Does News of IRS Tax Litigation Affect Assessments of Tax Risk?*

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ABSTRACT

This study investigates whether news of a firm's pending tax litigation with the IRS affects the subsequent tax behavior of networked non-litigating firms. We find that non-litigating partner firms reduce both their tax-avoidance and tax-aggressive behavior in the three-year period following a board-interlocked firm's disclosure of pending tax litigation. These non-litigating partners also exhibit greater awareness of tax litigation risk in the post-disclosure period, as evidenced by increased references to the IRS in their MD&A discussions. In addition, we examine whether differences in the tax shelter characteristics of non-litigating firms affect their response to news of a networked firm's tax litigation. We find that non-litigating partners with financial characteristics associated with tax shelter activity exhibit tax behavior that reduces future tax litigation risk, whereas non-litigating partners without such characteristics do not. Finally, we examine three nonexclusive channels through which news of a firm's tax litigation might reach a non-litigating firm – disclosures in Form 10-K, shared industry connections, and common local external auditors. We find that none of these channels of information exchange, by themselves, are associated with significant changes in the tax behavior of non-litigating partner firms.

Keywords: tax litigation, tax behavior, tax risk, social networks

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1. Introduction

Minimizing exposure to tax disputes is a key aspect of tax risk management. Litigation is costly, not only in terms of the expense of external tax and legal advisers, expanded demands on in-house tax professionals, and potential penalty assessments, but also in terms of possible media scrutiny and the uncertainty introduced to a firm's financial statement reporting of its tax positions.[1] Accurate assessments of tax litigation risk, therefore, are critical to a firm's overall financial health. But how does a firm gather information useful in assessing tax litigation risk? And do all firms react to news of tax litigation the same, or is the reaction conditional on a firm's exposure to future tax litigation?

One way a firm might gather information about tax litigation risk is through other firms' tax controversy experiences. Many tax strategies depend on untested interpretations of ambiguous tax law. When one firm reveals that it has decided to escalate a tax dispute with the IRS to the judiciary, other firms who have engaged in similar tax strategies and have knowledge of the dispute might react by reassessing their own tax litigation risk. We ask whether news of tax litigation revealed by a firm in a board-interlocked network affects the subsequent tax behavior of non-litigating partner firms. We focus on board-interlocked networks because directors bear a fiduciary responsibility to protect shareholder value and manage risks that might materially impact that value. We consider tax litigation risk one such risk. We also ask whether non-litigating partner firms with greater exposure to future tax litigation react differently to this news than non-litigating partners without such exposure.

[1] Within our sample of litigating firms, proposed deficiencies range from $400,000 to $2.2 billion, with a mean deficiency of $137 million or 9.29 percent of total assets. These amounts do not include the additional expense of external tax and legal counsel or the potential effect of negative media coverage or financial statement uncertainty.

News of a firm's tax litigation might affect non-litigating partner firms in one of three ways. First, it might serve as a warning that specific tax strategies are likely to be challenged by the IRS and that the legality of these strategies is uncertain. Non-litigating partners might respond to this knowledge by modifying their tax behavior in a manner that reduces exposure to future litigation (Hoopes, Mescall, and Pittman 2012; Graham, Hanlon, Shevlin, and Shroff 2013). Alternatively, partner firms might not change their tax behavior because either the litigating firm's dispute involves a strategy the partner has not adopted or the partner fears deviations from the strategy might attract greater scrutiny from the IRS (Slemrod 2007). It is also possible that partner firms might increase the aggressiveness of their tax behavior if they believe the litigating firm will successfully defend the strategy or they wish to provide for negotiating room in the event of an IRS challenge (DeBacker, Heim, Tran, and Yuskavage 2013).

To address our research questions, we define litigating firms as those disclosing a tax dispute with the IRS in the legal proceedings section of their Form 10-K between 1996 and 2014. We restrict our search to the legal proceeding section of Form 10-K because litigation disclosed in this section is generally of greater economic significance than legal disputes mentioned in other sections of the Form 10-K, such as the tax footnote. Next, we identify non-litigating firms sharing board members with these litigating firms, and test for changes in the tax behavior of the non-litigating partner firms. We measure changes in tax behavior by comparing the cash effective tax rates (CETRs) and permanent book-tax-difference unexplained by legitimate tax positions (DTAXs) of the non-litigating partner firms over the three-year periods occurring before and after the first disclosure of a tax dispute by the litigating firms. Although we present results using pre- and post-disclosure periods of three years, similar results are obtained with two-year periods. We augment the tax-avoidance and tax-aggressive behaviors measured by

CETR and DTAX with tests comparing the frequency with which partner firms mention the IRS in the Management Discussion and Analysis (MD&A) section of their Form 10-K over the same pre- and post-disclosure periods. Our results indicate a significant change in the tax behavior of non-litigating partner firms in the post-disclosure period. Specifically, non-litigating partner firms reduce their tax-avoidance and tax-aggressive behaviors in the post-disclosure period, while simultaneously increasing references to the IRS in their MD&A discussions. We interpret these findings are supporting our main hypothesis regarding the role of shared information in minimizing future tax litigation risk.

We also investigate whether the response of non-litigating partner firms to news of a board-interlocked firm's tax dispute is conditional on the partner's own exposure to future tax litigation. We measure exposure to tax litigation by computing a *Tax Shelter Score* for each of our non-litigating firms using the first principal components of significant variables identified in the model of tax sheltering in Lisowsky (2010). We then use a median split to divide our sample into two subsamples, and we compare the tax behavior of each subsample in the pre- and post-disclosure periods. We posit that non-litigating firms with greater exposure to future tax litigation should exhibit a stronger reaction to news of an interlocked firm's tax dispute. Results of our analyses support this hypothesis.

Next we consider three alternative channels through which news of a litigating firm's tax dispute might reach other firms – Form 10-K disclosures, shared industry connections, and common local external auditors. Recognizing that many channels of information exchange are likely to operate within a firm (Cook and Omer 2013; Aobdia 2015; Klassen, Lisowsky, and Mescall 2016), we investigate the strength of these three channels independently. Our objective is to determine whether the primary channel through which news of tax litigation travels is

common board members, or whether one of these alternative channels operates with equal strength. Results of our supplementary analyses provide no evidence that these alternative information channels independently affect change in the tax behavior of non-litigating firms.

This study contributes to the accounting literature in three ways. First, we add to the literature on the determinants of firms' tax behavior by providing evidence regarding the role of tax enforcement. Hoopes et al. (2012) find that U.S. firms are less tax aggressive when faced with increased probabilities of IRS audit. We look beyond the audit stage of IRS enforcement and investigate tax controversies escalating into litigation. As such, the enforcement actions of our research arise from genuine differences in interpretation regarding the application of tax law to complex business transactions – the so-called "gray areas" of tax law. Our results provide insight into how knowledge of litigation involving these gray areas affects tax behavior.

Second, we add to the literature on strategic interactions among firms. Prior research has shown that firms often mimic the actions of peers. For example, herding behavior has been detected for decisions regarding stock splits (Kaustia and Rantala 2015), capital structure (Leary and Roberts 2014), and corporate investments (Scharfstein and Stein 1990). More closely related to our work, Brown (2011) and Brown and Drake (2014) show that network ties in the form of board interlocks are associated with corporate tax avoidance. We add to this literature by providing evidence of temporal precedence – the firms in our sample alter their tax behavior *after* learning of another firm's tax litigation. As such, our research design goes beyond earlier work in this area by showing a causal link between the action of one firm and the subsequent actions of partner firms.

Third, we extend previous research on real option theory (e.g., Kallapur and Eldenburg 2005; Gulen and Ion 2016) by investigating whether news of a networked firm's tax litigation

alters a non-litigating firm's assessment of its own tax litigation risk, as manifested by changes in its subsequent tax behavior. Real option theory incorporates a learning model such that management makes more informed decisions as the levels of uncertainty surrounding a strategic action are resolved over time. When new information is received, subsequent decisions are modified to reflect changes in economic, technological or market conditions. Baker, Bloom, and Davis (2013) construct an index of aggregate policy uncertainty which includes uncertainty about future changes in the tax code. We assert that another form of tax uncertainty is that which arises from untested tax law and unknown IRS enforcement policy regarding that law. In our setting, non-litigating firms make strategic tax decisions in the pre-disclosure period. They then receive new information regarding the legality of certain tax strategies from networked firms. Non-litigating partners react to this new information in the post-disclosure period by reassessing the riskiness of their own tax strategies, and those firms with the greatest exposure to future litigation modify their tax behavior accordingly.

