity index, I find that transparent firms avoid more tax than opaque firms. This supports the notion that in a large section of the economy, value enhancing effects of tax avoidance predominate. To provide further insights, I decompose opacity into an internal component (e.g., earnings opacity) and a market scrutiny component, and explore their respective relation with tax avoidance. I find that both components bear significant negative relation to tax avoidance. To a certain extent, this alleviates the concern that aggressive tax transactions may lead to opaque earnings, and suggests that corporate transparency is an important determinant of firm-level tax avoidance.

Next, I directly examine the valuation impact of tax avoidance and how this relation varies with corporate transparency. My analysis suggests that investors place a price premium on tax avoidance, but the value premium decreases as firms become more opaque. To shed light on the mechanisms facilitating investor monitoring, I conduct

additional analysis by separating corporate transparency into an internal (earnings transparency) component and an external (market scrutiny) component. I find that firms lacking market scrutiny enjoy smaller value premiums for their tax avoidance activities relative to those intensely followed by financial analysts and other market participants. Overall, my study indicates that tax avoidance enhances firm value, especially for the most transparent firms.

My study contributes to two streams of research. First, in a unique setting - corporate tax management practice, I demonstrate that corporate transparency plays an important monitoring role as a determinant of corporate tax avoidance decisions and attaching greater value premium to tax avoidance activities. Second, my study also furthers our understanding of firm tax avoidance behavior. The results show that all else equal, opaque firms engage in less tax avoidance activities than transparent firms. Since aggressive tax transactions are more likely to mask managerial rent extraction in opaque firms, investors discount tax avoidance activities pursued by opaque firms.

**Table 1: Sample Description**

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*Panel A Sample selection*

Firm-years for S&P1500 firms, 1994-2001	14,355	<sup>a</sup>
Less: firm-years with missing tax avoidance measures	4,896	<sup>b</sup>
Less: firm-years with missing control variables	934	
Less: firm-years with missing opacity measures	<u>2,255</u>	
Firm-years in the final sample	<u>6,270</u>	

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**Table 1: Sample Description (Continued)**

<i>Panel B Industry distribution of sample firm-years <sup>c</sup></i>			
Industry	# of observation	% of Sample	cumulative %
Food Products	161	2.6%	2.6%
Candy & Soda	12	0.2%	2.8%
Beer & Liquor	26	0.4%	3.2%
Recreation	34	0.5%	3.7%
Printing and Publishing	114	1.8%	5.5%
Consumer Goods	128	2.0%	7.5%
Apparel	129	2.1%	9.6%
Healthcare	70	1.1%	10.7%
Medical Equipment	178	2.8%	13.5%
Pharmaceutical Products	180	2.9%	16.4%
Chemicals	247	3.9%	20.3%
Textiles	55	0.9%	21.2%
Construction Materials	174	2.8%	24.0%
Construction	50	0.8%	24.8%
Steel Works Etc	162	2.6%	27.4%
Fabricated Products	15	0.2%	27.6%
Machinery	291	4.6%	32.2%
Electrical Equipment	19	0.3%	32.5%
Automobiles and Trucks	175	2.8%	35.3%
Aircraft	39	0.6%	35.9%
Shipbuilding, Railroad Equipment	19	0.3%	36.2%
Defense	23	0.4%	36.6%
Precious Metals	7	0.1%	36.7%
Non-Metallic and Industrial Metal Mining	31	0.5%	37.2%
Petroleum and Natural Gas	235	3.7%	40.9%
Utilities	438	7.0%	47.9%
Communication	88	1.4%	49.3%
Personal Services	49	0.8%	50.1%
Business Services	468	7.5%	57.6%
Computers	310	4.9%	62.5%
Electronic Equipment	418	6.7%	69.2%
Measuring and Control Equipment	119	1.9%	71.1%
Business Supplies	157	2.5%	73.6%
Shipping Containers	29	0.5%	74.1%
Transportation	221	3.5%	77.6%
Wholesale	236	3.8%	81.4%



**Table 1: Sample Description (Continued)**

<i>Panel B Industry distribution of sample firm-years (continued)</i>			
Industry	# of obs.	% of obs.	cumulative %
Retail	483	7.7%	89.1%
Restaurants, Hotels, Motels	142	2.3%	91.4%
Banking	38	0.6%	92.0%
Insurance	227	3.6%	95.6%
Trading	103	1.6%	97.2%
Other <sup>d</sup>	170	2.7%	100.0%
Total	6,270	100.0%	100%

Notes to table 1:

- a. Firms were listed on S&P 1500 index either on December 31, 1996 or on December 29, 2000.
- b. Specifically, 3,216 observations are lost because they either have negative pre-tax income or no data on income taxes paid.
- c. Industries are defined on the basis of 4-digit SIC codes using the industry groupings identified in Fama and French (1997).
- d. Other industries include agriculture, entertainment, rubber and plastic products, sanitary services, steam, air conditioning supplies, irrigation systems, and cogeneration - SM power producer.

**Table 2: Sample Description – Main Variables by Industry**

Industry <sup>a</sup>	Mean			
	CETR <sup>b</sup>	LCETR <sup>b</sup>	PBTD <sup>b</sup>	OPACITY <sup>c</sup>
Food Products	0.309	0.334	0.011	0.516
Candy & Soda	0.237	0.225	0.001	0.585
Beer & Liquor	0.301	0.305	0.025	0.439
Recreation	0.328	0.310	0.026	0.537
Printing and Publishing	0.412	0.440	0.003	0.550
Consumer Goods	0.339	0.360	0.005	0.544
Apparel	0.341	0.347	0.010	0.536
Healthcare	0.319	0.330	0.009	0.608
Medical Equipment	0.335	0.321	0.024	0.543
Pharmaceutical Products	0.261	0.270	0.043	0.495
Chemicals	0.310	0.327	0.009	0.618
Textiles	0.324	0.329	0.002	0.625
Construction Materials	0.327	0.354	0.008	0.630
Construction	0.333	0.365	0.005	0.593
Steel Works Etc	0.282	0.288	0.010	0.532
Fabricated Products	0.328	0.272	0.007	0.667
Machinery	0.335	0.352	0.018	0.570
Electrical Equipment	0.384	0.332	0.015	0.634
Automobiles and Trucks	0.354	0.347	0.012	0.572
Aircraft	0.261	0.273	0.014	0.424
Shipbuilding, Railroad Equipment	0.294	0.438	0.002	0.493
Defense	0.370	0.370	0.013	0.573
Precious Metals	0.297	0.208	0.050	0.396
Non-Metallic and Industrial Metal Mining	0.331	0.343	0.025	0.624
Petroleum and Natural Gas	0.208	0.242	0.007	0.482
Utilities	0.328	0.312	0.006	0.591
Communication	0.328	0.322	0.004	0.571
Personal Services	0.296	0.324	0.001	0.599
Business Services	0.315	0.313	0.022	0.565
Computers	0.278	0.279	0.024	0.544
Electronic Equipment	0.255	0.266	0.037	0.495
Measuring and Control Equipment	0.308	0.344	0.029	0.550
Business Supplies	0.332	0.328	0.004	0.584
Shipping Containers	0.220	0.281	0.003	0.601
Transportation	0.264	0.262	0.002	0.496
Wholesale	0.362	0.361	0.002	0.602
Retail	0.328	0.333	0.008	0.491
Restaurants, Hotels, Motels	0.306	0.324	0.017	0.498

