Tax Aggressiveness and Corporate Transparency

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ABSTRACT

We investigate whether aggressive tax planning firms have a less transparent information environment. Although tax planning provides expected tax savings, it can simultaneously increase the financial complexity of the organization. And, to the extent that this greater financial complexity cannot be adequately clarified through communications with outside parties, such as investors and analysts, transparency problems can arise. Our investigation of the association between tax aggressiveness and information asymmetry, analysts' forecast errors, and earnings quality, suggests that aggressive tax planning is associated with lower corporate transparency. We also find evidence that managers at tax aggressive firms attempt to mitigate these transparency problems by increasing various tax-related disclosures. Overall, our results suggest that firms face a trade-off between tax benefits and financial transparency when choosing the aggressiveness of their tax planning.

Tax Aggressiveness and Corporate Transparency

I. INTRODUCTION

Corporations engage in various forms of tax planning to reduce expected tax liabilities. These expected benefits, however, do not come without costs. Such costs include direct labor and information systems necessary to carry out the tax planning, as well as expected costs of negotiation and penalties stemming from interactions with taxing authorities. In this paper, we examine a further cost of tax planning, specifically that aggressive tax planning can reduce corporate transparency.

Aggressive tax planning often requires firms to increase financial and organizational complexity.[1] And, to the extent that the economic implications of this greater complexity cannot be adequately clarified via communications with shareholders, creditors and analysts, transparency problems can arise. Poor transparency has been shown to impose an array of costs on firms, such as lowering liquidity and trading volume, raising both the debt and equity costs of capital, exacerbating governance problems, and reducing investment efficiency.[2] We also emphasize that although tax aggressiveness may make it more difficult for investors to ascertain

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[1] Drucker (2010) provides an illustration of this complexity through a description of a "Double Irish" tax planning technique used by pharmaceutical firm Forest Laboratories. Forest Laboratories' Irish subsidiary, Forest Laboratories Holdings Ltd., reorganized in 2005 by creating a new Irish subsidiary, Forest Laboratories Ireland, and relocating itself to Bermuda. The Irish subsidiary was to handle manufacturing, and the new Bermudian entity was responsible for the licensing of patents. Forest Laboratories Ireland paid the Bermudian firm a royalty fee for the use of the patents and, since Bermuda does not have an income tax, this organizational structure reduced Forest Laboratories Ireland's tax rate to 2.4% from 10.3%. To further reduce Forest's worldwide tax liabilities, the royalty payment made to the Bermudian entity was paid to Forest Finance BV, a Dutch affiliate. By routing the royalty through the Netherlands, Forest Laboratories Ireland avoided a 20% withholding tax that would be necessary if the royalty was paid to an entity outside the EU (the Netherlands has no such withholding requirement). In the year of the reorganization, foreign operations reduced Forest's effective tax rate by 21.8%. More detail on how this illustration relates to our measure of tax aggressiveness, as well as a further illustration based on Google's tax planning strategies are provided in our online Appendix (see http://accounting-faculty.wharton.upenn.edu/blouin/).
[2] For example, see Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000; Biddle and Hilary, 2006; Beatty, Liao and Weber, 2010; Miller, 2010; Armstrong, Guay and Weber, 2010.

or predict a firm's tax costs, the focus of our analysis is on the more general relation between tax aggressiveness and overall corporate transparency.

We document that tax aggressive firms have lower corporate transparency. Specifically, we find that firms with unusually low tax liabilities within their industry-size grouping have larger analysts' forecast errors, greater analysts' forecast dispersion, and a higher level of information asymmetry as characterized by the adverse selection component of the bid-ask spread. In addition, consistent with sophisticated tax planning creating challenges for the financial reporting process, we find that tax aggressive firms exhibit lower accruals quality, measured using several approaches advanced in the earnings quality literature. Moreover, we show that the transparency issues extend beyond investors' and analysts' understanding of tax expense by documenting that analysts have greater difficulty forecasting pre-tax income for tax aggressive firms. Overall, our results suggest that the benefits of tax aggressiveness may come at a cost of lower financial transparency.

We also explore whether tax aggressive managers augment financial disclosures in an attempt to mitigate the transparency implications of tax aggressiveness. Whether managers provide clarifying disclosures, however, depends not only on the benefits of providing such disclosures, but also the costs, both to shareholders as well as possibly to the managers themselves. For example, firms may be hesitant to transparently disclose the organizational details related to certain tax strategies if doing so would provide a roadmap for an audit by the tax authorities.[3] Further, to the extent that aggressive tax planning stems from agency conflicts between managers and shareholders (e.g., Desai and Dharmapala, 2006), managers may be

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[3] Consider that after it was revealed that Google's 10-K Exhibit 21 showed the locations of the tax shelter countries in which it was operating, Google reduced the number of disclosed affiliates with material operations from 102 (in 2009) to 3 (in 2012).

reluctant to provide disclosures that expose their motivation for the tax strategies.[4] Thus, we view the extent to which managers use disclosure to mitigate the transparency costs of aggressive tax planning to be an empirical issue.

We find that tax aggressive firms, on average, provide more detailed management discussion and analysis (MD&A) sections of the 10-K report as well as hold conference calls that are lengthier and contain more tax-related discussion. Further, we find some evidence that transparency problems are less severe when tax aggressive firms provide additional disclosures. We also explore whether these disclosure results are attenuated for firms with weaker corporate governance; that is, where agency conflicts with shareholders may reduce rent-seeking managers' interests in providing clarifying disclosures. Across an array of governance measures (i.e., board independence, director co-option, CEO-Chairman, shareholder rights, institutional ownership), we do not find a consistent interactive relation between tax aggressiveness and either corporate transparency or disclosure. Taken together, these results suggest that managers recognize the transparency issues that surround aggressive tax strategies, and on average, provide supplemental disclosure that may alleviate some of the difficulties faced by investors that analyse these firms.

An acknowledged challenge in our research setting is to carefully consider the inherent link between organizational complexity, tax planning and transparency. Prior research has shown that overall organizational complexity is associated with lower transparency (e.g., Bushman et al., 2004). Further, Blouin and Krull (2016) and Lewellen and Robinson (2014) document that multinational firms' organizational structures are influenced by tax considerations. In light of these issues, we give careful consideration to potential concerns that our documented negative

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[4] See Desai and Dharmapala (2006), Desai, Dyck, and Zingales (2007), and Hanlon, Hoopes, and Shroff (2014) for discussions of how tax planning may provide opportunities for insiders to extract rents.

relation between tax aggressiveness and transparency may be influenced by firm complexity that is correlated with tax aggressiveness, but that neither influences tax aggressiveness nor is influenced by tax aggressiveness.

We address this concern in four ways. First, we note that our tax aggressiveness measure is constructed within size and industry groupings. Thus, to the extent that size and industry capture a substantial portion of organizational complexity, our measure captures variation in tax aggressiveness within firms that have similar size-industry complexity. We also note that our findings are robust to alternative measures of tax aggressiveness constructed within groupings based on either industry and business unit complexity, or industry and geographic complexity. Second, we show that our results are robust to a changes analysis. Third, we employ a quasi-natural experiment around the 1997 adoption of "check-the-box" regulations that likely changed the costs of tax aggressiveness and find that our inferences continue to hold. In the end, we acknowledge that it is perhaps not possible to definitively rule out concerns about correlated omitted aspects of firm complexity driving our results. As such, although we find the notion that tax aggressiveness can weaken firm transparency to be compelling, we must leave it to the reader to decide the extent to which we have updated their priors on this relation.

Overall, we believe our paper addresses important issues of relevance to both the tax aggressiveness literature, as well as the broader literatures on the determinants of financial transparency, disclosure practices, and reporting quality. With respect to the former, our results may help explain why some firms appear to engage in more conservative tax planning than might otherwise be expected given the potential tax savings.[5] It is well documented that differences between book and tax income, stemming from a divergence in the rules designated

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[5] See Weisbach (2002) for a discussion about how firms' level of tax sheltering activity is surprisingly low given the potential tax savings (a phenomenon called the "under-sheltering puzzle").

for GAAP and tax reporting, can both provide useful information to market participants, as well as create divergence of opinion and uncertainty among investors.[6] This literature, however, emphasizes the informational properties of tax *reporting* for tax-related cash flows, and does not investigate the implications of tax *strategy* on the overall corporate information environment. Our paper posits a much broader scope for the transparency implications of tax aggressive firms, and we encourage future researchers to further explore the boundaries and implications of firms' tax choices.

Further, beyond the tax literature, we believe our findings will be of interest to researchers that seek to better understand how firms trade off the economic benefits from operational and organization choices with the potential costs associated with investors having difficulty understanding the financial implications of those choices. Prior work shows that greater corporate international diversification (Duru and Reeb, 2002), technology-induced informational complexity (Gu and Wang, 2005) and financial statement-related complexity (Hodder, Hopkins and Wood, 2008) are associated with less accurate analysts' forecasts. We extend this line of research by focussing on transparency issues related to tax-aggressiveness. Similarly, our findings that managers of tax-aggressive firms provide greater voluntary disclosure adds to existing studies that argue value-maximizing managers facing transparency problems will choose more informative disclosures to reduce information asymmetry among market participants. For example, Bartov and Bodnar (1996) find that firms switch to accounting techniques that make financial statements more informative to investors. In a similar vein, Guay,

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[6] For example, Lev and Nissim (2004) and Weber (2009) find that the ratio of taxable income to book income is useful in predicting earnings growth, and Hanlon (2005) documents that extreme book-tax differences provide a signal on the persistence of accruals. At the same time, the spread between book and tax income has also been shown to increase reduce the ability of accruals to provide information about future cash flows and increase investor uncertainty (e.g., Dhaliwal, Huber, Lee and Pincus, 2008 and Comprix, Graham and Moore, 2011). See also Hanlon and Heitzman (2010) for a detailed discussion of this literature.

Samuels and Taylor (2016) find that managers use voluntary disclosure to mitigate the negative effects of complex financial statements on the information environment.

II.   PRIOR RESEARCH AND HYPOTHESIS DEVELOPMENT

Transparency cost of aggressive tax planning

In their seminal textbook, Scholes and Wolfson (1992) discuss the conflicts that managers face between financial reporting and tax planning. While managers often desire to report high levels of income to investors, they simultaneously desire to report low levels of income to the tax authorities. In the U.S., as in many other countries, tax reporting rules differ from financial reporting rules, allowing firms to report disparate levels of income to tax authorities and to investors. However, as many economic transactions are reported similarly for book and tax reporting, firms often face a trade-off between cash tax savings and lower reported earnings.[7]

Of course, reporting lower earnings is only one of many potential costs of tax planning. Direct and indirect costs of tax planning include labor, information systems, coordination among business units, expected audit costs and penalties when tax planning strategies are found to be inappropriate, and potential tax-related agency conflicts between managers and shareholders. Recent research argues that managers view reputational concerns as an additional cost of aggressive tax planning.[8] A further potential cost, and the focus of our study, is the effect of tax planning on corporate transparency.

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[7] For example, see Scholes, Wilson and Wolfson (1990); Guenther, Maydew, and Nutter (1997); Maydew (1997); Matsunaga, Shevlin, and Shores (1992).

[8] For example, in a survey of 600 corporate executives, Graham, Hanlon, Shevlin and Shroff (2014) find that 69% of executives rate reputation as an important factor as to why firms do not adopt a potential tax planning strategy. Dhaliwal, Goodman, Hoffman and Schwab (2016) also find that around the Occupy Wall Street movement that firms' Tobin's Q is negatively related to its level of tax avoidance consistent with reputational costs pf tax planning during heightened scrutiny of firms' policies.