The remainder of this paper is organized as follows. In Section 2, we review the literature and develop our hypothesis. Section 3 describes the data sample and research design. Section 4 presents our findings, and Section 5 concludes.

2. Background and hypotheses

Some tax avoidance strategies are commonplace with well-defined consequences, such as purchasing tax-exempt bonds. Others depend on untested interpretations of ambiguous tax law. For example, tax law clearly indicates that partnership income, deductions and credits flow through to the tax returns of partners.[2] But the law is unclear as to the requirements of a bona fide partnership or how much risk each partner must bear in order for the partnership's tax

[2] Internal Revenue Code §702, *Income and Credits of Partner*.

allocations to be valid.[3] Similarly, the law is explicit in its requirement that intra-company transactions be priced at "arm's-length."[4] But determination of what constitutes an arm's-length price is problematic when comparable market transactions do not exist.[5]

Earlier research by Brown (2011) and Brown and Drake (2014) finds that firms use social networks to share information about tax avoidance strategies. In particular, Brown and Drake (2014) show that network ties established by directors have a significant effect on the diffusion of tax information, and that firms with board ties to low-tax firms have lower CETRs. This finding is an extension of recent studies showing board interlocks to influence a diverse number of accounting practices, including disclosure policy (Cai, Dhaliwal, Kim, and Pan 2014), option backdating (Bizjak, Lemmon, and Whitby 2009), investment decisions (Fracassi 2016), earnings management (Krishnan, Raman, Yang, and Yu 2011; Chiu, Teoh, and Tein 2013), and financial reporting quality (Omer, Shelley, and Tice 2016). Collectively, this body of research provides evidence of behavioral covariation among board-interlocked firms.

Our study adds to this steam of research in two unique ways. First, we examine how information is shared among networked firms when the message contains news of a potentially negative development for the source. Numerous studies in psychology, economics, and accounting (e.g., Leary and Kowalski 1990; Scharfstein and Stein 1990; Tse and Tucker, 2009)

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[3] In *Historic Boardwalk Hall, LLC*, 694 F.3d 425, 110 AFTR2d 2012-571 (CA-3, 2012), the Third Circuit held that Pitney Bowes, a corporate participant in a partnership engaged in the rehabilitation of a notable historic property, was not a bona fide partner because it lacked a meaningful stake in either the success or failure of the partnership. As a result, the court disallowed approximately $17.5 million of federal tax credits previously allocated to Pitney Bowes.

[4] Treasury Regulation §1.482-1, *Allocation of Income and Deductions among Taxpayers*.

[5] In its Form 10-K filing for 2004, Caterpillar disclosed that it had received an IRS assessment of approximately $1 billion for taxes and penalties related to its 2007 to 2009 tax returns and various offshore transactions with its affiliate in Switzerland. At a hearing before the Permanent Subcommittee on Investigations of the Committee on Homeland Security and Government Affairs of the U.S. Senate (April 1, 2014, S. Hrg. 113-408), the Swiss tax strategy was reported to have shifted $8 billion in profits from Caterpillar U.S. to the Swiss affiliate between 2000 and 2012, cutting the corporation's U.S. tax bill by $2.4 billion. Caterpillar indicated in its 2004 Form 10-K filing that it would "vigorously contest" the IRS assessment.

show that people tend to selectively omit or delay conveying negative information in an attempt to put the best parts of themselves into public view. Similarly, research in finance indicates that investors tend to discuss their stock market experiences with others when the experiences are favorable, but to withhold information about unfavorable outcomes (Hirshleifer, Lim, and Teoh 2011; Kaustia and Knupfer 2012). Whether news regarding a potentially negative development such as tax litigation[6] is exchanged through a private network remains an empirical question.

Second, our study extends the accounting research on social networks by providing evidence of temporal precedence in the tax behavior of partner firms. While earlier studies have demonstrated an association between the tax behavior of networked firms (Brown 2011; McGuire, Omer, and Wang 2012; Bianchi, Falsetta, Minutti-Meza, and Weisbrod 2014; Brown and Drake 2014), we are the first to establish a causal link between the tax decision of one firm and the subsequent tax behavior of partner firms.

Our research design selects tax litigation as the shared message for two reasons. First, as mentioned, we are interested in whether negative news is exchanged by networked firms in a manner similar to the way they share tax savings strategies and other positive information. Second, we wish to know whether information available through public channels, such as Form 10-K filings, is sufficient to trigger a change in tax behavior, or whether such a change is observed only when the public disclosures are augmented with private information available through a shared network. A sample of excerpts from the tax litigation disclosures of our litigating firms is provided in Appendix 1.

[6] Controversies with the IRS are time-consuming and expensive. Litigation places additional demands on in-house tax professionals and external tax and legal advisers. It also subjects the litigating firm to possible media scrutiny and uncertainty in the financial reporting of its tax positions. In the event of a judicial defeat, costs escalate if a firm decides to appeal the decision. Defeat is also highly probable, with the Office of the National Taxpayer Advocate indicating that taxpayers prevail, in whole in in part, in less than 30 percent of the cases involving gross income or business expenses (National Taxpayer Advocate 2010). For these reasons, we consider a disclosure of pending tax litigation as a negative development for the litigating firm.

Although firms may establish social connections through a variety of networks, we examine the effect of board interlocks because directors bear a fiduciary duty to protect shareholders from risks which may materially impact a firm's future financial performance. Tax litigation risk is one such risk (PricewaterhouseCoopers 2004). As such, information – even negative information – may be exchanged through this network.[7]

We conjecture that news of a litigating firm's tax dispute delivers three potential signals to a non-litigating partner. First, the tax dispute indicates that the IRS has targeted a particular tax strategy for close examination and judicial resolution. Partner firms who have adopted analogous tax strategies might react to this information by reassessing their own tax litigation risk and reducing future exposure. If so, then we expect non-litigating partners to exhibit less tax-avoidance and tax-aggressive behavior in the post-disclosure period (Hoopes et al. 2012). Alternatively, partner firms may not have adopted similar tax strategies or they might believe that deviations from the strategy will attract scrutiny from the IRS. If so, then non-litigating partners might exhibit no change in their tax behavior despite having knowledge of the dispute (Slemrod 2007). Last, partner firms might believe the IRS is unlikely to successfully litigate the tax controversy, or they may wish to provide room for negotiation in the event of IRS challenge. If so, then non-litigating partners might exhibit more aggressive tax behavior in the post-disclosure period (DeBacker et al. 2013).

We posit that the first of the above three signals is more likely. Tax litigation is an expensive and protracted process that often introduces uncertainty into a firm's financial statement reporting of its tax positions. Prior research indicates that firms may forgo tax benefits

[7] We also select board interlocks because it is a readily identifiable network. Other, potentially more potent networks such as shared executive directors, legal counsel, or external tax advisers are outside our reach; only 17 percent of our non-litigating partner firms share executive directors with litigating firms, few have common legal counsel, and most do not reveal the identity of their external tax advisor.

when they create negative financial reporting consequences (e.g., Shackelford and Shevlin, 2001; Erickson, Hanlong, and Maydew 2004). Additionally, many firms actively manage tax risk (e.g., Brockman 2016; Vodafone 2016). Thus, we hypothesize that non-litigating partner firms view a networked firm's tax litigation as a warning signal and act in ways to mitigate their risk of future tax disputes.

HYPOTHESIS 1: *After learning of a networked firm's tax litigation, non-litigating partners act to mitigate the risk of future tax disputes by modifying their tax behavior.*

A firm's reaction to information learned from another is also likely to be influenced by the relevancy of the information. For example, Haunschild and Beckman (1998) find that information from similar networked partners is more influential than information from dissimilar partners. Westphal, Seidel, and Stewart (2001) observe that firms imitate the strategic and compensation policies of industry competitors, but not the policies of firms outside their industries. Leary and Roberts (2014) show that the financing decisions and characteristics of peer firms are important determinants of corporate capital structure and financial policies.