<b>Table 2: Sample Description-Main Variables by Industry (Continued)</b>				
	Mean			
Industry	CETR	LCETR	PBTD	OPACITY
Banking	0.239	0.246	0.000	0.505
Insurance	0.270	0.283	0.009	0.551
Trading	0.353	0.346	0.008	0.563
Other <sup>d</sup>	0.319	0.317	0.011	0.579
Sample mean	0.308	0.316	0.014	0.548

Notes to table 2:

- a. Industries are defined on the basis of 4-digit SIC codes using the industry groupings identified in Fama and French (1997).
- b. Tax avoidance measures are annual cash effective tax rate (CETR), long-run cash effective tax rate (LCETR), and permanent book-tax difference (PBTD). See the Appendix A for variable measurements.
- c. The opacity index (OPACITY) provides a composite measure of opacity and is constructed by ranking four individual measures of opacity into deciles with the most opaque firms taking a value of 10. The four rankings are summed and divided by a factor of 40 to provide an index ranging from 0.1 to 1. See the Appendix A for variable measurements.
- d. Other industries include agriculture, entertainment, rubber and plastic products, sanitary services, steam, air conditioning supplies, irrigation systems, and cogeneration - SM power producer.

**Table 3: Descriptive Statistics of Tax Avoidance, Transparency and Other Firm Characteristics**

Variable	N	Mean	STD	25%	Median	75%
<i>Panel A: Tax avoidance/aggressiveness<sup>a</sup> and opacity measures<sup>b</sup></i>						
CETR	6,270	0.308	0.197	0.193	0.297	0.381
LCETR	6,270	0.316	0.150	0.240	0.318	0.380
PBTD	6,270	0.014	0.033	-0.001	0.007	0.020
OPACITY	6,270	0.548	0.158	0.425	0.550	0.675
EARNOPACITY	6,270	0.068	0.098	0.019	0.042	0.082
COVERAGE	6,270	-1.725	0.863	-2.398	-1.792	-1.099
TURNOVER	6,270	5.538	0.783	5.057	5.621	6.099
NEWS	6,270	-1.331	1.724	-2.485	-1.099	0.000
<i>Panel B: Other firm characteristics<sup>c</sup></i>						
Q	6,270	2.232	1.543	1.270	1.698	2.534
ROE	6,270	0.301	0.254	0.172	0.263	0.384
LAG_ROE	6,270	0.287	0.278	0.170	0.266	0.388
LEV	6,270	0.223	0.168	0.077	0.219	0.339
NOL	6,270	0.172	0.378	0.000	0.000	0.000
CNOL	6,270	0.001	0.027	0.000	0.000	0.000
FI	6,270	0.017	0.032	0.000	0.000	0.022
PPE	6,270	0.381	0.267	0.179	0.317	0.543
INTANG	6,270	0.110	0.173	0.000	0.028	0.156
UNCON	6,270	0.001	0.004	0.000	0.000	0.000
ASSETS	6,270	7.072	1.626	5.866	6.901	8.125
MB	6,270	3.551	3.046	1.762	2.612	4.196
RISK	6,270	0.108	0.048	0.073	0.099	0.133
GROWTH	6,270	0.181	0.214	0.054	0.124	0.243
AGE	6,270	3.087	0.674	2.485	3.219	3.689
ICOPTION	6,063	0.327	0.248	0.120	0.302	0.503
IHPERCENT	5,735	0.554	0.187	0.433	0.569	0.689

Notes to table 3:

- a. Tax avoidance measures are annual cash effective tax rate (CETR), long-run cash effective tax rate (LCETR), and permanent book-tax differences (PBTD). See the Appendix A for variable measurements.
- b. The opacity index (OPACITY) provides a composite measure of opacity and is constructed by ranking four individual measures of opacity into deciles with the most opaque firms taking a value of 10. The four rankings are summed and divided by a factor of 40 to provide an index ranging from 0.1 to 1. The four opacity index inputs are: discretionary accrual (EARNOPACITY), analyst following (COVERAGE), trading volume (TURNOVER) and press coverage (NEWS). See the Appendix A for variable measurements.
- c. Q is the sum of the market value of equity and the book value of debt scaled by the book value of assets, ROE is return on equity, LEV is long-term debt scaled by assets, NOL is an indicator variable for loss carry forward, CNOL is change in loss carry forward scaled by assets, FI is foreign income scaled by assets, PPE is property, plant, and equipment scaled by assets, INTANG is intangible assets scaled by assets, UNCON is equity income in earnings scaled by assets, ASSETS is the natural log of total assets, MB is the market-to-book ratio, RISK is the standard deviation of monthly stock return for the previous 36 months. GROWTH is the average annual sales growth for the previous three years. Age is the natural logarithm of one plus the number of years the firm has been in Compustat. ICOPTION is the ratio of Black-Scholes value of stock options granted to the top five managers to the value of their total compensation. IHPERCENT is the fraction of shares owned by institutional investors. See the Appendix for variable measurement. See Appendix A for variable measurements.

**Table 4: Correlation Matrix of Main Variable of Interest <sup>a</sup>**

	CETR	LCETR	PBTD	Q	OPACITY	EARNOPACITY	COVERAGE	TURNOVER
LCETR	0.461 (0.000)							
PBTD	-0.220 (0.000)	-0.171 (0.000)						
Q	-0.122 (0.000)	-0.115 (0.000)	0.365 (0.000)					
OPACITY	0.074 (0.000)	0.134 (0.000)	-0.057 (0.000)	-0.154 (0.000)				
EARNOPACITY	-0.020 (0.122)	-0.028 (0.028)	0.106 (0.000)	0.122 (0.000)	0.271 (0.000)			
COVERAGE	0.073 (0.000)	0.115 (0.000)	-0.036 (0.005)	-0.196 (0.000)	0.723 (0.000)	0.024 (0.056)		
TURNOVER	0.108 (0.000)	0.160 (0.000)	-0.203 (0.000)	-0.274 (0.000)	0.453 (0.000)	-0.144 (0.000)	0.263 (0.000)	
NEWS	-0.006 (0.618)	0.032 (0.012)	-0.012 (0.337)	-0.096 (0.000)	0.598 (0.000)	0.069 (0.000)	0.393 (0.000)	-0.050 (0.002)

Notes to table 4:

a. Table 4 presents Pearson correlation matrix of key variables, and two-sided *p* values are presented in parentheses.

