When Does Tax Avoidance Result in Tax Uncertainty?

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Abstract: We investigate the relation between tax avoidance and tax uncertainty, where tax uncertainty is the amount of unrecognized tax benefits recorded over the same time period as the tax avoidance. On average, we find that tax avoiders, i.e., firms with relatively low cash effective tax rates, bear significantly greater tax uncertainty than firms that have higher cash effective tax rates. We find that the relation between tax avoidance and tax uncertainty is stronger for firms with frequent patent filings and tax haven subsidiaries, proxies for intangible-related transfer pricing strategies. The findings have implications for several puzzling results in the literature.

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Abstract: We investigate the relation between tax avoidance and tax uncertainty, where tax uncertainty is the amount of unrecognized tax benefits recorded over the same time period as the tax avoidance. On average, we find that tax avoiders, i.e., firms with relatively low cash effective tax rates, bear significantly greater tax uncertainty than firms that have higher cash effective tax rates. We find that the relation between tax avoidance and tax uncertainty is stronger for firms with frequent patent filings and tax haven subsidiaries, proxies for intangible-related transfer pricing strategies. The findings have implications for several puzzling results in the literature.

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I. INTRODUCTION

Accounting researchers have been studying tax avoidance for decades, dating back to at least the 1980s.[1] Tax avoidance is typically defined in the literature to include a broad range of tax reduction activities, ranging from benign tax-advantaged investments (e.g., tax-exempt municipal bonds) to aggressive strategies that might not be upheld if challenged. Tax authorities may challenge tax avoidance and ultimately prevail, resulting in the loss of the tax savings that initially came with the tax avoidance. We refer to the potential loss of tax savings upon challenge as tax uncertainty. In this study, our objective is to provide evidence on the relation between tax avoidance and tax uncertainty.

The measurement of these constructs is important. There are several measures in the literature for tax avoidance. A common measure, and the one that we employ, is the long-run cash effective tax rate (Cash ETR), computed as the ratio of cash taxes paid to pre-tax accounting earnings measured over a long-run period (e.g., five years) (Dyreng, Hanlon, and Maydew 2008). To measure tax uncertainty, we use additions to the unrecognized tax benefit (UTB) account from firms' financial statements.

We first investigate the extent to which tax avoidance leads to tax uncertainty by examining the overall relation between the two. Our expectation is that, on average, as firms engage in greater levels of tax avoidance they will use strategies that involve increasing levels of tax uncertainty.[2] We then examine how the relation between tax avoidance and tax uncertainty varies across types of tax avoidance. We first test whether firms with frequent patent filings, our proxy for intangible intensity, have a stronger relation between tax avoidance and tax uncertainty. Prior research suggests that the more intangibles-based the firm, the easier it is to shift income across jurisdictions

[1] For reviews, see Shackelford and Shevlin (2001) and Hanlon and Heitzman (2010).
[2] We explain this in more detail in our hypotheses development section below.

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to save taxes (Grubert and Slemrod 1998; De Simone, Mills, Stomberg 2016). We predict that income-shifting tax avoidance is relatively uncertain, and thus, that intangibles-based firms will exhibit a stronger relation between tax avoidance and tax uncertainty.

We next examine tax avoidance that takes place through tax havens. The use of tax havens enables transfer pricing strategies to lower overall tax burdens for multinational corporations. Indeed, Dyreng and Lindsey (2009) and Markle and Shackelford (2012) both report that U.S. multinational firms with subsidiaries located in tax havens report effective tax rates that are between 1.5 and 2.2 percentage points lower than effective tax rates of U.S. multinational firms without subsidiaries in haven locations. What is unknown in the literature, however, is whether firms bear tax uncertainty as a result of their haven-related tax avoidance.

Finally, we examine whether firms engaging in aggressive "tax shelters" have a stronger relation between tax avoidance and tax uncertainty. We estimate the likelihood that a firm uses tax shelters using the shelter score from Lisowsky (2010).[3] There is prior evidence that firms engaged in tax shelters have more overall tax uncertainty than firms not engaged in tax shelters (Lisowsky, Robinson, and Schmidt 2013). Our question is different in that we are interested in whether tax shelter usage affects the relation between tax avoidance and tax uncertainty.

Our sample consists of 1,896 firm-year observations for which we have the required tax uncertainty data during the years 2008-2014. We classify firms as "tax avoiders" if they are in the bottom tercile of the distribution of five-year cash effective tax rates in our sample. To construct an analogous five-year income-statement-based measure for tax uncertainty, we use annual additions to the UTB account from current tax positions summed over the same five-year period as the tax avoidance measure (we discuss the measures in more detail below).

[3] The shelter score from Lisowsky is based on a model predicting when a firm has what is known as a listed transaction per IRS requirements. See Lisowsky (2010) for details.

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Our main findings are as follows. First, tax avoiders appear to bear significantly more tax uncertainty, on average, than non-avoiders. For example, univariate comparisons show that the mean addition to the UTB for a tax avoider over a typical five-year period is over fifty percent larger than the mean addition to the UTB for a tax non-avoider. The difference between the groups is statistically and economically significant. To put these differences into perspective, the mean tax avoider paid about $650 million of cash taxes while the mean tax non-avoider paid $1,261 million of cash taxes over a typical five-year period. However, the mean tax avoider also faced more tax uncertainty, increasing its UTB account by $139 million, compared to an increase of only $68 million for the mean non-avoider over the five-year periods. Multivariate tests show that after controlling for basic firm characteristics (size, leverage, net operating loss (NOL) status, and change in NOL level) tax avoiders continue to have larger UTB additions than non-avoiders.

Second, firms with frequent patent filings face significantly higher tax uncertainty than do other firms, and the relation between tax avoidance and tax uncertainty is stronger among firms with frequent patent filings. These results are consistent with intangibles exposing firms to increased tax uncertainty, particularly among firms we classify as tax avoiders. Third, we find that tax haven usage and intangible intensity appear to have a joint effect on the relation between tax avoidance and tax uncertainty. This suggests that while intangible-related tax avoidance involving transfer pricing provides tax savings, it also forces firms to bear tax uncertainty. Fourth, we find limited evidence that tax avoidance using tax shelters leads to more tax uncertainty than does tax avoidance outside of tax shelters. The tax shelter results should be interpreted cautiously, however, because of the difficulty of distinguishing between likely tax shelter users and likely non-users in samples of large firms. Finally, we conduct a path analysis, which confirms the presence of both direct and indirect effects of tax avoidance, patents, and havens on tax uncertainty.

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The results of this study also have implications for two puzzling empirical regularities. First, there is mounting evidence that multinational firms incur effective tax rates at least as large as domestic firms (Dyreng, Hanlon, Maydew, and Thornock 2017). This is a somewhat puzzling empirical regularity given that multinational firms have access to (arguably vast) opportunities for tax avoidance (i.e., shifting income to low-tax countries) that are simply not available to purely domestic firms. Our findings, however, show that income-shifting involving tax havens and intangibles comes at a price, in the form of increased tax uncertainty. Second, and relatedly, the results have implications for what the literature calls the "undersheltering puzzle." The undersheltering puzzle is why tax avoidance is not more pervasive given the large benefits that many firms appear to realize from it (Weisbach 2002; Dyreng et al. 2008). Our results show that certain forms of tax avoidance that can lead to dramatic reductions in cash taxes (e.g., income shifting to tax havens using intangible assets) also come with significant tax uncertainty. In other words, for certain tax avoidance strategies, obtaining a low cash effective tax rate is only possible if the firms are willing to bear tax uncertainty. Tax uncertainty is costly because it prevents the tax savings from being recognized for financial accounting purposes and leads firms to increase their precautionary cash holdings beyond what they otherwise would (Hanlon, Maydew, Saavedra 2017).

In the next section, we review the prior literature on tax avoidance and tax uncertainty. In section III, we develop our hypotheses. In section IV, we discuss our sample, variable measurement, and descriptive statistics. In section V we describe our empirical tests and present our results. Section VI concludes.

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II. PRIOR LITERATURE

Prior Research on Tax Avoidance

Pioneering work on tax avoidance, such as Scholes, Wilson, and Wolfson (1990) and Scholes and Wolfson (1992), brought to bear theory and empirical techniques from economics, finance, and accounting to better understand corporate tax avoidance. In the decades since then, researchers have made great strides in understanding methods and determinants of tax avoidance. For example, researchers have examined methods of tax avoidance such as shifting income across countries and states (Gupta and Mills 2002; Dyreng and Lindsey 2009; Dyreng, Lindsey, and Thornock 2013), holding municipal bonds (Erickson, Goolsbee, and Maydew 2003), engaging in tax shelters (Graham and Tucker 2006; Wilson 2009; Lisowsky 2010), increasing net operating losses (Erickson, Heitzman, and Zhang 2013), and engaging in complex financial arrangements (Engel, Erickson, and Maydew 1999).

Studies have also identified significant determinants of tax avoidance such as firm size (Rego 2003), political sensitivity (Mills, Nutter, and Schwab 2013), unionization (Chyz, Leung, Li, and Rui 2013), ownership structure (Chen, Chen, Cheng, and Shevlin 2010; Badertscher, Katz, and Rego 2013), institutional holdings (Khan, Srinivasan, and Tan 2017; Bird and Karolyi 2017; and Chen, Huang, Li, and Shevlin 2018), and managerial effects and incentives (Desai and Dharmapala 2006; Dyreng, Hanlon, and Maydew 2010; Robinson, Sikes, and Weaver 2010; Armstrong, Blouin, and Larker 2012; Rego and Wilson 2012). Other studies examine consequences of tax avoidance, such as loss of reputation (Hanlon and Slemrod 2009; Gallemore, Maydew, and Thornock 2014, Graham, Hanlon, Shevlin, and Shroff 2014), increased borrowing costs (Kim, Li, and Li 2010; Hasan, Hoi, Wu, and Zhang 2014; Shevlin, Urcan, and Vasvari 2013), and its association with aggressive financial accounting and fraud (Frank, Lynch, and Rego 2009;

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Lennox, Lisowsky, and Pittman 2013). We direct readers to Shackelford and Shevlin (2001) and Hanlon and Heitzman (2010) for comprehensive reviews of the tax literature in accounting and Scholes et al. (2015) for examples of tax avoidance strategies. In part answering a call for research in Hanlon and Heitzman (2010), researchers have begun to examine tax uncertainty in earnest. We turn to this research next.

Research on Tax Uncertainty, FIN 48, and Uncertain Tax Benefits

FIN 48 requires disclosure of firms' uncertain tax benefits in the financial statements.[4] Prior research has investigated several aspects of UTBs and FIN 48. An early study is Gleason and Mills (2002), which uses tax return data to show that prior to FIN 48 most firms did not voluntarily disclose UTBs (then called contingent tax reserves) even when they existed. Other studies have examined whether firms altered the UTB prior to the effective date of FIN 48 (Blouin, Gleason, Mills, and Sikes 2010), whether firms managed earnings using the tax reserve before or after FIN 48 (De Simone, Robinson, and Stomberg 2014; Cazier, Rego, Tian, and Wilson 2015), whether FIN 48 affected the relevance of the tax reserve (Robinson, Stomberg, and Towery 2016), whether firms change their financial reporting for UTBs to avoid having to report them to the IRS (Towery 2017), determinants of the UTB (Cazier, Rego, Tian, and Wilson 2009), whether UTB is influenced by the firm's business strategy (Higgins, Omer, and Phillips 2015), and the market reaction to legislation surrounding the enactment of FIN 48 (Frischmann, Shevlin, and Wilson 2008).

Ciconte, Donohoe, Lisowsky and Mayberry (2016) show that UTBs are predictive of future tax cash outflows and find neither systematic over or under reserving on average. Guenther, Matsunaga, and Williams (2017) find that UTBs are not related to future tax rate volatility,

[4] FIN 48 has been incorporated into ASC 740 in the codified U.S. GAAP.

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although predicted UTBs are related. Saavedra (2018) examines firms that attempt to avoid taxes but are unsuccessful and finds that lenders penalize those firms with higher borrowing costs.

Law and Mills (2015) find that financially constrained firms undertake more aggressive tax strategies, record higher UTBs, and face larger IRS audit adjustments. Hanlon et al. (2017) find that firms increase their cash holdings in response to tax uncertainty. Two recent papers report results consistent with ours. De Simone et al. (2016) study income-mobile firms (e.g., firms able to shift income to low tax jurisdictions) and find such firms report lower effective tax rates and higher UTBs than other firms.[5] A recent paper by Guenther, Wilson, and Wu (2018) examines the relation between tax avoidance and tax uncertainty for financially constrained firms and for financially unconstrained firms. The idea in their paper builds on our current paper as well as papers that study tax avoidance and financial constraints. They predict that financially constrained firms engage in more tax avoidance and that such additional (marginal) tax avoidance is more uncertain (i.e., a joint test). The authors find that most tax avoidance strategies are not uncertain, suggesting that about 6 percent of avoided tax is uncertain.[6]

Some concurrent research uses UTB as a measure of tax risk or tax aggressiveness (Guenther, Matsunaga, and Williams 2017; Hutchens and Rego 2015; Higgins et al. (2015), and Neuman, Omer, and Schmidt 2014). While precise definitions of these constructs are not yet agreed upon in the literature, it is clear that risk, uncertainty, and aggressiveness are related, at least in the tax realm (Blouin 2014). Guenther et al. (2017) examine tax risk, as proxied by tax rate volatility, and overall firm risk (e.g., stock return volatility). Hutchins and Rego (2015) proxy for

[5] They also find that income mobile firms are more likely to be subjected to audit and challenged by the IRS, but conditional upon being challenged are better able to defend their tax positions.

[6] Because our methodology is substantially different from the methodology used by Guenther et al. (2018), it is not possible to directly compare economic magnitudes across studies. As we discuss below, our findings suggest that unrecognized tax benefits are a small percentage of sales, about 0.24 percent at the mean. Our findings also suggest that firms with low effective tax rates record, on average, about 16 percent -25percent more unrecognized tax benefits than other firms, controlling for other factors.

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tax risk using four measures, stating that there is no accepted definition. They use 1) total UTB, 2) current UTB, 3) discretionary permanent book-tax differences, and 4) volatility in effective tax rates. Thus, they employ a broad set of proxies to capture various aspects as they associate tax risk with overall firm risk. Neuman et al. (2014) similarly incorporate six aspects into their overall measure of tax risk: transactional, operational, compliance, financial accounting, management, and reputational risk. Our focus on tax uncertainty is narrower, and we employ the proxy we think best aligns with the construct for our particular research question.

