How Do Firms Assess the Costs of Tax Aggressiveness? Evidence from Mandated Enterprise Risk Assessments

Trent Krupa
University of Connecticut
trent.krupa@uconn.edu
(860) 486-5987

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Abstract

Tax aggressiveness affects cash flow through various non-tax sources, such as reputational costs or tax-driven investments in high-risk locations or assets. Assessment of these costs likely requires internal information beyond the accounting function's scope and expertise. Using a novel regulatory setting in the U.S. insurance industry, I examine whether mandated firm-wide risk assessments help firms evaluate the costs from tax aggressiveness, and the extent to which this information influences firms' tax avoidance. These regulations require U.S. insurers to identify, assess, and report firm-wide risks to executives and the board of directors, considering risk interdependencies between business units. Results indicate that firm-wide risk assessments enable firms to identify costs of tax avoidance. After the imposition of the requirement for executives and boards to evaluate firm-wide risk assessment information, firms *reduce* investment in uncertain tax positions and tax haven activity, *increasing* cash taxes paid. Additionally, risk assessments attenuate the positive relation between uncertain tax positions and firm risk.

1. **Introduction**

Tax represents one of a firm's largest cash outflows and tax avoidance benefits firms by reducing these outflows (Shackelford and Shevlin 2001). However, firms must weigh the benefits of tax avoidance against potential tax (e.g., IRS audit) and non-tax costs (Hanlon and Heitzman 2010; Scholes et al. 2015). While survey evidence suggests that decision-makers are concerned about costs associated with corporate tax avoidance (Graham, Hanlon, Shevlin, and Shroff 2014), little is known about how these costs are assessed, or how the assessment influences tax avoidance behavior. Answering these questions can provide a better understanding of whether firms' select tax strategies that are pre-determined to present relatively limited risk and how internal information frictions can affect this determination. To address these questions, I exploit a regulatory change in the U.S. insurance industry which requires insurers to identify, assess, and report firm-wide risks to management and the board of directors, taking into account the interdependencies of risks between operating units. I propose that *firm-wide* risk assessments improve the ability to assess non-tax costs of tax avoidance, altering tax avoidance behavior depending on how improved information updates decision-makers' prior beliefs about these costs (Roychowdhury, Shroff, and Verdi 2019).

Recent literature suggests that stronger governance practices align incentives between management and shareholders, increasing investment in tax avoidance (e.g., Rego and Wilson 2012; Armstrong, Blouin, Jagolinzer, and Larcker 2015; Gallemore and Labro 2015). This is similar to the effect of aligned incentives increasing other risky investments such as R&D (e.g., Coles, Daniel, and Naveen 2006). However, unlike many other investments, tax avoidance presents a unique combination of additional risks through reputational damage (Hanlon and Slemrod 2009), political costs (Mills, Nutter, and Schwab 2013), public scrutiny (Dyreng, Hoopes, and Wilde 2016), or engagement in riskier operating activities (e.g., tax haven locations) to achieve explicit tax savings (Guenther, Matsunaga, and Williams 2017). These "outcome costs" (Wilde and Wilson 2018) extend beyond the tax functions' direct expertise and are more likely to be identified by other departments which carry ownership of these respective risks.

To better understand whether and to what extent firm-wide risk assessments enable firms to evaluate the costs of tax avoidance, I exploit a novel setting in the U.S. insurance industry where state insurance regulators adopted Own Risk and Solvency Assessment (ORSA) regulations between 2013 and 2017. ORSA requires medium and large insurers to implement a firm-wide process to identify, assess, and report risks to senior management and the board of directors (NAIC 2014). Importantly, ORSA requires the removal of artificial "silos" of traditional risk management, mandating the evaluation of risks after considering interdependencies between various departments and business units, with the board approving aggregate risk appetites (PWC 2011). Prior to ORSA, a firm's tax function can likely identify the *tax* costs of an aggressive tax position, such as the likelihood of a position being overturned by the tax authority and associated interest and penalties (Mills, Robinson, and Sansing 2010). However, I propose that ORSA increases decision-makers' understanding of how tax aggressiveness influences *non-tax* costs arising in other operating functions (e.g. investment operations, client services, human resources, etc.).[1]

In addition to providing a risk assessment mechanism, this setting is advantageous for two key reasons. First, ORSA is solely focused on enhancing the firm's internal risk assessment process with no requirement for firms to adhere to a specific risk profile, publicly disclose

[1] Tax avoidance falls on a continuum from least aggressive (routine) to most aggressive (tax sheltering). Consistent with prior literature, I define tax aggressiveness as tax avoidance that is uncertain to be upheld by the tax authority (Hanlon and Heitzman 2010; Rego and Wilson 2012; Lisowsky, Robinson, and Schmidt 2013; Blouin 2014; Hanlon, Maydew, and Saavedra 2017; Dyreng, Hanlon, and Maydew 2019).

information, or otherwise change operating activities. This mitigates the concern that observed changes to tax avoidance are due to required investments unique to this regulation, or significant changes to a firm's external information environment which can influence tax avoidance opportunities (Chen, Hepfer, Quinn, and Wilson 2018). Second, prior to ORSA, U.S. insurers have incentives to undertake tax avoidance strategies without a robust firm-wide process to evaluate the costs of these investments. Specifically, insurers faced pressure from the reinsurance market to maximize after-tax cash flow (Cole et al. 2011) while primarily (over) relying on high risk based capital (RBC) levels as a means of general risk management. This limited firms' understanding of broad operating and financial risks, leading to the calls for ORSA in the aftermath of the financial crisis (Cummins and Phillips 2009).[2] Thus, ORSA provides a unique setting to evaluate whether and how firm-wide risk information is useful in updating management's calculation of costs from tax aggressiveness when pre-period risk information is likely to be less robust, on average.

Importantly, it is an empirical question as to whether an enhanced risk assessment process *increases* or *decreases* tax aggressiveness. Studies examining whether tax aggressiveness generates significant non-tax costs find mixed results (e.g., Hanlon and Slemrod 2009 versus Gallemore, Maydew, and Thornock 2014). Thus, an enhanced risk assessment process may identify limited costs from tax avoidance, encouraging firms to increase tax avoidance to realize cash tax savings. On the other hand, absent a strong firm-wide risk assessment process, firms may select tax aggressive strategies while unaware of non-tax costs to the firm (e.g., reputation; Hanlon and Slemrod 2009; Dhaliwal, Goodman, Hoffman, and Schwab 2017) that when identified, induce firms to reduce tax aggressiveness. The direction of this effect

[2] Moreover, insurers were criticized for inconsequential implementation of enterprise risk management programs, preserving the boundaries of traditional risk management silos while creating a false sense of security (Power 2009).

provides evidence as to whether previously identified null-results from tax avoidance are simply due to limited non-tax costs, or management's self-selection into tax strategies that are less likely to present significant risk to the firm (Gallemore et al 2014).

I examine the effect of ORSA on public insurers' tax aggressiveness using a generalized difference-in-differences design with firm and year fixed-effects, mitigating endogeneity concerns common in governance literature and limiting the effect of tax law changes occurring in a particular year. I focus my primary analysis on the post-ORSA change to firms' investment in uncertain tax positions, measured by current year increases to unrecognized tax benefits (UTBs) reported under FIN 48 (now ASC 740-10-25). UTBs are associated with greater levels of tax avoidance (Dyreng, Hanlon, and Maydew 2019) and unlike routine tax avoidance strategies, such as investment in municipal bonds or assets which provide accelerated depreciation, aggressive tax avoidance represented by UTBs likely presents both tax (Mills, Robinson, and Sansing 2010) and non-tax costs to the firm (Blouin 2014; Klassen, Lisowsky, and Mescall 2016). I find a 22.5 percent reduction in current year increases to insurers' UTBs following ORSA. The reduction to uncertain tax avoidance suggests that managers and the board discover and mitigate previously unidentified costs from these positions. Thus, firm-wide risk assessments contain important information about the net benefits of tax avoidance. These results are robust to several additional analyses, including tests within only the sample of insurers that are subject to ORSA and a matched sample of ORSA covered insurers to smaller, non-covered insurers.

I perform additional cross sectional analyses to examine the risk assessment mechanism underlying my research setting. First, I find that the post period reduction to tax avoidance is strongest for insurers with higher capital ratios prior to ORSA, consistent with these insurers relying primarily on high capitalization to manage enterprise risks in the pre-period. Second, I find that the effect is concentrated among firms with a greater number of reported business and operating segments. This suggests that, prior to ORSA, a larger number of segments inhibited evaluation of non-tax costs across these business silos and that ORSA removed artificial barriers to information flow between silos.

While I focus on UTBs as my primary measure of tax aggressiveness (Lisowsky, Robinson, and Schmidt 2013; Dyreng et al. 2019), I also examine the effect of risk assessment information on a firm's cash effective tax rates (CETRs) and use of tax haven subsidiaries (Dyreng and Lindsey 2009). I find that firms report higher CETRs in the post-ORSA period and locate subsidiaries in fewer unique tax haven countries, suggesting that the reduction to UTBs was not simply due to ORSA driving financial reporting changes to UTBs, but rather an economic reduction to underlying tax avoidance. The inverse relationship between UTBs and CETRs is consistent with the expected relation between these two variables, but often not documented in prior work potentially due to endogeneity (cf. Dyreng et al. 2019).

I perform three additional analyses to support my inferences and rule out alternative explanations. First, I examine the relation between tax aggressiveness and firm risk before and after ORSA. Prior to ORSA regulation, insurers' UTBs are positively associated with firm risk and this relation is subsequently reduced or eliminated in the post period. This is consistent with ORSA enabling firms to identify and mitigate risks from tax aggressiveness. Second, using a system of simultaneous equations, I find that the reduction to tax aggressiveness is concentrated among higher-risk firms *and* the tax aggressive positions maintained post-ORSA are less risky. The post period null relation between UTBs and firm risk is consistent with the average relation identified by Guenther et al. (2017) and suggests that, absent a robust firm-wide risk assessment process, insurers accept tax avoidance strategies that increase the underlying riskiness of cash flows. Both of these tests suggest that UTBs remaining on insurers' books after ORSA present lower non-tax costs than pre-ORSA UTBs.

Third, if ORSA limits managers' ability to use tax aggressiveness for rent-seeking activities (Desai and Dharmapala 2006) by reducing information asymmetry between the board of directors and managers, the reduction in tax aggressiveness will be concentrated among firms with higher information asymmetry (e.g., firms with weaker governance). However, my evidence suggests that the regulatory effect is evenly distributed across firms regardless of the quality of governance proxies, which is more consistent with a general enhancement to risk assessment quality changing the cost-benefit calculation for tax aggressiveness, rather than uncovering rent-seeking activities by managers.

An important caveat of my study is that my findings may be unique to the U.S. insurance industry. While I examine a useful setting to evaluate a causal relation between firm-wide risk assessments and tax aggressiveness, I am limited to an analysis of U.S. insurers, which may have different tax avoidance opportunities, risks, or incentives than broader industries. Still, insurers have many tools for tax avoidance that are available to other industries, such as stock-based compensation arrangements, multi-jurisdictional income shifting, captive insurance, low-income housing tax credits, and like other industries, face general uncertainty associated with new or unique tax circumstances. More importantly, this setting enables a better understanding of how firm-wide risk information is utilized to assess the costs of tax aggressiveness, a question that is difficult to answer in other settings (see List 2020). Finally, insurers represent an important component of the U.S. economy and are often examined to identify effects that cannot be examined elsewhere (e.g., Petroni 1992; Petroni and Shackelford 1995; Gaver and Patterson 2001, 2004, 2007; Hepfer et al. 2019).

This study contributes to the literature in several ways. First, I answer the call by Gallemore and Labro (2015) to identify specific management information that influences corporate tax avoidance. While Gallemore and Labro (2015) find that general internal financial information quality is associated with an *increase* to tax avoidance, I find that information specifically pertaining to firm-wide risks results in a *reduction* to tax avoidance. Thus, internal information frictions can result in unmitigated risks from investments in tax avoidance (Roychowdhury et al. 2019). Second, industry groups such as the Committee of Sponsoring Organizations (COSO) increasingly call for boards to better understand and develop appetites around firm-wide risks (COSO 2020). My findings inform board members, executives, and other stakeholders about the importance of internal risk identification and reporting when evaluating non-tax risks of tax avoidance. Firms with limited ability to assess risk may take aggressive tax positions that present unmeasured costs.