Brown and Drake (2014) extend this research to examine the tax-avoidance behavior of similar networked partners. They find that low-tax firms sharing board members and possessing similar income mobility, growth opportunities, or financial risk also report lower CETRs. We take this stream of research a step further and ask whether a non-litigating partner firm's reaction to news of a board-interlocked firm's tax dispute is conditional on the partner's own exposure to future tax litigation. Tax controversy often arises when a taxpayer engages in tax shelter activity involving ambiguous tax law. We hypothesis that news of IRS enforcement action regarding such ambiguity may be more informative, and potentially more likely to elicit a change in tax

behavior, when it is received by non-litigating partners who have themselves engaged in risky tax minimization strategies than when it is received by those who have not.

HYPOTHESIS 2: *Non-litigating partners with greater tax shelter activity react to knowledge of a networked firm's tax litigation more strongly than non-litigating partners with little or no tax shelter activity.*

3. Data and research design

Sample construction

For our analyses, we begin by selecting a sample of U.S. incorporated firms having Form 10-K filings available in the Edgar database between 1996 and 2014. Within this set of firms, we identify 103 unique firms disclosing pending tax litigation with the IRS in the legal proceedings section of their Form 10-K.[8] We remove 24 firms because their disclosures either do not allow us to determine the first year of the dispute or the dispute originated prior to 1996. We define the remaining 79 firms as litigating firms, and identify the first year of disclosed litigation as year *t*.

We identify partner firms on the basis of shared board members as reported in the ISS *RiskMetrics* database.[9] Specifically, we define a partner as a firm sharing one or more board members with a litigating firm at some time during the three years before or after year *t*. We select this window because tax disputes originate during IRS examinations and these typically occur several years prior to litigation. Similarly, litigation may persist for several years before a final judicial decision is received, and exchanges of information may occur during these years as well. Of our 79 litigating firms, 50 do not have board member observations in ISS *RiskMetrics*.

[8] Specifically, we use a computerized algorithm that searches the legal proceedings section of Form 10-K for references to the "IRS" or "Internal Revenue Service". We then manually inspect each firm's filing to verify that the reference concerns a tax dispute and to identify the first year of litigation.

[9] Our methodology is consistent with earlier studies of interlocked boards (i.e., Brown 2011; Brown and Drake 2014; Omer et al. 2016).

The remaining 29 litigating firms are networked to 623 partner firms. From this sample, we eliminate 87 partner firms who do not have data available in the *Compustat* database. We also eliminate 22 partner firms who themselves report pending litigation with the IRS in their Form 10-K. Last, we remove 247 partner firms for whom we cannot calculate our dependent and control variables because of incomplete data. Our final sample consists of 267 non-litigating partner firms with 534 firm-year observations in the three-year pre- and post-disclosure periods, as detailed in Table 1.

[INSERT TABLE 1 HERE]

Table 2 compares the mean *CETR*, *DTAX*, and other variables of our sample with those of a subset of *Compustat* firms having data available in ISS *RiskMetrics* during the disclosure years. While our sample is larger than the ISS *RiskMetrics* firms in terms of total assets, revenue, and market value, it is not markedly different for measures of *CETR*, *DTAX*, return on assets, leverage, and Tobin's q.

[INSERT TABLE 2 HERE]

Table 3 compares the top ten industries in our sample with those of a subset of *Compustat* firms having ISS *RiskMetrics* data. While our sample tends to under-represent these ten industries, the under-representation is less than 3 percent in any given industry and the aggregate under-representation of all ten industries is only about 11 percent.

[INSERT TABLE 3 HERE]

Variables and Regression Models

We hypothesize that firms assess tax risk, in part, using information gained from other networked firms. Specifically, we posit that non-litigating firms assess the tax enforcement environment using knowledge learned from litigating partner firms, and that those who perceive a potential enforcement threat modify their tax behavior in a manner that reduces future tax litigation risk.

Because there are multiple dimensions of a firm's tax behavior, we use three variables to measure different aspects of this attribute. The first aspect we consider is tax-avoidance behavior and we measure it using *CETR*. Consistent with prior literature (e.g., Chyz, Leung, Li, and Rui 2013; Kubrick, Lynch, Mayberry, and Omer 2015), we treat lower values as suggestive of higher tax avoidance. We select CETR over alternative ETRs because it captures cash taxes paid in a given year, including cash payments associated with settlements of tax disputes arising in earlier years. As such, it is more likely to detect a shift in the level of tax avoidance exhibited by a non-litigating partner, both in terms of its current tax payments and its policy toward settling tax disputes. Following Dyreng, Hanlon, and Maydew (2008), we measure *CETR* as the ratio of income taxes paid to pretax income exclusive of special items. When special items are not reported, we treat them as zero.

Guenther, Matsanaga, and Williams (2016) find that low tax rates are more persistent than high tax rates. However, to support our two hypotheses, we must find a significant *increase* in the *CETRs* of our non-litigating partners in the post-disclosure period – a directional change contrary to both the persistence observed by Guenther et al. (2016) and the overall shift in recent years toward lower CETRs among firms similar to those represented by our sample (McIntyre,

Gardner, and Phillips 2014). As such, we believe that *CETR* is a robust measure of a firm's tax-avoidance behavior in our setting.

The second aspect of a firm's tax behavior that we consider is *DTAX*, a measure of permanent book-tax differences unexplained by legitimate tax positions (Frank, Lynch, and Rego 2009). Lisowsky, Robinson, and Schmidt (2013) classify *DTAX* as an extreme measure of tax aggressiveness on their continuum of uncertainty regarding the sustainability of tax benefits claimed. Also on their continuum, they indicate that *DTAX* captures tax positions that do not reach the "more likely than not" standard of ASC 740-10.[10] We expect that in the post-disclosure period, non-litigating partners will exhibit a decline in their tax-aggressive behavior, as measured by a significant and negative coefficient on our *DTAX* variable.

The third aspect of tax behavior that we measure is *IRS*, an indicator variable equal to 1 if a non-litigating partner mentions the IRS or Internal Revenue Service in the MD&A section of its annual Form 10-K at least once during the pre-disclosure period or, alternatively, during the post-disclosure period. In the MD&A section, management is responsible for identifying and discussing quantitative and qualitative factors that are necessary to investors' understanding of the firm, with particular emphasis on forward-looking disclosures (Securities and Exchange Commission 1989, 2003). If a non-litigating partner firm assesses its own tax litigation risk using news of a tax controversy involving a networked firm, we speculate that the partner might signal its heightened tax awareness in disclosures to shareholders. We expect, therefore, to find an increase in MD&A references to the IRS among our non-litigating partners in the post-disclosure period.

[10] ASC 740-10, Accounting for Uncertainty in Income Taxes, was formerly known as FASB Interpretation No. 48 or FIN 48, and it establishes a "more-likely-than-not" threshold for reporting of uncertain tax positions on financial statements.

A fourth aspect of tax behavior that we considered, but found to be impracticable, is a firm's unrecognized tax benefit (UTB). In 2006, the FASB began requiring firms to disclose their contingent tax liabilities. Because our tests require seven years of data for each non-litigating partner, removing those who lack seven UTB observations reduces the size of our sample to such an extent that there is insufficient power for statistical testing. Thus, we do not include this variable among our measures of tax behavior.

To test for changes in the tax behavior of our non-litigating partner firms, we compare our three variables, *CETR*, *DTAX*, and *IRS*, in the pre- and post-disclosure periods. We define the pre- and post-disclosure periods as the three years surrounding year *t+1* (the year subsequent to a litigating firm's disclosure in year *t*). We treat year *t+1* as a transition period and we expect that some partners may modify their tax behavior during this time. Thus, we compare the mean of *CETR*, *DTAX*, and *IRS* in years *t-2*, *t-1*, and *t* to the mean in years *t+2*, *t+3*, and *t+4*. We allow one year of transition based on Hoopes et al. (2012), whose survey results showed that 69.2 percent of tax executives who knew of a change in assessed tax risk would adjust their firm's tax strategy in one year or less. Although only three-year pre- and post-disclosure periods are presented, tests using pre- and post-disclosure periods of two years produce substantively similar results.