Because there is such a growing literature in the area, we want to be clear about explaining how our paper, our goals, and our empirical tests, are consistent with and at times different from the prior literature. For example, a recent study by Hanlon et al. (2017) examines whether a larger UTB (higher uncertainty about future tax payments and amounts related to positions already taken) is associated with cash holdings. The authors regress cash holdings on UTB balances. Cash holdings is a balance sheet amount (not a flow). As a result, Hanlon et al. (2017) use the analogous balance sheet amount for UTB to appropriately line up the test variables for their research question. In contrast, in the current study we are testing the relation with an income statement (a flow) measure. Thus, we use UTB additions to appropriately line up the test variables for our research question. Note that the research questions are quite different as well, Hanlon et al (2017) has cash holdings as the dependent variable whereas our dependent variable is UTB additions.

Another example is found in Higgins et al. (2015). The authors of that study test the relation between business strategies (Prospectors and Defenders) with tax avoidance (book ETR, cash ETR, and permanent book-tax differences) and tax aggressiveness (UTB additions and tax haven locations). The authors describe using UTBs as a measure of tax aggressiveness by stating they

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are a measure of firms' "…risk and uncertainty associated with firms' uncertain tax positions..." and that firms with one type of strategy are more likely to take "…tax positions with greater uncertainty and thus engage in more aggressive tax avoidance." This is consistent with our hypothesis. Higgins et al. (2015) assume a relation between UTBs and avoidance/aggressiveness when testing the effect of firm strategy on the tax outcomes; we are testing this assumption. Both the studies have UTB ADDs as a dependent variable (in a subset of tests in Higgins et al. (2015)).[7]

Finally, there are studies that examine whether the UTB is a 'good accrual', in other words do firms ultimately pay the amount out in cash. This too is distinct from our study. We are interested in understanding the relation between tax avoidance and an ex-ante assessment of tax uncertainty, which is captured by additions to UTB. We are not trying to understand whether the additions to UTB were unbiased representations of the ex-post realizations of cash outflows for taxes.[8] Our study contributes to the literature by examining the relation between avoidance and

[7] The regression models in the two studies largely overlap in terms of control variables. For example, both models include size and leverage. In our study we include the presence of a tax haven subsidiary and Higgins et al. (2015) include the proportion of foreign subsidiaries. We recognize we cannot directly compare R-squareds but note that our adjusted R-squareds range from 0.191 to 0.383, while the Higgins et al. (2015) adjusted R-squareds in Table 4, where UTB ADDS is the dependent variable, range from 0.05 - 0.15. The two variables from their paper that we do not include – discretionary accruals and market-to-book – are not significant in their tests.

[8] In terms of the recent research, it is still ongoing and producing a wide range of estimates depending on the methodology (e.g., Robinson et al. 2016; Ciconte et al. 2016). Estimating how much of the accrual is paid in cash is a difficult task. Robinson et al. 2016 state that 24 percent of the accrual is paid out in cash within three years of the accrual. We note that the 24 percent statistic cited from Robinson et al. (2016) is from examining a three-year period to estimate what percentage of the tax reserve is paid out as settlements. Robinson et al. (2016) do not estimate a regression of settlements on UTB. Rather, that estimate comes from dividing the sum of the settlement amounts in years t+1 to t+3 by the UTB balance in year t. However, many tax controversy cases go far beyond three years, thus it is not surprising that they do not find a high payout rate for the three-year period. As they show in Table 3 Panel B, extending the period to a five- year period results in 48 percent being paid out in cash settlements. The authors caveat the estimates, stating that they cannot conduct the ideal tests of their questions due to data limitations (page 1200). They also note that their method yields ratios over 100 percent for many components of the UTB rate reconciliation if they extend the time period beyond five-years, indicating some challenges with respect to their estimation method. Specifically, the issue is that new uncertainties arise and are settled over long time periods, increasing the mismatch of their settlement numerator to their UTB denominator. Ciconte et al. (2016) estimate a regression of cash taxes paid on UTBs and conclude that, under some conditions, 100 percent of the UTB is paid out in cash. They provide a discussion of the conditions under which the rate is less than 100 percent. Thus, the estimates are wide-ranging on how well the recorded UTB lines up with ex post realized tax payments to tax

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uncertainty and by investigating the factors that determine whether tax avoiders bear greater ex ante tax uncertainty than non-avoiders. We are cognizant that not all tax uncertainty is from tax avoidance, some is due to factual ambiguity or legal complexity/ambiguity such that there is genuine uncertainty with how a transaction will be treated in the absence of any intent of tax avoidance. Our primary focus is on the relation between tax avoidance and tax uncertainty, and we hypothesize that this relation varies with the complexity/ambiguity of the tax avoidance. In addition, we recognize, and our tests confirm, that some tax uncertainty is not related to avoidance. Our interest lies in the degree to which tax avoidance is related to tax uncertainty and what firm characteristics strengthen that relation. We turn to our hypotheses next.

III. HYPOTHESIS DEVELOPMENT

We test four hypotheses about the relation between tax avoidance and tax uncertainty. Our first hypothesis is that tax avoidance is positively related to tax uncertainty. While we predict a positive relation, tax avoidance does not necessarily lead to tax uncertainty. Attaining a low, long-run cash effective tax rate can be achieved via strategies that result in little or no tax uncertainty (e.g., investments in municipal bonds) and by tax-advantaged laws (e.g., bonus depreciation rules). In addition, tax uncertainty can result from ambiguity in the law or with respect to the facts (e.g., does the firm have a nexus requirement to file a particular state tax return). On the other hand, we know that some firms do engage in uncertain tax avoidance strategies. All else equal, we expect that firms first choose safe tax avoidance strategies and once those are exhausted they turn to uncertain strategies.

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authorities upon challenge. Our research question is different - we are interested in whether tax avoidance results in tax uncertainty when the tax avoidance is initiated, in other words, an ex-ante view.

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To support this conjecture, we consider the following. Slemrod and Yitzhaki (2002) summarize both the underlying theory and empirical work about (individual-level) tax avoidance and evasion, with a heavy emphasis on the Allingham and Sandmo (1972) model of income tax evasion.[9] Slemrod and Yitzhaki (2002) state that "The intriguing question becomes why people pay taxes rather than why people evade.…" In the A-S [Allingham and Sandmo (1972)] model what limits the amount of evasion attempted is the taxpayer's risk aversion. "At some point, further evasion becomes just too big a gamble, so that at the chosen amount of evasion the marginal gain in expected tax savings is exactly offset by the marginal disutility of the extra risk taken on." (p. 1431). The authors go on to then discuss the case of even a risk-neutral taxpayer who would also have a constraint on tax evasion if the probability of detection is endogenous, meaning that probability of detection is an increasing function of the amount of evasion, which they state is likely to characterize most tax systems (p. 1432).

In empirical tests, Hoopes, Mescall, and Pittman (2012) use data on the enforcement efforts of the IRS and show a negative association between enforcement and corporate tax avoidance. They also conduct a small survey of Tax Executives Institute (TEI), receiving 50 responses. Participants were asked… "From your experience, does a company's assessment of a higher probability of tax authority audit lead the company to…" and 59.1 percent of the respondents answered "take a less aggressive tax position due to the risk of being challenged" (p. 1609). Further evidence is found in Graham et al. (2014) who also survey Tax Executives Institute members. They ask about companies having tax planning strategies marketed to them by law and accounting

[9] We note that Slemrod (2004) points out that one difference when thinking about widely held corporations is the separation of ownership and control and the resulting potential for agency problems. Slemrod (2004), Chen and Chu (2005) and Crocker and Slemrod (2005) lay the foundation for understanding corporate tax avoidance in an agency framework. Slemrod and Yitzhaki (2002) is useful for our purposes on this point about the amount of tax avoidance, however.

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firms and ask the respondents…"What factors were important in your company's decision not to implement the tax planning strategy that was proposed?" The data show that 62.1 percent of their sample responded that "Risk of detection and challenge by the IRS" was important in their decision (pp. 1000-1002). These authors had roughly 500 respondents answer the question.[10]

Thus, the theory and empirical evidence are consistent with there being diminishing returns to tax avoidance and that one of the costs is the probability of detection. Our hypothesis is consistent with the studies above; companies will pursue avoidance strategies that are more likely to be sustained first and less likely to be sustained last, and if there is no chance it will be sustained only very rarely or never – "it becomes just too big a gamble" in the words of Slemrod and Yitzhaki (2002). Therefore, we predict that tax uncertainty is increasing in tax avoidance.

H1: Tax uncertainty is increasing in tax avoidance.

Our next three hypotheses involve factors that influence how tax avoidance results in tax uncertainty. Hypothesis 2 predicts that tax avoidance involving intangible asset-based strategies is more uncertain than other forms of tax avoidance. Intangibles-based firms are thought to have many opportunities to avoid tax, especially by shifting income from high tax jurisdictions to low tax jurisdictions (Grubert and Slemrod 1998; Hanlon, Mills, and Slemrod 2007). For example, intangible-intensive firms use strategies in which they locate intangible assets (e.g., patents) in low tax jurisdictions and charge royalties to their affiliates in high tax jurisdictions (Kleinbard 2011; De Simone et al. 2016). Often, such strategies depend on developing a transfer price; in this case often two prices, a (low) price paid to the entity in the high-tax jurisdiction (e.g., the U.S. parent) to "sell" the intangible to the offshore affiliate in a low-tax country and then a (high) royalty

[10] Nessa, Schwab, Stomberg, and Towery (2016) find that a decline in IRS resources leads to a reduced number of audits and a focus on audits with weaker taxpayer facts. The study provides evidence consistent with lower IRS resources leading to more efficient audits. Nessa et al. (2016) does not examine corporate responses to lower tax authority budgets. This study is quite interesting but has a very different research question from ours.

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payment from the entity in the high-tax jurisdiction (e.g., U.S. parent) to the offshore affiliate. This effectively shifts income out of the high tax country and into a low tax country, with greater royalty rates resulting in more income shifting.

Disputes between tax authorities and firms over transfer pricing are not uncommon, and some of the disputes are in the billions of dollars. For example, in 2006 GlaxoSmithKline plc entered into a $3.4 billion settlement with the IRS that was reportedly largely about transfer pricing of intangibles (Hilzenrath 2006). While $3.4 billion is large in itself, the company estimated that the dispute could have cost $15 billion. In 2007, Merck & Co. and the IRS entered into a $2.3 billion settlement centered around transfer pricing issues. The company disclosed that it still had a $1.7 billion ongoing dispute with the Canadian Revenue Agency (Johnson 2007). In a more recent example, Amazon.com, in June of 2017, won a transfer pricing case in Tax Court regarding the value of a cost-sharing arrangement (CSA) buy-in payment for Amazon's transfer to its Luxembourg subsidiary of the right to use certain preexisting intangible assets in Europe (Beaver 2017). In addition to these cases, income shifting using intangibles has attracted the concern of policymakers as well, with the Organization for Economic Cooperation and Development (OECD) proposing a broad set of reforms to address perceived abuses (OECD 2013). Thus, while intangible assets may increase the ability of firms to engage in tax avoidance, we predict that such tax avoidance comes at the cost of increased tax uncertainty.

Intangible-intensive firms can also avoid taxes by qualifying for tax credits designed to encourage R&D expenditures. In particular, in the U.S. there is a credit of up to twenty percent for domestic research expenditures that exceed a base amount from prior years. However, there is considerable complexity in the application of these rules (e.g., which types of expenditures qualify, when expenditures are domestic versus foreign, and special rules for qualified energy research)

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which leads to uncertainty. Indeed, the research credit is a Tier 1 audit issue in the U.S. (meaning it is a high priority in audits by the IRS).[11] We measure intangible intensity using the frequency of patent filings.[12] Stated in the alternative, our second hypothesis is:

H2: The positive relation between tax avoidance and tax uncertainty is greater for firms with frequent patent filings.

Hypothesis 3 focuses on the tax haven intensity of U.S. multinational firms. Subsidiaries located in tax haven countries are often used by multinationals to avoid taxes by shifting income from high tax countries to low tax countries (Klassen and Laplante 2012; Dyreng and Markle 2016). In other strategies, firms use tax havens to reduce withholding taxes on dividends and other payments among its subsidiaries. Firms also use tax havens in strategies that involve inter-company debt and/or leasing arrangements to shift income across jurisdictions; such strategies are sometimes challenged by the tax authorities. For these reasons, we predict that the greater the intensity of haven subsidiaries, the greater tax uncertainty a tax avoiding firm likely bears.

The astute reader may object that, in a worldwide tax system with deferral, tax avoidance in foreign operations results in only a temporary tax savings for the firm. Once the foreign earnings are repatriated back to the U.S., the firm pays the incremental U.S. tax. The eventual U.S. tax upon repatriation may seem to render income shifting ineffective at reducing the firm's tax in the long-run, and sometimes that is the case.[13] However, expected repatriation may be years or even decades in the future and may coincide with a tax holiday or some other favorable condition (such as the

[11] Towery (2017) reports that the Research and Experimentation credit is the most frequent item reported to the IRS as an uncertain tax position (UTP, the term the IRS uses in its reporting for uncertain positions). Note that the credit is termed the research and experimentation credit and we use patent filings as a proxy to identify the set of firms that would most likely have high intangibles and high research credits.

[12] Intangible assets on the balance sheet are problematic as a measure of intangible-intensity because self-generated intangible assets are usually not reflected on firm's balance sheets. In accounting terms, most spending on self-generated intangible assets is expensed rather than capitalized. Thus, we use patent filings as a measure of intangible-intensity.

[13] We are simplifying greatly here for the sake of exposition. Interested readers can consult Scholes et al. (2015) or any number of international tax papers or textbooks for details.

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tax reform enacted in 2017, generally known as the Tax Cuts and Jobs Act), resulting in relatively low levels of incremental U.S. tax.[14,15]

In sum, tax strategies involving tax havens are thought to be common and subject to challenge. Accordingly, we predict that tax avoidance involving tax havens will be particularly uncertain.

H3: The positive relation between tax avoidance and tax uncertainty is greater for firms with high tax haven intensity.

Hypothesis 4 focuses on tax shelter usage. The term tax shelter does not have a precise definition, but usually refers to tax strategies that are complex and, in some cases, involve little economic substance (Bankman 1999; Weisbach 2002; Bankman 2004). Prior studies have examined small samples of tax shelters (Graham and Tucker 2006; Hanlon and Slemrod 2009; Brown 2011) and the press has discussed so-called tax shelter activity extensively.[16] In larger sample studies, prior research has developed tax shelter "scores" such that higher scores indicate a greater likelihood of aggressive tax planning on the part of the firm (Wilson 2009; Lisowsky 2010). In addition, Lisowsky et al. (2013) provide evidence that firms that are likely to have engaged in tax shelters have higher UTBs than firms not likely to have engaged in tax shelters. This suggests a direct effect of tax sheltering on tax uncertainty. We examine the extent to which avoidance is uncertain as a result of tax shelter involvement and predict that the tax avoidance of

[14] Another incentive U.S. multinationals have to retain operating earnings offshore is the financial accounting effect. U.S. GAAP allows firms, under certain conditions, to avoid recording the deferred tax effects of having foreign tax rates below U.S. rates. This rule, which applies to so-called "permanently reinvested earnings" has the attractive result of decreasing the firm's tax expense in the current year (the future U.S. taxes do not need to be accrued) and therefore increasing the firm's after-tax earnings. Indeed, Graham et al. (2011) provide evidence using survey data that firms value the accounting expense deferral as much as the cash tax deferral. Blouin, Krull, and Robinson (2017) provide empirical data consistent with the importance of accounting expense deferral affecting repatriation decisions.