**Table 5: Tax Avoidance and Transparency – Univariate Analysis <sup>a</sup>**

OPACITY tercile	Mean			Median			P-Value	
	Low	2	High	Low	2	High	Mean	Median
CETR	0.295	0.306	0.325	0.283	0.291	0.314	0.000	0.000
LCETR	0.295	0.315	0.338	0.300	0.316	0.336	0.000	0.000
PBTD	0.016	0.013	0.013	0.008	0.007	0.006	0.002	0.000
Q	2.515	2.133	2.033	1.874	1.697	1.563	0.000	0.000
ROE	0.324	0.295	0.281	0.282	0.257	0.248	0.000	0.000
LEV	0.220	0.228	0.222	0.212	0.225	0.217	0.651	0.510
NOL	0.196	0.173	0.146	0.000	0.000	0.000	0.000	0.000
CNOL	0.001	0.002	0.001	0.000	0.000	0.000	0.672	0.918
FI	0.023	0.016	0.012	0.000	0.000	0.000	0.000	0.000
PPE	0.388	0.382	0.374	0.311	0.319	0.322	0.091	0.603
INTANG	0.104	0.117	0.110	0.021	0.036	0.028	0.213	0.175
UNCON	0.001	0.001	0.001	0.000	0.000	0.000	0.386	0.424
ASSETS	7.850	7.012	6.313	7.782	6.886	6.185	0.000	0.000
MB	4.224	3.480	2.915	3.086	2.635	2.196	0.000	0.000
RISK	0.112	0.109	0.104	0.104	0.099	0.095	0.000	0.000
GROWTH	0.201	0.192	0.148	0.142	0.129	0.105	0.000	0.000
AGE	3.156	3.048	3.054	3.296	3.178	3.219	0.000	0.000
ICOPTION	0.403	0.329	0.240	0.397	0.301	0.210	0.000	0.000
IHPERCENT	0.605	0.565	0.491	0.620	0.581	0.501	0.000	0.000

Notes to table 5:

- a. This table presents descriptive statistics of tax avoidance measures and firm characteristics separately for firms in different opacity groups. The last two columns report the two-sided p-values for the difference between transparent firms (1<sup>st</sup> tercile) and opaque firms (3<sup>rd</sup> tercile) in means and medians, respectively. T -tests (Wilcoxon rank tests) are used to test for the difference in means (medians).
- b. CETR is annual cash effective tax rate, LCETR is long-run cash effective tax rate, and PBTD is permanent book-tax difference.
- c. Q is the sum of the market value of equity and the book value of debt scaled by the book value of assets, ROE is return on equity, LEV is long-term debt scaled by assets, NOL is an indicator variable for loss carry forward, CNOL is change in loss carry forward scaled by assets, FI is foreign income scaled by assets, PPE is property, plant, and equipment scaled by assets, INTANG is intangible assets scaled by assets, UNCON is equity income in earnings scaled by assets, ASSET is the natural log of total assets, MB is the market-to-book ratio, RISK is the standard deviation of monthly stock return for the previous 36 months. GROWTH is the average annual sales growth for the previous three years. ICOPTION is the ratio of Black-Scholes value of stock options granted to the top five managers to the value of their total compensation. IHPERCENT is the fraction of shares owned by institutional investors.



**Table 6: Tax Avoidance and Opacity – Multivariate Analysis <sup>a</sup>**

Panel A: TaxAgg=1-CETR <sup>b</sup>	Model 1			Model 2			Model 3		
	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	0.631	***	12.14	0.643	***	11.57	0.605	***	11.75
β1 (OPACITY)	-0.059	***	-2.82	-0.060	***	-2.65	-0.045	**	-2.11
β2 (ROE)	0.148	***	7.35	0.146	***	7.01	0.154	***	7.54
β3 (LEV)	0.041		1.62	0.040		1.52	0.037		1.44
β4 (NOL)	0.029	***	3.27	0.030	***	3.33	0.025	***	2.77
β5 (CNOL)	0.044		0.39	0.023		0.20	0.042		0.35
β6 (FI)	0.278	***	2.89	0.250	**	2.53	0.255	***	2.59
β7 (PPE)	0.089	***	5.00	0.086	***	4.58	2.590	***	5.17
β8 (INTANG)	-0.082	***	-3.87	-0.083	***	-3.71	-0.085	***	-3.92
β9 (UNCON)	0.318		0.41	-0.103		-0.12	0.407		0.53
β10 (ASSETS)	-0.003		-0.89	-0.002		-0.77	-0.003		-0.85
β11 (MB)	-0.004	**	-2.54	-0.004	***	-2.58	-0.004	***	-2.92
β12 (AGE)	-0.012	**	-2.00	-0.016	***	-2.58	-0.010		-1.60
β13 (IHPERCEN)				0.012		0.63			
β14 (ICOPTION )							0.055	***	4.48
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			5,735			6,063		
Adjusted R <sup>2</sup> %	9.03			9.29			9.68		

**Table 6: Tax Avoidance and Transparency – Multivariate Analysis (Continued)**

Panel B: TaxAgg=1-LCETR <sup>c</sup>		Model 4		Model 5		Model 6			
	Coeff.		T-Stat	Coeff.	T-Stat	Coeff.	T-Stat		
β0 (INTERCEPT)	0.787	***	18.89	0.799	***	18.71	0.761	***	18.76
β1 (OPACITY)	-0.115	***	-6.00	-0.118	***	-5.80	-0.099	***	-5.15
β2 (ROE)	0.012		0.91	0.000		0.03	0.018		1.34
β3 (LEV)	0.031		1.34	0.032		1.33	0.027		1.12
β4 (NOL)	0.031	***	3.68	0.036	***	4.32	0.028	***	3.26
β5 (CNOL)	0.001		0.01	0.007		0.07	0.022		0.20
β6 (FI)	0.177	**	2.16	0.158	*	1.87	0.151	*	1.84
β7 (PPE)	0.093	***	5.87	0.087	***	5.28	0.095	***	6.04
β8 (INTANG)	-0.041	**	-1.98	-0.033		-1.49	-0.043	**	-2.09
β9 (UNCON)	0.733		1.08	0.616		0.85	0.777		1.17
β10 (ASSETS)	-0.006	*	-1.91	-0.006	**	-1.98	-0.005	*	-1.82
β11 (MB)	0.002	*	1.90	0.003	**	2.23	0.002		1.38
β12 (AGE)	-0.017	***	-2.96	-0.019	***	-3.30	-0.013	**	-2.33
β13 (IHPERCEN)				0.010		0.63			
β14 (ICOPTION)							0.045	***	4.48
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			5,735			6,063		
Adjusted R <sup>2</sup> %	11.67			12.82			12.16		