Our hypotheses regarding the effect of shared information on subsequent tax behavior are tested using variations of the following regression model. We measure a firm's tax behavior (*TB*) using *CETR* and *DTAX* as dependent variables in OLS models and *IRS* as the dependent variable in probit models.

$$TB = \beta_0 + \beta_1 POST + \beta_2 ROA + \beta_3 LEV + \beta_4 PPE + \beta_5 SIZE + \beta_6 TOBIN + \beta_7 RD + \beta_8 NOL + \beta_9 INV + \epsilon \quad (1)$$

POST is an indicator variable equal to 1 in the post-disclosure period, and 0 otherwise. Control variables are firm-specific characteristics previously found to affect firms' tax behavior. They include return on assets (*ROA*) because profitability is a major factor affecting a firm's tax liability; financial leverage (*LEV*) because a firm's debt policy is related to its tax avoidance activities (Graham, Lemmon, and Schallheim 1998; Graham and Tucker 2006); plant, property, and equipment (*PPE*) because capital intensive firms are affected more by the differences between financial and tax depreciation (Chen, Chen, Cheng, and Shevlin 2010); total assets (*SIZE*) because larger firms are more likely to be audited by the IRS (Hoopes et al. 2012) and they incur potentially higher reputational or political costs as a result of overly aggressive tax positions (Zimmerman 1983); Tobin's q (*TOBIN*) because it captures a firm's growth opportunities and these, in turn, affect many corporate decisions (McGuire, Wang, and Wilson 2014; Fracassi 2016); research expenditures (*RD*) because it proxies for a firm's business and tax-planning strategies (Higgins, Omer, and Phillips 2015), as well as providing tax deductions and credits; tax loss carryforwards (*NOL*) because they represent shields against future tax (Amir and Sougiannis 1999); and inventory intensity (*INV*) based on the work of Gupta and Newberry (1997). Appendix 2 provides a more complete explanation of the variables.

All control variables are calculated over the same three-year period as that of our dependent variables. Continuous variables are winsorized at 1 and 99 percent in tests using *CETR* and *IRS* as the dependent variables.[11] When *DTAX* is the dependent variable, continuous variables are winsorized at 5 and 95 percent due to the smaller sample sizes.[12]

[11] The Grubbs' test (Grubbs 1969) shows that winsorizing at 1 and 99 percent in the *CETR* model reported in Table 6 leaves only 2 outliers out of 534 observations. Because IRS is a binary variable, it is not feasible to apply the Grubbs' test to detect outliers.

[12] The Grubbs' test (Grubbs 1969) shows that winsorizing at 1 and 99 percent in the *DTAX* model reported in Table 6 leaves 29 outliers out of 106 observations. Winsorizing at 5 and 95 percent eliminates all outliers.

To help isolate changes in *CETR* and *DTAX* in the pre- and post-disclosure periods, we include firm- and year-fixed effects. Firm-fixed effects control for the time-invariant portion of a firm's *CETR* or *DTAX*. Year-fixed effects control for differences in *CETR* or *DTAX* that coincide with specific years. In tests with *IRS*, we employ probit models and we include industry-fixed effects rather than firm-fixed effects to avoid excluding firms that do not change their behavior in the pre- and post-disclosure periods.

Table 4 reports descriptive statistics of our sample. The *CETR* and *DTAX* of our sample of non-litigating partner firms are about 26 and -2 percent, which are comparable to previous studies (i.e., McGuire et al. 2012; Brown and Drake 2014; Kubrick et al. 2015). Regarding MD&A disclosures, slightly less than 40 percent of our sample mentions the IRS or Internal Revenue Service in these discussions during our study period.

[INSERT TABLE 4 HERE]

Table 5 provides a correlation matrix of our variables. The correlations between *CETR* and *DTAX*, *CETR* and *IRS*, and *DTAX* and *IRS* are not significant at the 5 percent level. This indicates that these three variables capture different dimensions of tax behavior. The correlation between *CETR* and *POST* is positive and significant, whereas the correlations between *POST* and *DTAX*, *POST* and *IRS*, and *POST* and most of the other control variables are generally not significant. Two exceptions are the correlations between *POST* and *SIZE*, and *POST* and *TOBIN*, both of which are significant at the 5 percent level. Taken as a whole, however, it does not appear that *POST* is correlated with firm characteristics that are likely to affect tax behavior.

[INSERT TABLE 5 HERE]

4. Results

Regression results

Table 6 reports the results of regressions using equation (1). For the *CETR* and *DTAX* tests, we formulate equation (1) as OLS regressions. For the *IRS* test, we use a probit regression. As predicted, the coefficients on *POST* are positive and significant in the *CETR* and *IRS* models, but negative and significant in the *DTAX* model. In the *CETR* model, the coefficient on *POST* is 0.0510 and significant at the 1 percent level. In the *DTAX* and *IRS* models the coefficients are -0.8604 and 0.5406, respectively, and both are significant at the 5 percent level. These results indicate that both the tax-avoidance and tax-aggressive behavior of non-litigating partner firms decreased over the three years after the tax dispute disclosures of networked litigating firms. Concurrent with this reduction in tax avoidance and aggressiveness, non-litigating partners referenced the IRS more frequently in their MD&A discussions.

[INSERT TABLE 6 HERE]

While most of the control variables in our regressions are not significant, our OLS models yield R-square values of almost 60 percent or higher. We attribute this to the inclusion of firm- and year-fixed effects, which appear to explain most of the variation in *CETR* and *DTAX*. When we exclude all control variables other than the two fixed effects, the R-square values drop only slightly to 71 percent for the *CETR* model and 50 percent for the *DTAX* model. Thus, we conclude that the explanatory power of the control variables is subsumed by the two fixed effects.

Our second hypothesis proposes that news of an interlocked firm's tax dispute affects the subsequent tax behavior of non-litigating partner firms differently, and that this difference is conditional upon the extent to which each partner's own tax minimization strategies expose it to

potential future tax litigation. Because risky tax minimization strategies are not observable ex ante, we measure these using a proxy developed from the empirical model of Lisowsky (2010). Specifically, we use a principal component analysis to construct a *Tax Shelter Score* for each of our non-litigating partners. This score represents the first principal components of six financial statement variables not already in our model and identified in Lisowsky (2010) as significantly related to tax shelter activity. An alternative tax shelter score computed using all of the significant variables in Lisowsky (2010) produces similar results. The first of these variables is income tax expense scaled by pretax income before special items (*ETR*). The second variable is foreign pretax income scaled by lagged total assets (*Foreign income*). The remaining four variables are indicators equal to 1 when a firm (1) has subsidiaries operating in jurisdictions identified by the OECD as tax havens (*Tax haven*), (2) reports equity in earnings of unconsolidated subsidiaries (*Equity in earnings*), (3) reports either a pretax or after-tax litigation/insurance settlement (*Litigation*), and (4) employs a Big 5 audit firm (*Big 5 auditor*).[13] We identify tax havens using Scott Dyreng's dataset.[14] Untabulated tests indicate that similar results are obtained using the tax havens employed in Lisowsky (2010).

Table 7, panel A, reports the results of regressions using a subsample of non-litigating firms classified as having a low likelihood of tax shelter activity.[15] The coefficient on *POST* is positive and significant in the *CETR* model, but not significant in either the *DTAX* or *IRS* models.

[13] Because our study period ranges from 1996 through 2014, we include Arthur Anderson in our definition of Big 5 auditors, together with Deloitte, PwC, EY, and KPMG. This is consistent with Lisowsky (2010).

[14] Scott Dyreng's dataset is available online and it gathers information from firms' exhibit 21 of Form 10-K filed on the SEC website. We select the list of tax havens identified in Dyreng's dataset over that used in Lisowsky (2010) because it captures the OECD's list of tax havens over time. See Dyreng and Lindsey (2009) and https://sites.google.com/site/scottdyreng/Home/data-and-code/EX21-Dataset.

[15] Although we use a median split to divide our sample into two subsamples of firms having either high or low *Tax Shelter Scores* (Table 7, panels A and B), the division is not equal because some firms have the same *Tax Shelter Score*. In the reported table, we define firms have having a high likelihood of tax shelter activity when the *Tax Shelter Score* is greater than the sample median. The results are similar when we split the sample based on scores greater or equal to the sample median.

These results suggest that knowledge of pending tax litigation has only a modest effect on the tax behavior of non-litigating partner firms who have engaged in little or no tax shelter activity. Although the coefficient on *POST* in the *CETR* model is positively significant, the magnitude is smaller than those in either Table 6 or panel B of Table 7, which reports the results of regressions using a subsample of non-litigating firms classified as having a high likelihood of tax shelter activity. As predicted, the panel B regressions detect significant coefficients on *POST* in all three models. The signs and levels of significance on these three *POST* coefficients are consistent with those in Table 6 and support our hypothesis that news of tax litigation elicits a greater change in tax behavior when it is received by non-litigating partner firms who have engaged in risky tax minimization strategies.[16]

[INSERT TABLE 7 HERE]

Additional Analyses

Our research design is based on the premise that news of a litigating firm's tax dispute is a random shock to non-litigating partners and that this shock occurs in different years for different partner firms. Despite the strength of our design, three alternative explanations for our results are possible. First, partner firms may simply be responding to public disclosures of other firms' tax litigation rather than information gained through network ties with board members. Second, partner firms may be reacting to news shared through other private networks, such as industry connections or common local auditor firms. Third, our findings may reflect a spurious relation. To address these alternative explanations, we perform three additional tests.