[15] There is some anecdotal evidence that firms can effectively repatriate earnings without incurring domestic taxes (e.g., Linebaugh 2013), but it unknown how sustainable or widespread those practices might be. Moreover, some researchers even put forth the idea that tax haven strategies such a Google Inc.'s "Double Irish Dutch Sandwich" can result in so-called "stateless income" (Kleinbard 2011).

[16] For example, see Sheppard (1995) and Drucker (2007).

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firms with high shelter scores is more uncertain than tax avoidance of firms with low shelter scores. Our hypothesis in the alternative is as follows:

H4: The positive relation between tax avoidance and tax uncertainty is greater for firms with a high tax shelter score.

IV. SAMPLE, VARIABLE DEFINITIONS, AND DESCRIPTIVE STATISTICS

Sample Selection

Table 1 describes our sample selection criteria. We begin by gathering all observations on Compustat with non-missing values of the amount of the increase to UTB from current year positions (TXTUBPOSINC) aggregated over the years *t*-4 to *t*, and average total assets (AT) over the years *t*-4 to *t* greater than $10 million, with *t* ranging from 2012 to 2014. We exclude observations that have negative pretax earnings aggregated over the period *t*-4 to *t*, and observations with missing values of cash tax paid (TXPD). These screens are necessary to have interpretable cash effective tax rates. In addition, we remove firms that are incorporated outside of the U.S., firms that do not have sufficient data to compute the tax shelter score variable (computed per Lisowsky (2010)), and firms that are missing any of the other variables used in the regressions. Finally, we exclude firms that had no additions to their UTB from current year positions (TXTUBPOSINC) over the period *t*-4 to *t*. After applying these screens, the main sample used in our tests has 1,896 observations corresponding to 861 firms.

Definition of Main Test Variables

Our fundamental research question is how tax avoidance affects tax uncertainty. Tax avoidance is a flow variable that we measure as the five-year *CASH ETR* from Dyreng et al. (2008) (five-year sum of cash taxes paid (TXPD) divided by the five-year sum of pretax income before special items (PI – SPI)). Our tax uncertainty variable, *UTB ADDS*, is also a flow variable: we sum additions to unrecognized tax benefits related to current-year tax positions over the same five-year

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period and scale the sum by the five-year sum of sales. We use additions to unrecognized tax benefits, rather than the ending balance in unrecognized tax benefits, to best match our research question about the flow variable tax avoidance.

UTBs are not a perfect measure of tax uncertainty, in part because they can be subject to managerial discretion.[17] However, UTBs have at least four important features that make them desirable and widely used measures. First, UTBs by definition are designed to reflect activities that the firm views as falling into the grey areas of tax law, such that the firm expects that a challenge by the tax authorities could result in the payment of additional tax. That is, tax avoidance that the firm believes is certain to be upheld if audited by the tax authorities is not recorded as a UTB. Our research question is about managements' ex ante expectations about their underlying tax positions. Thus, the UTB additions are a reasonable proxy because 1) UTBs reflect managements' ex ante expectations and 2) the additions to the account match the 'flow' for uncertainty (additions) to the flow for avoidance (cash ETR) for the same time period. Second, UTBs measure tax uncertainty with respect to the law, independent of tax authorities' auditing ability or effort. In other words, the proxy abstracts from the varying strengths of tax authorities across time and jurisdictions by employing the Financial Accounting Standards Board's (FASB's) UTB requirement to assume all positions are audited. Again, our aim is to identify the ex ante expectation about the position – is it sustainable (certain) or not? Third, UTBs are explicitly reported in the financial statements of the firm, specifically in the tax footnote, and thus are observable to researchers. Finally, UTBs are subject to financial accounting audit and are independent of researcher judgment.

[17] See Hanlon and Heitzman (2010) for a discussion. Also, note that recent empirical evidence suggests that management alters UTB amounts under certain conditions. For example, Towery (2017) and Honaker and Sharma (2017) find that firms reduce UTBs after imposition of the UTP reporting requirement consistent firms altering financial reporting for uncertain positions but not altering their underlying tax avoidance behavior.

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Measurement issues relevant for our study are what happens in future years as i) tax strategies are audited and benefits are retained, ii) the strategies are audited and benefits are lost, or iii) the statute of limitations runs out before the strategies are audited. To provide more support for our measures, we discuss each of these cases. First, consider the current reporting period for a firm. For example, a firm avoids paying cash taxes and thus lowers its cash taxes paid. If these tax savings are certain to be kept, the company will not need to record any unrecognized tax benefits. In this case, we will observe no relation between tax avoidance and tax uncertainty and conclude for this firm that tax avoidance is not uncertain. If the tax savings are uncertain, however, the firm will record an uncertain tax benefit, which accrues the future potential tax cost as a liability in the current period (as a UTB addition) even though the firm is not paying the cash in the current period. In this case, we will observe a negative relation between the cash effective tax rate and tax uncertainty (in other words, a positive relation between being a tax avoider and tax uncertainty) and conclude that the tax avoidance is uncertain.

Now consider future periods. If the firm has uncertain tax positions recorded and the firm ends up being able to keep the tax savings (e.g., they are audited and "win" or they are never audited), then the *CASH ETR* measure from Dyreng et al. (2008) is an appropriate measure of avoidance because the cash tax paid reflects the tax avoidance on the originally filed tax returns (we discuss the effects of settlements below). Similarly, our empirical measure of tax uncertainty, *UTB ADDS*, is not affected by the outcome of the position (i.e., the future decline in the UTB) because we only include additions to uncertain tax benefits for current year positions. If we had instead used the change in the total uncertain tax benefits for the year then we would have introduced measurement error (from the perspective of our research question) because the net

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change reflects both uncertainty from current year tax positions, and also the resolution of uncertainty from prior year tax positions.

Finally, consider the case of a firm whose tax avoidance is ultimately unsuccessful. Our measure of *UTB ADDS,* the additions to uncertain tax benefits for the current year, is, again, the correct measurement for our research question. Examining the change in the total unrecognized tax benefit would not reflect the uncertainty because the UTB balance initially increases to reflect the tax uncertainty but then decreases when the firm settles and the uncertainty is resolved.

Thus, our measure of UTB additions is appropriate when there are settlements. However, settlements potentially introduce measurement error in the Dyreng et al. (2008) *CASH ETR* for the purposes of our research question. The *CASH ETR* reflects not only current period tax avoidance, but also settlements of prior year's unsuccessful tax avoidance. Because Dyreng et al. (2008) were interested in examining successful long-run tax avoidance, including settlements in *CASH ETR* was appropriate for their research question. For this study, however, we would ideally have a measure of cash taxes paid that excluded settlements. However, the settlement data available are not ideal for making an adjustment to the *CASH ETR* because the settlement amount in the UTB disclosure is the effect of the settlement on the UTB liability, not the cash taxes paid in the settlement. For example, a firm may have a $100 UTB liability, which it settles with the government for $55. The UTB liability schedule will show a $100 reduction for settlements, but it only results in $55 of cash tax being paid.[18] Because we cannot be sure whether adjusting for settlements would increase or decrease measurement error in our cash taxes paid variable, we make no adjustment and instead acknowledge that *CASH ETR* may be measured with error.[19] However,

[18] We recognize that there is likely variation in practice in the accounting for these types of settlements.
[19] In an earlier version of this study we used settlement data from the UTB disclosures in the tax note to the financial statements to create a modified cash ETR, and we found qualitatively similar results to this version. However, based

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because we convert this variable to an indicator variable, *AVOIDER*, the issue is likely less important than if we employed the continuous *CASH ETR* measure.

Exhibit 1 is an example of an actual unrecognized tax benefit disclosure for one of the firms in our sample, Johnson & Johnson. For the fiscal year ending in December 28, 2014, Johnson & Johnson reported $281 million of unrecognized tax benefits related to tax positions in the current year. Our tax uncertainty measure, *UTB ADDS*, is the sum of annual increases to Johnson & Johnson's unrecognized tax benefits for tax positions related to the years *t*-4 to *t*, where *t* corresponds to 2012, 2013, or 2014. For example, when *t*=2012, the sum of annual increases (not shown on the Exhibit but including the $538 million for 2012 and the four prior year amounts in that same row) equals $2,505 million, and when scaled by total sales during the same period, yields a scaled value of 0.0078.[20] Our tax avoidance measure for Johnson & Johnson is the company's *CASH ETR* over the period 2008-2012, which equals 0.1656 (16.56 percent).

Descriptive Statistics

Table 2 presents the descriptive statistics for our sample. Panel A presents univariate statistics for each of the variables used in our tests. We multiply *UTB ADDS* by 100 for ease of presentation. *UTB ADDS* has a mean value of 0.244, indicating that the average firm in our sample had additions for current year positions to the unrecognized tax benefits account equal to about 0.24 percent of sales over the five-year periods, of which there are three during our sample period. *UTB ADDS* is highly variable and highly skewed. The standard deviation of *UTB ADDS* is 0.335, compared to a median value of 0.122. The 25th percentile of *UTB ADDS* is 0.044, indicating that a substantial portion of our firm-years have little or no uncertainty related to their tax positions.

on some thoughtful comments from a reviewer, we realize that UTB settlement data are imperfect to such an extent that we do not adjust the *CASH ETR* measure in our main tests.

[20] The 2014 five-year sum would include the $281 million for 2014, the $643 million for 2013, and $538 million for 2012, and the amounts from that same row for 2011 and 2010.

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CASH ETR shows that the mean (median) firm pays about 26.0 percent (24.5 percent) of is pretax earnings (adjusted for special items) in cash taxes over a typical five-year period. For the sample period 1995-2004, Dyreng et al. (2008) show an average *CASH ETR* (five year) of 29.1 percent and a median of 27.7 percent. The lower rates for our time period of 2008-2014 is consistent with declining effective tax rates in general as documented in Dyreng et al. (2017).

The variable *N PATENTS* is the five-year sum of patents filed.[21] Sample firms file, on average, about 132 patents during the five-year periods in our sample. *N PATENTS* is also skewed, with the median firm reporting five patents filed.

We obtain the location of firms' material subsidiaries from Exhibit 21 to firms' financial statements to compute the proportion of subsidiaries in tax havens. We classify a country as a tax haven based on the country being identified as a tax haven by three of the four following sources: (1) OECD, (2) the U.S. Stop Tax Havens Abuse Act, (3) The International Monetary Fund (IMF), and (4) the Tax Research Organization.[22] We compute our variable, *HAVEN INTENSITY*, as the number of subsidiaries in tax haven countries divided by the total number of foreign subsidiaries (in Exhibit 21). The variable has a mean (median) of 20.3 percent (16.8 percent), indicating that 20.3 percent of the average firm's foreign subsidiaries are located in tax havens.

SHELTER SCORE is the probability the firm has a tax shelter in place and is calculated following Lisowsky (2010). The mean value of *SHELTER SCORE* in our sample is 0.934, indicating that the mean firm in the sample has a 93.4 percent chance of being engaged in a tax shelter. Our sample firms have very high values of *SHELTER SCORE*, suggesting that it is likely

[21] Patent data are made available by Noah Stoffman at https://iu.app.box.com/patents.
[22] This follows the criteria used in Dyreng and Lindsey (2009). The underlying data can be found at: http://www.globalpolicy.org/nations/launder/haven/2008/0304listhavens.htm.

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many of the companies are engaged in transactions that are required to be reported to the IRS as possible tax shelters.[23]

Several studies find that higher institutional ownership is associated with increased tax avoidance (Khan et al. 2017; Bird and Karolyi 2017; and Chen et al. 2018). We compute the variable *INSTUTIONAL HOLDINGS* as the percentage of the firm's stock held by institutions, calculated using Thompson Reuters Ownership Data. In our sample, the variable has a mean value 79.6 percent.

Chyz et al. (2013) find that unionization is associated with less tax aggressiveness. We compute the variable *UNIONIZATION* as the percentage of the industry's workforce that belongs to a union, where industry is defined by U.S. Bureau of Census Industry Codes (CIC), and converted to North American Industry Classification System (NAICS) industry codes using the 2010 Census Occupational Codes.[24] *UNIONIZATION* has a mean value of 6.9 percent.

Other control variables in our tests are defined as follows. *SIZE* is the natural log of average total assets over the five-year period and has a mean value of 7.688, which is equivalent to approximately $2.2 billion of assets. *LEVERAGE* is the five-year average of the ratio of long-term debt to total assets. The firms in the sample have an average value for *LEVERAGE* of 0.212. The variable *NOLDUM* takes on a value of one if the firm has an NOL carryover at the beginning of the five-year period, and zero otherwise. About 53.7 percent of the firms in the sample report an NOL carryover. The variable ΔNOL reflects the change in the firm's NOL carryover from the

[23] *SHELTER SCORE* is a function of firm level variables, as specified in Liswosky (2010). Several of these variables are also included as control variables in our regressions, which should bias against *SHELTER SCORE* providing incremental explanatory power. We also note that the high mean for *SHELTER SCORE* is consistent with prior literature using this score. For example, Graham et al. (2014) report an average score of 94.4 percent and Chyz et al. (2013) reports a median score of between 80 percent - 94 percent, with larger values for larger firms. As Graham et al. (2014) state, these values might call into question the interpretation of the variable but consistent with Graham et al. (2014) our purposes are to capture cross-sectional variation in the measure.

[24] As reported by http://www.unionstats.com/.

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beginning to the end of the five-year period, divided by average total assets over the five-year period. The median firm in the sample shows no change to its NOL, while the mean change is 0.042.

Panel B presents Pearson correlations presented above the diagonal and Spearman correlations below. The panel shows that *CASH ETR* is negatively correlated with *UTB ADDS*, which is consistent with increased tax avoidance (i.e., lower *CASH ETR*) leading to greater tax uncertainty (i.e., higher *UTB ADDS*). *UTB ADDS* is positively correlated with *HAVEN INTENSITY*, *N PATENTS*, *SHELTER SCORE*, and *SIZE*, negatively correlated with *UNIONIZATION* and *LEVERAGE*, and not significantly correlated with *INSTITUTIONAL HOLDINGS*, *NOLDUM* and *ΔNOL*.