Poor transparency has been shown to impose an array of costs on firms, such as lowering trading volume, liquidity, retail investor ownership, raising both the debt and equity costs of capital, exacerbating governance problems and reducing investment efficiency (e.g., Diamond and Verrecchia 1991; Leuz and Verrecchia, 2000; Biddle and Hilary, 2006; Beatty, Liao and Weber, 2010; Miller, 2010; Lawrence, 2013). As discussed in the introduction, reduced transparency has been shown to be related to factors such as international diversification (Duru and Reeb, 2002), technology-induced informational complexity (Gu and Wang, 2005) and financial statement-related complexity (Hodder, Hopkins and Wood, 2008). We extend this line of research by focussing on transparency issues associated with tax-aggressiveness. Many tax planning opportunities can induce complexity as they require the bifurcation of legal structures into separate business activities (e.g., income qualifying for treaty-based withholding taxes, activity qualifying for the domestic manufacturers' deduction) and even the use of separate jurisdictions (i.e., tax-motivated transfer pricing and cost sharing agreements).[9]

We show that tax planning strategies can also alter capital flows within a firm. We argue that if these circuitous flows and separation of business activities make it more difficult for outsiders to interpret the source and persistence of the firm's earnings and cash flows, then this may reduce the transparency of the firm's financial and operating environment.[10] Other examples of how tax planning strategies can increase opacity include the creation of entities for multi-state tax planning (e.g., captive REITs, intangible holding companies), net operating loss monetization, and capital loss utilization.

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[9] Bushman, Chen, Engel, and Smith (2004, p. 175) describe this transparency potential problem as follows: "Operational complexities can arise as firms act to arbitrage institutional restrictions such as tax codes and financial restrictions (Bodnar et al., 1998). For example, firms may employ complex transfer pricing schemes to shift profits to low tax jurisdictions that can complicate efforts by shareholders and board members to understand firms' foreign operations."

[10] This phenomenon is illustrated in our multinational tax planning discussions of Google and Forest Laboratories in our online Appendix found at http://accounting-faculty.wharton.upenn.edu/blouin/.

Our study may also shed light on the observation by Weisbach (2002) that aggressive tax planning appears to be underutilized by firms given the large potential benefits and relatively small potential costs stemming from audits, interest and penalties.[11] Transparency-related costs may explain some of this apparent underutilization of aggressive tax planning.

Measuring Aggressive Tax Planning

Although several measures of "tax aggressiveness" have been used in prior literature, each proxy has limitations, and as a result, no well-accepted measure of tax aggressiveness has evolved. Blouin (2014) explains the lack of a definitive measure of tax aggressiveness is because there is little consensus as to how to define tax aggressiveness. She discusses how various types of tax planning have differing levels of risk, and argues that only tax planning beyond acceptable, legislated or "known" tax deductions should constitute aggressive tax planning. This perspective stems from the observation that, in general, any innovative tax planning that capitalizes on uncertainty in the tax code could be deemed risky until it survives challenges by the tax authorities and/or the courts. As a result, the aggressiveness of a particular firm's tax planning is best assessed by comparison to other firms' tax planning activities. While all complex tax planning can result in transparency issues, we argue that tax planning that is unusual relative to a firm's peers is likely to create the more significant opacity problems for financial statement users.

The GAAP and cash effective tax rates (ETRs) are often used in the literature to capture firms' tax avoidance activity (see Dyreng, Hanlon and Maydew, 2008). Yet, neither measure provides a benchmark against which to make a comparison regarding aggressiveness. For example, a domestic pharmaceutical company will have a lower GAAP and cash ETR relative to

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[11] See also Armstrong, Blouin and Larcker (2012), Gallemore, Maydew and Thornock (2014), Hanlon and Heitzman (2010).

a domestic food distributor simply because the pharmaceutical company is likely eligible for greater R&D tax credits. Hence, comparisons of raw GAAP and cash ETRs do not necessarily provide a clear indication of firms' level of aggressive tax planning.

In addition to the GAAP and cash ETRs, the tax aggressiveness literature also includes measures based on firms' likelihood of entering into a tax shelter (Wilson, 2009; Lisowsky, 2010), tax haven activity (Dyreng and Lindsey, 2009), discretionary permanent book-tax differences (Frank, Lynch and Rego, 2009) and uncertain tax benefits recorded under FIN 48 (De Waegenaere, Sansing and Wielhouwer, 2015). Each of the measures suffers from limitations in capturing opacity-inducing tax aggressiveness.[12] For example, some measures require firms to be multinationals (e.g., tax haven usage) or are only available for a limited number of years (FIN 48).[13] Further, and importantly for our study, existing tax aggressiveness measures do not measure aggressiveness relative to a benchmark of a "normal" level of tax planning. For example, some industries have far more extensive foreign operations than others (pharmaceutical manufacturing as compared to food distributers). These industries may well have greater ability to take advantage of various tax planning strategies, but investors or analysts that follow these industries may have a good understanding of such strategies. As such, it seems plausible that tax-planning activities that are common within an industry do not create substantial transparency problems.

We develop a tax aggressiveness measure that a) captures cross-sectional variation in firms' total tax planning (including timing and permanent differences), and b) benchmarks a given firm's tax aggressiveness relative to that of similar-sized firms in the same industry. Rego

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[12] See our online Appendix (http://accounting-faculty.wharton.upenn.edu/blouin/) for a detailed discussion of the limitations of each of these measures.

[13] De Simone, Nickerson, Seidman and Stomberg (2016) provide a simulation analysis showing that raw GAAP and cash effective tax rates often fail to capture even tax avoidance activities.

(2003) studies the association between firms' GAAP ETRs and both size and pre-tax income. Prior to her study, many researchers believed that larger firms had higher GAAP ETRs because these firms did less tax planning due to concerns about political costs. However, Rego (2003) explained that controlling for firm size actually reversed this association suggesting that "economies of scale can significantly affect a firm's ability to reduce its tax burden through tax planning." Hence, our tax aggressiveness measure is based on the notion that, other things equal, similar-sized firms in the same industry are expected to have similar tax planning opportunities. And, among firms with similar tax planning opportunities, firms with unusually low tax liabilities can be considered more tax aggressive.

We construct our measure in two steps. First, we use the GAAP effective tax rate (*GAAP ETR*) as a proxy for each firm's aggregate tax burden. *GAAP ETR* is the total tax expense scaled by pre-tax income.[14] To reduce the influence of transitory year-to-year fluctuations in effective tax rates, we estimate the effective tax rates by aggregating three years of data (as in Dyreng, Hanlon, and Maydew, 2008). *GAAP ETR* is therefore the sum of the past three years (t to t-2) of total tax expense scaled by the sum of the past three years of pre-tax income. We then adjust each firm's three-year ETR by the same period's three-year ETR for the portfolio of firms in the same quintile of total assets and the same industry, where size and industry are sorted independently, and industry is based on the 48 industries defined by Fama and French (1997). We therefore measure tax aggressiveness, *TA_GAAP*, as the industry-size matched *GAAP ETR* less the firm's *GAAP ETR*.[15] A positive value of *TA_GAAP* implies that the firm pays less tax

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[14] We censor the *GAAP ETR* and *Cash ETR* to be between 0 and 1.

[15] Note that adjusting the ETR by the mean of the firm's size and industry matched group's ETR is not equivalent to simply including size and industry fixed effects in the regression specification. Consider that a fixed effects specification is equivalent to adjusting a firm's ETR as follows: $ETR_{i,s}^* = ETR_{i,s} - \overline{ETR_i} - \overline{ETR_s} + \overline{ETR}$. Where $ETR_{i,s}^*$ is the firm's demeaned ETR by industry (i) and size quintile (s); $ETR_{i,s}$ is the firm's observed ETR; $\overline{ETR_i}$ is

than its size-industry peers, and greater values for this measure suggest greater tax aggressiveness. We also construct a second tax aggressiveness measure that is identical to *TA_GAAP* except that the effective tax rate is estimated using total cash paid for income taxes rather than income tax expense. We refer to the cash effective tax rate as the *CASH ETR*, and to this alternative tax aggressiveness measure as *TA_CASH*. Because *TA_GAAP* and *TA_CASH* are bottom line measures that reflect the results of aggressive tax planning, they do not identify specific tax planning strategies.[16]

We acknowledge that there is a difference of opinion regarding whether timing differences should be considered in measures of tax aggressiveness. As timing differences represent deductions for which there is no uncertainty as to the amount (the deduction will be reflected in both book and taxable incomes) only as to the timing of their inclusion in book or taxable incomes, over time, aggregate timing differences equivalently affect cash paid for taxes and total tax expense. Whereas timing differences do not affect the *GAAP ETR* (due to deferred tax accounting), they do influence the *CASH ETR*. This is because timing differences affect the numerator of the *CASH ETR* in a different period from when they affect the denominator.[17] A concern with including timing differences in a measure of tax aggressiveness is that the majority of timing differences pertain to rule differences between financial reporting and tax reporting. Bonus and acceleration depreciation, retirement benefits and intangible amortization/impairment represent the largest temporary differences (see Raedy, Seidman and Shackelford 2011). As we

the mean ETR of the firm's industry; $\overline{ETR_s}$ is the mean ETR of the firm's size quintile and $\overline{ETR}$ is the mean of the sample ETR. Our specification defines our measure as $ETR^*_{i,s} = -(ETR_{i,s} - \overline{ETR_{i,s}})$.

[16] See our online Appendix at http://accounting-faculty.wharton.upenn.edu/blouin/ for an illustration of how our measure captures the aggressiveness of Google's and Forest Laboratories' tax planning strategies.

[17] For example, consider a firm that has a constant pre-tax book income of $100 which includes book depreciation on a straight-line basis. Suppose that the firm will have an extra $20 of tax depreciation (relative to book) in year 1, tax depreciation equal to book depreciation in year 2 and $20 less tax depreciation in year 3. Assuming a 35% statutory tax rate and no other book-tax differences, this firm will report a *CASH ETR* of 28%, 35% and 42% in years 1, 2 and 3, respectively. However, its *GAAP ETR* will be 35% for all three periods.

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are interested in capturing opacity-inducing tax aggressiveness, we believe that many of the timing-difference-related changes to the *CASH ETR* are unlikely to reduce firms' information environment transparency. But because there is subjectivity in defining tax aggressive planning, we report results for both the *TA_GAAP* and *TA_CASH*.

In our analyses below, we compare the results obtained using our measures of tax aggressiveness to those obtained using measures of tax aggressiveness based on firms' tax haven activity, the extent of a firm's FIN 48 uncertain tax positions, the probability that the firm engaged in illegal tax shelters (Wilson's, 2009, *SHELTER* variable), and discretionary permanent tax differences (Frank et al.'s, 2009, *DTAX* variable). The details of the measurement of these metrics are provided in the Appendix.

Corporate Transparency Measures and Predictions

If aggressive tax planning increases financial and organizational complexity, we predict that tax aggressiveness will increase information uncertainty and information asymmetry (notwithstanding efforts by management to explain tax planning via augmented clarifying disclosures, an issue we discuss in more detail below). In particular, we argue that tax aggressiveness affects the transparency of firms' overall information environment; not simply the reporting implications of their accounting for income taxes. Therefore, to test our hypotheses, we construct general measures of firm transparency.

As proxies for information uncertainty, we use absolute analysts' forecast errors (*AFError*) and dispersion in analysts' forecasts (*AFDisp*). We predict that aggressive tax planning will be positively related to analysts' forecast errors in absolute terms, and positively related to analysts' forecast dispersion. We measure *AFError* as the average absolute analysts' forecast error over the three years corresponding to the measurement of our tax aggressiveness

measures (Gu and Wu, 2003). Each year, the forecast errors are the absolute value of the difference between the median analyst estimate of forecasts issued immediately before the fiscal year-end and the actual earnings for that fiscal year, scaled by the price at the end of previous year. *AFDisp* is the three-year average of the standard deviation of the analysts' forecasts issued immediately before the fiscal year-end scaled by lagged price (we require at least five individual analysts' forecasts in the year to compute this measure).