[16] We perform a statistical test on the difference in the coefficients on *POST* in the *CETR* models of panels A and B of Table 7 following Clogg, Petkova, and Haritou (1995). The result shows that the coefficient on *POST* in panel B is greater than that in panel A at the 10 percent significance level (one-tail test).

First, to address concerns that our non-litigating partner firms are responding to public disclosures, we construct a matched sample of non-partner firms in the same industry and with similar total assets in year *t*. Matching on the basis of size and industry allows us to compare firms having similar resources and strategic tax opportunities. In addition, firms of similar size and operating in complementary industries may share political or reputational concerns and, hence, may exhibit analogous tax behavior in response to public disclosures of tax litigation. We define industry using two-digit SIC codes.[17] Within these two-digit SIC codes, we select matched firms with total assets neighboring those reported by our non-litigating partner firms.[18]

Table 8 reports the regression results of our matched sample. In all three models, the coefficients on *POST* are not significant.[19] These results suggest that public disclosure of tax litigation is not, by itself, sufficient to elicit changes in the tax behavior of non-litigating firms.

[INSERT TABLE 8 HERE]

Next we consider whether news of tax litigation travels through alternative information channels. The first channel we consider is industry connections. As mentioned above, firms operating in the same industry share similar business environments, particularly when they reside within close proximity of each other and have opportunities for face-to-face exchanges of information. To examine whether firms react to news of tax litigation conveyed through industry connections, we construct a sample of firms sharing the same industry and metropolitan statistical area (MSA) as our litigating firms. As before, we define industry using two-digit SIC

[17] Refining this data requirement to three-digit SIC codes does not change our results, but does reduce the size of our sample markedly.

[18] The results reported in Table 8 are substantively unchanged if we require the matched firms to report total assets within 10 percent of those reported by our non-litigating partner firms.

[19] The probit model with *IRS* as the dependent variable does not have the same sample size as the earlier probit model based on board interlocks because the regression itself drops observations for which the fixed effects explain all variation.

codes, but now our industry ties connect our sample firms to litigating firms who reside in the same MSA in year *t*.

Results of our regressions, as reported in Table 9, show that the coefficients on *POST* are not significant in any of the three models. As such, these tests fail to provide support for the notion that knowledge of tax litigation gained through industry connections alters tax behavior.

[INSERT TABLE 9 HERE]

The last channel of information we consider is that of the external audit firm. Although the use of auditor-provided tax services has declined after the passage of the Sarbanes-Oxley Act (Maydew and Shackelford 2007), many firms continue to purchase at least part of their tax consulting and compliance services from their external auditor (Cook and Omer 2013; Klassen et al. 2016). As such, an external auditor exerts some influence on the tax strategies of a firm and its tax expertise may be an important determinant of tax behavior (McGuire et al. 2012). External auditors also may provide a communication channel through which their clients can learn about tax enforcement. Brown and Drake (2014) find evidence that indirect ties established through a common local auditor strengthen direct ties created through board interlocks. In our sample, only two percent of our non-litigating partner firms share both board members and an external audit firm. Thus, we are unable to empirically determine whether a common local auditor alters the tax behavior of board-interlocked partners. But our sample is sufficiently large for us to investigate whether firms respond to news of tax litigation gained through a common local auditor.

Table 10 reports the results of our models using a sample of firms sharing the same external audit firm and MSA as those of our litigating firms in year *t*. Although we define geographic proximity using MSA, alternative specifications using the *Compustat* item *City* produce similar results. In all three models, the coefficients on *POST* are not significant,

suggesting that firms sharing a local auditor either do not exchange information about tax litigation or they do not act on such information. Collectively, we conclude from these and the earlier analyses that information about tax litigation is more potent when it is gained through shared board memberships than public channels, industry connections, or local external auditors.

[INSERT TABLE 10 HERE]

5. Conclusion

This study investigates whether news of a firm's pending tax litigation affects the subsequent tax behavior of networked non-litigating firms. It also examines whether differences in the tax shelter activity of non-litigating firms affects their response to news of a networked firm's tax dispute. Although many channels of information exchange have been identified in the literature, we examine four nonexclusive medians through which news of a firm's tax litigation might reach a non-litigating firm – disclosures in Form 10-K, shared industry connections, common local external auditors, and interlocked board members. We find that only one of these medians of information exchange – interlocked board members – is associated with significant changes in the subsequent tax behavior of non-litigating partner firms. Specifically, we find that non-litigating partners reduce both their tax-avoidance and tax-aggressive behaviors in the three-year period following a board-interlocked firm's disclosure of pending tax litigation. These non-litigating partners also display greater awareness of tax enforcement in the post-disclosure period, as evidenced by increased references to the IRS in their MD&A discussions. Additionally, non-litigating partners with financial characteristics associated with tax shelter activity exhibit tax behavior that reduces future tax litigation risk, whereas non-litigating partners without such characteristics do not.

Our study makes three contributions to the accounting literature. First, we contribute to the literature on the determinants of tax strategy by finding that legal action by the IRS against one member of a network affects the tax behavior of partner firms. The effective reach of IRS litigation, therefore, is likely to be much greater than commonly believed. Second, we add to the literature on strategic interactions among firms by providing evidence of temporal precedence in the exchange of information regarding tax disputes. Third, we extend the research on real option theory by showing that non-litigating partner firms alter their tax behavior in response to new information gained from networked firms regarding the riskiness of prior strategic tax actions.

Appendix 1

Excerpts from Form 10-K Legal Proceedings of Litigating Firms' Tax Disputes

Year	Firm Name	Legal Proceedings
1998	BRUNSWICK CORP.	In December 1996, the Internal Revenue Service notified the Company that it allocated $190.0 million in short-term capital gains and $18.1 million in ordinary income to the Company and its subsidiaries for 1990 and 1991 in connection with two partnership investments by the Company. The IRS alleges that these investments lacked economic substance, were prearranged and predetermined, and had no legitimate business purpose. The Company strongly disagrees with the IRS position and contested the IRS allocation in a trial in the United States Tax Court in September 1998. A decision has not yet been rendered. If the IRS were to prevail, the Company would owe the IRS approximately $60 million in taxes, plus accrued interest. The Company does not believe that this case will have an unfavorable effect on the Company's results of operations.
1998	AMERICAN ELECTRIC POWER CO.	In 1998 AEP made payments of taxes and interest attributable to COLI interest deductions for taxable years 1991-97 to avoid the potential assessment by the IRS of any additional above- market rate interest on the contested amount. The payments to the IRS are included on the balance sheet in other property and investments pending the resolution of this matter. AEP will seek refund, either administratively or through litigation, of all amounts paid plus interest. In order to resolve this issue without further delay, on March 24, 1998, AEP filed suit against the U.S. in the U.S. District Court for the Southern District of Ohio. Management believes that it has a meritorious position and will vigorously pursue this lawsuit. In the event the resolution of this matter is unfavorable, it will have a material adverse impact on results of operations and cash flows.
2003	XILINX, INC.	We filed a petition with the U.S. Tax Court on March 26, 2001, in response to assertions by the Internal Revenue Service (IRS) that the Company owed additional tax for fiscal years 1996 through 1998. We are in discussions with the Appeals Office of the IRS to resolve and settle the issues. Two issues have been settled with the Appeals Office and we are continuing to explore possibilities for settlement of additional issues. The issue of whether the value of compensatory stock options must be included in the cost sharing agreement with Xilinx Ireland is still unresolved, with the Company filing a motion for summary judgment in February 2002, and the IRS filing a cross motion for summary judgment in March 2002. In June 2002, we filed our Notice of Objection to the IRS cross motion and filed a supplemental motion for summary judgment with respect to the issue. In September and November 2002, the parties filed responses. In March 2003, the IRS changed its position concerning the treatment of stock options in cost sharing agreements. The IRS now excludes stock options granted prior to the beginning of the cost sharing agreement with Xilinx Ireland. The IRS change in position significantly reduces the amount originally at issue on the treatment of stock options in cost sharing agreements, which is the subject of the summary judgment motions. In May 2003, the Court ordered the IRS to respond to the Company's responses. It is premature to comment further on the likely outcome of any issues that have not been settled to date. We believe we have meritorious defenses to the proposed adjustments and sufficient taxes have been provided

(The Appendix is continued on the next page.)