In Table 3 we provide more descriptive information about the relation between *CASH ETR* and *UTB ADDS*. We begin by designating firms as tax avoiders if their *CASH ETR* falls into the lowest tercile of the distribution of *CASH ETRs* for our sample firms. The cutoff to be designated an avoider is a *CASH ETR* about 19.7 percent, which roughly corresponds to the 20 percent threshold used in Dyreng et al. (2008). We designate firms with *CASH ETR*s greater than 19.7 percent as non-avoiders. In our regression tests in the rest of the paper, we use the indicator variable *AVOIDER* to identify firms in the lowest tercile of *CASH ETR (*all other firms have *AVOIDER* set equal to zero). While we recognize that tax avoidance is likely to be more of a continuous concept, designating firms as either avoiders or non-avoiders greatly simplifies the interpretation of the later results, and the broad conclusions are unaffected by using a continuous measure of avoidance (see Section 5, under Additional Analysis).

Panel A of Table 3 shows that the average firm designated as a tax avoider pays about 11.4 percent of pretax income in cash taxes. The average firm designated a non-avoider pays about 33.3

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percent of pretax earnings in cash taxes. Panel B presents descriptive statistics of *UTB ADDS* for tax avoider and non-avoider firms. The main finding is that tax avoider firms have larger values of *UTB ADDS* than do non-avoiders. The mean *UTB ADDS* is 0.326 for tax avoider firms and 0.203 for non-avoiders. In other words, *UTB ADDS* for avoider firms is more than 50 percent larger than for non-avoider firms.

Figure 1 presents a comparison of the distribution of *UTB ADDS* for tax avoider firms compared to non-avoider firms. The skewness of the *UTB ADDS* variable is obvious in the figure. More importantly, there is a clear relation between tax avoidance and tax uncertainty. The tax avoider firms (white bins) are much more likely to report high values of *UTB ADDS* than are non-avoider firms (grey bins). In addition, most of the relatively small *UTB ADDS* observations belong to non-avoider firms. On average, firms engaging in tax avoidance face more tax uncertainty (high *UTB ADDS*). These descriptive statistics are consistent with tax avoidance resulting in greater tax uncertainty, but they do not control for other differences across tax avoider firms and tax non-avoider firms. In addition, they do not tell us anything about the factors that determine which types of tax avoidance result in more or less tax uncertainty. We turn to these questions next.

V. EMPIRICAL TESTS AND RESULTS

Research Design and Main Findings

To empirically test our hypotheses, we estimate OLS regression models of the following form:

$$\begin{aligned} UTB\ ADDS_{it} = {} & \alpha_0 + \alpha_1 AVOIDER_{it} + \alpha_2 PATENTS_{it} + \alpha_3\ AVOIDER_{it} \\ & * PATENTS_{it} + \alpha_4 HAVEN_{it} + \alpha_5\ AVOIDER_i * HAVEN_{it} \\ & + \alpha_6 SHELTER_{it} + \alpha_7\ AVOIDER_{it} * SHELTER_{it} \\ & + \alpha_k CONTROL_{it} + \alpha_j AVOIDER_{it} * CONTROL_{it} + u_{it} \end{aligned} \quad (1)$$

where *UTB ADDS* and *AVOIDER* are as previously defined. To test our hypotheses, we convert the relevant variables into indicator variables for ease of interpretation: 1) *PATENTS* is an indicator

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variable set equal to one for firms in the highest tercile of the distribution *N PATENTS* and zero otherwise, 2) *HAVEN* is an indicator variable set equal to one for firms in the highest tercile of the distribution of *HAVEN INTENSITY* and zero otherwise, 3) *SHELTER* is an indicator variable equal to one for firms in the highest tercile of the distribution of *SHELTER SCORE* and zero otherwise. We include control variables as previously discussed and defined (*SIZE*, *LEVERAGE*, *NOLDUM*, *ΔNOL)*. We convert two of the control variables into indicator variables: 1) *HIGH INST* is an indicator variable set equal to one for firms in the top tercile of the distribution of *INSTITUTIONAL HOLDINGS* and zero otherwise and 2) *HIGH UNION* is an indicator variable set equal to one for firms in the top tercile of *UNIONIZATION* and zero otherwise.

Table 4 shows the results from estimating Eq. (1). We estimate the model using iteratively re-weighted least squares, commonly known as robust regression, to control for outliers (Leone, Minutti-Meza, and Wasley 2017).[25] In Model 1, we regress the dependent variable, *UTB ADDS*, on the *AVOIDER* indicator variable. We find that for firms with *AVOIDER* equal to one, *UTB ADDS* is higher by 0.041, an increase of about 17 percent over the unconditional mean *UTB ADDS* reported in Table 2, Panel A. Thus, consistent with the Table 3 results, greater tax avoidance is associated with greater tax uncertainty consistent with our first hypothesis.

In Models 2 and 3 we examine hypothesized cross-sectional determinants of the relation between tax avoidance and tax uncertainty (Hypotheses 2-4). Specifically, we include, *PATENTS*, *HAVEN*, and *SHELTER* as well as *AVOIDER* interacted with each test variable. We include the main effects to control for the effect of the hypothesized determinant on tax uncertainty for firms not in the lowest tercile of *CASH ETR* (non-avoiders). For example, even when the firms are not

[25] We note that each firm can have as many as three observations in the sample and those observations will substantially overlap one another. We cluster the standard errors by firm to take this correlation structure into account. Results are similar if we instead only use one observation per firm.

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avoiding tax to such an extent to place the firm in our low tax group, the R&D tax credit or transactions related to intangibles could lead to greater tax uncertainty for these firms (which are classified as non-avoiders in our tests).

In Models 2 and 3 we also include four control variables (*SIZE*, *LEVERAGE*, *NOLDUM*, and *ΔNOL*) and interactions between the control variables and *AVOIDER.* In Model 3, we include additional controls, *HIGH INST* and *HIGH UNION*, and interactions between each of them and *AVOIDER*. We report both sets of results because *HIGH INST* and *HIGH UNION* cause a substantial loss of observations due to missing data. Below we describe the results for Model 3.

The coefficient on *AVOIDER* continues to be positive and significant. This result suggests that even for firms with a relatively low number of patents, a low number of subsidiaries in tax havens, and a low likelihood of being in a tax shelter, tax avoidance is positively associated with tax uncertainty. The results relevant for our second hypothesis involve the variable *PATENTS*. The main effect of *PATENTS* is positive and significant, suggesting that intangible assets are related to tax uncertainty for non-avoiders in our sample. Consistent with hypothesis two, the coefficient on the interaction of *AVOIDER* and *PATENTS* is positive and significant, taking on a value of 0.070. This is consistent with tax avoiders bearing incremental tax uncertainty when the firm has many patents relative to few patents and with patents leading to more uncertainty for tax avoiders relative to non-avoiders.

To examine the results with respect to our third hypothesis, we look to the variable *HAVEN*. The main effect of *HAVEN* is insignificant as is the interaction of *AVOIDER* and *HAVEN*. These results suggest that having a tax haven subsidiary does not lead to tax uncertainty. However, we will examine the effect of havens in more detail in Table 5.

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Our fourth hypothesis concerns the probability of tax shelter activity. The results for tax shelters are that the main effect of *SHELTER* is insignificant, and the interaction of *AVOIDER* and *SHELTER* is positive and significant. The positive and significant coefficient on the interaction of *AVOIDER* and *SHELTER* is consistent with hypothesis four. These results suggest that non-avoiders with a high likelihood of being in a tax shelter do not bear more tax uncertainty than non-avoiders with a low probability of being in a shelter, but that tax avoiders with a high shelter score do bear greater uncertainty than tax avoiders with a low shelter score.

Examining our control variables, we observe the following. The coefficient on *SIZE* is positive and significant, as are the coefficients on *HIGH INST* and *HIGH UNION*, and the interaction between *AVOIDER* and *ΔNOL*. The coefficient on the interaction between *AVOIDER* and *HIGH UNION* is negative and significant. One interpretation of the results is that non-avoider, unionized entities have higher tax uncertainty in general but the relation between tax avoidance and *UTB ADDS* is mitigated by unionization. These results appear to be consistent with Chyz, Leung, Li, and Rui (2013) who find that unions constrain managers' ability to invest in tax aggressiveness through increased monitoring. Overall, the results in Table 4 reveal that tax uncertainty is greater for tax avoiders than non-avoiders and that the uncertainty is driven by high intangibles use and high probability of engaging in a tax shelter.

To examine the mechanisms by which the variables in our analysis affect *UTB ADDS* we perform a path analysis. The results are reported in Figure 2, where the standardized coefficients are reported along each of the paths to *UTB ADDS*. In Panel A of Figure 2 we find that *PATENTS*, *HAVEN*, and *LEVERAGE* all have a direct effect on *UTB ADDS*. We are particularly interested in the effect the variables have on *UTB ADDS* as they operate through our tax avoidance proxy, *AVOIDER*. We find that *PATENTS*, *HAVENS*, *LEVERAGE*, and *NOLDUM* have an indirect effect

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on *UTB ADDS*. That is, *PATENTS*, *HAVENS*, and *LEVERAGE* operate both directly on *UTB ADDS* and indirectly on *UTB ADDS* through *AVOIDER*. *NOLDUM* only operates through the indirect channel.

Because the coefficients in the path analysis are standardized, they can be interpreted in terms of standard deviations. Using *PATENTS* as an example, a one standard deviation increase in *PATENTS* is directly associated with a 0.208 standard deviation increase in *UTB ADDS*, and indirectly associated with a .019 standard deviation increase in *UTB ADDS* through the effect of *AVOIDER* (calculated by multiplying the 0.138 effect of *PATENTS* on *AVOIDER* and the 0.137 effect of *AVOIDER* on *UTB ADDS*). All of the estimates reported in Figure 2 can thus easily be interpreted in terms of standard deviations.

We repeat the analysis in Panel B of Figure 2, where we add the indicator variables for high institutional holdings and unionization. Of particular interest in this panel, we find that *HIGH INST* operates indirectly through tax avoidance on *UTB ADDS*. *HIGH UNION* has a direct statistical relation with *UTB ADDS* but does not operate indirectly through *AVOIDER*. Overall this analysis provides some richness to the analysis and presents a picture that is broadly consistent with our analysis in Table 4. Again, the economic interpretation of the results is similar to that of Figure 1, where each of the reported coefficients can be interpreted in terms of standard deviations.

One limitation of the analysis in Table 4 is that it treats the cross-sectional determinants of the relation between tax avoidance and tax uncertainty as separate factors. However, there is reason to believe that the effect of patents and tax havens are related to one another. Firms with relatively unique, mobile, intangible assets, such as those generated by patents, can use those assets to avoid taxes by assigning ownership of the asset to a subsidiary located in a tax haven country, and then using the assets to shift income from high tax jurisdictions to the tax haven country. If this is the

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case, tax avoiders with large numbers of patents and relatively many tax haven operations should have incrementally greater tax uncertainty. Thus, in Table 5, we re-estimate Models 2 and 3 from Table 4 (re-labeled Models 1 and 2 in Table 5) separately for firms that have low tax haven intensity *(HAVEN* = 0*)* and firms that have high tax haven intensity (*HAVEN*=1) (for ease of interpretation relative to including a triple interaction). Focusing on the coefficient for the interaction of *AVOIDER* and *PATENTS*, we see that the coefficient is not significantly different from zero for firms with low haven intensity (*HAVEN*=0) in both models. The main effects of *AVOIDER* and *PATENTS*, however, remain positive and significant. We interpret this to mean that among firms without tax haven subsidiaries, firms that have above-average tax avoidance and firms with large numbers of patents both face greater tax uncertainty.

However, for firms with high haven intensity (*HAVEN*=1), we see that the coefficient on *AVOIDER* interacted with *PATENTS* is positive and significant, taking on a value of 0.102 in Model 1 and 0.109 in Model 2. This indicates a positive, joint effect of having tax haven subsidiaries and large numbers of patent filings on the relation between tax avoidance and tax uncertainty. The main effects on *AVOIDANCE* and *PATENTS* remain positive and significant when *HAVEN* is equal to zero. Overall, these results suggest that the greatest tax uncertainty is attributable to tax avoiders with both large numbers of patents and with extensive tax haven presence.

Additional Tests

We perform several additional tests to examine the robustness of the results. First, in our main tests we use an indicator variable, *AVOIDER*, as our proxy for tax avoidance to facilitate interpretation of the many interactions in our tests. However, it is possible that information lost in

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converting a continuous variable to an indicator variable could alter our conclusions. We repeat the Table 4 and Table 5 analyses using the continuous measure *CASH ETR* and present these results in Table 6 and Table 7. Using *CASH ETR* results in coefficient estimates that are slightly more difficult to interpret, but our overall conclusions remain the same for Table 4 and Table 5.[26]

Second, our proxy for tax avoidance only captures non-conforming tax avoidance. That is, tax strategies that reduce cash taxes paid by also reducing reported income will not be captured in the *AVOIDER* proxy. To test the sensitivity of our results to this limitation, we redefine *AVOIDER* to be equal to one if the ratio of cash taxes paid to cash flow from operations is in the bottom tercile of the distribution (deleting observations that have negative cash flow from operations). Our overall conclusions again remain the same for the results presented in Table 4 and Table 5.[27]

Third, in our main tests we chose to scale additions to unrecognized tax benefits by sales when creating *UTB ADDS*, such that both the numerator and the denominator were flow variables. Alternatively, we could have scaled by a stock measure such as total assets.[28] In unreported results, we repeat our analyses with a new dependent variable that is calculated by dividing additions to unrecognized tax benefits by total assets. In unreported results, we find that the conclusions in Table 4 remain the same, except that the statistical significance on the interaction term *AVOIDER*HAVEN* becomes statistically weaker (t-stat = 1.64 in Model 2, and t-stat = 1.34 in Model 3). Similarly, when we use this new dependent variable in the tests reported in Table 5, we continue to find that the interaction term *AVOIDER*PATENTS* is only statistically significant in

[26] In Table 7, Model 2, the difference of the coefficient on the interaction of *CASH ETR* and *PATENTS* is not statistically significant.
[27] We recognize that using cash flows from operations only solves the issue to a limited extent. See Hanlon and Heitzman (2010) for a discussion.
[28] We thank an anonymous referee for this suggestion.

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the columns where *HAVEN* = 1, but the difference column shows that the statistical significance is weaker than reported in Table 5 (t-stat = 1.16 in column 3, t-stat = 0.80 in column 6).