**Table 6: Tax Avoidance and Transparency– Multivariate Analysis (Continued)**

Panel C: TaxAgg=PBTD <sup>d</sup>	Model 7			Model 8			Model 9		
	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	0.039	***	5.57	0.044	***	5.65	0.034	***	4.97
β1 (OPACITY)	-0.013	***	-3.29	-0.016	***	-3.88	-0.011	***	-2.88
β2 (ROE)	0.011	**	2.28	0.011	**	2.09	0.010	**	2.16
β3 (LEV)	-0.015	***	-3.72	-0.014	***	-3.26	-0.015	***	-3.57
β4 (NOL)	0.001		0.70	0.001		0.76	0.001		0.32
β5 (CNOL)	-0.002		-0.07	-0.001		-0.03	-0.004		-0.11
β6 (FI)	0.113	***	4.34	0.117	***	4.40	0.105	***	4.03
β7 (PPE)	-0.004		-1.19	-0.004		-1.12	-0.002		-0.77
β8 (INTANG)	-0.026	***	-7.34	-0.027	***	-7.32	-0.025	***	-7.01
β9 (UNCON)	0.141		1.09	0.171		1.17	0.142		1.08
β10 (ASSETS)	-0.003	***	-5.41	-0.003	***	-5.46	-0.003	***	-4.96
β11 (MB)	0.001	***	2.64	0.001	**	2.29	0.001	***	2.66
β12 (AGE)	0.000		-0.32	0.000		0.02	0.000		0.03
β13 (IHPERCEN)				-0.006		-1.59			
β14 (ICOPTION)							0.006	**	2.53
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			5,735			6,063		
Adjusted R <sup>2</sup> %	19.47			19.76			19.28		

Notes to table 6:

- a. Firm-year level analysis of tax avoidance and corporate opacity. The regression model is:

$$TaxAgg_{i,t} = \beta_0 + \beta_1 OPCITY_{i,t} + \beta_2 ROE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 NOL_{i,t} + \beta_5 CNOL_{i,t} + \beta_6 FI_{i,t} + \beta_7 PPE_{i,t} + \beta_8 INTANG_{i,t} + \beta_9 UNCON_{i,t} + \beta_{10} ASSETS_{i,t-1} + \beta_{11} MB_{i,t-1} + \beta_{12} AGE_{i,t} + \beta_{13} IHPERCENT_{i,t-1} + \beta_{14} ICOPTION_{i,t-1} + Year\ Dummies + Industry\ Dummies + \varepsilon_{i,t}$$

- b. In panel A (model 1-3), TaxAgg=1-CETR. See the Appendix for variable measurement. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.
- c. In panel B (model 4-6), TaxAgg =1-LCETR. See the Appendix for variable measurement. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.
- d. In panel C (model 7-9), TaxAgg =PBTB. See the Appendix for variable measurement. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

**Table 7: Tax Avoidance and Components of Corporate Opacity <sup>a</sup>**

Panel A: TaxAgg=1-CETR <sup>b</sup>	Model 1			Model 2			Model 3		
	Coeff.		<i>T-Stat</i>	Coeff.		<i>T-Stat</i>	Coeff.		<i>T-Stat</i>
β0 (INTERCEPT)	0.597	***	12.41	0.606	***	11.76	0.628	***	12.05
β1 (INTEROPACITY)	-0.026	***	-2.59				-0.027	**	-2.66
β2 (EXTEROPACITY)				-0.030	*	-1.63	-0.032	*	-1.72
β3 (ROE)	0.147	***	7.29	0.146	***	7.34	0.148	***	7.34
β4 (LEV)	0.033		1.32	0.039		1.54	0.039		1.53
β5 (NOL)	0.030	***	3.38	0.029	***	3.30	0.029	***	3.29
β6 (CNOL)	0.045		0.39	0.044		0.39	0.044		0.39
β7 (FI)	0.290	***	3.00	0.279	***	2.89	0.283	***	2.94
β8 (PPE)	0.092	***	5.13	0.088	***	4.93	0.090	***	5.07
β9 (INTANG)	-0.083	***	-3.91	-0.080	***	-3.79	-0.084	***	-3.92
β10 (UNCON)	0.254		0.33	0.306		0.39	0.296		0.38
β11 (ASSETS)	0.000		0.18	-0.001		-0.43	-0.002		-0.62
β12 (MB)	-0.003	**	-2.14	-0.003	**	-2.40	-0.003	**	-2.42
β13 (AGE)	-0.015	**	-2.47	-0.013	**	-2.06	-0.013	**	-2.14
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			6,270			6,270		
Adjusted R <sup>2</sup> %	9.10%			9.03%			9.16%		

**Table 7: Tax Avoidance and Components of Corporate Opacity (Continued)**

Panel B: TaxAgg=1-LCETR <sup>c</sup>	Model 4			Model 5			Model 6		
	Coeff.		<i>T-Stat</i>	Coeff.		<i>T-Stat</i>	Coeff.		<i>T-Stat</i>
β0 (INTERCEPT)	0.693	***	18.37	0.774	***	18.37	0.790	***	18.73
β1 (INTEROPACITY)	-0.017	**	-2.16				-0.018	**	-2.44
β2 (EXTEROPACITY)				-0.096	***	-5.53	-0.097	***	-5.60
β3 (ROE)	0.009		0.70	0.011		0.80	0.012		0.89
β4 (LEV)	0.016		0.71	0.033		1.43	0.033		1.42
β5 (NOL)	0.033	***	3.88	0.031	***	3.67	0.031	***	3.66
β6 (CNOL)	0.003		0.03	0.001		0.01	0.001		0.01
β7 (FI)	0.193	**	2.32	0.170	**	2.07	0.173	**	2.11
β8 (PPE)	0.095	***	5.95	0.089	***	5.65	0.091	***	5.76
β9 (INTANG)	-0.039	*	-1.87	-0.038	**	-1.82	-0.040	**	-1.93
β10 (UNCON)	0.624		0.93	0.759		1.12	0.752		1.11
β11 (ASSETS) (+)	0.001		0.49	-0.006	***	-1.91	-0.006	**	-2.05
β12 (MB) (?)	0.003	***	2.75	0.002	*	1.77	0.002	*	1.77
β13 (AGE) (?)	-0.021	***	-3.82	-0.015	***	-2.73	-0.016	***	-2.78
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			6,270			6,270		
Adjusted R <sup>2</sup> %	10.80%			11.71%			11.71%		