We use the adverse selection component of the bid-ask spread as a proxy for information asymmetry. This variable measures the extent to which prices are affected by unexpected order flow and is increasing in the level of information asymmetry among investors. We estimate the adverse selection component of the bid-ask spread, *Spread*, following Madhavan, Richardson, and Roomans (1997) as described in Armstrong, Core, Taylor, and Verrecchia (2011) to take into account cross-sectional differences in firm size. To estimate *Spread*, we gather trade-by-trade quote data from the ISSM and TAQ databases. We match trades and quotes using the Lee and Ready (1991) algorithm with a five-second lag to infer the direction of the trade (i.e., buy or sell). Once trades are classified as either buyer- or seller-initiated, we estimate the following firm-specific regression using all transactions available during the month:

$$\Delta p_t/p_{t-1} = \psi\,\Delta D_t + \lambda\,(D_t - \rho D_{t-1}) + u_t \;, \tag{1}$$

where p_t is the transaction price, D_t is the sign of trade (+1 if buy and -1 if sell), and ρ is the AR(1) coefficient for D_t. We measure *Spread* (λ) at a monthly level using all intra-day data for that month to estimate equation (1) for each firm in the sample. We use the average over the three years corresponding to the measurement of the tax aggressiveness measures in our tests. We predict that aggressive tax planning is positively related to information asymmetry as measured by *Spread*.

Control Variables

We include controls for factors that are expected to influence the quality of a firm's information environment. To control for an expected positive relation between firm size and transparency, we include *Size*, the log of market value of equity. We include *Leverage,* the ratio of long-term debt to total assets, to control for firms' debt service needs and capital structure, and *Age,* the natural logarithm of the number of years the firm has been listed on Compustat, to control for a relation between firm age and the quality of the information environment.

We control for organizational complexity using Bushman et al.'s (2004) revenue-based Hirfindahl-Hirschman geographic concentration index. The measure is calculated as the sum of the squares of each geographic segment's sales as a percentage of the total firm sales. We anticipate that more complex (i.e., geographically diverse) firms are relatively more opaque (note that lower values of the index imply a more diverse firm). Controlling for geographic concentration helps ensure that our findings on tax aggressiveness are incremental to any correlation between tax planning opportunities and the breadth of international operations. We return to this issue in Section 5 where we consider other proxies for organizational complexity.

To control for a relation between firms' growth opportunities and transparency, we include *Mkt to Book*, which is the ratio of the market value of assets to the book value of assets. We also include an indicator variable, *Loss*, which is equal to one if the firm's income before extraordinary items is less than zero in the current year and zero otherwise. Loss firms typically have lower earnings quality and have higher levels of information asymmetry. In addition, loss firms can sometimes appear to be aggressive tax planners, when, in actuality, they merely have very low income. The standard deviation of annual sales computed over the previous five years (*Std Dev of Sales*) is included in all specifications as a control for operating volatility. The log of

the number of analysts following the firm (*Analyst Following*) is included to capture the quantity

of firms' information production. The log standard deviation of returns computed over three

years (*Std Dev of Returns*) is included as an alternative measure of expected performance

volatility. Finally, we include industry as well as year fixed effects in all specifications.

To ensure that our inferences regarding aggressive tax planning are not confounded by the

influence of book-tax differences, we include the absolute value of the mean of the past three-

year's *Book-Tax Difference*, measured as pre-tax income less estimated taxable income (defined

as current federal tax expense grossed up by the maximum federal statutory tax rate (i.e., 35%)

plus pre-tax foreign income less the annual change in NOLs) scaled by total assets. Book-tax

differences have been shown to be correlated with firms' earnings management activities, and we

include the absolute value of the book-tax difference because earnings management, regardless

of direction, could affect earnings quality.[18,19] Hanlon (2005) and Dhaliwal et al. (2008) provide

evidence that larger book-tax differences adversely affect firms' earnings quality and cost of

equity capital, respectively.

In our *Spread* analyses, we also include several stock market-based measures that are

known to explain variation in the bid-ask spread (McInish and Wood, 1992; Stoll, 2000). The

Std Deviation of Volatility is included to capture stock return volatility. *Log Volume* is included

to capture the trade activity in the security. We also include *Price*, an indicator to denote

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[18] Because the market can surmise information about the firm's tax position from their cash and GAAP effective tax
rates, it seems reasonable that little incremental information about the firm's tax position can be gleaned from its
book-tax differences. Note that we are not saying that book-tax differences do not provide information about the gap
between book income and taxable income. Rather, consistent with Blaylock et al. (2012), we are arguing that any
market reaction to this difference stems from the signal about the quality of the firm's GAAP earnings.
[19] All of our inferences are robust to using temporary book-tax differences (i.e., deferred tax expense grossed up by
35%) or the signed book-tax difference, in place of the book-tax difference. All inferences also hold if we remove
the book-tax difference from the regression models.

whether the stock is trading at NYSE or NASDAQ, and the level of *Institutional Ownership* to control for additional drivers of the spread.

III. SAMPLE

We obtain our data from the Compustat, CRSP, I/B/E/S, and NYSE TAQ databases for the sample period 1990 through 2013. Constraining the sample to firms for which we are able to compute our tax aggressiveness measures, obtain analysts' forecast error estimates, and compute control variables results in our main sample of 40,193 firm-year observations.[20] For regressions involving dispersion in analysts' forecasts, the sample size drops to 26,715 because we impose a requirement that at least five error estimates be used in calculating the dispersion metric. For our bid-ask spread regressions, we require firms to have transaction-weighted bid-ask spread data, reducing the sample to 34,261 firm-year observations.[21]

The tests relating to management disclosure and tax havens require the extraction of text from the MD&A and Exhibit 21 sections of each firm's annual 10-K report, respectively. Exhibit 21 reports all of the firms' material subsidiaries as well as their jurisdiction (typically the subsidiaries' location of incorporation). We obtain these data from SEC EDGAR, and are able to extract and match MD&A data for 27,709 observations.[22] Finally, our management disclosure tests also examine 4,165 observations obtained from conference call transcripts in the Thomson Reuters StreetEvents database.

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[20] We exclude REITs from our analysis as they are not typically subject to entity level taxation.
[21] All of our key results are robust to, and in fact somewhat stronger, using the maximum number of observations that are available for any given specification (i.e., robust to placing minimal restrictions on requiring a common sample across the tables).
[22] MD&A data is available from 1995.

Table 1, Panel A presents descriptive statistics for our sample. With respect to firm characteristics, our sample is comprised of fairly large, mature, and profitable firms (only 21.7% of firms report negative net income). The mean *GAAP ETR* and *CASH ETR* of 29.8% and 25.2%, respectively, are lower than the 35% top statutory corporate tax rate, which could be attributable to either extensive foreign operations and/or tax planning. The standard deviations of these measures, 19% and 23% respectively, are quite high indicating substantial cross-sectional variation in ETRs. The *TA_GAAP* and *TA_CASH* measures, which are size-industry adjusted variables, exhibit nearly as much cross-sectional variation as do the raw ETRs, indicating that substantial variation exists within industry and size groupings.[23]   In an untabulated analysis, we evaluate the stability of our *TA_GAAP* and *TA_CASH* measures over time. We find that 37-49% of the observations in a particular quintile of tax aggressiveness continue to be in that same quintile four years later. For firms that are not in the same quintile in the future, we find that they are predominantly in the quintile that is either one above or one below their current quintile (e.g., 41% (23%) of the firms in the 3rd quintile are in the 3rd (2nd) quintile at t+4). Overall, these analyses suggest that our firm-specific measure of tax aggressiveness is quite stable over time.

Table 1, Panel B reports the correlations between several transparency measures and measures of tax aggressiveness. Notice that while *TA_GAAP* and *TA_CASH* are significantly positively correlated with analysts' forecast errors and dispersion, the other measures of tax aggressiveness used in the literature (havens, *DTAX*, shelter probability and *FIN 48*) are either insignificantly correlated or significantly negatively correlated. In addition, there are few significant correlations between *TA_GAAP* and *TA_CASH* and the other measure of tax

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[23] Note that the means of our *TA_GAAP* and *TA_CASH* measures are not zero because we use all firms with available ETR data to estimate three-year ETRs in the size-industry bins.

aggressiveness suggesting that our measure is capturing some aspect of tax planning not captured by the other measures.

IV. Results

The relation between tax aggressiveness and transparency

We begin our analysis by examining the relation between aggressive tax planning and our three types of financial transparency measures. Table 2, Panel A reports regressions of *AFError* and *AFDisp* on our ETR-based proxies for tax aggressiveness. The regressions include controls for both firm and earnings characteristics as discussed above. Consistent with our conjecture that aggressive tax planning increases investors' and analysts' difficulty in forecasting future profitability, we find that absolute earnings forecast errors are significantly larger for firms with greater *TA_GAAP* and *TA_CASH*. In addition, we find that the dispersion of forecast errors is also higher for tax aggressive firms. In terms of economic magnitude, a one standard deviation increase in *TA_GAAP* implies a 23% increase in analysts' forecast errors and a 17% in the dispersion of forecast errors.

With respect to the control variables, consistent with findings in prior literature that analysts are less able to accurately forecast earnings in the presence of earnings management, we find that larger book-tax differences are associated with higher forecast errors and greater forecast dispersion (Weber, 2009). We also find that forecast errors and dispersion are greater for firms that are smaller, more highly levered, and that have losses and lower analyst following.

Because we hypothesize that tax aggressiveness alters the transparency of the firms' aggregate reporting environment (beyond just transparency of tax-specific reporting), in Table 2, Panel B we evaluate analysts' forecast errors of pre-tax income (*PRETAX_AFError*), after-tax

income (*NET_AFError*), and implied tax expense (*TAXEXP_AFError*) for the sample where data are available on analysts' forecasts of these income statement line items (see Hutchens, 2015; Bratten, Gleason, Larocque, Mills, 2017). As described in our Appendix, analysts' forecast error measures adjusted for taxes rely on slightly different I/B/E/S metrics than *AFError* and *AFDisp*. Columns (1) and (2) report results consistent with Panel A; namely that more tax aggressive firms have greater analysts' net income forecast errors. In columns (3) and (4), we find that analysts' forecast errors of pre-tax income are also significantly greater for tax aggressive firms. Interestingly, columns (5) and (6) provides only modest evidence that tax aggressiveness reduces analysts' ability to forecast tax expense. Overall, these results suggest that tax aggressiveness affects not only the ability of analysts to forecast tax expense and after-tax earnings, but also their ability to forecast the pre-tax performance of the organization.[24]

In Table 3, we examine whether aggressive tax planning is related to information asymmetry between investors, as measured by the adverse selection component of the bid-ask spreads. Our results indicate that the *TA_GAAP* and *TA_CASH* measures are positively associated with *Spread*. Taken together with the results in Table 2, this finding suggests that aggressive tax planning not only increases investor uncertainty about future profitability, but also increases the information gap between informed and uninformed investors. Thus, it appears that some investors have a relative advantage in obtaining or processing information about tax-

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[24] There are several reasons as to why an association between tax forecast errors (*TAXEXP_AFERROR*) and tax aggressiveness is harder to detect. First, we believe that the tax forecast errors are potentially noisier than aggregate forecast errors. In untabulated analyses, we winsorize the tax forecast errors at 5% instead of 1% and we find a positive association between both TA measures and *TAXEXP_AFERROR*. Second, we speculate that there may be a weaker association between tax aggressiveness and tax forecast errors because tax aggressive firms will mechanically have lower tax forecast errors. This is because these firms have lower tax expense than their peers. Finally, it is also possible that management provides more ETR guidance for tax aggressive firms. If this is the case, the guidance may serve to reduce the tax forecast errors relative to their non-aggressive peers.

aggressive corporations. With respect to economic magnitude, a one standard deviation increase in *TA_GAAP* implies a 9% increase in firms' mean *Spread*.