Fourth, in our main tests we excluded observations where there were no additions to UTB in a given five year rolling period because Lisowsky et al. (2013) suggest that Compustat UTB data might not be reliable when values are missing. When we include these observations in the sample, we find that the conclusions in Table 4 remain the same, except the interaction term *AVOIDER*HAVEN* becomes marginally statistically significant in Model 3 (t-stat = 1.56, one-tailed p-value = 0.06) whereas it was insignificant in Table 4, and *AVOIDER*SHELTER* becomes statistically insignificant in both models whereas it was significant in Table 4. The conclusions drawn from Table 5 remain the same, with the interaction term on *AVOIDER*PATENTS* being statistically larger for firms with operations in tax haven countries than other firms in both models.

VI. CONCLUSIONS

We investigate whether and the conditions under which tax avoidance leads to tax uncertainty. We measure tax avoidance using cash effective tax rates, consistent with Dyreng et al. (2008). We define tax uncertainty as the amount of unrecognized tax benefits recorded over the same time period as the tax avoidance. Accordingly, we measure tax uncertainty using data on uncertain tax benefits (UTBs), which became required disclosure starting in 2007.

We test four hypotheses about the relation between tax avoidance and tax uncertainty. First, we predict that tax uncertainty is, on average, increasing in tax avoidance. The evidence supports this hypothesis. We next test three possible determinants of the relation between tax avoidance and tax uncertainty. Our second hypothesis is that the relation between tax avoidance and tax uncertainty will be stronger for firms with large numbers of patents, where patents are a proxy for intangible-intensity. We find that find the number of patents is significantly related to

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the UTB for both tax avoiders and non-avoiders, and the relation is stronger among tax avoiders These results are consistent with our hypothesis and also with intangibles-based firms having more tax uncertainty in general. For example, the R&D tax credit is a tier one audit issue and is one of the most often listed items on the IRS schedule UTP (Uncertain Tax Positions) (Towery 2017).

Our third hypothesis is that the relation between tax avoidance and tax uncertainty will be stronger for firms that use tax havens extensively. The results indicate that tax haven usage and intangible-intensity appear to have a joint effect on the relation between tax avoidance and tax uncertainty. These results are consistent with tax avoidance involving shifting intangible assets (as proxied by patents) to tax havens being more uncertain than other haven-related tax avoidance. Our fourth hypothesis is that the relation between tax avoidance and tax uncertainty will be stronger for firms with a high probability of being engaged in tax shelters, and only some of the results support this hypothesis. Regarding this last result, however, we caution that detecting tax shelter usage in broad samples is difficult due to considerable measurement error. In addition, it is possible that tax sheltering (as measured via the listed transactions in Lisowsky (2010)) is no more uncertain in terms of the tax benefits than other tax planning transactions.

In addition to providing the first empirical examination of the factors that connect tax avoidance to tax uncertainty, the results have implications for at least two puzzles in the literature. The first is that, despite their ability to engage in cross-border income shifting, multinational firms have effective tax rates that are at least as high as purely domestic firms (Dyreng et al. 2017). What then is constraining these multinationals from engaging in more tax avoidance than domestic firms? Our results suggest one possible answer. Tax avoidance that involves tax havens and high patent intensity – precisely the kind of tax avoidance associated with multinationals – also leads to tax uncertainty. The second, related puzzle that our results speak to is the "undersheltering

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puzzle" which questions why more firms do not take advantage of tax planning opportunities. We find that certain types of tax planning (e.g., via tax havens) also result in tax uncertainty. In other words, for certain tax avoidance strategies, obtaining a low cash effective tax rate is only possible if the firms are willing to bear tax uncertainty. Moreover, tax uncertainty is costly because it prevents the tax savings from being recognized for financial accounting purposes and leads firms to increase their precautionary cash holdings beyond what they otherwise would (Hanlon et al. 2017). Tax avoidance and tax uncertainty are fundamental aspects of effective tax planning, but the connections between them are only beginning to be examined. We hope that our research is a start to understanding these connections.

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REFERENCES

Allingham, M. and A. Sandmo. 1972. Income tax evasion: a theoretical analysis. *Journal of Public Economics* 1, 323-338.

Armstrong, C., J. Blouin, and D. Larcker. 2012. The incentives for tax planning. *Journal of Accounting and Economics* 53, 391-411.

Badertscher, B., S. Katz, and S. Rego. 2013. The separation of ownership and control and corporate tax avoidance. *Journal of Accounting and Economics* 56, 228-250.

Bankman, J. 1999. The new market in U.S. corporate tax shelters. *Tax Notes International* 18, 2681–2706.

Bankman, J. 2004. The tax shelter problem. *National Tax Journal* 57, 925-936.

Barth, M., Beaver, W., Hand, J., and W. Landsman. 2005. Accruals, Accounting-Based Valuation Models, and the Prediction of Equity Values. Journal of Accounting, Auditing, and Finance 20 (4), 311-345.

Beaver, J. A. 2017. Amazon wins transfer pricing case. *The Tax Advisor.com*. http://www.thetaxadviser.com/issues/2017/jun/amazon-wins-transfer-pricing-case.html

Bird, A., and S. Karolyi. 2017. Governance and taxes: Evidence from regression discontinuity. *The Accounting Review* 92 (1)

Blouin, J. 2014. Defining and measuring tax planning aggressiveness. *National Tax Journal* 67, 875-900.

Blouin, J., C. Gleason, L. Mills, and S. Sikes. 2010. Pre-empting disclosure? Firms' decisions prior to FIN 48. *The Accounting Review* 85, 791–815.

Blouin, J., L. Krull, and L. Robinson. 2017. The location, composition, and investment implications of permanently reinvested earnings. University of Pennsylvania, University of Oregon, and Dartmouth College working paper.

Brown, J. 2011. The spread of aggressive tax reporting: a detailed examination of the corporate-owned life insurance shelter. *The Accounting Review* 86, 23-57.

Brown, J. and L. Krull. 2008. Stock options, R&D, and the R&D tax credit. *The Accounting Review* 83, 703-734.

Cazier, R., S. Rego, X. Tian, R. Wilson. 2009. Early evidence on the determinants of unrecognized tax benefits. University of Iowa working paper.

Electronic copy available at: https://ssrn.com/abstract=2374945

Cazier, R., S. Rego, X. Tian, and R. Wilson. 2015. The impact of increased disclosure requirements and the standardization of accounting practices on earnings management through the reserve for income taxes. *Review of Accounting Studies* 20, 436-469.

Chen, K. and C. Chu. 2005. Internal control versus external manipulation: a model of corporate income tax evasion. *Rand Journal of Economics* 36, 151-164.

Chen, S., X. Chen, Q. Cheng, and T. Shevlin. 2010. Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics* 95, 41–61.

Chen, S., Y. Huang, N. Li, and T. Shevlin. 2018. How does quasi-indexer ownership affect corporate tax planning? *Journal of Accounting and Economics*, forthcoming.

Chyz, J. A., W. S. C. Leung, O. Z. Li, and O. M. Rui. 2013. Labor unions and tax aggressiveness. *Journal of Financial Economics* 108, 675-698.

Ciconte, W., M. Donohoe, P. Lisowsky, and M. Mayberry. 2016. Predictable uncertainty: the relation between unrecognized tax benefits and future income tax cash outflows. University of Florida and University of Illinois at Urbana-Champaign working paper.

De Simone, L., J. R. Robinson, and B. Stomberg. 2014. Distilling the reserve for uncertain tax positions: The revealing case of black liquor. *Review of Accounting Studies* 19, 456-472.

De Simone, L., L. Mills, and B. Stomberg. 2016. Examining IRS audit outcomes of income mobile firms. Stanford University, University of Texas, and University of Georgia working paper.

Desai, M., and D. Dharmapala. 2006. Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics* 79, 145–179.

Drucker, J. 2007. Inside Wal-Mart's bid to slash state taxes; Ernst & Young devises complex strategies: California pushes back. *The Wall Street Journal*, October 23, p. A1.

Dyreng, S., M. Hanlon, and E. Maydew. 2008. Long-run corporate tax avoidance. *The Accounting Review* 83, 61-82.

Dyreng, S., M. Hanlon, and E. Maydew. 2010. The effects of executives on corporate tax avoidance. *The Accounting Review* 85, 1163–1189.

Dyreng, S., M. Hanlon, E. Maydew, and J. Thornock. 2017. Changes in corporate effective tax rates over the past twenty-five years. *Journal of Financial Economics* 124, 441-463.

Dyreng, S., and B. Lindsey. 2009. Using financial accounting data to examine the effect of foreign operations located in tax havens and other countries on US multinational firms' tax rates. *Journal of Accounting Research* 47, 1283–1316.

Electronic copy available at: https://ssrn.com/abstract=2374945

Dyreng, S., B. Lindsey, and J. Thornock. 2013. Exploring the role Delaware plays as a domestic tax haven. *Journal of Financial Economics* 108, 751-772.

Dyreng, S., and K. Markle. 2016. The Effect of Financial Constraints on the Income Shifting of U.S. Multinationals. Forthcoming, *The Accounting Review*.

Engel, E., M. Erickson, and E. Maydew. 1999. Debt-equity hybrid securities. *Journal of Accounting Research* 37, 249-274.

Erickson, M., A. Goolsbee, and E. Maydew. 2003. How prevalent is tax arbitrage? Evidence from the market for municipal bonds. *National Tax Journal* 56, 259-270.

Erickson, M., S. Heitzman, and F. Zhang. 2013. Tax-motivated loss shifting. *The Accounting Review* 88, 1657-1682.

Frank, M., L. Lynch, and S. Rego. 2009. Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review* 84, 467-496.

Frischmann, P., T. Shevlin, and R. Wilson. 2008, Economic consequences of increasing the conformity in accounting for uncertain tax benefits. *Journal of Accounting and Economics* 46*,* 261-278.

Gallemore, J., E. Maydew, and J. Thornock. 2014. The reputational costs of tax avoidance. *Contemporary Accounting Review* 31, 1103-1133.

Gleason, C., and L. Mills. 2002. Reporting and recording of contingent tax liabilities. *The Accounting Review*, 317-342.

Graham, J., and A. Tucker. 2006. Tax shelters and corporate debt policy. *Journal of Financial Economics* 81, 563–594.

Graham, J. M. Hanlon, and T Shevlin. 2011. Real effects of accounting rules: evidence from multinational firms' investment location and profit repatriation decisions. *Journal of Accounting Research* 49: 137-185.

Graham, J., M. Hanlon, T. Shevlin and N. Shroff. 2014. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review* 89, 991-1023.

Guenther, D., S. Matsunaga, and B. Williams. 2017. Is tax avoidance related to firm risk? *The Accounting Review* 92, 115-136.

Guenther, D., R. Wilson, and K. Wu. 2018. Tax uncertainty and marginal tax avoidance. University of Oregon working paper.

Gupta, S., and L. Mills. 2002. Corporate multistate tax planning: Benefits of multiple jurisdictions. *Journal of Accounting and Economics* 33, 117-139.

Electronic copy available at: https://ssrn.com/abstract=2374945

Grubert, H., and J. Slemrod. 1998. The effect of taxes on investment and income shifting to Puerto Rico. *Review of Economics and Statistics* 80, 365-373.

Hanlon, M., and S. Heitzman. 2010. A review of tax research. *Journal of Accounting and Economics* 50, 127-178.

Hanlon, M., E. Maydew, and D. Saavedra. 2017. The taxman cometh: Does tax uncertainty affect corporate cash holdings. *Review of Accounting Studies* 22, 1198-1228.

Hanlon, M., L. Mills, and J. Slemrod. 2007. An empirical examination of corporate tax noncompliance," with Lillian Mills and Joel Slemrod, in *Taxing Corporate Income in the 21st Century*, A. Auerbach, J. R. Hines Jr., and J. Slemrod (eds.). Cambridge: Cambridge University Press.

Hanlon, M., and J., Slemrod. 2009. What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics* 93, 126–141.

Hasan, I., C. Hoi, Q. Wu, and H. Zhang. 2014. Beauty is in the eye of the beholder: the effect of corporate tax avoidance on the cost of bank loans. *Journal of Financial Economics* 113, 109-130.

Higgins, D., T. Omer, and J. Phillips. 2015. The influence of a firm's business strategy on its tax aggressiveness. *Contemporary Accounting Research* 32, 674-702.

Hilzenrath, D. 2006. Glaxo to pay IRS $3.4 billion. *Washington Post*, September 12.

Honaker, K., and D. Sharma. 2017. Does schedule UTP have uniform long run effects on corporate tax planning? *Journal of the American Taxation Association* 39, 63-79.

Hoopes, J. L., D. Mescall, and J. A. Pittman. 2012. Do IRS audits deter corporate tax avoidance? *The Accounting Review* 87(5), 1603-1640.

Hutchens, M., and S. Rego. 2015. Does greater tax risk lead to increased firm risk? Indiana University working paper.

Johnson, L. 2007. Merck to pay IRS $2.3 billion in tax disputes. *Washington Post*, February 14.

Khan, M., S. Srinivasan, and L. Tan. 2017. Institutional ownership and corporate tax avoidance: New evidence. *The Accounting Review* 92, 101-122.

Kim, J., O. Li, and Y. Li. 2010. Corporate tax avoidance and bank loan contracting. City University of Hong Kong, University of Arizona, and Purdue University working paper.

Klassen, K., and S. Laplante. 2012. Are U.S. Multinational Corporations Becoming More Aggressive Income Shifters? *Journal of Accounting Research* 50, 1245-1286.

Electronic copy available at: https://ssrn.com/abstract=2374945

Kleinbard, E. 2011. Stateless income. *Florida Tax Review* 11, 699-774.

Law, K., and L. Mills. 2015. Taxes and financial constraints: Evidence from linguistic cues. *Journal of Accounting Research* 53, 777-819.

Lennox, C., P. Lisowsky, and J. Pittman. 2013. Tax aggressiveness and accounting fraud. *Journal of Accounting Research* 51, 739-778.

Leone, A., M. Minutti-Meza, and C. Wasley. 2017. Influential observations and inference in accounting research. University of Miami and University of Rochester working paper.

Linebaugh, K. 2013. How firms tap overseas cash. *Wall Street Journal*. March 28.

Lisowsky, P. 2010. Seeking shelter: empirically modeling tax shelters using financial statement information. *The Accounting Review* 85, 1693–1720.

Lisowsky, P., L. Robinson, and A. Schmidt. 2013. Do publicly disclosed tax reserves tell us about privately disclosed tax shelter activity? *Journal of Accounting Research* 51, 583-629.

Markle, K., and D. Shackelford. 2012. Cross-country comparisons of corporate income tax rates. *National Tax Journal* 65, 493-528.

Mills, L., S. Nutter and C. Schwab. 2013. The effect of political sensitivity and bargaining power on taxes: evidence from Federal contractors. *The Accounting Review* 88, 977-1005.