**Table 7: Tax Avoidance and Components of Corporate Opacity (Continued)**

Panel C: TaxAgg=PBD <sup>d</sup>	Model 7			Model 8			Model 9		
	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	0.027	***	4.60	0.041	***	5.67	0.040	***	5.52
β1 (INTEROPACITY)	0.001		0.46				0.001		0.30
β2 (EXTEROPACITY)				-0.013	***	-4.02	-0.013	***	-4.00
β3 (ROE)	0.011	**	2.19	0.011	**	2.27	0.011	**	2.27
β4 (LEV)	-0.017	***	-4.10	-0.014	***	-3.55	-0.014	***	-3.55
β5 (NOL)	0.001		0.82	0.001		0.66	0.001		0.66
β6 (CNOL)	-0.002		-0.07	-0.002		-0.07	-0.002		-0.07
β7 (FI)	0.114	***	4.36	0.112	***	4.28	0.111	***	4.27
β8 (PPE)	-0.004		-1.20	-0.004		-1.33	-0.004		-1.35
β9 (INTANG)	-0.026	***	-7.19	-0.026	***	-7.29	-0.026	***	-7.26
β10 (UNCON)	0.131		1.01	0.148		1.13	0.148		1.13
β11 (ASSETS)	-0.002	***	-4.56	-0.003	***	-5.71	-0.003	***	-5.67
β12 (MB)	0.001	***	2.97	0.001	**	2.49	0.001	**	2.49
β13 (AGE)	-0.001		-0.75	0.000		-0.06	0.000		-0.05
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N									
Adjusted R <sup>2</sup> %	19.23%			19.59%			19.59%		

Notes to table 7:

a. Firm-year level analysis of tax avoidance and components of corporate OPACITY. The regression model is:

$$TaxAgg_{i,t} = \beta_0 + \beta_1 INTEROPCITY_{i,t} + \beta_2 EXTEROPCITY_{i,t} + \beta_3 ROE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 NOL_{i,t} + \beta_6 CNOL_{i,t} + \beta_7 FI_{i,t} + \beta_8 PPE_{i,t} + \beta_9 INTANG_{i,t} + \beta_{10} UNCON_{i,t} + \beta_{11} ASSETS_{i,t-1} + \beta_{12} MB_{i,t-1} + \beta_{13} AGE_{i,t} + \beta_{14} IHPERCENT_{i,t-1} + \beta_{15} ICOPTION_{i,t-1} + Year\ Dummies + Industry\ Dummies + \varepsilon_{i,t}$$

where, TaxAgg=Measure of tax aggressiveness. OPACITY is separated into internal (INTEROPCITY) and external (EXTEROPCITY) components. INTEROPCITY is constructed by ranking firms into deciles based on the level of discretionary accruals and dividing their rankings by a factor of 10 to provide an index value ranging from 0.1 to 1. EXTEROPCITY is an index value ranging from 0.1 to 1 constructed based on the other three components of OPACITY: analyst following (COVERAGE), trading volume (TURNOVER), and press coverage (NEWS). The most transparent firms take a value of 0.1, and the most opaque firms take a value of 1. See the Appendix for variable measurement.

- b. In panel A, TaxAgg=1-CETR. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.
- c. In panel B, TaxAgg=1-LCETR. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.
- d. In panel C, TaxAgg=PBTD. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.



**Table 8: Tax Avoidance and Corporate Transparency-Firm Level Analysis <sup>a</sup>**

	Model 1 <sup>b</sup>			Model 2 <sup>b</sup>			Model 3 <sup>c</sup>			Model 4 <sup>c</sup>		
	TaxAgg=1-CETR						TaxAgg=PBTB					
	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	0.926	***	10.61	0.812	***	11.54	0.064	***	5.79	0.049	***	5.24
β1 (OPACITY)	-0.190	***	-3.28	-0.117	**	-2.19	-0.029	***	-4.29	-0.022	***	-3.51
β2 (ROE)	0.009		0.56	0.007		0.62	0.005		0.99	0.010	**	2.05
β3 (LEV)	0.124	***	2.67	0.127	***	2.82	-0.011	**	-2.04	-0.011	**	-2.13
β4 (NOL)	0.000		-0.02	-0.006		-0.40	-0.002		-1.00	-0.003	*	-1.65
β5 (CNOL)	0.019		0.12	-0.013		-0.08	-0.015		-0.23	0.017		0.30
β6 (FI)	-0.029		-0.14	0.002		0.01	0.117	***	3.30	0.011	***	3.23
β7 (PPE)	0.042		1.17	0.050		1.50	0.001		0.14	0.001		0.17
β8 (INTANG)	-0.105	***	-2.80	-0.130	***	-3.25	-0.021	***	-4.97	-0.020	***	-5.31
β9 (UNCON)	-0.010		-0.01	0.162		0.21	0.137		0.48	0.092		0.30
β10 (ASSETS)	-0.012	**	-2.12	-0.016	***	-2.57	-0.004	***	-5.40	-0.004	***	-5.31
β11 (MB)	0.000	***	-2.84	-0.001	***	-3.25	0.000		0.57	0.000		0.42
β12 (AGE)	-0.013		-0.88	0.004		0.22	-0.001		-0.37	0.000		0.02
β13 (IHPERCEN)	0.024		0.46				-0.007		-1.47			
β14(ICOPTION )				0.202	***	2.99				0.007		1.54
Industry dummies	Yes			Yes			Yes			Yes		
N	1,269			1,338			1,269			1,338		
Adjusted R <sup>2</sup> %	7.62%			8.98%			23.04%			25.07%		

Note to Table 8:

- a. Firm-level analysis of tax avoidance and opacity. TaxAgg is measured as 1-CETR in model 1&2 and as PBTB in model 3&4. The regression model is:

$$\text{TaxAgg}_{i,t} = \beta_0 + \beta_1 \text{OPACITY}_{i,t} + \beta_2 \text{ROE}_{i,t} + \beta_3 \text{LEV}_{i,t} + \beta_4 \text{NOL}_{i,t} + \beta_5 \text{CNOL}_{i,t} + \beta_6 \text{FI}_{i,t} + \beta_7 \text{PPE}_{i,t} + \beta_8 \text{INTANG}_{i,t} + \beta_9 \text{UNCON}_{i,t} + \beta_{10} \text{ASSETS}_{i,t-1} + \beta_{11} \text{MB}_{i,t-1} + \beta_{12} \text{AGE}_{i,t} + \beta_{13} \text{IHPERCENT}_{i,t-1} + \beta_{14} \text{ICOPTION}_{i,t-1} + \text{Year Dummies} + \text{Industry Dummies} + \varepsilon_{i,t}$$

See the Appendix A for variable measurement.