Third, this study sheds new light on the mixed literature as to whether tax aggressiveness presents significant non-tax risk to a firm (Hanlon and Slemrod 2009 versus Gallemore et al. 2014). My findings suggest that, with firm-wide risk assessment, firms identify potential costs from tax aggressiveness and select strategies that are less likely to entail risk to future cash flows. This provides empirical support for Gallemore et al.'s (2014) proposal that a lack of ex-post cash flow and reputational effects from tax avoidance may be due to firms' use of tax avoidance strategies that are unlikely to carry high costs. Finally, I identify a unique setting in which U.S. insurers are subject to an exogenously determined increase to the quality of their internal risk assessment process. This setting may be fruitful for future research.

2. Setting

2.1. U.S. Insurance Regulation and the Enactment of ORSA

As a result of the McCarran-Ferguson Act of 1945, U.S. insurers are financially regulated at the state level (Petroni and Shackelford 1995). Given the fragmented nature of this regulatory process, state regulators created the National Association of Insurance Commissioners (NAIC) to increase coordination of model regulations. The NAIC issues standards, but individual states adopt a standard into regulation.

In response to the perceived failings of U.S. insurers' ability to manage risks during the global financial crisis, the NAIC implemented the "Solvency Modernization Initiative" with the intention of reviewing governance and risk management practices within the industry (NAIC 2012). As a result of this initiative, the NAIC issued the ORSA Guidance Manual for state insurance regulators in 2011, followed by the issuance of the Risk Management and Own Risk and Solvency Assessment Model Act (#505) in 2012 (NAIC, 2019). The ORSA Model Act's primary purpose is to require medium to large-size U.S. insurers (revenues greater than $500 million) to implement a formalized enterprise risk management (ERM) program tailored to the risk and complexity of the firm. While insurers often maintain subsidiaries in multiple states, the NAIC calls for ORSA to be regulated by the insurer's "lead state" regulator, the primary state of domicile, to provide for an enterprise level evaluation of risk (NAIC 2012, 2014; Wolf 2014).

Annually, insurers must submit an ORSA Summary Report to their lead state regulator which contains three sections: 1) a description of the insurer's risk management framework, 2) a discussion of the insurer's assessment of risk exposure, and 3) a corporate level assessment of solvency under risk scenarios. According to the ORSA Guidance Manual (NAIC 2014, pg. 3):

> The ORSA and the ORSA Summary Report link the insurer's risk identification, assessment, monitoring, prioritization, and reporting processes with capital management and strategic planning. Each insurer's ORSA and ORSA Summary Report will be unique, reflecting the insurer's business, strategic planning and approach to ERM. The commissioner will utilize the ORSA Summary Report to gain a high-level understanding of the insurer's ORSA. The ORSA Summary Report will be supported by the insurer's internal risk-management materials.

The regulation requires insurers to create a framework which identifies and prioritizes risks, creates a risk appetite and tolerance level, identifies how the firm will manage risks and implement controls, and creates a system of reporting and communicating risks to senior management and the board of directors (PWC 2011; NAIC 2014). ORSA requires insurers to assess risk exposure from a variety of sources, including credit, market, underwriting, and operations (NAIC 2014). Operational risks are those related to reputation, technology, human resources, and other sources that may impact an insurer's business strategy (PWC 2011).

The insurer's ORSA Summary is reported to the lead state insurance commissioner with strict confidentiality, such that information about their risks are unlikely to change the firm's external information environment. A review of 10-K's indicates that insurers keep external disclosure regarding ORSA to a minimum. To provide context, in Appendix C, I include an example of CIGNA (covered by ORSA) and Kansas City Life's (not covered by ORSA) public disclosure related to ORSA in their respective 10-Ks for the year of their lead state's adoption of ORSA.

The U.S. State Insurance Commissioners adopted the NAIC's ORSA regulations on a staggered basis between 2013 and 2017. The NAIC expected the ORSA Model Act to be adopted by all state insurance regulators by 2015. Six states adopted the ORSA Model Act in 2013, thirteen in 2014, fifteen states in 2015, and five in 2016. To encourage the remaining states to adopt the ORSA, the NAIC added the ORSA Model Act to its Accreditation Program as a requirement for 2017.[3] Accordingly, ten states adopted the ORSA Model Act in 2017, with only New Mexico and the District of Columbia yet to adopt the standard as of 2019. Appendix B

[3] Failure to adopt the ORSA Model Act would result in a state insurance regulator losing its accreditation. The loss of NAIC accreditation for a state insurance department could result in political repercussions and loss of consumer confidence within the state.

displays the list of states which adopted ORSA Model Act, the year of adoption, and the state regulatory code associated with the act.[4]

2.2. ORSA and Tax Strategy

Following the financial recession and prior to ORSA, U.S. insurers were criticized for their over-reliance on high capitalization as a method of managing the firm's general risk profile (Cummins and Phillips 2009). This, combined with the unique regulatory environment which insulated well-capitalized insurers from acquisitions (Cummins, Tennyson, and Weiss 1999; Cummins and Xie 2008), and restricts the existence of hostile takeovers (Lang 1970; McLeod 2014), limited efficiency benefits typically provided by the market for corporate control (Jensen and Ruback 1983). This resulted in incentives for insurers to rely on less-costly, traditional risk management activities conducted within the self-contained "silos" of various departments or business units (Powers, 2009; PWC 2011). Therefore, to ensure that U.S. insurers exhibit a more robust understanding of the unique operating and financial risks that face the company, ORSA requires insurers to take a holistic approach to risk, removing the artificial boundaries of departments or business units when performing risk assessments. To understand how this can influence tax strategy, consider the following example:

Insurer A actively holds non-U.S. investments to support its life insurance business through a U.K. investment subsidiary structured as a joint venture, resulting in cash tax savings that are uncertain to be upheld by the IRS. Prior to ORSA, *if* Insurer A's board requests an assessment of risk related to this uncertain tax position, Insurer A's accounting function will outline the strength of the underlying facts or circumstances supporting the position and provide

[4] The NAIC allows state insurance regulators to set their own penalty structure for lack of compliance with ORSA. Discussion with industry professionals and review of state insurance regulations suggest that the states tie ORSA compliance penalties to the same standard penalties for other insurance regulations, often amounting to a $1,000 penalty for each day that an ORSA Summary report is not filed with the state regulator.

an estimate of risk based on the position being overturned and any interest or penalties charged to the insurer. Post-ORSA, the process changes in two key ways. First, risks are identified and reported to the board continuously, without a pre-requisite request for information. Second, ORSA requires a more holistic firm-wide risk assessment process which considers the impact and likelihood of risks across all major business units. As risk management teams analyze the various potential causes and consequences of risk from tax strategies, they request information from the investment department to better understand the underlying risk of the U.K. joint venture. Next, they request information from the insurer's client services department to analyze how the customer base may react to news of the tax savings from this U.K. investment strategy. Even if the likelihood of the tax position being overturned by the tax authority is unchanged, the risk assessment process creates a more robust picture of the costs and benefits of this tax position compared to the pre-ORSA risk assessment.

Despite the lack of public disclosure related to ORSA, discussion with a Big 4 consultant directly involved with client implementation of ORSA strategies indicates that insurers often gain a more detailed understanding of non-tax costs from tax positions post-ORSA. While insurers' accounting functions maintain detailed support for their tax positions, risk management teams analyze risks using the framework suggested by the Committee of Sponsoring Organizations (COSO), which includes an evaluation of "financial, reputational, regulatory, health, safety, security, environmental, employee, customer, and operational impacts" of risks (COSO 2012, pg. 3). The consultant indicated that analyses of risks from the tax function create intricate impact assessments, often resulting in additional scrutiny by a firm's board of directors.

Further discussion with an executive in charge of a U.S. property and casualty insurer's ERM function indicated that a) their department and position were created specifically in response to ORSA and b) risks related to taxes are reviewed as part of the overall analysis of operational risks. Importantly, they emphasized that all risks are evaluated to include an interaction with reputation, deemed to be a critical component of the insurer's business strategy. Interestingly, this executive noted that their firm's specific risks from existing tax positions were assessed to be low given the routine nature of their tax department's strategies, though the insurer's board did not want to implement higher risk tolerances to increase cash tax savings. Further, new tax positions were to be included in a continuous analysis of risks as part of the insurer's ERM process implemented under ORSA. Overall this anecdotal evidence supports the notion that ORSA increased the scrutiny of the firm's tax positions, however directional predictions are unclear.

3. Literature Review and Hypothesis Development

Studies examining governance and taxes traditionally examine tax avoidance as a function of alignment between management and shareholder interests. For firms with high quality internal governance, shareholder and managerial incentives are considered more likely to be aligned and managers engage in tax avoidance to increase after-tax cash flows (Wilson 2009; Rego and Wilson 2012; Gallemore and Labro 2015; Bauer, 2016; Laplante, Lynch, and Vernon 2017; McGuire, Rane, and Weaver 2018). However, Blouin (2014) and Armstrong et al. (2015) suggest that tax aggressiveness should be viewed as a form of risky investment by firms. Thus, more tax avoidance is not necessarily a positive net present value investment if the potential costs associated with these positions outweigh the benefits of tax savings (Bauer et al. 2020). For example, as firms take on more aggressive strategies to increase cash tax savings, they increase uncertainty associated with the tax authority accepting the tax positions (Brown 2011; Dyreng, Lindsey, and Thornock 2013; Dyreng et al. 2019) and expose the firm to non-tax costs associated with reputational effects, political scrutiny, or more risky assets and business strategies (Dyreng, Hoopes, and Wilde 2016).

To date, little is known about how firms evaluate these outcome costs associated with tax strategies to arrive at an acceptable risk-reward tradeoff (Wilde and Wilson 2018). This is primarily driven by the unobservable nature of firms' process to internally assess and report risks. Additionally, extant studies report mixed evidence on the association between governance and taxes. For example, using quantile regressions, Armstrong et al. (2015) find evidence that high quality governance characteristics are associated with a *reduction* to tax avoidance for firms exhibiting the highest level of tax aggressiveness. Further, Klassen, Lisowsky, and Mescall (2016) find that firms which utilize their external auditor for tax compliance are *less* tax aggressive than those that use an internal tax department. They argue that the external auditor is more visible to the firm's board of directors and may fear that board-level concern about tax risk will compromise the external audit relationship. Conversely, Gallemore and Labro (2015) and Bauer (2016) find that high quality internal control results in *higher* levels of tax avoidance. Similarly, Beasley et al. (2020) find that firms externally reporting board involvement in oversight of risk report *higher* levels of tax avoidance as the board ensures that managers engage in tax planning to maximize cash flow.

There are likely two reasons for the mixed results in this literature. First, firms' governance structures are endogenous to other important characteristics associated with tax avoidance (Armstrong et al. 2015; Roychowdhury et al. 2019), such as higher quality management teams (Koester, Shevlin, and Wangerin 2017), better external information environments (Shroff 2017), or unique business environments where tax avoidance opportunities are more abundant (Higgins et al. 2015). The endogenous nature of governance makes it difficult to make strong causal inferences regarding governance and tax aggressiveness.

Second, there is increasingly mixed evidence as to whether tax aggressiveness presents costs to a firm's cash flows. Conceptually, firms face tax-specific costs such as penalties and interest associated with overturned positions (Rego and Wilson 2012) or intensified scrutiny by the tax authority (Mills and Sansing 2000). Additionally, firms may realize non-tax costs through reputational effects of negative consumer perceptions (Hanlon and Slemrod 2009; Dhaliwal, Goodman, Hoffman, and Schwab 2018), negative employee perceptions (Lee, Ng, Shevlin, and Venkat 2020), proprietary costs from public scrutiny of tax avoidance (Dyreng, Hoopes, and Wilde 2016), and political pressure from governments (Mills, Nutter, and Schwab 2013; Hanlon, Saavedra, and Maydew 2017). In fact, the IRS commissioner stated that aggressive tax strategies can pose risks to corporate reputations and suggested that the general public has little tolerance for overly aggressive tax planning (Shulman 2009).