Neuman, S., T. Omer, and A. Schmidt. 2014. Examining the association between tax risk and tax outcomes. University of Missouri, University of Nebraska, and North Carolina State University working paper.

Nessa, M., C. Schwab, B. Stomberg, and E. Towery. 2016. How do IRS resources affect the tax enforcement process? Michigan State University, Indiana University, and University of Georgia working paper.

OECD, 2013. Action plan on base erosion and profit shifting. OECD publishing. http://dx.doi.org/10.1787/9789264202719-en

Rego, S. 2003. Tax avoidance activities of U.S. multinational corporations. *Contemporary Accounting Research* 20, 805–833.

Rego, S. and R. Wilson. 2012. Equity risk incentives and corporate tax aggressiveness. *Journal of Accounting Research* 50, 775-809.

Robinson, J., S. Sikes, and C. Weaver. 2010. Performance measurement of corporate tax departments. *The Accounting Review* 85, 1035-1064.

Electronic copy available at: https://ssrn.com/abstract=2374945

Robinson, L., B. Stomberg, and E. Towery. 2016. One size does not fit all: How the uniform rules of FIN 48 affect the relevant of income tax accounting. *The Accounting Review* 91, 1195-1217.

Saavedra, D. 2018. Is tax volatility priced by lenders in the syndicated loan market? UCLA working paper.

Scholes, M., P. Wilson, and M. Wolfson. 1990. Tax planning, regulatory capital planning, and financial reporting strategy for commercial banks. *Review of Financial Studies* 3, 625-650.

Scholes, M., and M. Wolfson. 1992. *Taxes and Business Strategy: A Planning Approach*. 1st edition. Prentice Hall.

Scholes, M., M. Wolfson, M. Erickson, M. Hanlon, E. Maydew, and T. Shevlin. 2015. *Taxes and Business Strategy: A Planning Approach*. 5th Edition. Pearson.

Shackelford, D., and Shevlin, T. 2001. Empirical tax research in accounting. *Journal of Accounting and Economics* 31, 321-387.

Shevlin, T., O. Urcan, and F. Vasvari. 2013. Corporate tax avoidance and public debt costs. University of California - Irvin and London Business School working paper.

Sheppard, L. 1995. News analysis: 'Janitor' insurance as a tax shelter. *Tax Notes* 68, 1526.

Slemrod, J. 2004. The economics of corporate selfishness. *National Tax Journal* 57, 877-899.

Slemrod, J. and S. Yitzhaki. 2002. Tax avoidance, evasion, and administration. *Handbook of Public Economics* Vol. 3, A. J Auerbach and M. Feldstein, editors, 1423-1470.

Towery, E. 2017. Unintended consequences of linking tax return disclosures of tax uncertainty to financial reporting for income taxes: evidence from schedule UTP. *The Accounting Review* 92, 201-226.

Weisbach, D. 2002. Ten truths about tax shelters, *Tax Law Review* 55, 215-253

Wilson, R. 2009. An examination of corporate tax shelter participants. *The Accounting Review* 84, 969-999.

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Exhibit 1
Unrecognized Tax Benefit Disclosure for
Johnson & Johnson
Fiscal Year Ended December 28, 2014

The following table summarizes the activity related to unrecognized tax benefits:

(Dollars in Millions)	2014	2013	2012
Beginning of year	$ 2,729	3,054	2,699
Increases related to current year tax positions	281	643	538
Increases related to prior period tax positions	295	80	57
Decreases related to prior period tax positions	(288)	(574)	(41)
Settlements	(477)	(418)	(120)
Lapse of statute of limitations	(75)	(56)	(79)
End of year	**$ 2,465**	**2,729**	**3,054**

The unrecognized tax benefits of $2.5 billion at December 28, 2014, if recognized, would affect the Company's annual effective tax rate. The Company conducts business and files tax returns in numerous countries and currently has tax audits in progress with a number of tax authorities. The IRS has completed its audit for the tax years through 2009; however, there are a limited number of issues remaining open for prior tax years going back to 1999. In other major jurisdictions where the Company conducts business, the years remain open generally back to the year 2004. The Company believes it is possible that audits may be completed by tax authorities in some jurisdictions over the next twelve months. However, the Company is not able to provide a reasonably reliable estimate of the timing of any other future tax payments relating to uncertain tax positions.

The Company classifies liabilities for unrecognized tax benefits and related interest and penalties as long-term liabilities. Interest expense and penalties related to unrecognized tax benefits are classified as income tax expense. The Company recognized after tax interest expense of $12 million, $40 million and $41 million in 2014, 2013 and 2012, respectively. The total amount of accrued interest was $298 million and $412 million in 2014 and 2013, respectively.

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Table 1
Sample Selection

Criteria	Firms	Firm-years
Observations with non-missing values of increase to UTB from current year positions (TXTUBPOSINC) aggregated over the years *t*-4 to *t*, and average total assets (AT) over the years *t*-4 to *t* greater than $10 million, with *t* ranging from 2012 to 2014.	2,480	7,090
Drop observations with negative pretax earnings (PI) aggregated over the period *t*-4 and *t*.	1,914	5,369
Drop observations with missing values of cash tax paid (TXPD) in any year *t*-4 to *t*.	1,844	5,192
Drop firms incorporated outside the United States.	1,667	4,727
Drop firms with missing values for the tax-shelter score (computed as per Lisowsky, 2009) in any year of the years *t*-4 to *t*.	1,535	4,330
Drop firms with missing values of any other variable used in the regressions.	928	2,093
Drop firms with zero additions to UTB aggregated over the period *t*-4 to *t*.	861	1,896

Notes: Financial data are gathered from Compustat. Compustat data item pneumonics are in all capital letters in parentheses. Tax shelter score data are computed following Lisowsky (2010). We thank Pete Lisowsky for sharing the tax shelter score data with us.

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Table 2
Descriptive Statistics

Panel A: Univariate Descriptive Statistics

NAME	N	MEAN	STD	P25	P50	P75
UTB ADDS	1,896	0.244	0.335	0.044	0.122	0.304
CASH ETR	1,896	0.260	0.170	0.167	0.245	0.316
N PATENTS	1,896	132.544	470.349	0.000	5.000	41.000
HAVEN INTENSITY	1,896	0.203	0.184	0.077	0.168	0.277
SHELTER SCORE	1,896	0.934	0.159	0.961	0.994	0.999
INSTITUTIONAL HOLDINGS	1,500	0.796	0.188	0.706	0.836	0.929
UNIONIZATION	1,500	0.069	0.065	0.030	0.050	0.087
SIZE	1,896	7.688	1.596	6.560	7.588	8.806
LEVERAGE	1,896	0.212	0.174	0.064	0.192	0.303
NOLDUM	1,896	0.537	0.499	0.000	1.000	1.000
ΔNOL	1,896	0.042	0.152	0.000	0.004	0.050

Panel B: Pearson (Spearman) Correlations Above (Below) the Diagonal

		1	2	3	4	5	6	7	8	9	10	11
1	*UTB ADDS*		-0.08*	0.11*	0.19*	0.05*	0.02	-0.16*	0.07*	-0.12*	0.03	0.01
2	*CASH ETR*	-0.17*		-0.09*	-0.11*	-0.10*	-0.09*	-0.09*	-0.11*	-0.04	-0.10*	0.14*
3	*N PATENTS*	0.32*	-0.19*		0.16*	0.10*	-0.03	-0.00	0.38*	0.00	-0.04	-0.05*
4	*HAVEN INTENSITY*	0.22*	-0.16*	0.19*		0.04	0.01	-0.05*	0.10*	-0.06*	0.02	-0.03
5	*SHELTER SCORE*	0.13*	-0.07*	0.26*	0.13*		0.32*	0.07*	0.57*	0.24*	0.04	-0.04
6	*INSTITUTIONAL HOLDINGS*	-0.01	-0.08*	-0.01	0.04	0.08*		-0.01	0.18*	0.04	0.04	-0.10*
7	*UNIONIZATION*	-0.12*	-0.05*	0.03	-0.11*	0.16*	-0.08*		0.15*	0.20*	0.05*	-0.04
8	*SIZE*	0.12*	-0.09*	0.24*	0.13*	0.94*	0.11*	0.15*		0.34*	-0.00	-0.09*
9	*LEVERAGE*	-0.09*	-0.08*	-0.07*	-0.08*	0.35*	0.05	0.25*	0.42*		0.04	0.02
10	*NOLDUM*	0.02	-0.12*	0.03	0.03	0.03	0.06*	0.03	0.02	0.04		-0.14*
11	*ΔNOL*	0.02	0.08*	0.01	0.01	-0.04	-0.06*	0.04	-0.04	0.04	-0.14*	

Notes: The table shows descriptive statistics for the variables used in the study. *UTB ADDS* is the five-year sum of additions to UTB from current year positions (TXTUBPOSINC) divided by the five-year sum of sales (SALE). We multiply UTB ADDS by 100. *CASH ETR* is the five-year sum of cash taxes paid (TXPD) divided by the five-year sum of pretax income before special items (PI-SPI). *N PATENTS* is the five-year sum of patents filed, using data available by Noah Stoffman at https://iu.app.box.com/v/patents. Because patent data ends in 2010, we fill in data beyond 2010 with 2010 values. *HAVEN INTENSITY* is the average of the ratio of the number of disclosed significant subsidiaries located in tax haven countries divided by the number of disclosed significant subsidiaries in foreign countries. Subsidiary location data used to compute *HAVEN INTENSITY* were gathered for each firm-year from Exhibit 21 of Form 10-K filed with the SEC. We classify a country as a tax haven based on the country being identified as a tax haven by three of the four following sources: (1) OECD, (2) the U.S. Stop Tax Havens Abuse Act, (3) The International Monetary Fund (IMF), and (4) the Tax Research Organization. *SHELTER SCORE* is the tax shelter score developed in Lisowsky (2010) and is provided by Pete Lisowsky. *INSTITUTIONAL HOLDINGS* is the percent of the firm that is held by institutions, calculated using Thomson Reuters Ownership Data. *UNIONIZATION* is the fraction of the industry work force that belongs to a union as reported by http://www.unionstats.com/, where industry is defined by U.S. Census Industry Codes (CIC), and converted to NAICS industry codes using the 2010

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Census Occupation Codes with Crosswalk file available at https://www.census.gov/people/io/methodology/. *SIZE* is the natural log of the five-year average of total assets (AT). *LEVERAGE* is the five-year average of the ratio of long-term debt to assets ((DLTT+DLC)/AT). *NOLDUM* indicates the firm had a tax loss carryforward (TLCF) at the beginning of the five-year period. *ΔNOL* is the change in tax loss carry forward (TLCF) from the beginning of the period to the end of the period, divided by average assets over the period. All continuous variables are winsorized at the 1st and 99th percentiles, except *CASH ETR*, which is winsorized at 0 and 1. All financial data are obtained from Compustat.

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Table 3
Comparison of *CASH ETR* and *UTBADDS* by *AVOIDER*

Panel A: CASH ETR by AVOIDER

	N	MEAN	STD	MIN	P25	P50	P75	MAX
AVOIDER	632	0.114	0.062	0.000	0.063	0.129	0.167	0.197
non-*AVOIDER*	1264	0.333	0.159	0.197	0.245	0.290	0.350	1.000

Panel B: UTB ADDS by AVOIDER

	N	MEAN	STD	MIN	P25	P50	P75	MAX
AVOIDER	632	0.326*	0.394	0.002	0.059	0.182	0.457	1.930
non-*AVOIDER*	1,264	0.203	0.293	0.002	0.039	0.106	0.231	1.930

*represents statistical significance comparing *AVOIDER* to non-*AVOIDER* at 5 percent or better.

Notes: We classify firms as tax avoiders if their *CASH ETR* falls into the lowest tercile of the distribution of *CASH ETR* (five year) in our sample. *UTB ADDS* is the five-year sum of additions to UTB from current year positions (TXTUBPOSINC) divided by the five-year sum of sales (SALE). *CASH ETR* is the five-year sum of cash taxes paid (TXPD) divided by the five-year sum of pretax income before special items (PI-SPI).

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Table 4
Regression of *UTB ADDS* on *AVOIDER, Test Variables,* and *Controls*

		Model 1	Model 2	Model 3
INTERCEPT		0.039***	0.066***	0.075***
		(4.36)	(6.64)	(5.73)
AVOIDER	(+)	0.041***	0.045***	0.064***
		(4.63)	(5.23)	(6.17)
PATENTS			0.053***	0.052***
			(4.40)	(3.88)
*AVOIDER * PATENTS*	(+)		0.052***	0.070***
			(2.59)	(2.90)
HAVEN			0.012	0.010
			(1.25)	(0.83)
*AVOIDER * HAVEN*	(+)		0.015	0.023
			(0.90)	(1.14)
SHELTER			-0.005	0.007
			(-0.44)	(0.45)
*AVOIDER * SHELTER*	(+)		0.055***	0.054**
			(2.40)	(2.03)
SIZE			0.014***	0.011**
			(3.01)	(2.23)
*AVOIDER * SIZE*			-0.007	-0.003
			(-0.91)	(-0.29)
LEVERAGE			0.042	-0.015
			(1.47)	(-0.44)
*AVOIDER * LEVERAGE*			-0.189***	-0.092
			(-3.83)	(-1.43)
NOLDUM			-0.000	0.018*
			(-0.00)	(1.94)
*AVOIDER * NOLDUM*			-0.011	-0.053**
			(-0.70)	(-2.58)
ΔNOL			-0.014	-0.006
			(-0.48)	(-0.17)
*AVOIDER * ΔNOL*			0.161***	0.154***
			(2.75)	(2.60)
HIGH INST				-0.017*
				(-1.80)
*AVOIDER * HIGHINST*				-0.021
				(-1.08)
HIGH UNION				0.025**
				(2.01)
*AVOIDER * HIGH UNION*				-0.049**
				(-2.40)
INDUSTRY FIXED EFFECTS		YES	YES	YES
N		1,896	1,896	1,500
ADJRSQ		0.191	0.322	0.383

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Table 4 (continued)
Regression of *UTB ADDS* on *AVOIDER, Test Variables, and Controls*

Notes: In this table we report results from estimating Eq. (1):

$$UTB\ ADDS_{it} = \alpha_0 + \alpha_1 AVOIDER_{it} + \alpha_2 PATENTS_{it} + \alpha_3\ AVOIDER_{it} * PATENTS_{it} + \alpha_4 HAVEN_{it} + \alpha_5\ AVOIDER_{it} * HAVEN_{it} + \alpha_6 SHELTER_{it} + \alpha_7\ AVOIDER_{it} * SHELTER_{it} + \alpha_k CONTROL_{it} + \alpha_j AVOIDER_{it} * CONTROL_{it} + u_{it}.$$

UTB ADDS is the five-year sum of additions to UTB from current year positions (TXTUBPOSINC) divided by the five-year sum of sales (SALE). *AVOIDER* is an indicator equal to one if the firm's *CASH ETR* (defined in Table 2) is in the lowest tercile of the sample. *PATENTS* is an indicator equal to one if the firm is in the highest tercile of *N PATENTS* (defined in Table 2), *HAVEN* is an indicator equal to one if the firm is in the highest tercile of *HAVEN INTENSITY* (defined in Table 2) and *SHELTER* is an indicator equal to one if the firm is in the highest tercile of *SHELTER SCORE* (defined in Table 2). Control variables include *HIGH INST,* an indicator variable equal to one if the firm is in the highest tercile of *INSTITUTIONAL HOLDINGS* (defined in Table 2), *HIGH UNION*, an indicator variable equal to one of the firm is in the highest tercile of *UNIONIZATION* (defined in Table 2), *SIZE*, *LEVERAGE*, *NOLDUM*, and *ΔNOL* (all defined in Table 2). Industry fixed effects based on Barth et al. (2005) are included where indicated. Regressions are estimated using iteratively reweighted least squares (robust regression). T-statistics based on standard errors that are clustered at the firm level are reported below the coefficient estimates. ***, **, and * represent statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using one-tailed tests where a signed prediction is made, and two-tailed tests where a signed prediction is not made.