Appendix 1 (continued)

Excerpts from Form 10-K Legal Proceedings of Litigating Firms' Tax Disputes

Year	Firm Name	Legal Proceedings
2003	DUN & BRADSTREET CORP.	The IRS completed its review of the utilization of certain capital losses generated during 1989 and 1990 and, on June 26, 2000, issued a formal notice of adjustment. On May 12, 2000, an amended tax return was filed for the 1989 and 1990 tax periods, which reflected $561.6 million of tax and interest due. Moody's/D&B2 paid the IRS approximately $349.3 million of this amount on May 12, 2000, and IMS paid the IRS approximately $212.3 million on May 17, 2000. The payments were made to the IRS to stop further interest from accruing. We are continuing to contest, on behalf of Donnelley/ D&B1, the IRS's formal assessment and would also contest any assessment of penalties or other amounts, if any, in excess of the amounts paid. Donnelley/ D&B1 filed a complaint for a refund in the U.S. District Court on September 21, 2000. The case is expected to go to trial in 2005, unless otherwise resolved between the parties. D&B would share in the final resolution of this matter with IMS, NMR and Moody's/ D&B2, as disclosed above.
2003	GOODRICH CORP.	In 2000, the IRS issued a statutory notice of deficiency asserting that Rohr, Inc. (Rohr), our subsidiary, was liable for $85.3 million of additional income taxes for the fiscal years ended July 31, 1986 through 1989. In 2003, the IRS issued an additional statutory notice of deficiency asserting that Rohr was liable for $23 million of additional income taxes for the fiscal years ended July 31, 1990 through 1993. The proposed assessments relate primarily to the timing of certain tax deductions and tax credits. Rohr has filed petitions in the U.S. Tax Court opposing the proposed assessments. Rohr expects that these cases will go to trial in late 2004 or in 2005 and that it will ultimately be successful in these cases. However, if Rohr is not successful in these cases, we believe that the net cost to Rohr at the time of the final determination by the court would not exceed $100 million, including interest, as the court will take into account the timing benefit of the disallowed tax deductions at that time. We believe that our best estimate of the liability resulting from these cases has been fully reserved.
2006	ALTRIA GROUP, INC.	The IRS concluded its examination of ALG's consolidated tax returns for the years 1996 through 1999, and issued a final Revenue Agent's Report ("RAR") on March 15, 2006. The RAR disallowed benefits pertaining to certain PMCC leveraged lease transactions for the years 1996 through 1999. Altria Group, Inc. has agreed with all conclusions of the RAR, with the exception of the disallowance of benefits pertaining to several PMCC leveraged lease transactions for the years 1996 through 1999. PMCC will continue to assert its position regarding these leveraged lease transactions and contest approximately $150 million of tax and net interest assessed and paid with regard to them. The IRS may in the future challenge and disallow more of PMCC's leveraged leases based on recent Revenue Rulings, a recent IRS Notice and subsequent case law addressing specific types of leveraged leases (lease-in/lease-out ("LILO") and sale-in/lease-out ("SILO") transactions). PMCC believes that the position and supporting case law described in the RAR, Revenue Rulings and the IRS Notice are incorrectly applied to PMCC's transactions and that it's leveraged leases are factually and legally distinguishable in material respects from the IRS's position. PMCC and ALG intend to vigorously defend against any challenges based on that position through litigation. In this regard, on October 16, 2006, PMCC filed a complaint in the U.S. District Court for the Southern District of New York to claim refunds for a portion of these tax payments and associated interest and intends to file complaints for the remainder. However, should PMCC's position not be upheld, PMCC may have to accelerate the payment of significant amounts of federal income tax and significantly lower its earnings to reflect the recalculation of the income from the affected leveraged leases, which could have a material effect on the earnings and cash flows of Altria Group, Inc. in a particular fiscal quarter or fiscal year. PMCC considered this matter in its adoption of Financial Accounting Standards Board ("FASB") Interpretation No. 48, "Accounting for Uncertainty in Income Taxes – an interpretation of FASB Statement No. 109" ("FIN 48") and FASB Staff Position No. FAS 13-2, "Accounting for a Change or Projected Change in the Timing of Cash Flows Relating to Income Taxes Generated by a Leveraged Lease Transaction."

Appendix 1 (continued)

Excerpts from Form 10-K Legal Proceedings of Litigating Firms' Tax Disputes

Year	Firm Name	Legal Proceedings
2006	TENET HEALTHCARE CORP.	After the settlement, the IRS issued a statutory notice of tax deficiency for $67 million in the fourth quarter of 2005 related to the remaining disputed items for fiscal years May 31, 1995, 1996 and 1997. The principal issues in dispute included the deductibility of a portion of the civil settlement we paid to the federal government in 1994 related to our discontinued psychiatric hospital business and the computation of depreciation expense with respect to certain capital expenditures incurred during the fiscal years at issue. In early 2006, we filed a petition to contest the tax deficiency notice through formal litigation in Tax Court. Subsequently, on November 22, 2006, we announced that we had reached a settlement with the IRS to resolve the principal disputed issues, and, in December 2006, we paid $80 million as an advance payment of taxes and interest owed under the settlement with respect to those matters. One issue, relating to the timing of the deductibility of certain contributions to our health and welfare benefit plans, remains to be resolved with the IRS in connection with the tax examination for fiscal years ended May 31, 1995, 1996 and 1997. We are working with the IRS to resolve this matter without litigation; we anticipate that the ultimate resolution of this remaining issue and final settlement of this case will involve a cash payment to the IRS of no more than $5 million.
2009	REPUBLIC SERVICES, INC.	On January 18, 2001, the IRS designated this type of transaction and other similar transactions as a "potentially abusive tax shelter" under IRS regulations. During 2002, the IRS proposed the disallowance of all of this capital loss. In April 2005, the Appeals Office of the IRS upheld the disallowance of the capital loss deduction with respect to BFI tax years prior to the acquisition. In July 2005, Allied filed a suit for refund in the United States Court of Federal Claims (CFC) relating to the BFI tax years. In January 2009, we paid all tax, interest and penalty asserted by the IRS with respect to the BFI tax years and withdrew our suit for refund in the CFC.

Appendix 2

Variable Definitions

Variable	Definition
CETR	Cash effective tax rate of a non-litigating firm over the three years before (or after) a litigating firm's first disclosure in year *t*, defined per Dyreng et al. (2008) as cash taxes paid scaled by pretax income exclusive of special items, measured as *TXPD/* (*PI –SPI)*. Observations are dropped when *TXPD* is negative, (*PI – SPI*) is negative, or either *PI* or *TXPD* is missing. When *SPI* is not reported, it is treated as zero.
DTAX	Discretionary permanent book-tax differences of a non-litigating firm over the three years before (or after) year *t*, defined per Frank et al. (2009) as the residual from a regression of permanent book-tax differences on goodwill and other intangibles (*INTAN*), equity in earnings (*ESUB*), minority interest in earnings (*MII*), current state tax expense (*TXS*), change in tax loss carryforward (Δ*TLCF*), and prior-period permanent book-tax differences, all scaled by prior-period total assets.
IRS	Indicator variable equal to 1 if a non-litigating firm's MD&A disclosure mentions "internal revenue service" or "IRS" at least once in the three years before (or after) year *t*; 0 otherwise.
Tax Shelter Score	First principal components of the following variables in the pre-disclosure period: *ETR, foreign income, tax haven, equity in earnings, litigation*, and *Big 5 auditor*. These variables are significant in the Table 4 combined model (2) – column 5 – in Lisowsky (2010) and do not duplicate other control variables.
	ETR — Effective tax rate (*TXT/(PI - SPI))*
	Foreign income — Foreign pretax income scaled by lagged total assets (*PIFO/AT)*
	Tax haven — Indicator variable equal to 1 if one or more subsidiaries operate in a tax haven jurisdiction, per Scott Dyreng's dataset at https://sites.google.com/site/scottdyreng/Home/data-and-code/EX21-Dataset; 0 otherwise.
	Equity in earnings — Indicator variable equal to 1 if equity in earnings (*ESUB*) is present and does not equal zero; 0 otherwise.
	Litigation — Indicator variable equal to 1 if pretax (*SETP*) or after-tax litigation/insurance settlement (*SETD*) is negative, indicating a payout; 0 otherwise.
	Big 5 auditor — Indicator variable equal to 1 if external audit firm is Deloitte, PwC, EY, KPMG, or Arthur Anderson; 0 otherwise.