A novel feature of our tax aggressiveness measures is the industry and size adjustment made to firms' ETRs to account for cross-sectional variation in tax planning opportunities. As alternative tax aggressiveness measures, one could examine raw ETRs unadjusted for variation in tax planning opportunities. When we use raw *GAAP ETR* and *CASH ETR* as our measures of tax aggressiveness, we continue to find evidence that firms with lower ETRs face greater analysts' forecast errors, greater forecast dispersion and larger adverse selection components of the bid-ask spread. To investigate whether our industry and size adjusted ETR measure is incrementally informative about tax aggressiveness beyond raw ETR measures, we partition firms into high and low *TA_GAAP* using an indicator variable set equal to one when the firm is in the top half of the *TA_GAAP* distribution of tax aggressiveness, and zero otherwise. We then re-run the regressions in Tables 2 and 3 but replace *TA_GAAP* with the raw *GAAP ETR* and the tax aggressiveness indicator variable. In untabulated results, we find that even when the raw ETR variable is included in the regression, the tax aggressiveness indicator variable is significantly related to all of the transparency proxies. We obtain similar results when we use *TA_CASH* as the proxy for tax aggressiveness and control for *CASH ETR*.

We also consider alternative tax aggressiveness measures that partition on industry and geographic complexity, and on industry and business-unit complexity (instead of size). These measures, however, have at least two disadvantages relative to size. First, firms have discretion regarding how to report segment information, and as a result these data might not be comparable across firms or over time for a given firm (e.g., see Botosan and Stanford, 2005). Second, firms have discretion regarding whether to report segment data or geographic data. Nonetheless, we

construct alternative industry-complexity tax aggressiveness measures based on industry and geographic segment data, and industry and business unit segment data (where complexity is based on a Hirfindahl-Hirschman index). In untabulated replications of Tables 2 and 3, we find similar results using these alternative tax aggressiveness measures. Also, perhaps somewhat reassuringly, we find that *TA_GEO_GAAP* and *TA_BUS_GAAP* have a correlation of about 0.9 with our *TA_GAAP* measure, indicating that firm size is relatively highly correlated with segment complexity.

Management disclosure decisions in the presence of aggressive tax planning

In light of our findings in above, it is interesting to consider whether managers augment disclosure to at least partially mitigate the difficulties investors have in understanding the financial and organizational complexity induced by aggressive tax planning. The predictions regarding augmented disclosure, however, are not unambiguous. On the one hand, shareholders and other investors may demand increased disclosure to mitigate the reduced transparency stemming from tax aggressiveness. This argument is similar to Guay, Samuels and Taylor's (2016) prediction that managers may use voluntary disclosure to mitigate the negative information effects of complex financial statements. On the other hand, managers may be reluctant to publicly reveal too many details about their tax planning if this increases the likelihood that tax authorities take action against the firm, or if the tax planning activities are intended to serve the manager's self-interest. Shareholders may also recognize these potential costs and resign themselves to accept lower transparency in return for more profitable tax planning activities.

In Table 4, Panel A, we explore whether managers who make aggressive tax planning choices increase the volume of disclosure. We examine four proxies for volume of financial disclosure: 1) the number of words in the Management Discussion & Analysis (MD&A) section of the annual report (*MDA*); 2) the number of tax-related words in *MDA (MDA_Tax)*[25]; 3) the total word length of conference call transcripts during the year (*ConfCall*), and; 4) the number of tax-related words in conference call transcripts during the year (*ConfCall_Tax*).

After controlling for firm and industry characteristics (book-tax differences, size, leverage, age, geographic concentration, market-to-book, losses, sales volatility, the number of analysts' forecasts, and returns volatility), we find that the four disclosure proxies are positively related to aggressive tax planning, as measured by *TA_GAAP*.[26] Thus, the results in Table 4, Panel A suggest that management increases the volume of disclosure in both the MD&A and via conference calls when the firm is more tax aggressive.

In Table 4, Panel B, we also explore whether firms that provide additional disclosure are successful in reducing some of the transparency problems created by aggressive tax planning. We expect that if additional disclosure mitigates tax-related transparency problems, the relation between tax aggressiveness and analysts' forecast errors will be less positive for high disclosure firms than for low disclosure firms.

The results in Table 4, Panel B indicate that the relation between tax aggressiveness and *AFError* is somewhat less positive for the high disclosure firms for each of the management disclosure proxies. The difference between high and low disclosure firms, however, is only significant for the conference call disclosure variable in Column (3). The results are similar if we

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[25] Our tax-related search included the following terms: "captive REIT", passive, intercompany, offshore, transfer prices(ing), tax (and any variation), shifting, intellectual property, intangible(s), withholding, royalty(ies), management fee(s).

[26] The results are similar using *TA_CASH* as the proxy for tax aggressiveness.

use *AFDisp* or *Spread* as the dependent variable (i.e., the differences between high and low disclosure firms are significant in only a few cases). Overall, the results in Table 4, Panels A and B suggest that managers supplement tax aggressiveness with increased disclosure, but that increased disclosure may have limited success in mitigating the transparency problems that tax aggressive operating strategies create.[27]

There are several reasons as to why firms may not be able to completely eliminate tax-induced opacity through a change in disclosure. First, although the manager of the average firm may increase disclosure to mitigate tax-induced opacity, it may be difficult to capital markets' participants to completely disentangle information regarding tax planning from information regarding the firm's underlying production function. Furthermore, we conjecture that some managers may simply be unable to credibly communicate information about the firm's tax planning without divulging too much information to the tax authorities. For these firms, it may be less costly to incur the cost of opacity relative to the cost of detection of the aggressive tax planning. Finally, we acknowledge that it is a firm choice to alter disclosure to alleviate transparency issues. Our results are also consistent with firms that face particularly acute transparency problems choosing to alter their disclosures. For these firms, the post-disclosure environment may still be opaque though less so than it would be in the absence of the incremental disclosures.

We also recognize, however, that not all managers have incentives to reduce opacity stemming from tax aggressiveness. In particular, managers that attempt to use tax strategies to extract rents (e.g., Desai and Dharmapala, 2006) may forgo clarifying disclosures precisely

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[27] Merger and acquisition activity is a plausible omitted variable that could reduce firms' tax burdens while simultaneously inducing increased managerial disclosures. To explore this possibility, we exclude firm-years with M&A activity (where the Compustat field *compst* is either "AA" or "AB"), and find that the results are robust to this alternative specification.

because tax aggressiveness provides an opaque gateway to obtain private benefits. Because it is difficult to identify managers that use tax strategies for this purpose, we instead investigate whether strong governance is associated with a weaker relation between tax aggressiveness and corporate transparency, as well as whether strong governance increases the likelihood that managers provide disclosures to mitigate the decline in the transparency of tax-aggressive firms' information environments.

We measure governance strength using an array of common proxies: board independence, fraction of directors appoint by the current CEO (co-option), CEO-Chair duality, entrenchment index (E-index), and percentage of dedicated institutional investors (variable definitions are provided in the Appendix). In Table 5, we replicate the regressions in Table 2, Column 2, and Table 4, Panel A Columns 1 and 2, for samples partitioned based on high/low values of the governance proxies. The results suggest that there is little difference in the relation between tax aggressiveness and either analysts' forecast errors or disclosure across firms that vary in governance strength.[28] Overall, we find little evidence that agency conflicts with managers explain the negative relation between corporate transparency and tax aggressiveness.

V. SENSITIVITY ANALYSES

Alternative proxies for tax aggressiveness

Although we believe that our industry-size benchmarked measure of tax aggressiveness is a constructive innovation to the tax planning literature, we appreciate the benefits of comparing our results to those obtained using alternative measures of tax planning. As discussed in Section 2.2., prior literature has considered measures of tax aggressiveness based on firms' tax haven

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[28] In addition, when we combine the governance metrics to create a single governance factor, we find no evidence of differences in the association between tax aggressiveness and measures of reporting transparency across weakly and strongly governed firms. Note that results are similar when we use *TA_CASH* as our proxy for tax aggressiveness.

activity, the extent of a firm's FIN 48 uncertain tax positions, the probability that the firm engaged in illegal tax shelters (Wilson's, 2009, *SHELTER* variable), and discretionary permanent tax differences (Frank et al.'s, 2009, *DTAX* variable). In a series of untabulated analyses, we replicate the results in Table 2 using each of these measures in place of the ETR-based tax aggressiveness variables.

We find that the results are similar to those in Table 2 when we use the number of tax havens (*TAX_HAVENS*) in place of our measure of tax aggressiveness.[29] However, when we replace our measure of tax aggressiveness with firms' ending FIN 48 balance scaled by average total assets, we find a marginally significant positive association with analysts' forecast errors but not with forecast dispersion (note that because FIN 48 data are not available until 2007, we have far fewer observations for these regressions).

When we use Wilson's (2009) *SHELTER* measure, we find no evidence that tax aggressiveness, as measured by *SHELTER*, is significantly, positively associated with analysts' forecast errors or dispersion. Finally, we find no evidence that greater tax aggressiveness, as measured by Frank et al.'s (2009) *DTAX*, is associated with greater analysts' forecast errors or dispersion. In fact, *DTAX* appears to be significantly, negatively associated with analysts' forecast errors and forecast dispersion suggesting that larger permanent differences are associated with better information environments.

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[29] Because there is no consensus on which countries are considered havens, we alternatively define havens using the seven havens identified in Hines and Rice (1994). The seven havens in Hines and Rice are Hong Kong, Ireland, Lebanon, Liberia, Panama, Singapore, and Switzerland. All inferences hold. We also confirm that our results are not sensitive to the decline in reported haven subsidiaries in Exhibit 21 documented in Gramlich and Whiteaker-Poe (2013). First, the sample mean of *TAX_HAVEN* does not decline over our sample period. Second, all of our inferences hold when we only include pre-2009 observations in our analysis.

Effect on Earnings quality

If aggressive tax planning increases financial and organizational complexity, we predict that tax aggressiveness could also potentially reduce the quality of financial reporting. As a proxy for the quality of financial reporting, we use a measure of accruals quality (*AQ*) that follows Francis et al. (2004, 2005) and is based on the measure developed by Dechow and Dichev (2002).

We expect that if aggressive tax planning confounds the ability of accrual accounting to resolve timing and matching problems with cash flows, then accruals quality will be lower. For example, a firm that sets up intercompany transfer pricing schemes may bifurcate manufacturing facilities into multiple profit centers (e.g., require different cost allocations to different manufacturing lines within the same plant). If these profit centers serve both related-party and third-party transfers, then accrual activity related to tax incentives could confound firms' external reporting of accruals. In an untabulated analysis, we find that *TA_GAAP* and *TA_CASH* are positively related to *AQ*.

Although we hypothesize that tax aggressiveness alters aggregate accrual quality, we also consider whether tax aggressiveness results in lower quality tax-specific accounting accruals. To estimate the quality of tax accounting accruals, we follow Choudhary, Koester, and Shevlin (2016). Consistent with tax aggressiveness altering the ability of management to estimate the accrual of total tax expense, an untabulated analysis indicates that greater tax aggressiveness is also associated with lower quality tax accruals.