- b. In model 1 &2, TaxAgg=1-CETR. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.
- c. In model 3&4, TaxAgg=PBTB. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

**Table 9: The Valuation Impact of Tax Avoidance and Corporate Transparency <sup>a</sup>**

Panel A <sup>b</sup>	Model 1			Model 2			Model 3		
TaxAgg=CETR indicator	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	4.908	***	8.83	5.637	***	9.65	4.781	***	7.98
β1 (TaxAgg)	0.767	***	4.43	0.775	***	4.44	0.742	***	4.21
β2 (OPACITY)	-0.793	***	-4.05	-1.147	***	-5.56	-0.640	***	-3.34
β3 (TaxAgg*OPACITY)	-0.978	***	-3.38	-0.960	**	-3.27	-0.962	***	-3.22
β4 (ASSETS)	-0.086	***	-2.80	-0.099	***	-3.00	-0.101	***	-3.17
β5 (RISK)	-3.766	***	-4.12	-4.617	***	-4.74	-4.280	***	-4.49
β6 (GROWTH)	0.644	***	3.93	0.636	***	3.61	0.617	***	3.64
β7 (LEV)	-2.088	***	-5.99	-1.956	***	-5.32	-2.091	***	-5.79
β8 (ROE)	1.153	***	7.55	1.133	***	7.11	1.204	***	7.52
β9 (NOL)	-0.020		-0.28	-0.024		-0.32	-0.035		-0.49
β9 (CNOL)	0.864		0.93	1.015		1.07	1.056		1.09
β10 (FI)	7.593	***	6.42	7.919	***	6.63	7.481	***	6.16
β11 (PPE)	0.214		1.51	0.204		1.38	0.232		1.60
β12 (INTANG)	-0.507	***	-3.46	-0.526	***	-3.34	-0.537	***	-3.62
β13 (UNCON)	-1.207		-0.19	4.662		0.65	2.744		0.42
β14 (AGE)	-0.253	***	-4.46	-0.253	***	-4.29	-0.234	***	-4.03
β15 (IHPERCENT)				-0.809	***	-5.42			
β16 (ICOPTION)							0.550	***	4.85
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			5,735			6,063		
Adjusted R <sup>2</sup> %	40.35			40.75			41.20		

**Table 9: The Valuation Impact of Tax Avoidance and Corporate Transparency – (Continued)**

Panel B <sup>c</sup>	Model 4			Model 5			Model 6		
TaxAgg=LCETR indicator	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	4.910	***	8.27	5.656	***	9.55	4.804	***	7.94
β1 (TaxAgg)	0.673	***	3.44	0.694	***	3.42	0.650	***	3.25
β2 (OPACITY)	-0.832	***	-4.26	-1.183	***	-5.80	-0.676	***	-3.54
β3 (TaxAgg*OPACITY)	-0.832	**	-2.49	-0.845	**	-2.43	-0.844	**	-2.44
β4 (ASSETS)	-0.088	***	-2.84	-0.100	***	-3.03	-0.103	***	-3.21
β5 (RISK)	-3.727	***	-4.09	-4.560	***	-4.69	-4.223	***	-4.44
β6 (GROWTH)	0.615	***	3.75	0.594	***	3.37	0.590	***	3.49
β7 (LEV)	-2.042	***	-5.89	-1.909	***	-5.22	-2.042	***	-5.69
β8 (ROE)	1.120	***	7.61	1.096	***	7.16	1.167	***	7.56
β9 (NOL)	-0.023		-0.31	-0.026		-0.35	-0.037		-0.51
β9 (CNOL)	0.808		0.86	0.960		1.00	0.991		1.01
β10 (FI)	7.617	***	6.51	7.942	***	6.71	7.536	***	6.27
β11 (PPE)	0.198		1.41	0.198		1.35	0.220		1.53
β12 (INTANG)	-0.502	***	-3.41	-0.517	***	-3.27	-0.535	***	-3.58
β13 (UNCON)	1.792		0.27	4.856		0.68	2.882		0.44
β14 (AGE)	-0.254	***	-4.42	-0.256	***	-4.30	-0.235	***	-4.02
β15 (IHPERCENT)				-0.817	***	-5.44			
β16 (ICOPTION)							0.548	***	4.82
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			5,735			6,063		
Adjusted R <sup>2</sup> %	40.22			40.62			41.05		

**Table 9: The Valuation Impact of Tax Avoidance and Corporate Transparency – (Continued)**

Panel C <sup>d</sup>	Model 7			Model 8			Model 9		
TaxAgg=PBTD indicator	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	4.454	***	7.63	5.165	***	8.90	4.358	***	7.29
β1 (TaxAgg)	1.112	***	5.73	1.155	***	5.77	1.057	***	5.41
β2 (OPACITY)	-0.688	***	-4.02	-0.994	***	-5.33	-0.561	***	-3.23
β3 (TaxAgg*OPACITY)	-1.010	***	-3.09	-1.076	***	-3.21	-0.937	***	-2.81
β4 (ASSETS)	-0.064	**	-2.14	-0.073	**	-2.27	-0.078	**	-2.50
β5 (RISK)	-3.320	***	-3.73	-4.069	***	-4.32	-3.758	***	-4.07
β6 (GROWTH)	0.618	***	3.86	0.605	***	3.52	0.595	***	3.59
β7 (LEV)	-1.789	***	-5.34	-1.677	***	-4.77	-1.811	***	-5.22
β8 (ROE)	1.041	***	7.40	1.014	***	6.95	1.096	***	7.44
β9 (NOL)	0.003		0.05	0.004		0.06	-0.011		-0.16
β9 (CNOL)	0.999		1.11	1.137		1.24	1.198		1.28
β10 (FI)	6.454	***	5.39	6.783	***	5.59	6.397	***	5.21
β11 (PPE)	0.227	*	1.64	0.226		1.55	0.240	*	1.68
β12 (INTANG)	-0.364	***	-2.56	-0.372	***	-2.43	-0.396	***	-2.75
β13 (UNCON)	-0.493		-0.07	1.842		0.25	0.561		0.08
β14 (AGE)	-0.241	***	-4.27	-0.249	***	-4.24	-0.223	***	-3.86
β15 (IHPERCENT)				-0.808	***	-5.41			
β16 (ICOPTION)							0.504	***	4.46
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	6,270			5,735			6,063		
Adjusted R <sup>2</sup> %	42.17			42.57			42.93		