However, several studies fail to find evidence of non-tax costs associated with tax aggressiveness. For example, Gallemore, Maydew, and Thornock (2014) are unable to find significant long-run negative consequences for firms engaging in aggressive tax avoidance through tax sheltering. Austin and Wilson (2017) find mixed evidence that consumers respond to tax avoidance. Chen et al. (2019) find no indication that firms modify their tax avoidance following negative media attention associated with low tax rates, indicating that firms may not feel pressure associated with reputational costs from tax avoidance. Further, Guenther et al. (2017) fail to find a relation, on average, between a firm's use of uncertain tax positions and proxies for firm risk.

Therefore, it is possible that greater availability of risk assessment information to the firm's board of directors – arising from the ORSA regulatory shock – results in less (more) tax avoidance if pre-ORSA (i.e., uninformed) costs are determined to be relatively high (low) and require post-ORSA adjustment. On one hand, I expect a negative relation between tax aggressiveness and enhanced risk information if firms undertook tax strategies without fully considering the non-tax costs prior to ORSA. This can occur if limited risk assessment information prior to ORSA makes it difficult to accurately assess risks to future cash flows associated with tax uncertainty (Sims 2003; Ferracuti and Stubbin 2019), leading to an overuse of aggressive tax avoidance that, with additional risk assessment information, are deemed to be too high for the board of directors' risk appetites.

On the other hand, there may be a positive relation between tax aggressiveness and an enhanced risk assessment process if, prior to ORSA, the firm perceives all aggressive tax avoidance strategies as overly risky despite lacking a comprehensive risk assessment. This may be due to information asymmetry between tax managers and executives such that risk-averse managers forego otherwise value-added investments (Roychowdhury et al. 2019). Alternatively, absent a proper risk assessment, managers may use general heuristics to avoid tax aggressive strategies even though the strategies do not pose significant risks to the firm (i.e., the under-sheltering puzzle, Shackelford and Shevlin 2001; Weisbach 2001).

Finally, I expect a null relation if internal risk information is relatively frictionless. Given the salience of UTBs on a firm's financial statements, executives and board members may already request sufficient information to assess potential non-tax costs (Brown, Drake, and Martin 2016). Thus, a change to a firm's internal risk assessments will not result in a change to tax avoidance strategies. Given the lack of clarity as how firms evaluate risks given limited risk information, I state my first hypothesis in the null as follows:

H1*: Increased internal firm-wide risk information does not affect firms' tax aggressiveness.*

My next hypothesis exists as a potential consequence of H1. If firm-wide risk assessments identify previously unmeasured costs from tax avoidance, then this information will enable managers to retain tax positions that present reduced risk to the firm's cash flows. While Guenther et al. (2017) fail to find an average relation between tax avoidance and firm risk, the existence of frictions in identifying the costs of tax aggressiveness likely results in instances where a positive relation between tax aggressiveness and firm-risk exists. As ORSA removes these frictions, tax avoidance is likely to be less risky. As such, I write my second hypothesis in the alternative as follows:

H2: *Increased internal firm-wide risk information mitigates risk associated with tax positions.*

4. Data and Research Design

4.1. Research Design – H1

My primary analysis for H1 uses a generalized difference-in-differences design to evaluate the effect of ORSA on U.S. insurers' tax aggressiveness as follows:

$$Y_{i,t} = \alpha + \beta_1 POST\_ORSA + \sum \beta_k\, Controls_{i,t} + \delta_1 Firm + \delta_2 Year + \epsilon_{it} \qquad (1)$$

Blouin (2014) suggests that for a tax position to be considered aggressive, it should contain uncertainty. She discusses the potential advantages of using unrecognized tax benefits (UTBs) reported on financial statements under FASB interpretation no. 48 (FIN 48), as a proxy for aggressive tax positions. UTBs represent a contingent liability for the value of tax positions that have less than a 50 percent probability of being retained upon audit by the relevant tax authority (Mills et al. 2010). Thus, this financial statement item should be closely tied to the underlying construct of tax aggressiveness (Rego and Wilson 2012; Lisowsky et al. 2013).

Therefore, my primary dependent variable is the current year increase to UTBs which most closely aligns with an annual "investment" in tax aggressiveness (Dyreng et al. 2019) and is shown to have high power to identify tax avoidance (De Simone, Nickerson, Seidman, and Stomberg 2020). Still, I also examine the annual ending UTB balance because firms may re-evaluate existing uncertain tax positions following the enhancement to internal risk assessments. I utilize measures in both log form and scaled by firm size. With firm fixed effects included, logged measures provide insight into the level of tax aggressive positions each period, while scaled measures indicate how tax aggressiveness changes relative to firm size. Thus, if firms increase in size, but do not increase tax aggressiveness, the scaled transformation of UTBs will be more likely to identify this effect. This results in four dependent variables (*LN_UTBINC*, *SC_UTBINC*, *LN_UTB*, and *SC_UTB*).

My independent variable of interest is the period after the implementation of ORSA. *POST_ORSA* is set to 1 for "covered" firms the year that ORSA was enacted in the firm's primary state of domicile (discussed further in section 4.2) and for each subsequent year thereafter, 0 otherwise. Because ORSA implementation represents an irreversible investment for purposes of identifying firm-wide risks, I identify a firm as covered by ORSA (*COVERED*) if a firm's revenue exceeds $500 million in the post period and do not revert to 0 if the firm's revenue goes back below this threshold.[5] For smaller firms, *POST_ORSA* is always set to 0 (*POST_ORSA* is analogous to *COVERED*POST*). The staggered implementation of ORSA

[5] Based on discussion with industry professionals, insurers that expect to reach the $500 million threshold are likely to begin implementation of firm-wide risk assessment processes in anticipation of the ORSA regulation. Therefore, I classify firms as *COVERED* if at any point in the post enactment period they exceed $500 million in revenue.

allows year fixed effects to absorb the effect of any U.S. federal tax law changes (e.g., TCJA) that affect all firms in a particular year.[6] Given year fixed effects, I do not include a separate "post" indicator. Similarly, *COVERED* is absorbed by firm fixed effects.[7]

While I control for firm-fixed effects, it is possible that differences between small and large insurers result in model misspecification. I mitigate this concern in two ways. First, I re-perform my primary tests within the sub-sample of larger insurers covered by ORSA, using the staggered regulatory implementation for identification. Second, I use coarsened exact matching on *SIZE* and *ROA* in the year prior to ORSA implementation to match the sample of non-covered insurers to those that are covered by ORSA, eliminating the largest firms from the sample. This allows me to examine the effect of ORSA on insurers closer in economic size and profitability to the counterfactual group.

The generalized difference-in-differences design utilizes firm fixed effects to control for other time-invariant, firm-specific attributes that may affect a firm's use of uncertain tax positions. In addition, I control for other factors found to be associated with UTBs, including *SIZE*, *LEVERAGE*, *ROA*, the existence of a loss (*LOSS*), operating loss carryforwards (*NOLCF*), growth (*SALES_GROWTH*) investment opportunities (*TOBINQ*), and the inverse of an insurer's coverage ratio (*COV_RATIO*), where the coverage ratio is an insurer's revenue to surplus (total assets less long-term liabilities). When this number is low, insurers have a greater amount of net assets to cover their underwriting activity, providing a natural risk management mechanism (Wu and Colwell 1988).

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[6] As with most regulatory activities, the adoption of state insurance regulations is a relatively drawn out process, whereby firms understand the timeline for adoption of a new regulation. Therefore, insurers should be aware of the year of enactment and take steps to meet this legislative requirement for the appropriate fiscal year.

[7] For all difference-in-difference tests with firm fixed effects I cluster standard errors by firm (Bertrand et al. 2004). However, recent research notes that there are potential issues with the inclusion of a fixed effect as a cluster dimension (Cameron and Miller 2015). Following Cameron and Miller (2015), I use Stata's XTREG function for all fixed effect regressions, which adjusts the degrees of freedom to allow valid statistical inferences.

Next, I control for the general quality of a firm's internal information environment, including the number of days between fiscal year end and earnings announcement (*REPORT_DAYS*) and the existence of a SOX 404 material control weakness (*ICW*). While ORSA is specifically intended to enhance internal risk information, it is possible that this process results in changes to overall internal information quality, which is associated with tax avoidance (Gallemore and Labro 2015). Additionally, because UTBs are a financial reporting construct, I also control for the existence of a Big 4 auditor (*BIG4*), which may alter the calculation of tax accruals (Koester, Stomberg, Williams, and Xia 2019). Finally, I control for other factors that may change with enhanced internal risk information that are potentially associated with uncertain tax positions, such as acquisitions (*ACQUISITION*), capital expenditures (*CAPX*), foreign income (*FOREIGN*), intangible assets (*INTANGIBLE*), and excess tax benefits from stock options (*ETBSO*) (Towery, 2017).[8, 9] All variables are defined in Appendix A.

4.2. Data

I use Compustat to identify public firms in the insurance industry between 2008 and 2018 (2-digit SIC = 63). I begin my sample in 2008 because this is the first year following the transition to FIN 48 in 2007 (Blouin, Gleason, Mills, and Sikes 2007). I end my sample in 2018 because I require year *t+1* stock return data in additional analyses. I require firms to be headquartered within the continental U.S. Additionally, I require firms to have data on UTBs.[11,12]

[8] Insurers do not record R&D expenditures.
[9] Controlling for these measures helps alleviate the concern that changes to tax aggressiveness are driven by changes to other investments, not due to the potential risk associated with tax avoidance. However, these measures may also be mechanisms through which tax aggressiveness occurs, potentially reducing the measured effect of ORSA on tax aggressiveness. Untabulated analyses show that my results are not sensitive to excluding these variables.
[11] To increase sample size while also avoiding measurement error, I set missing UTBs to 0 only for missing firm-years where firms otherwise report a non-missing value of UTBs in other years, suggesting that missing values are indeed 0, rather than a firm-specific failure to report. I then hand collect the 10-K filings for firm-years affected by this change and confirm that UTBs are 0.
[12] Studies such as Rego and Wilson (2012) also measure predicted UTBs. However, it is unclear how well these models translate to the U.S. insurance industry, particularly since insurers do not report R&D activity, an important

Next, I identify the timing of ORSA for each insurer. States regulate the insurance product written in their respective state (e.g. policy language, premium rate changes, etc.). As such, insurers often maintain corporate subsidiaries in various states to navigate regulatory burdens (Petroni and Shackelford 1995). However, as discussed in section 2, financial regulation such as ORSA is administered by the insurer's primary state of domicile (the lead state), typically at the firm's headquarters (HQ) location (NAIC 2014). HQ state regulators may agree to allow an alternate state to take the lead financial regulatory role if the firm maintains significant operational and/or insurance presence in said state.

I begin by identifying firms' primary HQ location.[13] I then manually review each insurer to identify discrepancies between the HQ state and primary state of domicile. First, I review the NAIC's current listing of publicly available lead states. While this listing contains a vast majority of insurers' lead states, is not comprehensive and does not contain historic lead state information.[14] For firms that are not listed, or contain different HQ locations from this listing, I examine the 10-Ks to identify information pertaining to either a lead state or specific mention of ORSA regulation that differs from the HQ state. In total, I identify 7 firms with primary states of domicile that do not match the HQ state and I update *POST_ORSA* accordingly.[15] Finally, I utilize the Compustat Segments database to identify firms with reported SG&A expense in multiple geographic segments. These firms are more likely to have operational activity in more than one state, reducing the likelihood that the HQ state is the primary state of domicile. Among

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variable in UTB prediction models. In section 6.1, I examine other measures of tax avoidance, including cash ETRs and tax haven subsidiaries.

[13] I utilize the Loughran and McDonald (2016) historic headquarters location. The authors make this data available at https://sraf.nd.edu/data.

[14] The NAIC keeps the most recent list available at https://content.naic.org/public_lead_state_report.htm (accessed Q3, 2020). I directly confirm the lead state location for approximately 76 percent of firms from this process.

[15] In an untabulated analysis, I re-perform all tests without this modification, retaining the HQ state indicated *POST_ORSA*. Across all specifications, results continue to hold, but with lower statistical significance, consistent with an "error in variables" problem for *POST_ORSA* which biases the coefficient toward zero.

these, I drop 8 firms where I cannot affirmatively verify the primary state of domicile through either the 10-K or the NAIC's listing.

INSERT FIGURE 1 HERE

I then require availability of remaining control variables. Figure 1 displays the lead state location of the sample of firms used in my study, along with the adoption year for ORSA by each state. Table 1 displays the results of the sample selection process. For my primary tests of H1, I retain a sample of 807 firm years across 95 unique firms.