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Table 5
Regression of *UTB ADDS* on *AVOIDER*, Test Variables, and Controls When Tax Haven Intensity is Low or High

		Model 1			Model 2		
		HAVEN = 0	*HAVEN* = 1	*Difference*	*HAVEN* = 0	*HAVEN* = 1	Difference
INTERCEPT		0.068***	0.044*	-0.023	0.074**	0.057	-0.017
		(7.53)	(1.87)	(-0.92)	(6.24)	(1.52)	(-0.45)
AVOIDER		0.038***	0.058***	0.021	0.052**	0.078***	0.026
		(3.62)	(4.10)	(1.21)	(4.34)	(4.68)	(1.30)
PATENTS		0.053***	0.044**	-0.008	0.054**	0.036	-0.017
		(3.59)	(2.13)	(-0.33)	(3.34)	(1.52)	(-0.62)
*AVOIDER * PATENTS*	(+)	0.019	0.102***	0.083**	0.044	0.109***	0.065*
		(0.78)	(3.12)	(2.08)	(1.54)	(2.70)	(1.35)
SHELTER		-0.001	-0.002	-0.000	0.002	0.033	0.031
		(-0.08)	(-0.06)	(-0.01)	(0.14)	(0.96)	(0.82)
*AVOIDER * SHELTER*		0.045*	0.052	0.007	0.056	0.021	-0.035
		(1.74)	(1.20)	(0.14)	(1.72)	(0.40)	(-0.60)
SIZE		0.015***	0.010	-0.005	0.015**	0.004	-0.012
		(2.93)	(1.12)	(-0.47)	(2.83)	(0.36)	(-0.97)
*AVOIDER * SIZE*		-0.000	-0.015	-0.015	0.004	-0.007	-0.011
		(-0.04)	(-1.09)	(-0.87)	(0.30)	(-0.45)	(-0.55)
LEVERAGE		0.005	0.093	0.088	-0.055	0.013	0.068
		(0.16)	(1.57)	(1.35)	(-1.42)	(0.21)	(0.91)
*AVOIDER * LEVERAGE*		-0.138**	-0.320***	-0.182*	-0.022	-0.231*	-0.208
		(-2.39)	(-3.41)	(-1.69)	(-0.30)	(-1.92)	(-1.50)
NOLDUM		-0.008	0.017	0.024	0.010	0.049**	0.039*
		(-0.81)	(0.98)	(1.27)	(0.96)	(2.26)	(1.66)
*AVOIDER * NOLDUM*		0.000	-0.053*	-0.053	-0.037	-0.112***	-0.075*
		(0.00)	(-1.88)	(-1.59)	(-1.56)	(-3.07)	(-1.77)
ΔNOL		0.015	-0.078*	-0.093*	0.013	-0.044	-0.057
		(0.44)	(-1.82)	(-1.75)	(0.32)	(-0.77)	(-0.83)
*AVOIDER * ΔNOL*		0.102	0.315***	0.214**	0.112	0.294***	0.182
		(1.47)	(3.78)	(2.05)	(1.62)	(3.22)	(1.64)
HIGH INST					-0.014	-0.027	-0.013
					(-1.28)	(-1.47)	(-0.62)
*AVOIDER * HIGHINST*					-0.026	-0.013	0.013
					(-1.15)	(-0.41)	(0.33)
HIGH UNION					0.021	0.055**	0.034
					(1.47)	(2.07)	(1.14)
*AVOIDER * HIGH UNION*					-0.050*	-0.041	0.009
					(-2.09)	(-1.17)	(0.22)
INDUSTRY FIXED EFFECTS		YES	YES		YES	YES	
N		1,264	632		1,003	497	
ADJRSQ		0.268	0.442		0.349	0.495	

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Table 5 (continued)
Regression of *UTB ADDS* on *AVOIDER* and Tax Uncertainty Factors When Tax Haven Intensity is Low or High

Notes: In this table we report results from estimating Eq. (1) separately for observations that have *HAVEN* = 0, and *HAVEN* = 1:

$$UTB\ ADDS_{it} = \alpha_0 + \alpha_1 AVOIDER_{it} + \alpha_2 PATENTS_{it} + \alpha_3\ AVOIDER_{it} * PATENTS_{it} + \alpha_5 SHELTER_{it} + \alpha_6\ AVOIDER_{it} * SHELTER_{it} + \alpha_k CONTROL_{it} + \alpha_j AVOIDER_{it} * CONTROL_{it} + u_{it}.$$

UTB ADDS is the five-year sum of additions to UTB from current year positions (TXTUBPOSINC) divided by the five-year sum of sales (SALE). *HAVEN* is an indicator equal to one if the firm is in the highest tercile of *HAVEN INTENSITY* (defined in Table 2). *AVOIDER* is an indicator equal to one if the firm's *CASH ETR* (defined in Table 2) is in the lowest tercile of the sample. *PATENTS* is an indicator equal to one if the firm is in the highest tercile of *N PATENTS* (defined in Table 2) and *SHELTER* is an indicator equal to one if the firm is in the highest tercile of *SHELTER SCORE* (defined in Table 2). Control variables include *HIGH INST* which is an indicator variable equal to one if the firm is in the highest tercile of *INSTITUTIONAL HOLDINGS* (defined in Table 2), and *HIGH UNION*, an indicator variable equal to one of the firm is in the highest tercile of *UNIONIZATION* (defined in Table 2), as well as *SIZE*, *LEVERAGE*, *NOLDUM*, and *ΔNOL* (all defined in Table 2). Industry fixed effects based on Barth et al. (2005) are included where indicated. Regressions are estimated using iteratively reweighted least squares (robust regression). T-statistics based on standard errors that are clustered at the firm level are reported below the coefficient estimates. ***, **, and * represent statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using one-tailed tests where a signed prediction is made, and two-tailed tests where a signed prediction is not made.

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Table 6
Regression of *UTB ADDS* on *CASH ETR, Test Variables*, and *Controls*

		Model 1	Model 2	Model 3
INTERCEPT		0.049***	0.073***	0.088***
		(5.73)	(7.82)	(6.57)
CASH ETR	(-)	-0.037	-0.047*	-0.109***
		(-1.54)	(-1.78)	(-3.14)
PATENTS			0.068***	0.071***
			(6.49)	(5.62)
*CASH ETR * PATENTS*	(-)		-0.144***	-0.278***
			(-2.59)	(-3.18)
HAVEN			0.020**	0.020*
			(2.32)	(1.90)
*CASH ETR * HAVEN*	(-)		0.002	-0.012
			(0.04)	(-0.20)
SHELTER			0.005	0.015
			(0.47)	(1.12)
*CASH ETR * SHELTER*	(-)		-0.160**	-0.313***
			(-2.26)	(-3.10)
SIZE			0.014***	0.013**
			(3.49)	(2.57)
*CASH ETR * SIZE*			0.023	0.062**
			(1.07)	(2.08)
LEVERAGE			-0.027	-0.046
			(-1.20)	(-1.53)
*CASH ETR * LEVERAGE*			0.318***	0.111
			(3.23)	(0.59)
NOLDUM			-0.001	0.006
			(-0.08)	(0.64)
*CASH ETR * NOLDUM*			-0.024	0.061
			(-0.61)	(1.08)
ΔNOL			0.043	0.082**
			(1.31)	(2.20)
*CASH ETR * ΔNOL*			-0.049	-0.079
			(-0.55)	(-0.63)
HIGH INST				-0.022**
				(-2.41)
*CASH ETR * HIGHINST*				-0.128*
				(-1.96)
HIGH UNION				0.012
				(0.98)
*CASH ETR * HIGH UNION*				-0.037
				(-0.58)
INDUSTRY FIXED EFFECTS		YES	YES	YES
N		1,896	1,896	1,500
ADJRSQ		0.176	0.289	0.324

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Table 6 (continued)
Regression of *UTB ADDS* on *CASH ETR, Test Variables, and Controls*

Notes: In this table we report results from estimating Eq. (1) with *CASH ETR* in place of *AVOIDER*:

$$UTB\ ADDS_{it} = \alpha_0 + \alpha_1 CASH\ ETR_{it} + \alpha_2 PATENTS_{it} + \alpha_3\ CASH\ ETR_{it} * PATENTS_{it} + \alpha_4 HAVEN_{it} + \alpha_5\ CASH\ ETR_{it} * HAVEN_{it} + \alpha_6 SHELTER_{it} + \alpha_7\ CASH\ ETR_{it} * SHELTER_{it} + \alpha_k CONTROL_{it} + \alpha_j CASH\ ETR_{it} * CONTROL_{it} + u_{it}.$$

UTB ADDS is the five-year sum of additions to UTB from current year positions (TXTUBPOSINC) divided by the five-year sum of sales (SALE). *CASH ETR* is the five-year sum of cash taxes paid (TXPD) divided by the five-year sum of pretax income before special items (PI-SPI). *PATENTS* is an indicator equal to one if the firm is in the highest tercile of *N PATENTS* (defined in Table 2), *HAVEN* is an indicator equal to one if the firm is in the highest tercile of *HAVEN INTENSITY* (defined in Table 2) and *SHELTER* is an indicator equal to one if the firm is in the highest tercile of *SHELTER SCORE* (defined in Table 2). Control variables include *HIGH INST,* an indicator variable equal to one if the firm is in the highest tercile of *INSTITUTIONAL HOLDINGS* (defined in Table 2), *HIGH UNION*, an indicator variable equal to one of the firm is in the highest tercile of *UNIONIZATION* (defined in Table 2), *SIZE*, *LEVERAGE*, *NOLDUM*, and *ΔNOL* (all defined in Table 2). Industry fixed effects based on Barth et al. (2005) are included where indicated. Regressions are estimated using iteratively reweighted least squares (robust regression). T-statistics based on standard errors that are clustered at the firm level are reported below the coefficient estimates. ***, **, and * represent statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using one-tailed tests where a signed prediction is made, and two-tailed tests where a signed prediction is not made.

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Table 7
Regression of *UTB ADDS* on *CASH ETR,* Test Variables, and Controls When Tax Haven Intensity is Low or High

	Model 1			Model 2		
	HAVEN = 0	*HAVEN* = 1	*Difference*	*HAVEN* = 0	*HAVEN* = 1	Difference
INTERCEPT	0.070***	0.059**	-0.012	0.076**	0.113**	0.038
	(8.20)	(2.57)	(-0.48)	(6.49)	(2.26)	(0.75)
CASH ETR	-0.038	-0.108**	-0.070	-0.090*	-0.178***	-0.088
	(-1.28)	(-2.44)	(-1.33)	(-2.02)	(-3.21)	(-1.27)
PATENTS	0.054***	0.078***	0.023	0.055**	0.090***	0.035
	(4.36)	(4.01)	(1.03)	(3.70)	(3.58)	(1.22)
*CASH ETR * PATENTS*	-0.090	-0.471***	-0.381***	-0.269*	-0.250**	0.020
	(-1.36)	(-4.41)	(-3.09)	(-2.20)	(-2.26)	(0.12)
SHELTER	0.007	-0.001	-0.008	0.013	0.016	0.003
	(0.58)	(-0.04)	(-0.32)	(0.88)	(0.56)	(0.10)
*CASH ETR * SHELTER*	-0.122	-0.086	0.036	-0.259*	-0.347**	-0.087
	(-1.62)	(-0.69)	(0.25)	(-2.33)	(-2.29)	(-0.48)
SIZE	0.017***	0.009	-0.008	0.019**	0.003	-0.016
	(3.68)	(1.14)	(-0.91)	(3.46)	(0.30)	(-1.35)
*CASH ETR * SIZE*	0.040	-0.018	-0.058	0.066	0.058	-0.008
	(1.56)	(-0.58)	(-1.45)	(1.94)	(1.63)	(-0.17)
LEVERAGE	-0.050*	-0.007	0.043	-0.076*	-0.053	0.022
	(-1.95)	(-0.15)	(0.87)	(-2.27)	(-0.84)	(0.32)
*CASH ETR * LEVERAGE*	0.186*	0.640***	0.454*	-0.073	0.032	0.105
	(1.68)	(2.70)	(1.74)	(-0.39)	(0.08)	(0.23)
NOLDUM	-0.006	-0.001	0.005	0.002	0.014	0.012
	(-0.74)	(-0.06)	(0.32)	(0.17)	(0.70)	(0.55)
*CASH ETR * NOLDUM*	-0.104**	0.050	0.155*	-0.103	0.450***	0.553***
	(-2.24)	(0.67)	(1.76)	(-1.61)	(5.11)	(5.21)
ΔNOL	0.064*	0.010	-0.054	0.085*	0.114	0.028
	(1.84)	(0.18)	(-0.87)	(2.16)	(1.53)	(0.36)
*CASH ETR * ΔNOL*	0.036	-0.215*	-0.252	-0.151	0.010	0.160
	(0.32)	(-1.80)	(-1.58)	(-0.84)	(0.08)	(0.77)
HIGH INST				-0.018	-0.036**	-0.018
				(-1.74)	(-2.20)	(-0.92)
*CASH ETR * HIGHINST*				-0.044	-0.466***	-0.421***
				(-0.60)	(-3.23)	(-2.71)
HIGH UNION				0.011	0.038	0.026
				(0.78)	(1.55)	(0.96)
*CASH ETR * HIGH UNION*				-0.012	0.044	0.056
				(-0.17)	(0.38)	(0.43)
INDUSTRY FIXED EFFECTS	YES	YES		YES	YES	
N	1,264	632		1,003	497	
ADJRSQ	0.248	0.407		0.288	0.428	