Notes to table 9:

- a. Firm-year level analysis of tax avoidance, corporate opacity, and firm value. The regression model is:

$$Q_{i,t} = \beta_0 + \beta_1 TaxAgg_{i,t} + \beta_2 OPCITY_{i,t} + \beta_3 (TaxAgg_{i,t} * OPCITY_{i,t}) + \beta_4 ASSETS_{i,t} + \beta_5 RISK_{i,t} + \beta_6 GROWTH_{i,t} + \beta_7 LEV_{i,t} + \beta_8 ROE_{i,t-1} + \beta_9 NOL_{i,t} + \beta_{10} CNOL_{i,t} + \beta_{11} FI_{i,t} + \beta_{12} PPE_{i,t} + \beta_{13} INTANG_{i,t} + \beta_{14} UNCON_{i,t} + \beta_{15} AGE_{i,t} + \beta_{16} IHPERCENT_{i,t-1} + \beta_{17} ICOPTION_{i,t-1} + Industry Dummies + Year Dummies + \varepsilon_{i,t}$$

- b. Panel A, TaxAgg = Tax aggressiveness indicator, coded as one for firms in the bottom CETR tercile, zero otherwise. See the Appendix for variable measurement. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.
- c. Panel B: TaxAgg = Tax aggressiveness indicator, coded as one for firms in the bottom LCETR tercile, zero otherwise. See the Appendix for variable measurement. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.
- d. Panel C: TaxAgg = Tax aggressiveness indicator, coded as one for firms in the top PBTD tercile, zero otherwise. See the Appendix for variable measurement. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

**Table 10: The Valuation Impact of Tax Avoidance – Monitoring Effect of Components of Corporate Transparency <sup>a</sup>**

Dependant Variable=Q	Model 1			Model 2			Model 3		
	TaxAgg=CETR indicator			TaxAgg=LCETR indicator			TaxAgg=PBTD indicator		
	Coeff.		T-Stat	Coeff.		T-Stat	Coeff.		T-Stat
β0 (INTERCEPT)	6.103	***	10.30	6.127	***	10.35	5.786	***	9.93
β1 (TaxAgg)	0.662	***	3.84	0.601	***	3.06	0.933	***	4.98
β2 (INTEROPACITY)	0.170	**	1.99	0.109		1.18	0.045		0.63
β3(EXTEROPACITY)	-1.465	***	-7.28	-1.444	***	-7.30	-1.274	***	-7.24
β4 (TaxAgg*INTEROPACITY)	-0.197		-1.32	-0.018		-0.11	0.220		1.38
β5 (TaxAgg*EXTEROPACITY)	-0.758	***	-3.09	-0.776	***	-2.69	-1.055	***	-3.58
β6 (ASSETS)	-0.166	***	-4.51	-0.168	***	-4.53	-0.145	***	-4.08
β7 (RISK)	-6.506	***	-5.97	-6.512	***	-6.02	-6.109	***	-5.83
β8 (GROWTH)	0.638	***	3.51	0.595	***	3.30	0.606	***	3.44
β9 (LEV)	-1.798	***	-4.43	-1.759	***	-4.32	-1.591	***	-4.05
β10 (ROE)	1.558	***	6.59	1.558	***	6.59	1.454	***	6.46
β11 (NOL)	-0.045		-0.64	-0.050		-0.70	-0.024		-0.35
β12 (CNOL)	1.743	*	1.76	1.687	*	1.70	1.900	**	2.01
β13(FI)	6.919	***	5.60	6.891	***	5.63	5.826	***	4.66
β14 (PPE)	0.133		0.88	0.120		0.80	0.138		0.93
β15 (INTANG)	-0.529	***	-3.47	-0.510	***	-3.34	-0.375	**	-2.54
β16 (UNCON)	3.774		0.57	3.688		0.56	1.178		0.18
β17 (AGE)	-0.203	***	-3.56	-0.207	***	-3.59	-0.200	***	-3.51
β18 (IHPERCENT)	-0.985	***	-6.39	-0.997	***	-6.47	-0.979	***	-6.38
β19(ICOPTION)	0.509	***	4.45	0.506	***	4.42	0.477	***	4.20
Industry dummies	Yes			Yes			Yes		
Year dummies	Yes			Yes			Yes		
N	5,554			5,554			5,554		
Adjusted R <sup>2</sup> %	45.35			45.35			46.95		

Notes to table 10:

a. Firm-year level analysis of tax avoidance, components of corporate OPACITY, and firm value. The regression model is:

$$\begin{aligned}
 Q_{i,t} = & \beta_0 + \beta_1 TaxAgg_{i,t} + \beta_2 INTEROPCITY_{i,t} + \beta_3 EXTEROPCITY_{i,t} + \beta_4 (TaxAgg_{i,t} * INTEROPCITY_{i,t}) + \beta_5 (TaxAgg_{i,t} * EXTEROPCITY_{i,t}) \\
 & + \beta_6 ASSETS_{i,t} + \beta_7 RISK_{i,t} + \beta_8 GROWTH_{i,t} + \beta_9 LEV_{i,t} + \beta_{10} ROE_{i,t-1} + \beta_{11} NOL_{i,t} + \beta_{12} CNOL_{i,t} + \beta_{13} FI_{i,t} + \beta_{14} PPE_{i,t} \\
 & + \beta_{15} INTANG_{i,t} + \beta_{16} UNCON_{i,t} + \beta_{17} AGE_{i,t} + \beta_{18} IHPERCENT_{i,t-1} + \beta_{19} ICOPTION_{i,t-1} + Industry Dummies \\
 & + YearDummies + \varepsilon_{i,t}
 \end{aligned}$$

where, TaxAgg = Tax aggressiveness indicator, coded as one for firms in the bottom CETR tercile, zero otherwise in model 1; coded as one for firms in the bottom LCETR tercile, zero otherwise in model 2; coded as one in the top PBDT tercile, zero otherwise. OPACITY is separated into internal (INTEROPCITY) and external (EXTEROPCITY) components. INTEROPCITY is constructed by ranking firms into deciles based on the level of discretionary accruals and dividing their rankings by a factor of 10 to provide an index value ranging from 0.1 to 1. EXTEROPCITY is an index value ranging from 0.1 to 1 constructed based on the other three components of OPACITY: analyst following (COVERAGE), trading volume (TURNOVER), and press coverage (NEWS). The most transparent firms take a value of 0.1, and the most opaque firms take a value of 1. See the Appendix for variable measurement. T-values are corrected for serial correlation and heteroskedasticity. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.