Appendix 2 (continued)

Variable Definitions

Variable	Definition
POST	Indicator variable equal to 1 if the measurement period occurs after a litigating firm's first disclosure in year *t*; 0 otherwise.
ROA	Return on assets, defined as income before extraordinary items scaled by total assets, measured as *IB/AT*.
LEV	Leverage, defined as total liabilities scaled by total assets, measured as *LT/AT*.
PPE	Property, plant and equipment, defined as gross property, plant and equipment scaled by total assets, measured as *PPEGT/AT*.
SIZE	Natural logarithm of total assets, measured as *ln(AT + 1).*
TOBIN	Tobin's q, defined as market value scaled by total assets, measured as *(AT-CEQ + CSHO×PRCC)/AT*.
RD	Research and development expense scaled by lagged total assets, measured as *XRD/AT*. When *XRD* is not reported, it is treated as zero.
NOL	Tax loss carry forward scaled by lagged total assets, measured as *TLCF/AT*. When *TLCF* is not reported, it is treated as zero.
INV	Inventory intensity, defined as inventory scaled by total assets, measured as *INVT/AT*.

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TABLE 1
Sample Selection

Panel A: Sample of litigating firms

	Firms
Firms disclosing pending tax litigation in Form 10-K between 1996 and 2014	103
Firms with identifiable starting date of pending tax litigation	79
Firms with data for at least one board member in ISS (*RiskMetrics*)	29

Panel B: Sample of non-litigating firms

	Firms	*Obs.*
Firms with a common board member as a litigating firm during at least one of the three years before and after the litigating firm's first disclosure of tax litigation	623	
Firms with data available in *Compustat*	536	
Firms without pending tax litigation[a]	514	
Firms/observations with data required to calculate all variables in 3-year regression analyses	267	534

[a] To eliminate the effect of tax litigation reported by both a litigating firm and one or more of its networked partners, litigating partners are removed.

TABLE 2
Key indicators of ISS population and sample

Indicator	*Compustat Observations with ISS Riskmetrics Data (N=6009)*	*Sample of Non-Litigating Partner Firms (N=534)*
Total assets[a]	4615.265	9386.168
Total revenue[a]	4308.825	8153.707
Market value[a]	5988.905	11953.360
Return on assets	0.085	0.079
Leverage	0.164	0.173
Tobin's q	2.137	2.108
CETR	0.410	0.300
DTAX	0.180	0.116

[a] Total assets, total revenue, and market value are presented in $mm.

TABLE 3
Top ten industries of ISS population and sample

2-digit SIC	*Industry*	*Compustat Observations with ISS Riskmetrics Data (N=6009)*		*Sample of Networked Partner Firms (N=534)*	
		Percentage	Cumulative	*Percentage*	Cumulative
73	Business services	10.88	10.88	7.87	7.87
36	Electronic & other electric equipment	8.10	18.99	5.62	13.48
28	Chemical & allied products	7.17	26.16	7.89	21.35
38	Instruments & related products	7.17	33.33	4.49	25.84
35	Industrial machinery & computer equipment	6.17	39.51	4.49	30.34
20	Food & kindred products	3.81	43.32	4.87	35.21
37	Transportation equipment	3.53	46.85	2.37	38.58
50	Wholesale trade	3.43	50.27	2.62	41.20
56	Apparel & Accessory Stores	3.05	53.32	1.87	43.07
58	Eating & Drinking Places	2.91	56.23	1.87	44.94

TABLE 4
Descriptive statistics

Variable[a]	N	Mean	Standard Deviation	Q1	Median	Q3
CETR	534	0.2581	0.1248	0.1776	0.2552	0.3261
DTAX	106	-0.0167	0.5068	-0.0004	0.0003	0.0368
IRS	342	0.3947	0.4895	0.0000	0.0000	1.0000
POST	534	0.5000	0.5005	0.0000	0.5000	1.0000
ROA	534	0.0721	0.0614	0.0340	0.0602	0.1016
LEV	534	0.1807	0.1287	0.0844	0.1797	0.2674
PPE	534	0.3329	0.2483	0.1384	0.2698	0.4860
SIZE	534	8.0167	1.5528	6.8693	7.9209	9.2643
TOBIN	534	1.9961	1.1006	1.3067	1.6560	2.2987
RD	534	0.0225	0.0424	0.0000	0.0000	0.0276
NOL	534	0.0241	0.0608	0.0000	0.0000	0.0169
INV	534	0.1192	0.1283	0.0183	0.0818	0.1744

[a] Variables are defined in Appendix 2.

TABLE 5
Spearman correlation matrix

Variable[a]	*CETR*	*DTAX*	*IRS*	*POST*	*ROA*	*LEV*	*PPE*	*SIZE*	*TOBIN*	*RD*	*NOL*
DTAX	-0.209										
IRS	-0.057	-0.118									
POST	**0.141**	-0.037	0.044								
ROA	0.024	0.125	-0.121	-0.077							
LEV	**-0.214**	-0.042	0.068	-0.040	**-0.343**						
PPE	**-0.208**	0.046	-0.003	-0.034	-0.081	**0.296**					
SIZE	**-0.126**	-0.223	**0.240**	**0.120**	**-0.227**	**0.288**	**0.153**				
TOBIN	0.017	0.147	-0.097	**-0.103**	**0.786**	**-0.293**	**-0.171**	**-0.178**			
RD	-0.037	0.017	0.042	0.011	**0.122**	**-0.258**	**-0.294**	**-0.157**	**0.364**		
NOL	**-0.150**	-0.062	0.047	-0.002	-0.060	0.028	-0.070	**-0.150**	-0.003	**0.196**	
INV	**0.173**	0.033	**-0.152**	-0.020	**0.108**	**-0.182**	**-0.105**	**-0.142**	0.007	**-0.105**	-0.045

Bold face indicates that the correlation is significant at least 5% level.
[a] Variables are defined in Appendix 2.

TABLE 6
Tax behavior of non-litigating partner firms in pre- and post-disclosure periods

$$TB = \beta_0 + \beta_1 POST + \beta_2 ROA + \beta_3 LEV + \beta_4 PPE + \beta_5 SIZE + \beta_6 TOBIN + \beta_7 RD + \beta_8 NOL + \beta_9 INV + \epsilon$$

	Tax Behavior (*TB*)					
	CETR		*DTAX*		*IRS*	
Variable[a]	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Intercept	0.3748**	0.0479	1.3970	0.4123	-2.3364**	0.0446
POST	0.0510***	0.0010	-0.8604**	0.0367	0.5406**	0.0262
ROA	-0.5245***	0.0100	5.4433**	0.0259	3.1455**	0.0133
LEV	-0.0074	0.9143	-1.2290	0.3001	-1.1104*	0.0750
PPE	-0.0906	0.4553	0.2328	0.7994	-1.9770**	0.0213
SIZE	-0.0073	0.7265	-0.0566	0.7598	0.2766***	0.0000
TOBIN	0.0022	0.8313	-0.3793*	0.0666	-0.2569**	0.0432
RD	0.1553	0.7354	14.4082**	0.0360	5.1709***	0.0063
NOL	-0.4791**	0.0193	2.2447*	0.0607	0.2025	0.6830
INV	0.0867	0.6463	-1.0016	0.5173	-3.7379**	0.0142
N	534		106		342	
R-square	0.7422		0.5961			
Pseudo R-square					0.2000	
Year-fixed effects	Yes		Yes		Yes	
Firm-fixed effects	Yes		Yes		No	
Industry-fixed effects	No		No		Yes	

The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.
[a] Variables are defined in Appendix 2.