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Table 7 (continued)
Regression of *UTB ADDS* on *CASH ETR* and Tax Uncertainty Factors When Tax Haven Intensity is Low or High

Notes: In this table we report results from estimating Eq. (1) separately for observations that have *HAVEN* = 0, and *HAVEN* = 1, with *CASH ETR* in place of *AVOIDER*:

$$UTB\ ADDS_{it} = \alpha_0 + \alpha_1 CASH\ ETR_{it} + \alpha_2 PATENTS_{it} + \alpha_3\ CASH\ ETR_{it} * PATENTS_{it} + \alpha_5 SHELTER_{it} + \alpha_6\ CASH\ ETR_{it} * SHELTER_{it} + \alpha_k CONTROL_{it} + \alpha_j CASH\ ETR_{it} * CONTROL_{it} + u_{it}.$$

UTB ADDS is the five-year sum of additions to UTB from current year positions (TXTUBPOSINC) divided by the five-year sum of sales (SALE). *HAVEN* is an indicator equal to one if the firm is in the highest tercile of *HAVEN INTENSITY* (defined in Table 2). *CASH ETR* is the five-year sum of cash taxes paid (TXPD) divided by the five-year sum of pretax income before special items (PI-SPI). *PATENTS* is an indicator equal to one if the firm is in the highest tercile of *N PATENTS* (defined in Table 2) and *SHELTER* is an indicator equal to one if the firm is in the highest tercile of *SHELTER SCORE* (defined in Table 2). Control variables include *HIGH INST*, which is an indicator variable equal to one if the firm is in the highest tercile of *INSTITUTIONAL HOLDINGS* (defined in Table 2), and *HIGH UNION*, an indicator variable equal to one of the firm is in the highest tercile of *UNIONIZATION* (defined in Table 2), as well as *SIZE*, *LEVERAGE*, *NOLDUM*, and *ΔNOL* (all defined in Table 2). Industry fixed effects based on Barth et al. (2005) are included where indicated. Regressions are estimated using iteratively reweighted least squares (robust regression). T-statistics based on standard errors that are clustered at the firm level are reported below the coefficient estimates. ***, **, and * represent statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using one-tailed tests where a signed prediction is made, and two-tailed tests where a signed prediction is not made.

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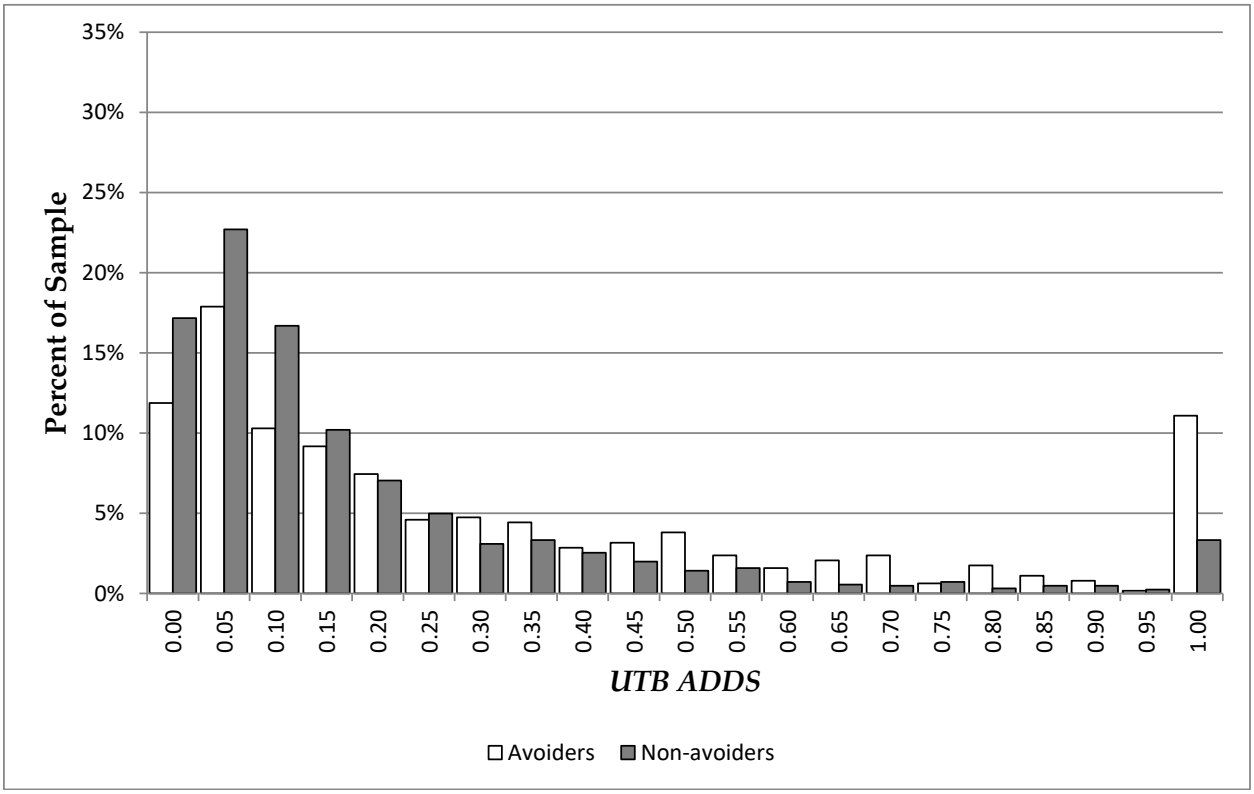
Figure 1
Plot of *UTB ADDS* for Tax Avoider and Non-Avoider Firms



Notes: The figure is comprised of 1,896 observations from the *AVOIDERS* and non-*AVOIDERS* groups reported in Table 3, Panel A. The white bins are observations from the sample of *AVOIDERS* reported in Table 3, Panel A. The grey bins are observations from the sample of non-*AVOIDERS* reported in Table 3, Panel A. The horizontal axis represents *UTB ADDS* over a five-year period, scaled by sales over the same five-year period. The ratio is multiplied by 100 to facilitate interpretation.

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Figure 2
Path Analysis

Panel A: Main Results

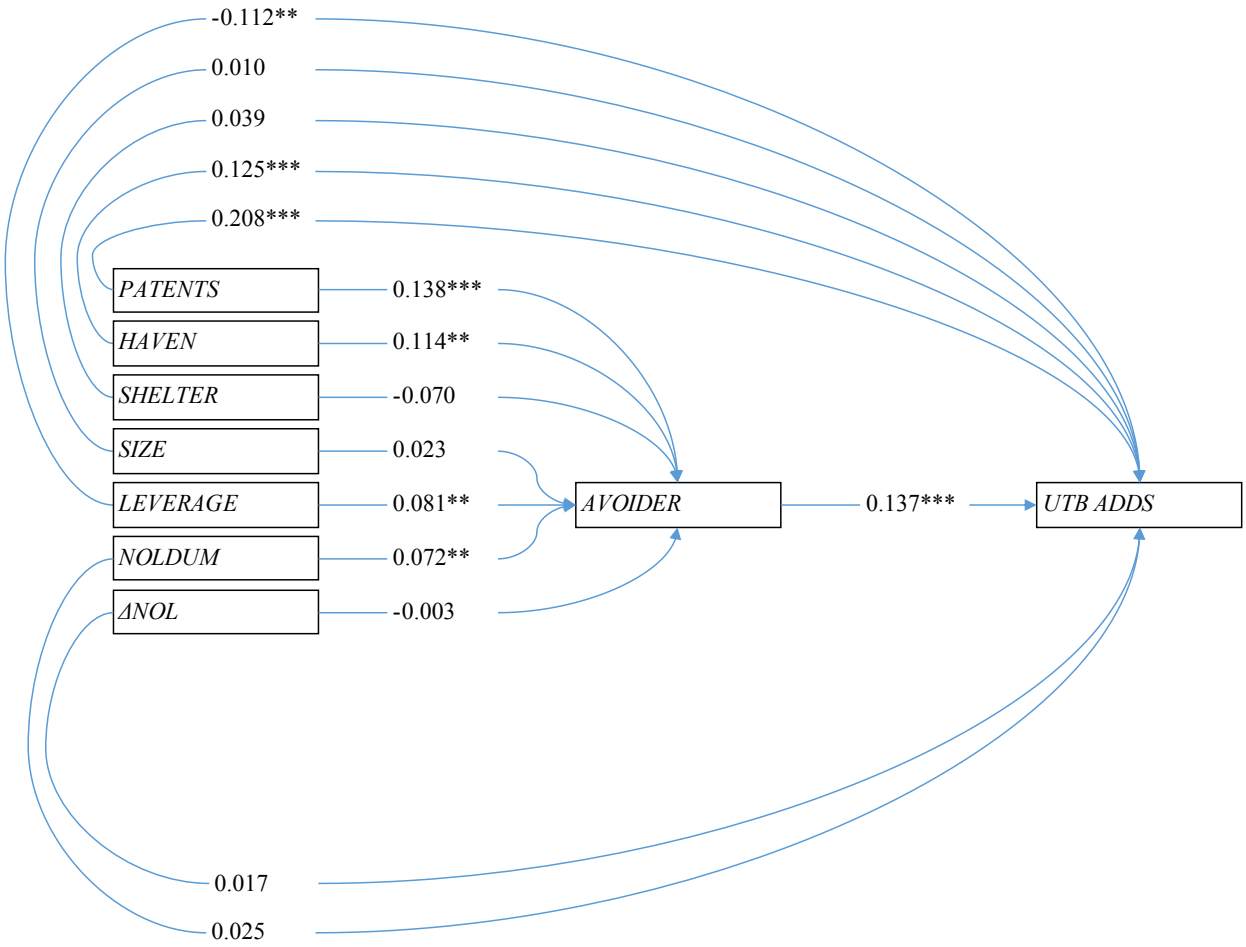

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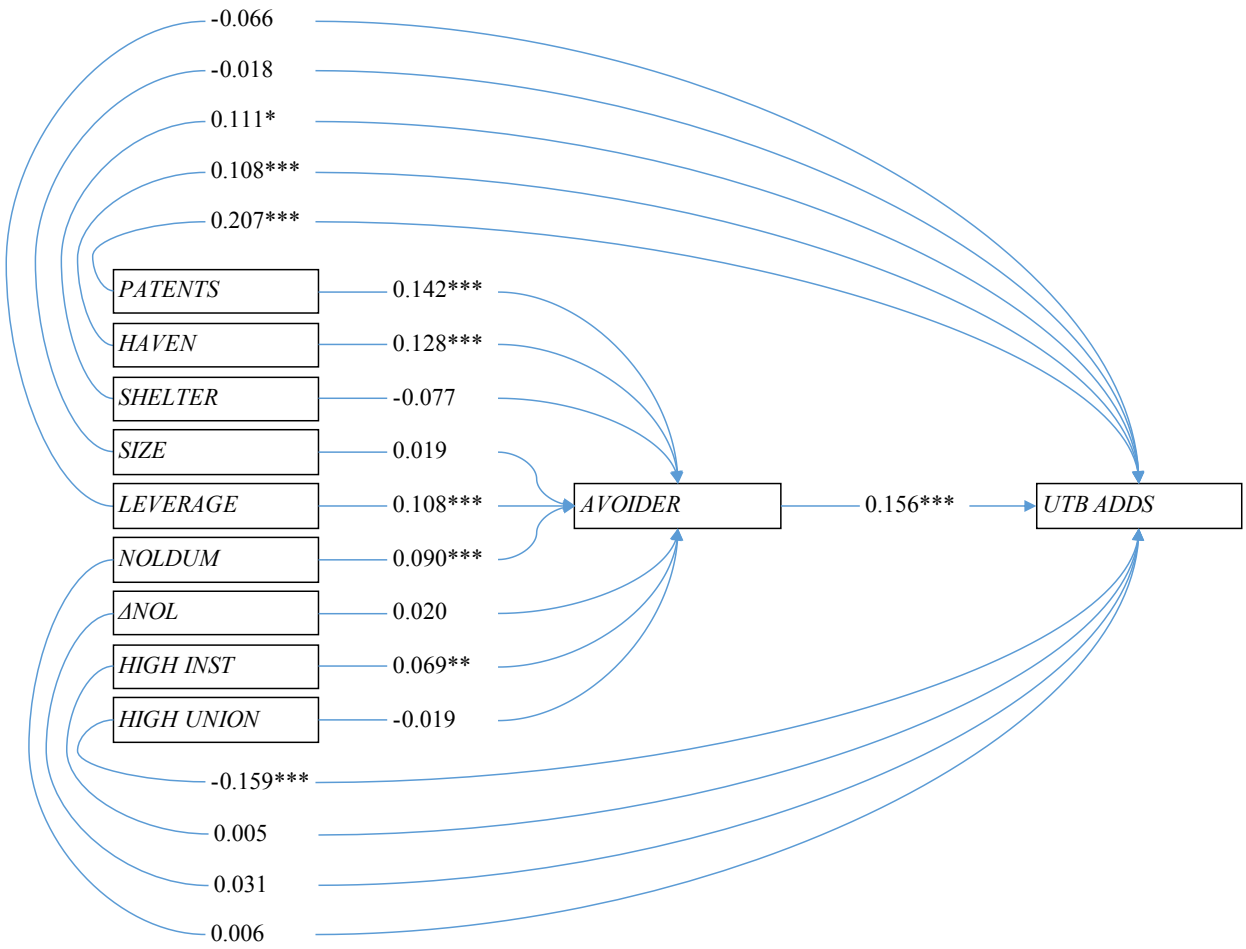
Figure 2 (continued)
Path Analysis

Panel B: Additional results including HIGH INST and HIGH UNION.



Notes: The figure represents the path analysis describing the relation between *UTB ADDS*, *AVOIDER*, and the other variables used in the study. Variables of interest are defined as follows: *PATENTS*, which is an indicator equal to one if the firm is in the highest tercile of *N PATENTS* (defined in Table 2); *HAVEN*, which is an indicator equal to one if the firm is in the highest tercile of *HAVEN INTENSITY* (defined in Table 2); *SHELTER*, which is an indicator equal to one if the firm is in the highest tercile of *SHELTER SCORE* (defined in Table 2); *HIGH INST*, which is an indicator variable equal to one if the firm is in the highest tercile of *INSTITUTIONAL HOLDINGS* (defined in Table 2); and *HIGH UNION*, which is an indicator variable equal to one of the firm is in the highest tercile of *UNIONIZATION* (defined in Table 2). Other variables are as defined in Table 2.

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