INSERT TABLE 1 HERE

I present descriptive statistics in Table 2. Panel A displays the univariate results for my sample, including the full sample of insurers and a breakdown of firms that are covered by ORSA versus those that are not. As expected, firms covered by ORSA are larger with lower cash ETRs and higher average *LN_UTB*, consistent with larger firms having more opportunities to avoid taxes (Rego 2003). Because my sample consists of public firms, ORSA applies to the majority of my sample observations (600 firm-years versus 207 that are not covered).

INSERT TABLE 2 HERE

Table 2, Panel B reports correlations for my sample and Panel C reports a simple 2-by-2 average of *SC_UTBINC* and *SC_UTB* in the pre- and post-ORSA periods for both covered and non-covered insurers (for non-covered insurers, post represents the period that the insurer's lead state enacted ORSA, but the regulation does not apply). This provides initial descriptive evidence of a reduction to tax aggressiveness for medium to large insurers subject to ORSA. Notably, smaller, non-covered insurers report similar (slightly higher) UTB increases (ending balances) over time, consistent with increasing tax avoidance strategies as firms increase in size, mitigating concerns that an unobservable event reduces tax avoidance for all insurers.

5. Results

5.1. H1 – Main Analysis

Following Jennings, Kim, Lee, and Taylor's (2020) suggestion that researchers evaluate specifications with and without high-dimensional (firm) fixed effects, I begin my multivariate analysis using state and year fixed effects in table 3. This allows for a difference-in-differences (*COVERED*POST*) analysis while also evaluating the cross-sectional effects of various control variables on UTBs in this setting. Importantly, there are different relations depending on whether UTBs are a flow (current year increases) or stock measure and whether UTBs are logged or scaled. Of note, *SIZE*, *NOLCF*, *LOSS*, *FOREIGN*, and *CAPX* are generally positively associated with measures of UTBs. *ROA* is positively associated with annual increases to UTBs, though not to the ending balance. Further, firms with lower capitalization (high *COV_RATIO*) report limited tax uncertainty, consistent with these firms having incentives to manage risk.

INSERT TABLE 3 HERE

Because this test does not include firm fixed effects, I add an indicator variable for firms covered by ORSA (*COVERED*). By the nature of the treatment, these firms are larger than non-covered firms. However, with control variables, *COVERED* is only weakly associate with one measure (*LN_UTB)*. Finally, results provide evidence of a significant negative post period effect with *COVERED*POST* at $p<0.01$ (two-tailed) for all specifications. Still, I withhold inferences to analyses using firm fixed effects.

Table 4, Panel A displays the results of my primary test within the full sample of U.S. insurers. Columns 1 and 2 report the effect of ORSA on current year's increases to UTBs. Results are consistent with a significant reduction to insurers' tax aggressiveness following enhanced internal identification, assessment, and reporting of firm-wide risks ($p<0.05$, two tailed). The point estimate on *LN_UTBINC* (column 1) translates to a 22.5 percent reduction in current year increases to UTBs in the post period. Columns 3 and 4 present the effect on the firm's ending balance of UTBs, also suggesting a significant reduction in firms' total balance of UTBs in the post period ($p<0.05$, two tailed).

INSERT TABLE 4 HERE

Table 4, Panel B presents results for only the sub-sample of firms covered by ORSA. This test relies on the staggered implementation of ORSA among larger insurers for identification and mitigates potential issues associated with smaller counterfactual firms. The coefficient on *POST_ORSA* continues to be significantly negative in all specifications.

Next, I note that *UTBINC* is a flow variable which results in a significant number of observations with a value of 0. This is often resolved using a non-linear Tobit regression (see for example Klassen, Lisowsky, and Mescall 2016). However, Tobit regressions are difficult to interpret when using firm fixed effects in panel datasets (Kalwij 2003; Greene 2004). Therefore, in Table 4, Panel C, I display the results of Tobit regression outputs examining both *LN_UTBINC* and *SC_UTBINC*, replacing firm fixed effects with state and four digit SIC indicators. Columns 1 and 2 present the results for the full sample. As with Table 3, I add an indicator variable for firms that are subject to ORSA (*COVERED*). Columns 3 and 4 present results for the sample of covered firms only. Again, the coefficient on *POST_ORSA* is negative.

Finally, I match larger insurers, covered by ORSA, to smaller, non-covered insurers using coarsened exact matching on *SIZE* and *ROA* in year *t-1*. This allows for a broad set of counterfactual firm-years that are never subject to ORSA while identifying a closer set of treatment firms that are closer in economic size and profitability. The coarsened exact matching process results in a sample of 593 firm-years, with 415 covered firm-years matched to 178 non-covered firm-years, eliminating the largest insurers from my sample. Table 4, Panel D reports the results of this analysis. Across all specifications, I continue to see a significant reduction to UTBs in the post period.

5.2. Cross Sectional Analyses

I next examine cross-sectional variation in the post period effect of ORSA based on the likelihood that an insurer already had a robust risk information environment prior to the enactment of ORSA. Even in the absence of regulation, some firms choose to increase their risk information environment through the implementation of formal ERM programs (see for example Beasley et al. 2020; Ehinger, Eastman, and Xu 2021). Thus, it is unlikely that the enactment of ORSA has a symmetric effect across all insurers.

I utilize insurers' coverage ratios (*COV_RATIO*) to provide inferences about the likely extent of risk identification practices in the absence of regulation. Insurers can naturally manage risks by writing a limited amount of business (underwriting revenues) compared to overall shareholder surplus (Cummins and Phillips 2009). Thus, insurers can maintain a robust capital base to fund potential adverse scenarios (Wu and Colwell 1988). On the other hand, insurers may be endowed with limited capital compared to size of their insurance operations. These insurers carry higher inherent risks from limited capital to fund cash needs in the event of adverse business or economic scenarios. Firms with limited capital (more revenues to surplus) are more likely to have a stronger internal risk identification and management process in place to compensate for limited available equity.[18] I identify each insurer's coverage ratio (*COV_RATIO*) in the year prior to the respective state adoption of ORSA and rank this ratio by tercile (*COVRANK*). I scale *COVRANK* so that it ranges from 0 to 1, with 0 representing the bottom

[18] My definition of coverage ratio in the inverse of the typical definition (Surplus/Revenue). Therefore, an increasing measure indicates the likelihood of a greater risk information environment and eases interpretation of results.

tercile (lower need for robust risk information environment prior to ORSA), and 1 representing the top tercile (higher need for robust risk information environment prior to ORSA).

INSERT TABLE 5 HERE

Table 5 presents the results of this analysis. I modify model (1) to interact *COVRANK* with *POST_ORSA*, retaining fixed effects and control variables. Because *COVRANK* equals 0 for the bottom tercile, the indicator of *POST_ORSA* represents the effect of ORSA for firms that are least likely to rely on robust risk information prior to the regulatory change (Cummins and Phillips 2009). The interaction variable shows how this relationship changes cross-sectionally as firms increase to the top tercile coverage ratio. Columns 1 and 2 (3 and 4) report the effect on current year UTB increases (the balance of UTBs).[19] The negative relation is strongest within the bottom tercile of coverage ratio firms. This result is mitigated for those firms most likely to have a robust risk assessment information environment prior to ORSA, with tests of the *interaction + post = 0* failing to find evidence that these firms change their tax strategies, consistent with the likelihood that these firms had a stronger risk assessment environment prior to ORSA.

Finally, in an untabulated analysis, I examine cross-sectional variation between firms with higher and lower numbers of total reported business and operating segments. I find that the *POST_ORSA* reduction to tax aggressiveness is concentrated among firms with greater than the median reported segments. This result is consistent with greater dispersion or complexity among operating or business units increasing frictions in identifying non-tax costs of tax aggressiveness, absent a formalized firm-wide risk assessment process (i.e., pre-ORSA).

Results consistently indicate a negative relation between the enactment of ORSA and UTBs, providing evidence to reject H1's null hypothesis. The establishment of firm-wide risk

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[19] For brevity, I report results within the full sample of firms, though I note qualitatively similar inferences within the sub-sample of covered insurers.

assessments identifies non-tax costs from various sources throughout the firm, changing the cost-benefit calculation for tax aggressiveness. Additionally, this provides insight into the mixed literature regarding the risks presented by aggressive tax avoidance, with evidence suggesting that firms identify and take measures to mitigate risks from these positions.

5.3. H2 – Analysis of Firm Risk

If firms identify costs from tax aggressiveness, then I expect pre-period UTBs to be positively associated with firm risk, with the implementation of ORSA resulting in a reduction to the association between UTBs and firm risk. Remaining tax positions will be those that management determines are less likely to result in significant risk to the firm's cash flows (Gallemore et al. 2014; Graham et al. 2014). I examine this using the following model:

$$\begin{aligned} SD\_RET_{i,t+1} &= \alpha + \beta_1 POST\_ORSA + \beta_2 SC\_UTB + \beta_3 POST\_ORSA * SC\_UTB + \\ &\sum \beta_k \, Controls_{i,t} + \delta_1 Firm + \delta_2 Year + \epsilon_{i,t} \end{aligned} \qquad (2)$$

Following Guenther et al. (2017), I examine the relation between tax aggressiveness and risk using *SC_UTB* and the standard deviation of monthly stock returns in year *t+1* (*SD_RET*).[20, 21] β_2 represents the relation between the ending balance of UTBs and firm risk for firm-years in which an insurer is not subject to ORSA. A positive coefficient indicates that a firm's balance of UTBs are positively associated with future cash flow risk. β_3 indicates how this relationship changes as firms' risk information increases. I include the control variables from equation (1) and add variables utilized in Guenther et al. (2017) that are likely to vary with volatility of returns, including institutional ownership (*INST_OWN*), the log of shares outstanding (*SHARES*), current fiscal year's stock return (*RETURN*), the firm's fiscal year-end share price

[20] I examine scaled, rather than logged UTBs to be consistent with Guenther et al. (2017). However, my inferences are similar if I used logged UTBs.

[21] I find qualitatively similar inferences if I replace higher order firm-fixed effects with state fixed effects.

(*SHAREPRICE*).[22] I require non-missing CRSP data and non-missing Thomson Reuter's data for *INST_OWN* which results in a sample of 667 firm-years.[23, 24]

INSERT TABLE 6 HERE

Table 6 presents the results of this analysis. In columns 1 and 2, I first examine the post period effect of internal risk information on a firm's overall risk. I find that ORSA implementation results in a reduction to firms' overall *SD_RET*, providing novel evidence that the regulation realized its intended effect of reducing risk within the insurance industry. Columns 3 and 4 present the effect of a firm's *SC_UTB* on *SD_RET* and the interaction of this relation *POST_ORSA*. Results indicate that prior to ORSA adoption, a firm's tax aggressiveness is positively associated with firm risk. This relation is mitigated in the post-period, with columns 3 and 4 indicating a reduction to risk associated with UTBs following ORSA.