## Appendix A: Variable Measurement – Main Variables of Interest and Control

### Variables

Variable	Definition
Cash effective tax rate ( <i>CETR</i> )	=Cash taxes paid / Pretax income; =#317/#170; CETR is set as missing when pretax income is <=0; CETR is truncated to the range [0, 1];
Long-run cash effective tax rate ( <i>LCETR</i> )	=the sum of cash taxes paid (#317) from year t-4 to year t / the sum of pretax income (#170) over the same period;
Permanent book-tax difference ( <i>PBTD</i> )	= {total book-tax difference – temporary book-tax difference} / lagged total assets; = {Pretax income – (federal income tax + foreign income tax) / statutory tax rate - deferred tax expense / statutory tax rate} / lagged total assets; = {#170 – (#63 + #64) / STR – (#50 / STR)} / lag #6; #64 is set as zero if missing;
Tobin's Q ( <i>Q</i> )	=(book value of total assets + market value of equity – book value of equity) / book value of total assets; = (#6 + #199 * #25 - #60) / #6;
Opacity Index ( <i>OPACITY</i> )	An index that ranks the relative opacity/transparency of each firm-year observation
Financial Reporting transparency/opacity ( <i>EARNOPACITY</i> )	=Abs(DiscAcc <sub>t</sub> ); Estimation details are provided in the Appendix B.
Analyst coverage ( <i>COVERAGE</i> )	= the negative of the natural logarithm of the number of analysts providing an annual earnings forecast three quarters prior to the company's fiscal year end;
Press coverage ( <i>NEWS</i> )	= the negative of the natural logarithm of the number of articles containing the company's name that appear in the major U.S. newspapers over the fiscal year t-1;
Trading Volume ( <i>TURNOVER</i> )	= the negative of the natural logarithm of the mean daily turnover ratio (e.g., the number of shares traded divided by the total shares outstanding from the daily CRSP) during fiscal year t-1;
Equity in earnings ( <i>UNCON</i> )	=#55/lag #6; #55 is set as zero if missing;
Change in NOL ( $\Delta NOL$ )	=(#52 - lag #52) / lag #6;
Total accruals ( <i>ACC</i> )	=(Income before extraordinary items – operating cash flows) / lagged total assets; = {#18 – (#308 - #124)} / lag #6
Profitability ( <i>ROE</i> )	= (#170 - #192) / lag #60

Leverage ( <b>LEV</b> )	=long-term debt/total assets; = (#9+#34)/#6
Net operating loss ( <b>NOL</b> )	= Indicator variable coded as 1 if loss carryforward lag #52 > 0;
Change in NOL ( $\Delta$ <b>NOL</b> )	= (#52 – lag #52)/lag #6;
Foreign income ( <b>FI</b> )	= #273/lag #6;
Property, plant, and equipment ( <b>PPE</b> )	= #8 /lag #6;
Market-to-book ratio ( <b>MB</b> )	= (#199*#25)/#60;
Book value of total assets ( <b>ASSETS</b> )	= LN(#6);
Firm risk ( <b>RISK</b> )	= standard deviation of monthly stock returns for the prior 36 months;
Growth opportunities ( <b>GROWTH</b> )	= 3-year average sales growth over year t-2 to year t; Sales growth= (#12-lag#12)/lag #12;
Firm age ( <b>AGE</b> )	= LN(1+the number of years that the firm has been in Compustat);
Intangible ( <b>INTANG</b> )	= #33/lag #6; #33 is set as zero if missing;
Option grant ( <b>ICOPTION</b> )	The ratio of the Black-Sholes value of stock option granted to top five managers to the value of their total compensation in year t-1;
Institutional holding ( <b>IHPERCENT</b> )	The fraction of the firm's shares owned by institutional investors in year t-1;

## Appendix B – Estimate Discretionary Accruals

I rely on the Jones model (Jones 1991) as modified by Dechow et al. (1995) to estimate normal accruals and abnormal accruals.

Specifically, I estimate the following cross-sectional regression equation using firms in each industry (based on Fama and French (1997) industry classification scheme) for each fiscal year between 1994-2001:

$$\frac{ACC_{j,t}}{ASSETS_{j,t-1}} = \alpha_0 \frac{1}{ASSETS_{j,t-1}} + \beta_1 \frac{\Delta SALES_{j,t}}{ASSETS_{j,t-1}} + \beta_2 \frac{GPPE_{j,t}}{ASSETS_{j,t-1}} + \varepsilon_{j,t} \quad (1)$$

where total accruals ( $ACC$ ) are computed directly from cash flow statement (#123 – (#308-#124)) as Hribar and Collins (2002) show that total accruals measured by using cash flow statement contain less measurement error than the ones derived from the balance sheet approach.

Next, I estimate firm-level discretionary accruals as a fraction of lagged assets for firm  $j$  during year  $t$  ( $DiscAcc_{j,t}$ ) by using equation (2). The parameters are estimated from Eq. (1). The original Jones model assumes that revenues are nondiscretionary, and following Dechow et al. (1995), I relax this assumption by assuming all changes in credit sales are the result of managerial discretion.

$$DiscACC_{j,t} = \frac{ACC_{j,t}}{ASSETS_{j,t-1}} - \left\{ \widehat{\alpha}_0 \frac{1}{ASSETS_{j,t-1}} + \widehat{\beta}_1 \frac{\Delta SALES_{j,t} - \Delta RECEIVABLES_{j,t}}{ASSETS_{j,t-1}} + \widehat{\beta}_2 \frac{GPPE_{j,t}}{ASSETS_{j,t-1}} \right\} \quad (2)$$

where variables are defined as follows:

Total accruals ( $ACC$ ) = (Income before extraordinary items and discontinued operations – operating cash flows) / lagged total assets;  
= {#123 – (#308 – #124)} / lag #6;

Change in sales ( $\Delta SALES$ ) (#12 – lag #12) / lag #6;

Gross property, plant, and equipment ( $GPPE$ ) #7 /lag #6;

Change in receivables ( $\Delta RECEIVABLES$ ) (#2 – lag #2) / lag #6;

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