TABLE 7

Tax behavior of non-litigating partner firms in pre- and post-disclosure periods conditioned on tax shelter scores

$$TB = \beta_0 + \beta_1 POST + \beta_2 ROA + \beta_3 LEV + \beta_4 PPE + \beta_5 SIZE + \beta_6 TOBIN + \beta_7 RD + \beta_8 NOL + \beta_9 INV + \epsilon$$

Panel A: Non-litigating partners with tax shelter scores below the sample median

	Tax Behavior (*TB*)					
	CETR		*DTAX*		*IRS*	
Variable[a]	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Intercept	0.4674*	0.0779	-1.7614	0.7722	1.9336	0.3542
POST	0.0354**	0.0172	1.9156	0.1001	-0.0191	0.5733
ROA	-0.2168	0.3853	3.2950	0.3745	5.9034	0.3621
LEV	-0.2035*	0.0784	1.0619	0.4713	-0.4927	0.7022
PPE	-0.2865***	0.0059	-2.0486*	0.0947	-3.4410	0.1044
SIZE	0.0009	0.9812	0.5925	0.4380	0.1757	0.3082
TOBIN	-0.0031	0.8233	-0.0972	0.6963	-0.6049	0.2010
RD	1.0490	0.1490	-123.3322*	0.0710	1.0292	0.9027
NOL	-1.0604***	0.0000	1.5822	0.2413	9.7063***	0.0097
INV	-0.0257	0.9077	0.5614	0.8614	-4.4176	0.3542
N	256		52		74	
R-square	0.8151		0.5474			
Pseudo R-square					0.2408	
Year-fixed effects	Yes		Yes		Yes	
Firm-fixed effects	Yes		Yes		No	
Industry fixed-effects	No		No		Yes	

The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.
[a] Variables are defined in Appendix 2.

TABLE 7 (continued)
Tax behavior of non-litigating partner firms in pre- and post-disclosure periods conditioned on tax shelter scores

$$TB = \beta_0 + \beta_1 POST + \beta_2 ROA + \beta_3 LEV + \beta_4 PPE + \beta_5 SIZE + \beta_6 TOBIN + \beta_7 RD + \beta_8 NOL + \beta_9 INV + \epsilon$$

Panel B: Non-litigating partners with tax shelter scores above the sample median

	Tax Behavior (*TB*)					
	CETR		*DTAX*		*IRS*	
Variable[a]	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Intercept	0.3664	0.3011	-2.4949	0.5400	-2.0366	0.1705
POST	0.0704***	0.0062	-0.5635***	0.0080	0.6830**	0.0289
ROA	-0.3922	0.1914	6.6859**	0.0367	2.2572	0.2954
LEV	0.0561	0.6101	-3.9138***	0.0093	-1.5425	0.1225
PPE	-0.0874	0.6814	1.8621	0.2304	-0.2115	0.7998
SIZE	-0.0140	0.7344	0.5180	0.1151	0.2308***	0.0103
TOBIN	-0.0129	0.3310	-1.2453**	0.0238	-0.0729	0.6226
RD	0.0411	0.9595	28.4175**	0.0174	4.5264**	0.0446
NOL	-0.5611	0.1293	4.5281**	0.0101	-0.4457	0.6355
INV	0.3739	0.1576	-2.3805	0.2429	-3.2594	0.1615
N	252		42		184	
R-square	0.7553		0.8998			
Pseudo R-square					0.1631	
Year-fixed effects	Yes		Yes		Yes	
Firm-fixed effects	Yes		Yes		No	
Industry fixed-effects	No		No		Yes	

The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.
[a] Variables are defined in Appendix 2.

TABLE 8
Tax behavior of matched firms in pre- and post-disclosure periods

$$TB = \beta_0 + \beta_1 POST + \beta_2 ROA + \beta_3 LEV + \beta_4 PPE + \beta_5 SIZE + \beta_6 TOBIN + \beta_7 RD + \beta_8 NOL + \beta_9 INV + \epsilon$$

	Tax Behavior (*TB*)					
	CETR		*DTAX*		*IRS*	
Variable[a]	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Intercept	0.3643	0.1871	3.4476	0.4324	1.9242	0.1794
POST	0.0075	0.6500	-0.0989	0.5385	0.2641	0.1236
ROA	-0.6077	0.1099	-5.2833	0.1080	1.4949	0.2826
LEV	0.2318*	0.0995	-1.4741	0.5062	-0.1480	0.7944
PPE	-0.2666*	0.0862	0.5788	0.6404	-1.8148***	0.0032
SIZE	0.0069	0.8299	-0.4996	0.1495	0.1799***	0.0065
TOBIN	-0.0520*	0.0751	-0.2557	0.4418	-0.1983*	0.0832
RD	0.0602	0.9666	-6.9777	0.3794	-1.5205	0.3909
NOL	-0.7145***	0.0039	0.3630	0.7341	-0.3820	0.4793
INV	0.1465	0.5580	8.4685	0.1707	-4.5086***	0.0004
N	534		84		292	
R-square	0.7406		0.8121			
Pseudo R-square					0.2408	
Year-fixed effects	Yes		Yes		Yes	
Firm-fixed effects	Yes		Yes		No	
Industry-fixed effects	No		No		Yes	

The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.
[a] Variables are defined in Appendix 2.

TABLE 9
Tax behavior of firms networked by industry and MSA in pre- and post-disclosure periods

$$TB = \beta_0 + \beta_1 POST + \beta_2 ROA + \beta_3 LEV + \beta_4 PPE + \beta_5 SIZE + \beta_6 TOBIN + \beta_7 RD + \beta_8 NOL + \beta_9 INV + \epsilon$$

	Tax Behavior (*TB*)					
	CETR		*DTAX*		*IRS*	
Variable[a]	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Intercept	0.0156	0.9740	-165.3499	0.2968	-1.1152	0.3552
POST	-0.0647	0.1235	9.0963	0.1654	-0.2187	0.5789
ROA	-1.3150**	0.0155	-117.7069***	0.0006	0.6387	0.2014
LEV	-0.1243	0.7302	-25.8301	0.6759	-2.2919**	0.0471
PPE	0.8844	0.1702	-103.1018	0.3875	0.5162	0.5041
SIZE	0.0738	0.3393	11.8918	0.4391	0.3459***	0.0000
TOBIN	0.0046	0.8624	18.2880	0.1691	-0.1550*	0.0772
RD	2.0706	0.1279	-19.4835	0.9189	-1.0755	0.4014
NOL	0.3981*	0.0747	46.9973***	0.0000	0.2016**	0.0137
INV	-0.6227	0.1691	33.1892	0.8305	1.1779	0.3393
N	194		86		237	
R-square	0.6922		0.8666			
Pseudo R-square					0.3364	
Year-fixed effects	Yes		Yes		Yes	
Firm-fixed effects	Yes		Yes		No	
Industry-fixed effects	No		No		Yes	

The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.
[a] Variables are defined in Appendix 2.

TABLE 10
Tax behavior of firms networked by local auditor in pre- and post-disclosure periods

$$TB = \beta_0 + \beta_1 POST + \beta_2 ROA + \beta_3 LEV + \beta_4 PPE + \beta_5 SIZE + \beta_6 TOBIN + \beta_7 RD + \beta_8 NOL + \beta_9 INV + \epsilon$$

	Tax Behavior (*TB*)					
	CETR		*DTAX*		*IRS*	
Variable[a]	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Intercept	0.5406	0.2131	7.9657	0.9780	-0.9363	0.6616
POST	0.0203	0.4895	-0.4146	0.9090	-0.6750	0.4512
ROA	-1.2985***	0.0002	7.8734	0.2853	1.4484	0.4470
LEV	0.3298	0.1502	-27.8264	0.3485	-1.9678	0.2260
PPE	-0.2225	0.2991	-47.9451	0.3604	-1.3932	0.4428
SIZE	-0.0225	0.7525	1.0514	0.9116	0.6096***	0.0015
TOBIN	-0.0115	0.4395	-0.6872	0.8168	0.0098	0.9416
RD	-2.9511**	0.0420	213.6152**	0.0488	5.2041	0.1144
NOL	-0.6987	0.1288	-3.9226	0.4925	-0.3377	0.6766
INV	0.8010**	0.0222	25.5921	0.2559	2.4378	0.1643
N	140		52		86	
R-square	0.8729		0.9286			
Pseudo R-square					0.4014	
Year-fixed effects	Yes		Yes		Yes	
Firm-fixed effects	Yes		Yes		No	
Industry-fixed effects	No		No		Yes	

The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.
[a] Variables are defined in Appendix 2.