While Table 6 provides inferences regarding the relation between UTBs and firm risk, it is unclear whether a post ORSA change is related to high-risk firms changing tax aggressiveness, or from post period UTBs generated by lower-risk tax avoidance. Therefore, it is important to account for the joint decision for high-risk firms to modify their tax aggressiveness in the post period. I examine this with the following simultaneous equations:

$$SC\_UTB_{i,t} = \alpha + \beta_1 POST\_ORSA + \beta_2 SD\_RET + \beta_3 POST\_ORSA * SD\_RET + \beta_2 SIZE + \beta_4 LEVERAGE + \beta_5 ROA + \beta_6 LOSS + \beta_7 TOBINQ + \beta_8 SALES\_GROWTH + \beta_9 NOLCF + \beta_{10} COV\_RATIO + \beta_{11} REPORT\_DAYS + \beta_{12} ICW + \beta_{13} BIG4 + \beta_{14} FOREIGN + \beta_{15} ETSBO + \beta_{16} INANGIBLE + \beta_{17} CAPX + \beta_{18} ACQUISITION + \delta_1 Firm + \delta_2 Year \quad (3)$$

[22] Guenther et al. (2017) also include the 5-year volatility of these control variables. However, given my difference-in-differences design with firm fixed-effects and the small sample of firms, I do not include these control variables.
[23] I lose firm-year observations for certain years missing Thomson Reuter's coverage. Review of the data suggests that this typically occurs for a firm's earlier years. My results are qualitatively similar if I omit institutional ownership, however given the importance of this variable in stock price volatility research, I follow Guenther et al. (2017) and require this variable for market based tests.
[24] Descriptive statistics for these variables are included in Table 2.

$$SD\_RET_{i,t+1} = \alpha + \beta_1 POST\_ORSA + \beta_2 SC\_UTB + \beta_3 POST\_ORSA * SC\_UTB + \beta_2 SIZE + \beta_4 LEVERAGE + \beta_5 ROA + \beta_6 LOSS + \beta_7 TOBINQ + \beta_8 SHOUT + \beta_9 RET + \beta_{10} SHAREPRICE + \beta_{11} INST\_PCT + \delta_1 Firm + \delta_2 Year \quad (4)$$

I perform a joint estimation of structural equations from models (3) and (4) using three stage least squares following Zellner and Theil (1962). This enables me to jointly examine whether riskier firms are associated with the decision to change UTBs (β_3 in equation 3) while also identifying the changing effect of UTBs on firm risk in the post period (β_3 in equation 4). I modify the control variables for each equation to reflect those that are more likely to be associated with *SC_UTB* versus *SD_RET*. Table 7 displays the results of this joint estimation. In both equations, β_3 is significantly negative, suggesting that the reduced association between UTBs and firm risk is driven both by higher risk firms reducing UTBs and by retained UTBs carrying less significant risk to the firm.

INSERT TABLE 7 HERE

Taken together, the results of tables 6 and 7 provide evidence to support H2. Firms reduce tax aggressiveness and retain tax positions that present limited costs to the firm. This finding helps shed light on the mixed literature that often fails to find negative effects from tax aggressive strategies, highlighting the importance of accounting for the ex-ante selection of strategies that are deemed to be low risk to the firm. Additionally, these results support H1, such that risk information is the catalyst to reducing costs from tax strategies.

6. Additional Analyses

6.1. Economic versus Financial Reporting Effect

In light of Hanlon and Heitzman’s (2010) call for researchers to focus on specific proxies that are pertinent to the research question, I limit my primary inferences to a firm’s UTBs which provide a public proxy of uncertain tax strategies that both quantitatively and qualitatively signal aggressive tax avoidance (Hanlon and Heitzman 2010; Lisowsky, Robinson, and Schmidt 2013; Dyreng et al. 2019). Still, it is important to acknowledge that UTBs are a financial reporting construct subject to managerial discretion (Mills et al. 2010; Towery 2017).[25] While not the goal of ORSA, it is possible that the risk assessment process causes firms' to change their assessment of the strength of facts supporting the underlying tax positions, therefore the reduction to UTBs may be a financial reporting construct. To evaluate this, I perform two additional analyses. First, I modify model (1) by replacing UTBs with measures of cash effective tax rates. If firms simply change their accounting for the UTB tax accrual, then this will result in a change to GAAP ETRs, but should not affect cash ETRs. However, if firms reduce underlying tax aggressiveness, then I predict that the post ORSA period will be associated with an increase to cash ETRs (Dyreng et al. 2019).

INSERT TABLE 8 HERE

I begin with the Henry and Sansing (2018) measure of tax avoidance (*HS_ETR (Δ)*) which measures the difference between a firm's cash taxes paid and expected tax owed scaled by assets (see Appendix A for detailed variable definitions). This measure is beneficial in that it does not scale taxes paid by pre-tax income, eliminating the need to drop loss observations which cause issues measuring effective tax rates when the denominator is negative (Henry and Sansing, 2018). I add a control variable interacting (*ROA*) and (*LOSS*) to account for the asymmetric effect of losses on a firm's tax rates.[26] Increases (decreases) to this measure represent a higher

[25] For example, the IRS required Form UTB to be filed in 2010, resulting in some firms changing their financial reporting of UTBs (Towery 2017). As noted previously, this exists within my pre-period and results are robust to beginning analyses after 2010.

[26] A recent study by De Simone et al. (2020) finds some power issues for *HS_ETR(Δ)* to identify tax avoidance. With firm fixed effects, I control for cross-sectional differences between firm's average levels of tax avoidance, focusing on the difference in this average level post ORSA and mitigating concerns with a particular measure. Still, the authors note that the power issue is partially due to the potential for different tax avoidance incentives or abilities for loss firms, therefore I control for the interaction *ROA*LOSS.*

(lower) cash effective tax rate. Table 8, columns 1 and 2 display the results of this regression for the full and covered sample respectively. I find a positive relation between *POST_ORSA* and *HS_ETR(Δ)* ($p<0.01$). Thus, as firms reduce their tax aggressiveness, they also increase cash effective tax rates. Table 8, columns 3 and 4 display the results using cash ETRs (*CETR*) for the full sample and covered sample respectively, dropping loss observations.[27] I continue to see a positive relation between an enhanced risk assessment process and cash taxes paid.

Next, I examine a channel through which tax aggressiveness can be reduced. Specifically, tax havens present the opportunity for aggressive income shifting that reduces taxes while generating tax uncertainty for firms (Dyreng and Lindsey 2009; Dyreng et al. 2019). While haven activity is not the sole source of non-tax costs, havens represent the potential for riskier underlying investment activities (e.g., Guenther et al. 2017) and garner media attention which may impact firms' reputation (Chen et al. 2019). These attributes are more likely to be identified as non-tax costs when firms expand their assessment of the costs of tax aggressiveness.

I modify model (1), replacing the dependent variable with the log number of unique tax havens mentioned in Exhibit 21 of a firm's 10-K (*LN_HAVEN*). Scott Dyreng makes this measure available on his personal website (Dyreng and Lindsey 2009; Dyreng, Lindsey, and Thornock 2013). However, these data were last updated through 2014, coving part of my post-period analysis. I hand collect Exhibit 21 data for the remaining firm-year observations, identifying the number of unique tax haven locations as identified in Dyreng and Lindsey (2009). To limit errors, I review the last available firm-year observation from Dyreng's dataset and ensure that my methodology identifies the same number of unique tax haven countries. Further, I perform tests limiting observations solely to those identified by Dyreng's dataset. This reduces

[27] Following the suggestion of Schwab, Stomberg, and Xia (2020), I winsorize CETRs at 0.40. However, I note that inferences are similar without this step.

the number of firms with an available *POST_ORSA* period, but provides additional comfort that results are not driven by differences in methodology.

INSERT TABLE 9 HERE

Table 9 reports the results of this analysis. Columns 1 and 2 (3 and 4) report the analysis within the full and covered-only (limited to Dyreng's dataset) samples respectively.[28] Across all columns, *LN_HAVEN* is reduced in the post period, with column 1 indicating a 12.8 percent reduction to the number of unique haven countries that insurers report in the post period ($p<0.01$). Taken together, Tables 8 and 9 suggest that firms reduce reliance on aggressive tax avoidance with an enhanced understanding of the costs from these positions.

Importantly, these results differ from prior studies which find that stronger governance measures (e.g., internal control: Gallemore and Labro 2015, Laplante et al. 2017; disclosed board oversight of risk: Beasley et al. 2020) are associated with *greater* tax avoidance. Using a setting that circumvents the endogenous nature of governance proxies and tax avoidance opportunities (Armstrong et al. 2015) and focuses on firms improving their understanding of risks, my findings suggest a *reduction* to tax avoidance when new regulations require management to more completely understand non-tax costs.[29]

6.2. Post Period Falsification, Trends Analysis, and Regression Discontinuity

While my tests of H1 control for firm and year fixed effects and covariates associated with tax avoidance, it is possible that there is an omitted trend that drives results. This may be problematic given that the sample begins in 2008, during the financial recession and ends in 2018, a period of growth in the U.S. economy. While (untabulated) analyses starting in 2010

[28] This results in a slightly smaller sample of 757 firm-year observations due to some missing observations.
[29] In an untabulated analysis, I find that UTBs remain consistently low post ORSA compared to the pre-period. However, CETRs decrease toward pre-ORSA levels as *t* increases. This is consistent with firms gradually shifting to more routine tax avoidance strategies over time, achieving cost-saving tax avoidance at lower risk post-ORSA.

provide similar results, I perform additional analyses to help mitigate this concern. First, I re-perform my analysis for UTBs, CETRs, and tax havens by moving the post period effect forward two years, beginning between 2011 and 2015. Table 10 presents the results of this falsification test. Across all specifications, I fail to find a decrease (increase) to UTBs or tax havens (cash ETRs), providing comfort that results are not the result of a lack of pre-period parallel trends.

INSERT TABLE 10 HERE

Next, I plot the coefficients for the current year increases to UTBs and *HS_ETR(Δ)* and across *t-2* through *t+2*. I limit my sample to these periods and suppress *t* which represents the year of ORSA enactment. Thus, *t* represents the reference effect centered at 0. Figure 2 presents these results. The graphs show a relatively constant trend among increases to UTBs (*HS_ETR*) in *t-2* and *t-1* which are significantly higher (lower) than the reference year of ORSA enactment. Current year UTB increases and cash effective tax rate measures remain similar to *t* in the remainder of the post period. Taken together, these results provide additional comfort that I am not picking up a general decrease in tax aggressiveness over my sample period.

INSERT FIGURE 2 HERE

Finally, the cutoff of $500 million in premium revenue for application of ORSA potentially lends itself to a regression discontinuity design (RDD) whereby the exogenously determined cutoff creates a randomized effect of increased risk assessment quality just above and below the cutoff (Lee and Lemieux, 2011). However, there are several limitations to the use of RDD in this setting. The first is a practical limitation given the number of firm-year observations with zero current year increases to UTBs. This biases the beginning of a discontinuous regression line toward zero at random cutoffs, making it impractical to rely on inferences related to UTBs. However, this does not apply to either the *HS_ETR(Δ)* or *CETR* measures. The second is also a practical limitation associated with a relatively small sample size. A limited number of observations creates potential for discontinuous "jumps" to appear spuriously in the data. The third limitation is conceptual. In order to assume randomized treatment, firms must be unable to perfectly control their treatment effect to avoid treatment (Lee 2008; Lee and Lemieux 2011). ORSA was announced by the NAIC prior to the formal adoption of state regulations, allowing firms to potentially modify their revenue around $500 million per year. However, Lee (2008) shows that RDD may be "as good as randomized" if a firm is unable to precisely control the variable that determines the cutoff. Given the importance of revenue growth to public firms, firms are unlikely to be able to perfectly limit revenue.

I perform an RDD analysis using *HS_ETR(Δ)* and *CETR*. However, given the aforementioned concerns with an RDD in this setting, I limit my inferences to general support for my main analysis. I run regressions for both *HS_ETR(Δ)* and *CETR*, alternating between first, second, and third order polynomials. Post-period (pre-period) regressions do (not) report a discontinuous effect around $500 million. I tabulate graphs and report regression discontinuity effects in Appendix D where I provide more information about the specifications for my tests.

6.3. Information Quality versus Information Asymmetry

Desai and Dharmapala (2006) theorize that executives utilize tax avoidance activity as a means of extracting rents from shareholders. Thus, it is possible that enhanced availability of risk assessment information to the board of directors uncovers managerial perquisite activities. If the reduction to tax avoidance is driven by resolved agency conflicts, I expect the post period result to be concentrated among firms with weaker proxies for firm governance. In appendix E, I perform cross-sectional analyses using various proxies for a firm's governance structure and external monitoring environment. In these additional analyses, I find no effect when interacting

POST_ORSA with various proxies for firm governance. The reduction to UTBs occurs for firms with both high and low measures of governance. This result is consistent with a "shock" to the analysis of the costs and benefits of tax avoidance, rather than resolved agency conflicts.

6.4. Tax Law Changes

There two key tax law changes that affect insurers during this sample period, the PATH Act and the TCJA.[30] However, both changes should not result in a bias towards my findings for several reasons. First, the staggered post-period allows for year fixed effects to control for tax law changes which affect all firms in a single year. Second, the PATH Act, which made permanent the active financing exception for Subpart F income related to foreign banking and insurance subsidiaries, represents an extension of earlier law, effectively resulting in no change. Additionally, this law was passed prior to the end of the calendar year of expiration, meaning that it was unlikely to alter the recording of UTBs or cash effective tax rates. To examine this further (untabulated), I find that foreign income does not significantly change in the post period. Additionally, I find similar, though weaker results for my primary inferences if I limit my sample to firms without foreign income. Finally, I find that results hold if I drop the period related to TCJA, after 2016, supporting the control provided by this difference-in-differences design.