Correlated omitted variables

A potential concern with our analysis is that tax aggressiveness may be correlated with determinants of corporate transparency that are not adequately controlled for in our tests. Although it is difficult to definitively rule out this possibility, we conduct three sets of robustness tests to help address this concern. First, we conduct an alternative version of the analyses reported in Tables 2, 3, and 4 in a changes specification. A changes specification can help alleviate concerns about omitted variables by isolating a specific period of time over which innovations in tax strategy are expected to cause a change in corporate transparency. Second, we explore a quasi-natural experiment that investigates the change in the firms' information environments around the 1997 implementation of the "check-the-box" regulations. "Check-the-box" offered multinational firms a series of new tax planning opportunities precipitated through the creation of new subsidiaries (i.e., an increase in the firm's organizational complexity). We use the check-the-box setting to investigate whether a shock to tax-induced complexity alters firms' information environments. Third, we control for several alternative measures of geographic and organizational complexity that help address a concern that geographically complex organizations have access to a greater menu of tax reduction strategies, and that such organizations also have more opaque information environments.

Changes analysis

Table 6 presents regressions analogous to those in Tables 2 (Panel A), 3, and 4 (Panel A) but with the dependent and independent variables measured in changes.[30] The results show that increases in tax aggressiveness are positively related to increases in analysts' forecast errors

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[30] Note that because our main analyses in Tables 2, 3, and 4 are conducted using three-year average values for tax aggressiveness and the transparency measures, the changes analysis examines changes in rolling three-year averages for these variables.

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forecast dispersion and spreads.[31] We also find positive relations between tax aggressiveness and all of the disclosure variables, although the coefficient is insignificant for *MDA* and *ConfCall*.

Quasi-natural experiment: "Check-the-box" regulations

"Check-the-box" regulations (CTB), effective January 1, 1997, provided U.S. multinational corporations significant new cross-border tax planning opportunities. CTB was an event created by regulation rather than legislation – i.e., the U.S. Treasury issued regulations that create the tax planning opportunities rather than a congressionally approved bill – thereby creating a relatively clean event in a very short window.[32] Final regulations were issued in December 1996 and were effective almost immediately. To take advantage of the CTB regulations, U.S. multinationals were required to create new legal entities in order to elect "disregarded entity status". Being disregarded allowed U.S. multinationals to circumvent an anti-avoidance provision which taxes certain passive and lightly-taxed income at top U.S. statutory rates (see Blouin and Krull, 2016 for a detailed explanation of CTB).[33] Blouin and Krull (2016) document that CTB results in a significant change in the organizational structure of U.S. multinationals (including an increase in the number of foreign subsidiaries and tax havens)

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[31] In untabulated changes regressions using *TA_CASH* in place of *TA_GAAP*, we find that the change in tax aggressiveness is significantly positively related to changes in analysts' forecast errors and dispersion as well as to changes in spreads.

[32] Note that the regulations were issued to simplify the existing entity classification regime (https://www.irs.gov/pub/irs-regs/ps4395.txt). There was no intent by the IRS to create new planning opportunities. See Blouin and Krull (2016) for additional discussion regarding how the IRS was caught off-guard by the international planning opportunities created by CTB.

[33] For example, a U.S. multinational could reduce its worldwide tax burden by establishing an intercompany loan between a tax haven and, say, France. Every dollar of interest paid by France, would result in t_{FRANCE} of tax savings (assuming that interest is taxed at 0% in the haven). The anti-avoidance regime would preclude this tax planning opportunity by subjecting the interest income in the tax haven to immediate U.S. tax. Hence, instead of saving the U.S. multinational t_{FRANCE} this strategy would actually cost the U.S. $t_{U.S.} - t_{FRANCE}$ (since the U.S. tax rate is higher than the French tax rate). CTB allowed U.S. multinationals to effectively consolidate France and the tax haven into one affiliate for purposes of U.S. tax reporting. Combining these two affiliates results in the elimination of the intercompany interest payment – hence, no incremental U.S. tax under the anti-avoidance regime. However, the interest is still paid and deducted in France so CTB facilitates "earnings stripping" out of France.

consistent with a tax-induced change in complexity. The authors also document that CTB is associated with significantly lower tax burdens.

To isolate the effect of CTB on firms' information environments, we limit our analysis of CTB to the years 1994-2000 to focus on the six years surrounding the 1997 issuance of the regulations. We then employ a difference-in-difference design and compare firms that are multinational with propensity-score-matched non-multinational firms that are in the same industry-year, of similar size, tax aggressiveness, book-tax differences and information environment just prior to the introduction of the regulations. We replace our *TA_GAAP* and *TA_CASH* measures in the main specifications with an indicator variable for the years after the CTB regulation to test whether multinational firms' incremental aggressiveness after 1997 is associated with lower corporate transparency. Thus, we compare multinational firms post-1997 with pre-1997 (first difference) and with the pre-1997 and post-1997 difference of other similar non-multinational firms (second difference).

Table 7 reports a significant increase in both analysts' forecast errors and MD&A disclosures for multinational firms in the post-1997 period. These results indicate that following the CTB regulations, analysts had greater difficulty forecasting earnings for multinational firms, but also that multinational firms responded by increasing their tax-related and overall MD&A disclosures. To test a parallel trends concern that differences in analysts' forecast errors might be driven by factors other than the change in regulation, we decompose the Post_1997 indicator into three parts: an indicator for the year immediately before CTB (i.e., 1996), an indicator for the year of the change (i.e., 1997) and an indicator for the period after the change (i.e., 1998). If factors other than CTB explain our results, then we expect to observe a positive and significant coefficient on each of the indicator variables. Column (2) of Table 9 shows that only the post-

CTB period indicators are positive and significant, lessening the concern that alternative confounding variables drive our results.

Alternative proxies for geographic and organizational complexity

Measuring the extent of firms' geographic and organizational complexity is challenging because the concept is somewhat abstract and the data from publicly available financial statements are coarse. Measures of geographic and organizational complexity typically rely on the concentration of segment data disclosed in firms' 10-Ks. Likewise, our analyses thus far employ complexity measures that rely on Bushman et al.'s (2004) revenue-based Hirfindahl-Hirschman index calculated as the sum of the squares of each *geographic segment's sales* as a percentage of the total firm sales (*Geographic Complexity*).

In a series of untabulated analyses, we re-estimate our Table 2, 3 and 4 regressions using several additional measures of geographic and organizational complexity. We measure complexity as 1) an asset-based Hirfindahl-Hirschman index, calculated as the sum of the squares of each *geographic segment's assets* as a percentage of the total assets, 2) the *number of geographic segments* in which the firm operates, 3) an asset-based Hirfindahl-Hirschman index, using the sum of the squares of each firms' affiliate asset information reported to the Bureau of Economic Analysis (BEA)[34], 4) the number of countries and states where firms' report material subsidiaries in its Exhibit 21 10-K data, 5) the number of countries for which the BEA reports firms' affiliates, 6) the number of foreign affiliates reported in the BEA data, and 7) a revenue-

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[34] We obtain the data for this measure from the Bureau of Economic Analysis (BEA) *Survey of U.S. Direct Investment Abroad*. Participation in the BEA surveys is mandated by federal law pursuant to the International Investment and Trade in Services Survey Act (P.L. 94-472, 90 Stat. 2059, 22 U.S.C. 3101-3108). The surveys collect detailed financial information of U.S. multinational firms' domestic and foreign subsidiaries based on U.S. GAAP that is input and reviewed by BEA staff. These procedures help reduce the limitations typically attributed to survey data. See Mataloni (2003) and http://www.bea.gov/surveys/diadurv.htm for more detailed information on the BEA data.

based Hirfindahl-Hirschman index using the industries of each of the firm's BEA-reported foreign affiliates and its domestic parent. All of our inferences with respect to the association between our measure of tax aggressiveness and analysts' forecast errors, forecast dispersion, spreads, and management disclosure are robust to controlling for these alternative proxies for geographic and organizational complexity. As a final check on how our results are influenced by complexity, in another untabulated analysis, we partition our sample into high and low international activity based on whether firms have greater than 50% of their sales or 50% of their assets abroad. Our inferences hold in both the high and the low international activity partitions.

Loss Firms

As a final robustness check, we examine whether our results are influenced by firms reporting losses. Other things equal, loss firms typically have more opaque information environments than profitable firms (Dechow and Dichev 2002). Although all of our analyses include a dummy variable for firm years with a reported book loss, we undertake several additional tests to allay potential concerns that loss firms are exerting undue influence on our measures of tax aggressiveness.

In Table 8, we report the sensitivity of our analysts' forecast error results to three alternative specifications that consider the influence of loss firms on the results. In Column (1), we limit our analyses to only the sample of firms that report positive estimated taxable income. In Column (2), we again limit the sample to firms that report positive taxable income, but also further restrict the sample to include only firms that have non-missing pre-tax foreign income and positive estimated taxable income. This approach isolates the sample to those firms that have the greatest opportunity to engage in foreign tax planning. Finally, in Column (3), we re-compute

TA_GAAP by measuring a firm's tax aggressiveness relative to industry-size benchmark firms that have positive taxable income.

In each column of Table 8, we find that analysts' forecast errors continue to be increasing in tax aggressiveness. For brevity, we have only tabulated the robustness of our analysts forecast error results. However, the inferences from the sensitivity analyses in Table 8 also hold for our analysts' forecast dispersion, and information asymmetry results reported in Tables 2, 3, and 4.[35]

VI. CONCLUSION

Corporations engage in various forms of tax planning to reduce expected tax liabilities. These expected benefits, however, do not come without costs. Such costs include direct labor and information systems necessary to carry out the tax planning, as well as expected costs of negotiation and penalties stemming from interactions with taxing authorities. In this paper, we explore a loss of financial transparency as a previously unexamined cost of aggressive tax planning.

Using a measure of tax planning aggressiveness that benchmarks firms' tax burdens against firms of similar size and industry (as well as alternative proxies), our results suggest that tax aggressiveness is associated with greater absolute analysts' forecast errors, dispersion of analysts' forecasts and adverse selection component of the bid-ask spreads increase, as well as lower accruals quality. However, managers appear to be aware of this potential cost as tax aggressive firms are found to have greater total disclosure and tax-related disclosure in the MD&A sections of their financial statements as well as in conference calls. We also find modest evidence that the negative relation between tax aggressiveness and transparency is attenuated for

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[35] All references hold when we replace *TA_GAAP* with *TA_CASH* as the measure of tax aggressiveness.

firms with greater disclosure. However, we find no evidence that governance strength influences the relation between tax aggressiveness and transparency, or the likelihood that firms alter their disclosure regime to combat this loss of information transparency.

Our results offer an interesting juxtaposition to Gallemore and Labro (2015), who find that firms with better internal information environments are better tax planners. Our findings suggest that although high quality internal information may facilitate tax avoidance, managers appear to be unable (or unwilling) to convey to market participants some important information about the financial and organizational structures that support tax avoidance. Building on our study, Goh, Lee, Lim and Shevlin, (2014) suggest that firms with poorer information environments receive less benefit to their cost of equity capital from tax planning.

Overall, our findings highlight lower financial transparency as a potentially important cost of aggressive tax planning. These results may help explain why some firms appear to engage in more conservative tax planning than would otherwise be optimal from a tax-savings perspective.

APPENDIX
Variable Definitions

Tax Aggressiveness Measures (NOTE - Higher values imply more aggressive tax planning):

- **TA_CASH_t**: The firm's mean industry size GAAP ETR less the firm's GAAP ETR, where GAAP_ETR is the sum of current tax expense over years t, t-1 and t-2 divided by the sum of pre-tax income over years t, t-1 and t-2.

- **TA_GAAP_t**: The firm's mean industry size CASH ETR less the firm's CASH ETR, where CASH_ETR is the sum of cash paid for taxes over years t, t-1 and t-2 divided by the sum of pre-tax income over years t, t-1 and t-2.