7. Conclusion

Using a unique setting whereby U.S. insurers realize an exogenous increase to firm-wide risk assessment information available to senior management and the board of directors, I find that firms significantly reduce their tax aggressiveness as non-tax costs are more readily

[30] State income taxes are unlikely to be influential in this difference-in-differences setting. Specifically, U.S. insurers face a unique state tax system through a "premium tax" on gross premiums written within each state (Petroni and Shackelford 1995). U.S. states tax gross premiums written directly in their state and these rates are unlikely to be connected to the adoption of ORSA at an insurer's primary state of domicile. Further, premium tax payments remain relatively stable from year to year (Casey and Conlin 2009).

identifiable. This effect is concentrated among insurers that were less likely to have a robust internal risk assessment process prior to the effective date of new regulations. I reconcile these results to firm risk, with results indicating that tax aggressiveness is associated with stock volatility for firms with limited internal risk information. However, this association diminishes after tax avoidance decisions are made with higher quality risk assessment processes in place.

The evidence suggests that there is value relevant information related to the cost of tax avoidance contained in firm-wide assessments of risk. This answers the call by Gallemore and Labro (2015) to identify specific mechanisms through which management information can influence tax avoidance. Additionally, results suggest that firms modify their tax avoidance to undertake strategies that are less likely to result in reduction to future cash flows. This provides empirical evidence supporting the survey results of Graham et al. (2014) and sheds light on why accounting studies often identify limited ex-post costs associated with aggressive tax avoidance (Gallemore et al. 2014; Guenther et al. 2017; Chen et al. 2019).

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Appendix A
Variable Definitions

LN_UTB	The annual measure of the ending balance of unrecognized tax benefits calculated in log form as ln(1+TXTUBEND). Compustat.
SC_UTB	The annual measure of the ending balance of unrecognized tax benefits calculated as TXTUBEND/SIZE. Compustat.
LN_UTBINC	The annual measure of the increase to unrecognized tax benefits from current year's tax positions calculated in log form as ln(1+TXTUBPOSINC). Compustat.
SC_UTBINC	The annual measure of the increase to unrecognized tax benefits from current year's tax positions calculated as TXTUBPOSINC/SIZE. Compustat.
POST_ORSA	An indicator variable set to 1 in the year of a firm's lead state enactment of ORSA regulation and all following years, 0 otherwise. Firms are subject to ORSA if they have revenues (REVT) greater than or equal to 500 million. For firms that are not covered by ORSA, *POST_ORSA* always equals 0. Compustat, NAIC (see appendix B).
COVERED	A firm-level indicator variable equal to 1 if a firm is subject to ORSA regulation because revenues exceed $500 million. This variable is subsumed in analyses that use firm fixed effects.
HS_ETR (Δ)	The annual measure of the cash effective tax rate as calculated by Henry and Sansing (2018). Calculated as adjusted cash taxes paid less expected tax owed divided by the firm's book value of assets (AT). Adjusted cash taxes paid is calculated as cash taxes paid (TXPD) less change in tax refund (TXR). Expected tax owed is calculated as the annual corporate tax rate (35% for all years except 2018 which is 21%) * pre-tax income (PI)).
CETR	The annual measure of cash taxes paid (TXPD) / pre-tax income (PI) less special items (SPI). Compustat.
LN_HAVEN	The log of 1 plus the number of unique tax haven countries reported in a firm's Exhibit 21. Data are retrieved from Scott Dyreng's personal website through 2014 filings. Remaining data are hand collected from the 10-K.
SIZE	The annual measure of the average market value between year t and year t-1. Calculated as PRCC_F*CSHO (Compustat).
LEVERAGE	The annual measure of the ratio of long-term debt (DLLT) to total assets (AT). Compustat.

ROA	The annual measure of the ratio of pre-tax income (PI) to total assets (AT). Compustat.
LOSS	An indicator variable set to 1 for firms with ROA less than 0. Compustat.
TOBINQ	The annual measure of market value of equity (PRCC_F*CSHO) plus long-term debt (DLTT) plus short-term debt (DLC) divided by SIZE. Compustat.
FOREIGN	The annual measure of pre-tax foreign income (PIFO) scaled by SIZE. Compustat.
NOLCF	The annual measure of tax loss carry forwards (TLCF) scaled by SIZE. Compustat.
SALES_GROWTH	The annual percentage change in revenue (REVT) from year t-1 to year t. Compustat.
COV_RATIO	The annual ratio of revenue (REVT) to surplus. Surplus is calculated as total assets (AT) less long term debt (DLTT). Compustat.
REPORT_DAYS	The annual measure of the number of days between fourth quarter earnings announcement (RDQ) and fiscal year end (DATADATE). Compustat.
ICW	An indicator variable set to 1 in the year if firm reports a SOX 404 material control weakness, 0 otherwise. Audit Analytics.
BIG4	An indicator variable set to 1 if the firm reports an auditor key (1,4), 0 otherwise. Audit Analytics.
ETSBO	The annual measure of excess tax benefits from stock options. Calculated as TXBCOF + TXBCO divided by SIZE. Compustat.
INTANGIBLE	The annual measure of intangible assets (INTAN) divided by SIZE. Compustat.
CAPX	The annual measure of capital expenditures (CAPX) divided by SIZE. Compustat.
ACQUISITION	The annual measure of acquisitions (AQC) divided by SIZE. Compustat.
SD_RET	The standard deviation of monthly stock returns measured over twelve months. CRSP.
INST_PCT	The annual measure of the percentage of institutional ownership calculated as an average over the fiscal year. Thomson Reuters 13F file.

SHROUT	The firm's total common shares outstanding calculated as ln(1+CSHO). Compustat.
RETURN	The fiscal year's annual return measured as the change in PRCC_F from *t-1* to *t*. divided by PRCC_F at *t-1*. Compustat.
SHAREPRICE	The firm's fiscal year end share price (PRCC_F). Compustat.
COV_RANK	The tercile ranking of the firm-level measure of COV_RATIO in the year prior to ORSA adoption. The measure is scaled to vary between 0 and 1. Where 0 represents the bottom tercile and 1 represents the top tercile. Compustat.
AC_SIZE10	The decile ranking of a firm's audit committee size by year and 4 digit SIC code. The measure is scaled to vary between 0 and 1. Where 0 represents the bottom decile and 1 represents the top decile. BoardEx.
BOARD_SIZE10	The decile ranking of a firm's board size by year and 4 digit SIC code. The measure is scaled to vary between 0 and 1. Where 0 represents the bottom decile and 1 represents the top decile. BoardEx.
FIN_EXPERT10	The decile ranking of the percentage financial expertise on the board of directors by year and 4 digit SIC code. Following Cohen, Hoitash, Krishnanmoorthy, and Wright (2014), a board member is categorized as a financial expert if they have a CPA license or report historic employment with a title that includes: CFO, Treasurer, Chief Accountant, Chief Financial Officer, VP- Finance, VP- Corporate Finance, Director- Accounting, Director- Finance, Head of Finance, Controller, Chief Accounting Officer, Accounting Officer, Audit, Tax. The measure is scaled to vary between 0 and 1. Where 0 represents the bottom decile and 1 represents the top decile. BoardEx.
INST_PCT10	The decile ranking of a firm's percentage of institutional ownership by year and 4 digit SIC code. The measure is scaled to vary between 0 and 1. Where 0 represents the bottom decile and 1 represents the top decile. Thomson Reuters 13F file.
EXEC_PCT10	The decile ranking of a firm's insider ownership by year and 4 digit SIC code. Insider ownership represents the percentage of shares (excluding options) held by the firm's top 5 executives. The measure is scaled to vary between 0 and 1. Where 0 represents the bottom decile and 1 represents the top decile. ExecuComp.

Appendix B – NAIC ORSA MODEL ADOPTION BY STATE

NAIC MEMBER	MODEL ADOPTION
Alabama	Ala. Code §§ 27-29A-1 to 27-29A-10 (2016).
Alaska	Alaska Stat. §§ 21.23.01 to 21.23.090 (2015).
Arizona	Ariz. Rev. Stat. Ann. §§ 20-491 to 20-490.07 (2016).
Arkansas	Ark. Code Ann. §§ 23-69-401 to 23-69-410 (2015).
California	Cal. Ins. Code §§ 935-1 to 935.11 (2013).
Colorado	Colo. Rev. Stat. §§ 10-3-1501 to 10-3-1511 (2016).

NAIC MEMBER	MODEL ADOPTION
Illinois	215 Ill. Comp. Stat. 5/129.1 to 5/129.9 (2014).
Indiana	Ind. Code §§ 27-1-23.5-1 to § 27-1-23.5-14 (2014).
Iowa	Iowa Code §§ 522.1 to 522.10 (2013).
Kansas	Kan. Stat. Ann. §§ 40-6001 to 40-6011 (2015).
Kentucky	Ky. Rev. Stat. Ann. §§ 304.3-600 to 304.3-635 (2014); § 304.99-055 (2014).
Louisiana	La. Rev. Stat. Ann. §§ 22:691.31 to 22:691.39 (2015).

NAIC MEMBER	MODEL ADOPTION
Montana	Mont. Code Ann. §§ 33-2-1130 to 33-2-1138 (2015).
Nebraska	Neb. Rev. Stat. §§ 44-9001 to 44-9011 (2014).
Nevada	Nev. Rev. Stat. §§ 692C.351 to 692C.3548 (2015).
New Hampshire	N.H. Rev. Stat. Ann. §§ 401-C:1 to 401-C:10 (2013).
New Jersey	N.J. Stat. Ann. §§ 17:23-27 to 17:23-37 (2014).
New Mexico	NO CURRENT ACTIVITY

NAIC MEMBER	MODEL ADOPTION
Rhode Island	R.I. Code R. §§ 27-77-1 to 27-77-10 (2013).
South Carolina	S.C. Code Ann. §§ 38-13-810 to 38-13-900 (2017).
South Dakota	S.D. Codified Laws § 58-5A-1 (2017).
Tennessee	Tenn. Code Ann. §§ 56-11-201 to 56-11-210 (2014).
Texas	Texas Code Ann. §§ 830.001 to 830.012 (2015).
Utah	Utah Code Ann. §§ 31A-16a-101 to 31A-16a-110 (2017).

Connecticut	CONN. GEN. STAT. § 38A-142 (2015).
Delaware	DEL. CODE ANN. TIT. 18, §§ 8401 TO 8412 (2014).
District of Columbia	NO CURRENT ACTIVITY
Florida	FLA. STAT. § 624.4212 (2016).
Georgia	Ga. Code Ann. §§ 33-13-30 to 33-13-41 (2015).
Hawaii	Haw. Rev. Stat. §§ 431:3D-101 to 431:3D-110 (2016).
Idaho	Idaho Code Ann. §§ 41-6301 to 41-6308 (2017).

Maine	Me. Rev. Stat. Ann. tit. 24-A, § 222 (2017).
Maryland	Md. Code Ann. Ins. §§ 32-101 to 32-110 (2017).
Massachusetts	Mass. Gen. Laws ch. 176V, § 1 to 14 (2017).
Michigan	Mich. Comp. Laws §§ 500.1701 to 500.1715 (2015).
Minnesota	Minn. Stat. §§ 60D.50 to 60D.58 (2014).
Mississippi	Miss. Code Ann. §§ 83-85-1 to 83-85-21 (2017).
Missouri	Mo. Rev. Stat. §§ 382.500 to 382.550 (2015).

New York	N.Y. Comp. Codes R. & Regs. tit. 11, §§ 82.1 to 82.5 (2014).
North Carolina	N.C. Gen. Stat. §§ 58-10-700 to 58-10-745 (2017).
North Dakota	N.D. Cent. Code §§ 26.1-10.2-01 to 26.1-10.2-08 (2015).
Ohio	Ohio Rev. Code Ann. §§ 3901.371 to 3901.378 (2014).
Oklahoma	Okla. Stat. tit. 36, §§ 3301 to 3310 (2015).
Oregon	Or. Rev. Stat. §§ 732.650 to 732.672 (2015).
Pennsylvania	40 Pa. Cons. Stat. §§ 991.2601 to 991.2610 (2013).