- *Alternative Tax Aggressiveness Measures:*

  TAX_HAVENS: The number of times one of the following tax haven locations (as described in Dyreng and Lindsey 2009) are mentioned in Exhibit 21of the current year 10K - ANDORRA, ANGUILLA, ANTIQUA AND BARBUDA, ARUBA, BAHAMAS, BAHRAIN, BARBADOS, BELIZE, BERMUDA, MOTSWANA, BRITISH VIRGIN ISLANDS, BRUNEI, CAPE VERDE, CAYMAN ISLANDS, COOK ISLANDS, COSTA RICA, CYPRUS, DOMINICA, GIBRALTAR, GRENADA, GUERNSEY AND ALDERNEY, HONG KONG, IRELAND, ISLE OF MAN, JERSEY, KITTS AND NEVIS, LATVIA, LEBANON, LIBERIA, LIECHTENSTEIN, LUXEMBOURG, MACAO. MACAU, MALDIVES, MALTA, MARSHALL ISLANDS, MAURITIUS, MONACO, MONTSERRAT, NAURU, NETHERLANDS ANTILLES (or DUTCH ANTILLES), NIUE, PALAU, PANAMA, SAMOA, SAN MARINO, SEYCHELLES, SINGAPORE, ST. LUCIA, ST. VINCENT AND THE GRENADINES, SWITZERLAND, U.S. VIRGIN ISLANDS, URUGUAY, VANUATU.

  DTAX: DTAX refers to the discretionary permanent differences and is computed as described in Frank et al. (2009).

  SHELTER: SHELTER is the tax shelter predicted value as described in Wilson (2009).

  FIN48: FIN48 is the ending FIN48 balance scaled by average assets.

Information Environment Variables:

- **AFError**: Absolute Analysts' Forecast Errors – measured as the average absolute analysts' forecast errors over the three years in which tax aggressiveness measures are calculated. Each year, the forecast errors are the absolute value of the difference between median analyst estimate reported immediately before the end of the fiscal year and the actual earnings for that fiscal year scaled by the price at the end of previous year.

- **AFDisp**: Average Dispersion of Analyst Earnings Forecasts – measured as the three-year average of the standard deviation of analysts' annual earnings forecasts over the three years in which tax aggressiveness measures are calculated. Each year, the dispersion in forecasts immediately before

the end of the fiscal year is scaled by the price at the end of the previous year. We require a minimum of five analysts' forecasts each year to compute this measure.

- **Spread**: A measure of information asymmetry and an estimate of the adverse selection component of the bid-ask spread, computed based on Madhavan, Richardson, and Roomans (1997) as modified by Armstrong, Core, Taylor, and Verrecchia (2010) to take into account cross-sectional differences in firm size. We measure spread as the average monthly spread over the three years in which tax aggressiveness measures are calculated.

- **NET_AFError:** Absolute Analyst Net Income Forecast Errors - measured as the average absolute analysts' forecast errors for the I/B/E/S measure *NET* over the three years in which tax aggressiveness measures are calculated. Each year, the forecast errors are the absolute value of the difference between median analyst estimate reported for *NET* immediately before the end of the fiscal year and the actual earnings for *NET* that fiscal year scaled by the price at the end of previous year.

- **PRETAX_AFError:** Absolute Analyst Pre-Tax Income Forecast Errors - measured as the average absolute analysts' forecast errors for the I/B/E/S measure *PRE* over the three years in which tax aggressiveness measures are calculated. Each year, the forecast errors are the absolute value of the difference between median analyst estimate reported for *PRE* immediately before the end of the fiscal year and the actual earnings for *PRE* that fiscal year scaled by the price at the end of previous year.

- **TAXEXP_AFError:** Absolute Analyst Tax Expense Forecast Errors – measured as the average absolute analysts' forecast errors for the I/B/E/S-based tax expense measure (*TAXEXP*) over the three years in which tax aggressiveness measures are calculated. *TAXEXP* is calculated as I/B/E/S-based Net Income (*NET*) minus I/B/E/S-based pre-tax income *(PRE)*. Each year, the forecast error for tax expense is the absolute value of the difference between the median estimate of *TAXEXP* immediately before the end of the fiscal year and the actual for *TAXEXP* that fiscal year scaled by the price at the end of previous year.

Corporate Disclosure Variables:

- **MDA:** the average number of words in the MD&A section of the annual 10-K report over the three years in which tax aggressiveness measures are calculated.
- **MDA_Tax:** the average number of tax-specific words in the MD&A section of the annual 10-K report over the three years in which tax aggressiveness measures are calculated.
- **ConfCall:** the number of words in the conference call transcripts held by the management in the year for which tax aggressiveness measures are calculated.
- **ConfCall_Tax:** the number of tax-specific words in the conference call transcripts held by the management in the year for which tax aggressiveness measures are calculated.

Control Variables:

- **Book-Tax Difference:** the absolute value of the average of years t, t-1 and t-2 book tax difference (defined as pre-tax income less taxable income which is current federal tax expense grossed up by the maximum federal statutory tax rate (i.e., 35%) plus pre-tax foreign income less the annual change in NOLs scaled by the average of the last three years of total assets.
- **Size:** the log of market value of equity (in millions).
- **Leverage:** the ratio of long term debt to total assets.
- **Age:** the natural logarithm of the difference between the first year when the firm appears in COMPUSTAT and the current year.
- **Geographic Complexity:** a measure of multinational complexity of a firm. Following Bushman et al. (2004), this measure is a revenue-based Hirfindahl-Hirschman index, calculated as the sum of the squares of each geographic segment's sales as a percentage of the total firm sales.
- **Mkt to Book:** the market-to-book ratio measured as the ratio of the market value to the book value of total assets.
- **Loss:** an indicator variable that takes a value 1 if the firm has incurred a loss in the current year and zero otherwise.
- **Analyst Following:** the natural logarithm of the number of analyst estimates reported immediately before the end of the fiscal year.
- **Std Dev of Sales:** the standard deviation of annual sales over the previous five years.
- **Log Volume:** the natural logarithm of the average monthly volume of stock traded over the three year period over which the tax aggressiveness measures are estimated (in thousands).
- **Std Dev of Volume:** the natural logarithm of standard deviation of monthly volume of stock traded over the three year period over which the tax aggressiveness measures are estimated.
- **Price:** is stock price at the end of the year and is included as the natural logarithm of price in regressions.
- **Institutional Ownership:** is the percentage of shares held by institutional owners as at the end of the year and is obtained from Thomson 13-F filings.
- **NYSE:** a dummy variable that takes a value 1 if the firm is listed on NYSE.
- **Std Dev of Returns:** the natural logarithm standard deviation of monthly stock returns over the three year period over which the tax aggressiveness measures are estimated.

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TABLE 1
Univariate Statistics
Panel A: Descriptive statistics for the variables used in this study as defined in the Appendix.

Variable	N	Mean	Std Dev	P25	Median	P75
GAAP_ETR	40,193	0.298	0.193	0.191	0.339	0.386
CASH_ETR	40,193	0.252	0.226	0.048	0.244	0.359
TA_GAAP	40,193	-0.028	0.184	-0.103	-0.037	0.069
TA_CASH	40,193	-0.012	0.214	-0.101	0.009	0.133
TAX_HAVENS	16,961	2.942	9.979	0.000	0.000	2.000
DTAX	42,358	0.010	0.521	-0.024	0.001	0.031
SHELTER	36,142	2.915	7.182	0.524	2.058	4.235
FIN48	10,127	0.008	0.015	0.000	0.001	0.008
AFError	40,193	0.015	0.047	0.001	0.003	0.009
AFDisp	26,715	0.341	0.734	0.056	0.129	0.301
Spread	34,261	0.135	0.163	0.033	0.080	0.176
NET_AFError	14,083	0.014	0.033	0.002	0.004	0.011
PRETAX_AFError	13,784	0.021	0.044	0.003	0.008	0.019
TAXEXP_AFError	13,567	0.010	0.020	0.001	0.004	0.010
MDA	27,709	8275	6146	3846	7346	11348
MDA_Tax	27,709	25	24	6	18	37
ConfCall	4,165	31972	36533	8383	18266	40374
ConfCall_Tax	4,165	9	18	0	3	10
Book-Tax Difference	40,193	0.043	0.082	0.008	0.021	0.045
Size	40,193	6.350	1.728	5.084	6.333	7.630
Leverage	40,193	0.174	0.181	0.010	0.128	0.286
Mkt to Book	40,193	1.698	0.998	1.038	1.320	1.961
Log Age	40,193	2.785	0.683	2.197	2.708	3.367
Std Dev of Sales	40,193	0.197	0.244	0.053	0.119	0.240
Geographic Complexity	40,193	0.804	0.296	0.500	1.000	1.000
Loss	40,193	0.217	0.412	0.000	0.000	0.000
Analyst Following	40,193	1.872	0.799	1.099	1.792	2.485
Std Dev of Returns	40,193	0.122	0.060	0.079	0.111	0.152
Log Volume	34,261	10.212	1.762	9.010	10.235	11.364
Std Dev of Volume	34,261	9.593	1.626	8.494	9.619	10.647
Price	34,261	23.629	19.099	9.360	18.750	32.375
Institutional Ownership	34,261	31.525	35.722	0.000	0.000	67.217

Panel B: Spearman correlations among variables used in this study as defined in the Appendix.

	TA_GAAP	TA_CASH	TAX HAVENS	DTAX	SHELTER	FIN48
TA_CASH	0.571**					
TAX HAVENS	0.150**	-0.029				
DTAX	-0.021	-0.040	0.040			
SHELTER	0.086**	0.003	0.320**	0.145**		
FIN48	-0.006	-0.064**	0.270**	0.005	0.133**	
AFError	0.172**	0.184**	-0.086**	0.010	-0.154**	-0.078**
AFDisp	0.205**	0.228**	-0.067**	-0.062**	-0.179**	-0.066**
MDA	0.085**	0.079**	0.063**	-0.0154	0.022	0.010
MDA_Tax	0.099**	0.063**	0.188**	0.015	0.125**	0.207**
ConfCall	0.051**	-0.015	0.276**	0.014	0.291**	0.205**
ConfCall_tax	0.011	-0.010	0.124**	0.003	0.139**	0.057**
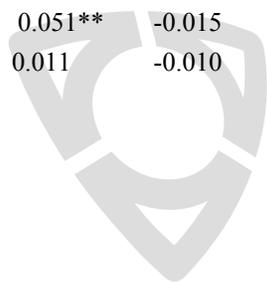
TABLE 2
Tax Aggressiveness and Absolute Analysts' Forecast Errors and Dispersion

Panel A:

VARIABLES	Predicted Sign	(1) AFError	(2) AFError	(3) AFDisp	(4) AFDisp
TA_GAAP	+	0.019***		0.312***	
		(8.480)		(6.770)	
TA_CASH	+		0.016***		0.200***
			(8.531)		(5.297)
Book-Tax Difference	+	0.036***	0.037***	0.403*	0.434**
		(3.457)	(3.405)	(1.943)	(2.043)
Size	-	-0.002***	-0.002***	-0.019	-0.017
		(-4.427)	(-4.117)	(-1.444)	(-1.272)
Leverage	?	0.010***	0.009***	0.357***	0.353***
		(3.008)	(2.781)	(4.332)	(4.272)
Log Age	-	0.006***	0.006***	0.058***	0.059***
		(5.955)	(6.014)	(3.009)	(3.015)
Geographic Complexity	-	-0.001	-0.001	0.014	0.016
		(-0.517)	(-0.454)	(0.614)	(0.656)
Mkt to Book	?	-0.001	-0.001**	-0.044***	-0.047***
		(-1.368)	(-1.965)	(-4.105)	(-4.378)
Loss	+	0.016***	0.017***	0.293***	0.305***
		(9.258)	(9.525)	(9.633)	(10.135)
Std Dev of Sales	+	-0.002	-0.001	-0.083***	-0.085***
		(-0.882)	(-0.822)	(-2.869)	(-2.953)
Analyst Following	-	-0.008***	-0.008***	-0.089***	-0.091***
		(-9.274)	(-9.546)	(-4.156)	(-4.236)
Std Dev of Returns	+	0.136***	0.133***	2.881***	2.862***
		(5.745)	(5.809)	(5.484)	(5.519)
Observations		40,193	40,193	26,715	26,715
R-squared		0.159	0.160	0.176	0.174

Panel A presents pooled time-series cross-sectional regressions of analysts' forecast errors (*AFError*) and dispersion of analysts' forecasts (*AFDisp*) on tax aggressiveness measures and control variables. Panel B presents cross-sectional regressions of analysts' forecast errors of Pre-Tax Income (*PRETAX AFError*), Net Income (*NET AFError*) and Tax Expense (*TAXEXP_AFError*) on tax aggressiveness measures and control variables. All variables are defined in the Appendix. Industry and time effects are included in all specifications. t-statistics, reported in parentheses, are calculated based on standard errors obtained by clustering at the firm as well as time level. Statistical significance (two-sided) at the 10%, 5% and 1% level is denoted by *, **, and ***, respectively.

Panel B:

VARIABLES	(1) NET_AFError	(2) NET_AFError	(3) PRETAX_AFError	(4) PRETAX_AFError	(5) TAXEXP_AFError	(6) TAXEXP_AFError
TA_GAAP	0.011***		0.009***		0.001	
	(6.585)		(4.170)		(1.238)	
TA_CASH		0.010***		0.012***		0.004**
		(4.604)		(3.782)		(2.073)
Book-Tax Difference	0.019***	0.018***	0.020*	0.019*	0.004	0.003
	(2.753)	(2.717)	(1.835)	(1.731)	(0.803)	(0.665)
Size	0.005***	0.005***	0.006***	0.006***	0.002***	0.002***
	(5.720)	(5.835)	(5.395)	(5.450)	(5.165)	(5.092)
Leverage	0.005	0.005	0.013***	0.013***	0.010***	0.009***
	(1.545)	(1.404)	(3.012)	(2.906)	(4.279)	(4.192)
Log Age	-0.001	-0.001	-0.002	-0.002	-0.001	-0.000
	(-1.130)	(-1.140)	(-1.372)	(-1.329)	(-0.797)	(-0.733)
Geographic Complexity	-0.002	-0.001	-0.001	-0.001	-0.000	-0.000
	(-1.257)	(-1.070)	(-0.451)	(-0.360)	(-0.078)	(-0.060)
Mkt to Book	-0.002***	-0.002***	-0.004***	-0.004***	-0.002***	-0.002***
	(-3.623)	(-3.873)	(-3.974)	(-4.132)	(-4.731)	(-4.823)
Loss	0.009***	0.009***	0.013***	0.013***	0.004***	0.004***
	(8.441)	(8.262)	(7.538)	(7.410)	(4.606)	(4.472)
Std Dev of Sales	-0.002	-0.002	-0.006*	-0.005*	-0.002	-0.002
	(-1.097)	(-1.042)	(-1.805)	(-1.771)	(-1.227)	(-1.192)
Analyst Following	-0.013***	-0.013***	-0.014***	-0.014***	-0.006***	-0.006***
	(-8.979)	(-9.065)	(-7.523)	(-7.592)	(-7.401)	(-7.512)
Std Dev of Returns	0.178***	0.177***	0.226***	0.224***	0.092***	0.091***
	(8.059)	(8.282)	(7.578)	(7.722)	(7.129)	(7.218)
Observations	14,083	14,083	13,784	13,784	13,567	13,567
R-squared	0.199	0.200	0.175	0.176	0.144	0.145

TABLE 3
Tax Aggressiveness and Information Asymmetry

VARIABLES	Predicted Sign	(1) *Spread*	(2) *Spread*
TA_GAAP	+	0.010**	
		(2.034)	
TA_CASH	+		0.015***
			(3.006)
Book-Tax Difference	+	0.002	-0.000
		(0.166)	(-0.021)
Size	-	-0.024***	-0.024***
		(-7.441)	(-7.388)
Leverage	?	0.026***	0.025***
		(2.993)	(2.891)
Log Age	-	0.004	0.004
		(1.462)	(1.542)
Geographic Complexity	-	0.008**	0.008**
		(2.330)	(2.340)
Mkt to Book	?	0.003**	0.003**
		(2.258)	(2.149)
Loss	+	-0.002	-0.002
		(-0.688)	(-0.643)
Std Dev of Sales	+	0.014**	0.014**
		(2.484)	(2.554)
Log Volume	-	-0.063***	-0.063***
		(-9.838)	(-9.829)
Std Dev of Returns	+	0.287***	0.284***
		(3.770)	(3.750)
Std Dev of Volume	+	0.033***	0.033***
		(6.699)	(6.661)
Analyst Following	-	-0.002	-0.002
		(-0.551)	(-0.574)
Price	-	0.000	0.000
		(0.390)	(0.356)
Institutional Ownership	-	-0.000**	-0.000**
		(-2.338)	(-2.362)
NYSE	-	0.001	0.001
		(0.132)	(0.127)
Observations		34,261	34,261
R-squared		0.463	0.463

This table presents pooled time-series cross-sectional regressions of information asymmetry (*Spread*) on tax aggressiveness measures and control variables. All variables are defined in the Appendix. Industry and time effects are included in all specifications. t-statistics, reported in parentheses, are calculated based on standard errors obtained by clustering at the firm as well as time level. Statistical significance (two-sided) at the 10%, 5% and 1% level is denoted by *, **, and ***, respectively

TABLE 4
TABLE 4
Tax aggressiveness and Management's Disclosure

Panel A: Regressions of Disclosure Proxies on Tax Aggressiveness

VARIABLES	Predicted Sign	(1) MDA	(2) MDA_Tax	(3) ConfCall	(4) ConfCall_Tax
TA_GAAP	+	0.963***	0.003**	6.942**	0.004**
		(3.733)	(2.480)	(2.235)	(2.512)
Book-Tax Difference	+	1.656***	-0.003	11.602**	0.001
		(2.667)	(-1.126)	(2.062)	(0.318)
Size	+	0.938***	0.002***	8.366***	0.002***
		(9.842)	(5.863)	(6.226)	(2.926)
Leverage	?	1.681***	0.002	-3.114	0.003
		(5.081)	(1.402)	(-0.882)	(1.363)
Age	?	-0.394***	-0.001**	9.588***	0.002***
		(-2.921)	(-2.248)	(6.430)	(2.736)
Geographic Complexity	-	0.304	0.002**	-2.622	0.001
		(1.385)	(2.101)	(-0.919)	(0.606)
Mkt to Book	?	-0.829***	-0.002***	-1.079	-0.000
		(-9.770)	(-7.556)	(-0.840)	(-0.745)
Loss	+	0.826***	0.001***	4.044***	-0.000
		(9.497)	(4.156)	(2.795)	(-0.254)
Std Dev of Sales	+	0.231	-0.001	6.992**	0.000
		(1.273)	(-1.096)	(2.161)	(0.210)
Analyst Following	?	-0.004	0.001	7.747***	0.002**
		(-0.036)	(1.398)	(4.737)	(2.285)
Std Dev of Returns	?	11.894***	0.023***	18.009	-0.001
		(9.860)	(4.069)	(1.531)	(-0.234)
Observations		27,709	27,709	4,165	4,165
R-squared		0.292	0.295	0.268	0.170

Panel B: Does High Disclosure Mitigate Effect of Tax Aggressiveness on Analysts' Forecast Errors?

VARIABLES		(1) AFError	(2) AFError	(3) AFError	(4) AFError
DISCLOSURE MEASURE	Predicted Sign	MDA	MDA_Tax	ConfCall	ConfCall_Tax
TA_GAAP_HI_DISC	+	0.017***	0.017***	-0.002	0.004
		(5.955)	(6.045)	(-0.199)	(0.386)
TA_GAAP_LO_DISC	+	0.017***	0.021***	0.014***	0.009***
		(5.103)	(5.750)	(4.664)	(3.085)
Difference		-0.001	-0.004	-0.0173***	-0.004
t-stat		(-0.302)	(-0.978)	(-2.034)	(-0.388)

Control Variables:

Book-Tax Difference	+	0.023***	0.023***	-0.011**	-0.011**
		(2.877)	(2.865)	(-2.267)	(-2.510)
Size	+	-0.003***	-0.003***	-0.000	-0.000
		(-3.984)	(-4.014)	(-0.414)	(-0.365)
Leverage	?	0.006**	0.006**	-0.000	0.000
		(2.111)	(2.087)	(-0.086)	(0.021)
Log Age	-	0.007***	0.007***	0.005***	0.005***
		(5.966)	(5.983)	(2.998)	(3.104)
Geographic Complexity	-	-0.000	-0.000	0.000	0.000
		(-0.214)	(-0.235)	(0.116)	(0.151)
Mkt to Book	?	-0.000	-0.000	-0.001***	-0.001***
		(-0.296)	(-0.281)	(-2.822)	(-2.690)
Loss	+	0.012***	0.012***	0.006**	0.006**
		(7.772)	(7.752)	(2.317)	(2.293)
Std Dev of Sales	+	0.001	0.000	-0.000	-0.000
		(0.242)	(0.236)	(-0.098)	(-0.119)
Analyst Following	-	-0.006***	-0.006***	-0.004***	-0.004***
		(-5.821)	(-5.820)	(-2.694)	(-2.686)
Std Dev of Returns	+	0.135***	0.134***	0.171***	0.170***
		(4.779)	(4.776)	(4.334)	(4.434)
Observations		25,978	25,978	4,045	4,045
R-squared		0.151	0.151	0.140	0.138

Panel A presents pooled time-series cross-sectional regressions of management disclosure proxies on tax aggressiveness measures and control variables. In Column (1), disclosure is measured as the length of the Management, Discussion & Analysis (MD&A) section of firms' 10-K reports (*MDA*). In Column (2), disclosure is measured as the number of tax-specific words in the MD&A section of firms' 10-K reports (*MDA_Tax*). In Column (3), disclosure is measured as the word length of conference call transcripts held by the management during the year (*ConfCall*). In Column (4), disclosure is measured as the number of tax-specific words in conference call transcripts held by the management during the year (*ConfCall_Tax*). Panel B examines whether the relation between tax aggressiveness and analysts' forecast errors differs between high disclosure firms and low disclosure firms. *TA_GAAP_HI_DISC* takes the value *TA_GAAP* if the value of the disclosure variable is above median and zero otherwise. *TA_GAAP_LO_DISC* takes the value *TA_GAAP* if the value of the disclosure variable is below median and zero otherwise. All other variables are defined in the Appendix. Industry and time effects are included in all specifications. t-statistics, reported in parentheses, are calculated based on standard errors obtained by clustering at the firm as well as time level. Statistical significance (two-sided) at the 10%, 5% and 1% level is denoted by *, **, and ***, respectively.