Vermont	Vt. Stat. Ann. tit. 8, §§ 3581 to 3589 (2013).
Virginia	Va. Code Ann. §§ 38.2-1334.3 to 1334.10 (2014).
Washington	Wash. Rev. Code §§ 48.05A.005 to 48.05A.901 (2015).
West Virginia	W.Va. Code §§ 33-40B-1 to 33-40B-11 (2017).
Wisconsin	Wis. Stat. §§ 622.03 to 622.17 (2014).
Wyoming	Wyo. Stat. Ann. §§ 26-51-101 to 26-51-110 (2014).

This table presents the state adoption of the Risk Management and Own Risk and Solvency Model Act with the associated code and year of adoption in parentheses. According to the NAIC, these states represent those that have adopted the most recent version of the NAIC Model in a **substantially similar manner** to the Risk Management and Own Risk And Solvency Assessment Model Act (#505). Source: NAIC.

Appendix C – Public Disclosure of ORSA Regulation

C.1. Cigna 2015 10K – Covered by ORSA Regulation beginning 2015 [***emphasis added***]

Solvency and Capital Requirements
Many states have adopted some form of the NAIC model solvency-related laws and risk-based capital rules ("RBC rules") for life and health insurance companies. The RBC rules recommend a minimum level of capital depending on the types and quality of investments held, the types of business written and the types of liabilities incurred. If the ratio of the insurer's adjusted surplus to its risk-based capital falls below statutory required minimums, the insurer could be subject to regulatory actions ranging from increased scrutiny to conservatorship.

In addition, various non-U.S. jurisdictions prescribe minimum surplus requirements that are based upon solvency, liquidity and reserve coverage measures. Our HMOs and life and health insurance subsidiaries, as well as non-U.S. insurance subsidiaries, are compliant with applicable RBC and non-U.S. surplus rules.

The Risk Management and Own Risk and Solvency Assessment Model Act ("ORSA"), adopted by the NAIC, provides requirements and principles for maintaining a group solvency assessment and a risk management framework and reflects a broader approach to U.S. insurance regulation. ORSA includes a requirement to file an annual ORSA Summary Report in the lead state of domicile and now must be adopted into law by each state. ***Our insurance business in the United States is subject to these requirements and we filed our initial ORSA Summary Report as required in 2015.***

C.2. Kansas City Life 2015 10K – Not Covered by ORSA Regulation [***emphasis added***]

State Regulation
The Company's life insurance entities are subject to periodic examinations by state regulatory authorities. Financial statements are prepared and examined on a basis other than GAAP, namely statutory accounting principles. The most recently completed examination performed by the State of Missouri occurred as of December 31, 2009 for Kansas City Life, Sunset Life, and Old American. There were no adjustments recommended to any of the insurance companies as a result of that examination. The Company has been notified of a regulatory scheduled examination to occur in 2015 based upon the year ended December 31, 2014.

The National Association of Insurance Commissioners (NAIC) has received regulatory authority by the respective state departments of insurance. Accordingly, the NAIC has been able to establish more consistency for insurers with regard to financial reporting requirements. In one such measure, the NAIC has adopted risk-based capital (RBC) guidelines to assist in the evaluation of the adequacy of statutory capital and surplus in relation to an insurance company's risks. RBC requirements are intended to be used by insurance regulators as an early warning tool to identify deteriorating or weakly capitalized insurance companies for the purpose of initiating regulatory action. RBC guidelines consist of target statutory surplus levels based on the relationship of statutory capital and surplus to the sum of weighted risk exposures. At December 31, 2014 and 2013, the statutory capital and surplus of each of the Company's insurance entities was substantially above the required levels. ***The NAIC continues to assess solvency issues and makes recommendations to enhance the existing guidelines, such as solvency modernization and own risk and solvency assessment (ORSA). While the Company is not subject to these regulations based on current business volumes, it continues to monitor them for ongoing developments.***

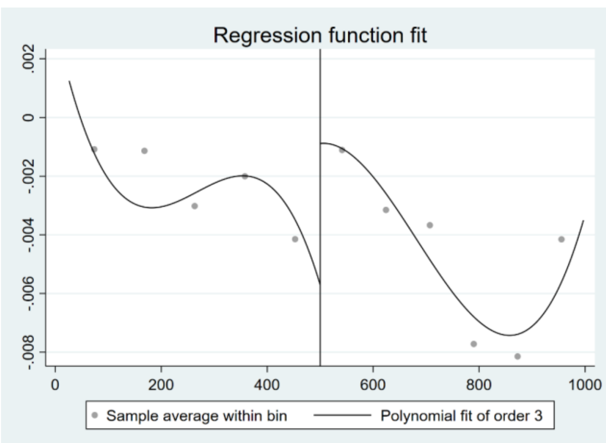
Appendix D - Regression Discontinuity Design Analysis

D.1. Description of Analysis.

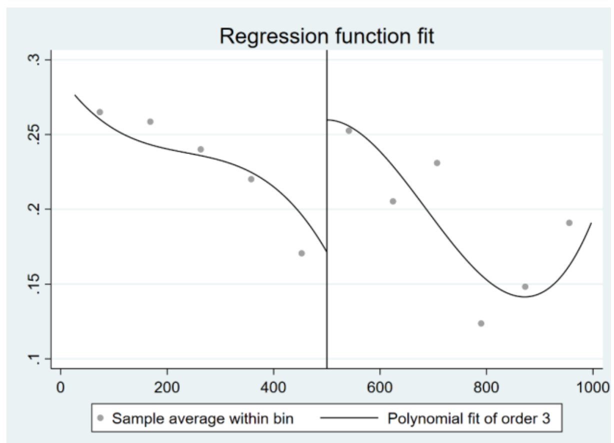
I follow the suggestion of Lee and Lemiux (2011) by first reporting the graph of *HS_ETR* and *CETR* along the running variable for firm revenue, with a cutoff at $500 million. I report this using binned averages of observations at various revenue points in the post period (Section D.2). The graphical analysis suggests a discontinuous jump around $500 million in revenue for both tax rate variables. Next, I perform a regression discontinuity estimation with robust bias corrected inference procedures (Calonico, Cattaneo, and Titiunik, 2014, 2015). While RDD provides an estimate as if assignment is randomized, I control for *ROA* in all regressions and drop loss observations given the importance of profitability to tax rates. Additionally, because this analysis does not include year fixed effects, I omit observations occurring during the financial recession (for pre-period) and following 2017 (for post period) with the enactment of TCJA. Following DiSimone and Olbert (2020), I report estimates using triangular kernels, which place greater weight on observations closer to the cutoff point. I utilize bandwidths of $500 million above and below the cutoff. I report estimates using local linear (polynomial of 1), local quadratic (polynomial of 2), and local cubic (polynomial of 3) estimation.

D.2. RDD Graphical Analysis

A) HS_ETR



B) CETR



D.3. RDD Estimation

Panel A: HS_ETR (Δ)

	(1)	(2)	(3)	(4)	(5)	(6)
	PRE	PRE	PRE	POST	POST	POST
RD Estimate	0.0009	0.0023	0.0014	**0.0064*** **	**0.0066*** **	**0.0076*** **
	(0.0063)	(0.0083)	(0.0111)	**(0.0021)**	**(0.0022)**	**(0.0025)**
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Polynomial	1	2	3	1	2	3
Drop Loss Observations	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: CETR

	(1)	(2)	(3)	(4)	(5)	(6)
	PRE	PRE	PRE	POST	POST	POST
RD Estimate	0.1090	0.1581	0.0823	**0.1431** **	**0.2139** **	**0.2829** **
	(0.1954)	(0.2636)	(0.3104)	**(0.0655)**	**(0.1001)**	**(0.1346)**
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Polynomial	1	2	3	1	2	3
Drop Loss Observations	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the results of a regression discontinuity estimation for *HS_ETR* and *CETR*. The running variable is firm revenue and the cutoff represents $500 million. Panel A (Panel B) reports the RD estimate for *HS_ETR* (*CETR*). Columns 1 through 3 report estimation using data in the pre-period, while columns 4 through 6 report data in the post period where I expect to find results. Robust bias adjusted standard errors are reported in parentheses. P-values are based on two-tail tests.

*** p<0.01, ** p<0.05, * p<0.1

Appendix E – Analysis of Governance Variables

E.1 Description of Analysis

I examine the interactive effect of various governance proxies on the post-period ORSA effect, including audit committee size (*AC_SIZE*), board size (*BOARD_SIZE*), and percentage of financial expertise on the board (*FIN_EXPERT*). Higher quality board characteristics can help to mitigate information asymmetry between managers and shareholders, reducing the cost of agency conflicts between managers and shareholders (Armstrong et al. 2010; Armstrong et al. 2015). Additionally, I examine the effect of institutional (*INST_PCT*) and insider ownership (*EXEC_PCT*). Institutions often enhance the firm's general governance and information environment (Armstrong et al. 2010; Ramalingegowda and Yu 2012; Ramalingegowda, Utke, and Yu 2020) and a misalignment of incentives can result in managers undertaking tax strategies to mask rent-seeking (i.e. Jensen and Meckling 1976). I gather board characteristic variables from BoardEx which limits my sample to 759 firm-year observations. I gather institutional ownership data for my tests of firm-risk. However, because I do not require CRSP data on the standard deviation of returns, I retain a slightly higher observation count of 689 firm-years. I calculate executive ownership as the percentage of shares outstanding held by the top 5 executives as reported by ExecuComp, limiting my sample to 536 firm-year observations.

If tax aggressiveness is the result of information asymmetry between managers and the board, then I expect the reduction to UTBs to be most strongly concentrated among firms with proxies for lower governance. Conversely, if tax aggressiveness is due to miscalculations from low-quality information, then I expect limited difference among governance characteristics as uncovered agency conflicts are less likely to drive the reduction in tax aggressiveness. All governance and ownership measures are ranked by decile and transformed to vary between 0 and 1, such that the effect of *POST_ORSA* is interpreted for firms in the bottom governance or ownership decile where unresolved agency conflicts are likely highest. The interaction with *POST_ORSA* represents the effect as governance proxies' increase from the bottom to top decile. Because I expect ownership and governance variables to vary with firm size, I limit my analyses to the scaled measures of UTBs. I focus on the balance of UTBs (*SC_UTB*) as this captures the accumulation of tax aggressive strategies during the pre-period.

In E.2, I report the results of this analysis. Columns 1 through 3 (4 and 5) present the interaction of board governance (ownership) variables on the *POST_ORSA* effect of firms' *SC_UTB.* The reduction to uncertain tax positions is similar across the top and bottom decile of governance proxies and ownership, with no evidence of a significant difference between governance or ownership structures. These results are consistent with risk assessment information influencing the calculation of the cost-benefit tradeoff associated with tax aggressiveness and do not indicate that a reduction to rent-seeking is the primary driver of the change to tax aggressiveness.

E.2. Interactive Effect of Governance Characteristics on UTBs.