Table 5
Cross-Sectional Tests Based on Governance Measures

PARTITIONING VARIABLES	(1) AFError	(2) AFError	Difference (1)-(2)	(3) MDA	(4) MDA	Difference (3)-(4)	(5) MDA_tax	(6) MDA_tax	Difference (5)-(6)
	Governance			*Governance*			*Governance*		
	Weak	*Strong*		*Weak*	*Strong*		*Weak*	*Strong*	
Predicted sign	++	+	+	--	?	-	--	?	-
Board Independence	0.009**	0.008*	*0.001*	0.411	0.435	*-0.024*	0.006**	0.007**	*-0.001*
	(2.059)	(1.776)	*(0.489)*	(0.705)	(0.639)	*(-0.090)*	(2.042)	(2.261)	*(-0.035)*
Co-option	0.008***	0.005	*0.003*	0.710	0.092	*0.618*	0.009***	0.005	*0.004*
	(2.583)	(1.352)	*(0.852)*	(1.290)	(0.124)	*(0.937)*	(3.325)	(1.458)	*(1.076)*
CEO Chair Duality	0.012**	0.006	*0.006*	0.228	0.581	*-0.353*	0.009**	0.005**	*0.004*
	(2.135)	(1.626)	*(1.322)*	(0.346)	(1.186)	*(-0.831)*	(2.486)	(2.077)	*(1.376)*
Entrenchment Index (E-Index)	0.010**	0.008***	*0.002*	0.764	0.568	*0.196*	0.010***	0.005**	*0.005**
	(2.395)	(2.739)	*(0.045)*	(1.047)	(1.202)	*(0.534)*	(2.885)	(2.216)	*(2.144)*
Dedicated Inst Ownership	0.019***	0.007***	*0.012***	1.046***	0.434	*0.612*	0.002	0.004**	*-0.002*
	(4.634)	(3.778)	*(4.632)*	(3.183)	(1.014)	*(1.227)*	(1.403)	(2.018)	*(-0.989)*

This table presents pooled time-series cross-sectional regressions of analysts' forecast errors (*AFError*) and management disclosure proxies on tax aggressiveness measures and control variables on subsamples based on measures of corporate governance. The table presents only the coefficient on the tax aggressiveness measure (*TA_GAAP*) across subsamples formed based on governance measures. The first row represents the partition of the sample based on the fraction of independent directors (*Board Independence*) in the firm. A firm that has above (below) median percentage is categorized as *Strong* (*Weak*) governance. The second row examines partition of the sample based on the fraction of the board comprised of directors appointed after the CEO assumed office (*Co-option*, see Coles et al. (2014)). A firm that has above (below) median fraction is categorized as *Weak* (*Strong*) governance. The third row partitions the sample based on whether the CEO is the Chairman of the Board or not (*CEO Chair Duality*). Firms with Dual (Non Dual) boards are categorized as *Strong* (*Weak*) governance. The fourth row partitions the sample based on six provisions that place the most constraints on shareholders during takeover attempts (*E-Index*, Bebchuk et al. (2009)). A firm that has above (below) median *E-Index* is categorized as *Weak* (*Strong*) governance. The fifth row partitions the sample based on above (below) median percentage ownership by dedicated long-term horizon institutions (*Dedicated Inst Ownership*) and labelled as *Strong* (*Weak*) governance. The full set of controls, industry and time fixed effects are included in all specifications. t-statistics, reported in parentheses, are calculated based on standard errors obtained by clustering at the firm as well as time level. Statistical significance (two-sided) at the 10%, 5% and 1% level is denoted by *, **, and ***, respectively.

TABLE 6
Changes Analysis

VARIABLES	Predicted Sign	(1) D_AFError	(2) D_AFDisp	(3) D_Spread	(4) D_MDA	(5) D_MDA_Tax	(6) D_ConfCall	(7) D_ConfCall_Tax
D_TA_GAAP	+	0.278***	0.015*	0.001	0.114	0.132**	3.068	0.002***
		(3.289)	(1.776)	(1.128)	(0.817)	(2.178)	(1.418)	(2.696)
D_Book-Tax Difference	+	2.359***	0.059	0.020***	0.402	0.209*	-2.933	-0.000
		(3.002)	(1.169)	(4.068)	(1.216)	(1.778)	(-0.316)	(-0.080)
D_Size	-	-0.610***	-0.037***	-0.012***	0.045	0.009	-1.308	0.001**
		(-6.930)	(-7.446)	(-7.084)	(0.549)	(0.261)	(-1.237)	(2.172)
D_Leverage	?	0.145	0.061***	-0.003	1.072***	0.285*	1.016	-0.001
		(0.614)	(2.729)	(-0.796)	(2.857)	(1.854)	(0.172)	(-0.613)
D_Geo Complexity	-	-0.059	-0.009	-0.000	0.048	-0.036	-2.561	-0.003
		(-0.671)	(-0.926)	(-0.271)	(0.246)	(-0.444)	(-0.960)	(-1.637)
D_Mkt to Book	+	0.331***	0.018***	0.005***	-0.089*	-0.014	2.202***	-0.000
		(6.044)	(6.627)	(5.579)	(-1.683)	(-0.717)	(2.658)	(-0.748)
D_Loss	+	0.305***	0.013***	-0.002***	-0.055	-0.020	-1.582	-0.000
		(3.490)	(2.889)	(-2.893)	(-0.884)	(-0.715)	(-1.204)	(-0.567)
D_Std Dev of Sales	+	-0.564***	-0.028	-0.000	0.281	-0.148	-9.088	-0.008*
		(-2.578)	(-1.250)	(-0.052)	(0.815)	(-1.349)	(-1.339)	(-1.796)
D_Analyst Following	-	-0.448***	-0.025***	-0.007***	-0.153*	-0.012	2.632***	0.001
		(-7.510)	(-3.817)	(-5.947)	(-1.852)	(-0.397)	(2.851)	(0.834)
D_Std Dev of Returns	+	11.932***	1.259***	-0.081***	3.092*	1.255*	-30.863	-0.002
		(6.116)	(8.482)	(-14.076)	(1.841)	(1.734)	(-0.999)	(-0.093)
D_Log Volume	-			0.431***				
				(10.481)				
D_Std Dev of Volume	+			0.019***				
				(10.595)				
D_Price	-			0.000***				
				(2.909)				
D_Institutional Ownership	-			-0.000*				
				(-1.718)				
Observations		32,189	21,476	26,308	20,466	20,466	2,337	2,337
R-squared		0.043	0.043	0.198	0.023	0.012	0.046	0.027

This table re-estimates the regressions reported in Table 2, 3, 4, and 6 but using a changes framework. All variables are defined in the Appendix. The prefix *D_* refers to the changes in the variable. Time effects are included in all specifications. t-statistics, reported in parentheses, are calculated based on standard errors obtained by clustering at the firm as well as time level. Statistical significance (two-sided) at the 10%, 5% and 1% level is denoted by *, **, and ***, respectively.

TABLE 7
Effects around "Check-the-Box" Regulation

VARIABLES	(1) AFError	(2) AFError	(3) MDA	(4) MDA_tax
Post_1997*MNC	0.003**		0.674**	0.002**
	(2.235)		(2.482)	(2.451)
Y1996*MNC		0.002		
		(1.254)		
Y1997*MNC		0.004**		
		(2.189)		
Post_1998*MNC		0.003**		
		(2.236)		
Book-Tax Difference	0.074***	0.074***	5.680***	0.005
	(8.722)	(8.721)	(2.840)	(0.775)
Size	-0.007***	-0.007***	0.233	0.001
	(-7.988)	(-7.992)	(1.307)	(1.213)
Leverage	-0.006*	-0.006*	1.935**	0.005**
	(-1.681)	(-1.661)	(2.360)	(1.969)
Age	0.017***	0.017***	-1.211	-0.008**
	(4.084)	(4.073)	(-1.035)	(-2.092)
Geographic Complexity	0.003**	0.003**	-0.479	-0.002**
	(2.042)	(2.073)	(-1.645)	(-2.030)
Mkt to Book	0.004***	0.004***	-0.343**	-0.001*
	(5.920)	(5.890)	(-2.517)	(-1.734)
Loss	0.056***	0.056***	-0.257	-0.001
	(3.836)	(3.826)	(-1.241)	(-1.253)
Std Dev of Sales	-0.006**	-0.006**	0.039	-0.001
	(-2.369)	(-2.370)	(0.069)	(-0.794)
Analyst Following	-0.008***	-0.008***	-0.406*	-0.002**
	(-7.396)	(-7.389)	(-1.711)	(-1.963)
Std Dev of Returns	0.005***	0.005***	1.815	0.000
	(4.941)	(4.920)	(0.633)	(0.006)
Observations	5,357	5,357	2,556	2,556
R-squared	0.861	0.861	0.787	0.774

This table presents pooled time-series cross-sectional regressions of analysts' forecast errors (*AFError*) and management disclosure proxies (*MDA* and *MDA_Tax*) around the CTB regulation and control variables. The sample period is 1994 to 2000. MNC is a dummy variable that identifies multinational firms based on non-zero Profit/Loss from Foreign Operations (Compustat pifo) in any of the years prior to 1997. Post_1997 (Post_1998) is a dummy variable that takes a value 1 for the years starting 1997 (1998) and zero in prior years. Y1996 (Y1997) is a dummy variable that takes a value of 1 for the year 1996 (1997) and zero otherwise. All other variables are defined in the Appendix . Firm and time effects are included in all specifications. t-statistics, reported in parentheses, are calculated based on standard errors obtained by clustering at the firm as well as time level. Statistical significance (two-sided) at the 10%, 5% and 1% level is denoted by *, **, and ***, respectively.

TABLE 8
Sensitivity Analysis Restricted to Positive Taxable Income Firms

		Restricted sample: Positive taxable income firms only		
		No additional restrictions	Further restriction: Foreign income firms only	Tax aggressiveness computed relative to positive income control firms
VARIABLES	Predicted Sign	(1) AFError	(2) AFError	(3) AFError
TA_GAAP	+	0.015***	0.010***	0.014***
		(7.224)	(5.100)	(6.772)
Book-Tax Difference	+	0.048***	0.048***	0.052***
		(3.802)	(3.395)	(3.706)
Size	?	-0.001***	-0.001	-0.001***
		(-3.021)	(-1.353)	(-2.871)
Leverage	+	0.010***	0.012***	0.009***
		(3.206)	(2.859)	(3.004)
Age	-	0.004***	0.003***	0.004***
		(5.233)	(3.392)	(4.446)
Geographic Complexity	-	-0.000	-0.001	-0.000
		(-0.477)	(-0.909)	(-0.373)
Mkt to Book	?	-0.001***	-0.001*	-0.001***
		(-2.904)	(-1.889)	(-3.366)
Loss	+	0.015***	0.010***	0.013***
		(9.194)	(4.902)	(8.094)
Std Dev of Sales	+	-0.002	-0.002	-0.002
		(-1.103)	(-1.145)	(-1.187)
Analyst Following	-	-0.006***	-0.006***	-0.006***
		(-10.857)	(-8.817)	(-11.021)
Std Dev of Returns	+	0.120***	0.101***	0.115***
		(5.361)	(4.073)	(5.481)
Observations		31,864	17,589	30,980
R-squared		0.144	0.124	0.126

This table re-estimates the regressions reported in Table 2 but using three alternate specifications that consider the influence of loss firms on the results. Column (1) restricts the sample to firms with aggregate positive taxable income over years t, t-1and t-2. Column (2) restricts the sample to firms with positive taxable income as well as firms having foreign income (since foreign income firms are more likely to have opportunities to engage in foreign tax planning). Column (3) restricts the sample to firms with positive taxable income, and also re-computes the *TA_GAAP* variable by measuring a firm's tax aggressiveness relative to industry-size benchmark firms that have positive taxable income. Industry and time effects are included in all specifications. All variables are defined in the Appendix. t-statistics, reported in parentheses, are calculated based on standard errors obtained by clustering at the firm as well as time level. Statistical significance (two-sided) at the 10%, 5% and 1% level is denoted by *, **, and ***, respectively.