VARIABLES	Pred.	(1) SC_UTB	(2) SC_UTB	(3) SC_UTB	(4) SC_UTB	(5) SC_UTB
POST_ORSA	(-)	-0.015**	-0.019**	-0.017**	-0.016**	-0.014**
		(-2.04)	(-1.94)	(-1.72)	(-2.08)	(-2.24)
*AC_SIZE10*POST_ORSA*		0.002				
		(0.31)				
BOARD_SIZE10 POST_ORSA*			0.008			
			(0.85)			
FIN_EXPERT10 POST_ORSA*				0.006		
				(0.53)		
INST_PCT10 POST_ORSA*					0.001	
					(0.09)	
EXEC_PCT10 POST_ORSA*						0.008
						(0.96)
Interaction + Post = 0	(-)	-0.013**	-0.008*	-0.011*	-0.015**	-0.006*
		[0.04]	[0.07]	[0.08]	[0.03]	[0.10]
Controls		Yes	Yes	Yes	Yes	Yes
Observations		759	759	759	689	536
R-squared		0.663	0.661	0.663	0.740	0.727
Sample		Full	Full	Full	Full	Full
Fixed Effects		Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year

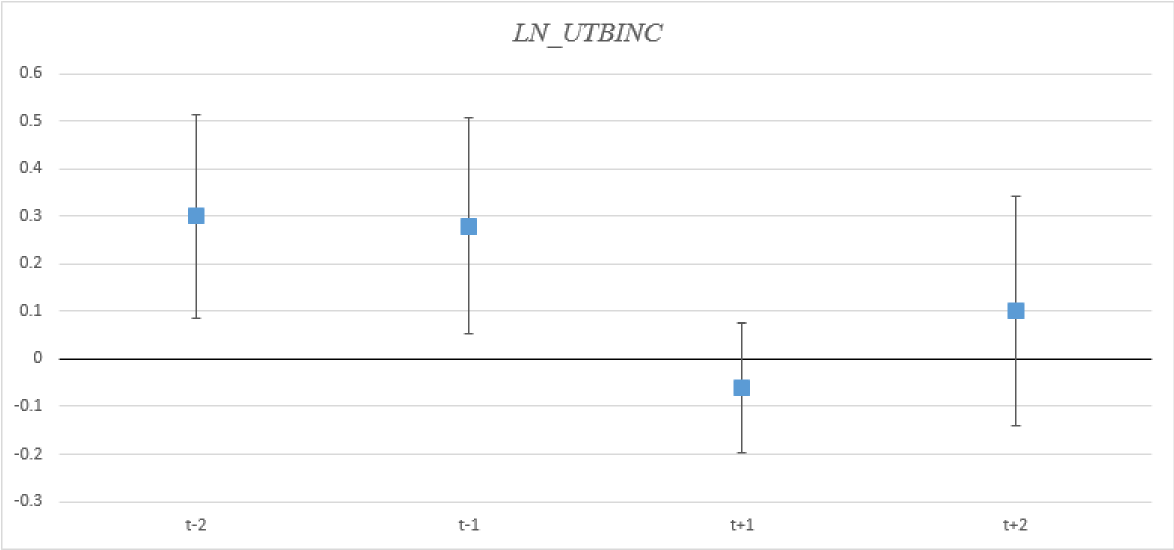
This table reports the post period effect of enhanced risk information through ORSA regulation on firms' use of uncertain tax positions measured by year end UTB balances (*SC_UTB*) with an interaction of the decile of firms' Audit Committee size (*AC_SIZE10*), Board Size (*BOARD_SIZE10*), percentage financial expertise (*FIN_EXPERT10*), and institutional (*INST_PC10*) and executive (*EXEC_PCT10*) ownership transformed between 0 and 1. Tests of the effect within the top decile of governance measures are represented by (Interaction + Post = 0) F-tests. Reported p-values are based on two tailed tests except where predicted. Robust t-statistics are in parentheses. Standard errors are clustered by firm. F-test probability values are in brackets.

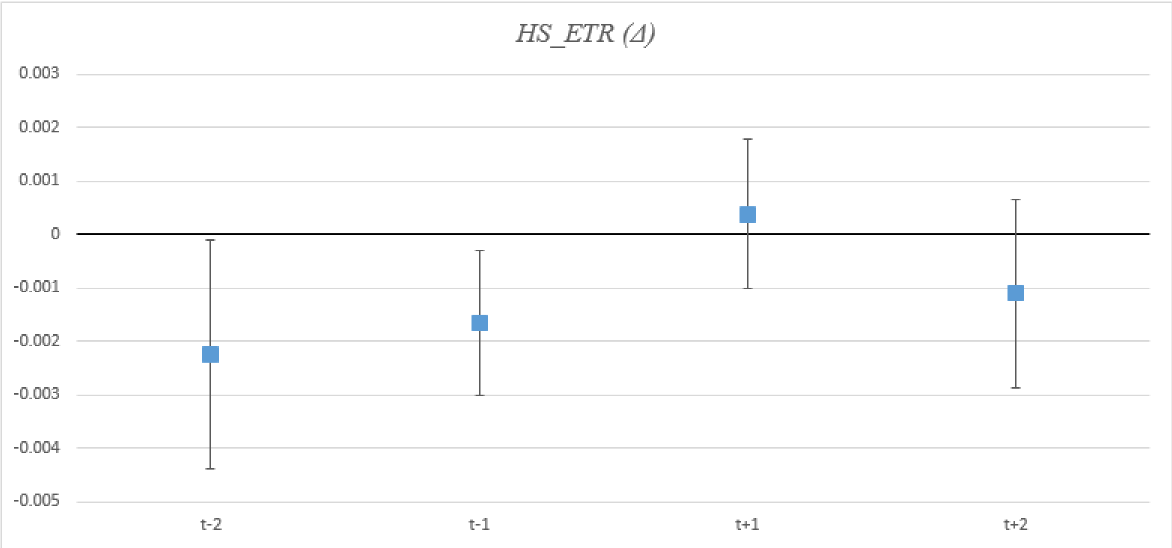
*** p<0.01, ** p<0.05, * p<0.1

Figure 1
Sample Locations of Firm-Year Observations and Corresponding HQ State Implementation Year of ORSA Regulation

Lead State	Firm-Years	Unique Firms	Percent	ORSA Implementation
AL	17	2	2.11	2016
CA	46	6	5.70	2013
CO	11	1	1.36	2015
CT	47	6	5.82	2015
FL	80	10	9.91	2016
GA	11	1	1.36	2015
IA	24	3	2.97	2013
IL	61	7	7.56	2014
IN	33	3	4.09	2014
KY	21	2	2.60	2014
LA	11	1	1.36	2015
MA	30	3	3.72	2017
ME	11	1	1.36	2015
MI	5	2	0.62	2015
MN	11	1	1.36	2014
MO	33	3	4.09	2015
NC	11	1	1.36	2017
NE	11	1	1.36	2014
NJ	25	3	3.10	2014
NV	11	1	1.36	2015
NY	89	12	11.03	2014
OH	54	6	6.69	2014
PA	27	3	3.35	2013
TN	14	2	1.73	2014
TX	51	5	6.32	2015
VA	28	4	3.47	2014
WA	12	3	1.49	2015
WI	22	2	2.73	2014

Figure 2
Trends Analysis: UTB Investments and Cash ETRs around ORSA Implementation (t=0)





This figure displays the trends of current year increases to UTBs and HS_ETRs. The reference period is set to the year of ORSA enactment (*t*) which centers the effect a 0. Point estimates represent the difference between each period and year *t*. Results indicate that the effect is centered on the enactment year of ORSA regulation, representing a significant decrease (increase) to UTBs (HS_ETR) in the post period (*t*, *t+2*). Additionally, the graph displays a relatively constant pre-period trend for variables, providing comfort that the effect does not represent an unmeasured trend in these variables. Error-bars represent 90 percent confidence intervals (two tailed).

Table 1
Sample Selection

Public Compustat North American Insurers (2 Digit SIC: 63)	Firm-Years
Fiscal Years between 2008 and 2018	1,599
Non Missing HQ Location in Continental US	1,119
Non Missing UTB Data	897
Without Multiple Segments with SG&A	825
Non Missing Compustat & Audit Analytics Variables	**807**

Table 2 Univariate Analysis
Panel A: Descriptive Statistics

	Full Sample						ORSA Covered = 1			ORSA Covered = 0		
Variable	N	Mean	SD	P25	P50	P75	N	Mean	SD	N	Mean	SD
LN_UTB	807	1.6658	2.1233	0.0000	0.0257	3.0910	600	2.1768	2.2039	207	0.1846	0.7422
SC_UTB	807	0.0104	0.0324	0.0000	0.0001	0.0040	600	0.0122	0.0331	207	0.0052	0.0298
LN_UTBINC	807	0.5019	1.0035	0.0000	0.0000	0.4953	600	0.6599	1.1101	207	0.0440	0.2708
SC_UTBINC	807	0.0005	0.0018	0.0000	0.0000	0.0002	600	0.0006	0.0018	207	0.0003	0.0018
HS_ETR(Δ)	807	0.0002	0.0132	-0.0047	-0.0014	0.0022	600	-0.0011	0.0102	207	0.0040	0.0190
CETR	678	0.2054	0.1525	0.0983	0.2171	0.3330	521	0.1975	0.1492	157	0.2313	0.1608
NUM_HAVENS	757	1.1321	2.1586	0.0000	0.0000	1.0000	564	1.4503	2.4091	193	0.2020	0.4026
SIZE	807	7,132	12,696	415	1,732	6,881	600	9,509	13,957	207	243	244
LEVERAGE	807	0.0748	0.0923	0.0175	0.0480	0.0958	600	0.0842	0.0960	207	0.0476	0.0742
ROA	807	0.0234	0.0536	0.0060	0.0219	0.0465	600	0.0266	0.0430	207	0.0139	0.0757
NOLCF	807	0.1191	0.4313	0.0000	0.0000	0.0145	600	0.1181	0.4243	207	0.1221	0.4521
SALES_GROWTH	807	0.0774	0.3457	-0.0257	0.0398	0.1162	600	0.0612	0.3337	207	0.1246	0.3752
COV_RATIO	807	0.4845	0.7351	0.1029	0.2312	0.4332	600	0.5066	0.7904	207	0.4205	0.5401
REPORT_DAYS	807	48.8707	20.7038	36.0000	43.0000	58.0000	600	42.2950	17.1349	207	67.9308	18.2322
ICW	807	0.0322	0.1767	0.0000	0.0000	0.0000	600	0.0317	0.1753	207	0.0338	0.1812
BIG4	807	0.7931	0.4054	1.0000	1.0000	1.0000	600	0.9267	0.2609	207	0.4058	0.4922
FOREIGN	807	0.0078	0.0250	0.0000	0.0000	0.0000	600	0.0105	0.0285	207	0.0000	0.0000
ETSBO	807	0.0002	0.0008	0.0000	0.0000	0.0000	600	0.0002	0.0007	207	0.0004	0.0011
INTANGIBLE	807	0.1521	0.2411	0.0032	0.0483	0.1833	600	0.1690	0.2513	207	0.1033	0.2013
CAPX	807	0.0120	0.0206	0.0000	0.0059	0.0144	600	0.0116	0.0201	207	0.0132	0.0220
ACQUISITION	807	0.0116	0.0352	0.0000	0.0000	0.0006	600	0.0127	0.0358	207	0.0081	0.0333
SD_RET	667	0.0839	0.0573	0.0510	0.0681	0.0996	533	0.0818	0.0608	134	0.0923	0.0399
INST_PCT	667	0.6617	0.2621	0.4606	0.7173	0.8883	533	0.7156	0.2261	134	0.4471	0.2854
SHROUT	667	4.2659	1.3950	3.3223	4.0524	5.4886	533	4.6473	1.2345	134	2.7487	0.8645
RETURN	667	0.1059	0.3816	-0.1049	0.0804	0.2624	533	0.1116	0.3797	134	0.0832	0.3894
SHAREPRICE	667	50.3141	74.6889	16.9600	33.1100	54.2400	533	57.7496	80.9366	134	21.9594	29.4881

Table 2 (Continued)
Panel B: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) LN_UTB	1.000												
(2) SC_UTB	**0.614**	1.000											
(3) LN_UTBINC	**0.687**	**0.390**	1.000										
(4) SC_UTBINC	**0.339**	**0.382**	**0.637**	1.000									
(5) HS_ETR	-0.077	**-0.142**	-0.002	**-0.107**	1.000								
(6) CETR	-0.057	-0.023	0.008	0.014	**0.447**	1.000							
(7) NUM_HAVENS	**0.568**	**0.341**	**0.390**	0.080	0.026	-0.027	1.000						
(8) SIZE	**0.597**	**0.190**	**0.429**	-0.012	0.043	-0.024	**0.538**	1.000					
(9) LEVERAGE	**0.160**	0.080	**0.213**	**0.213**	**-0.121**	-0.043	0.009	0.074	1.000				
(10) ROA	**-0.135**	**-0.107**	-0.031	0.028	**-0.138**	**0.136**	**-0.194**	-0.050	**0.286**	1.000			
(11) NOLCF	**0.240**	**0.373**	**0.255**	**0.360**	**-0.129**	-0.023	**0.171**	0.043	**0.326**	**-0.090**	1.000		
(12) SALES_GROWTH	**-0.090**	0.039	-0.062	-0.033	-0.056	-0.004	-0.007	-0.072	-0.001	**0.195**	**-0.090**	1.000	
(13) COV_RATIO	0.016	-0.063	**0.123**	**0.116**	**0.294**	**0.192**	**-0.112**	-0.004	**0.346**	**0.452**	**-0.086**	**0.110**	1.000
(14) REPORT_DAYS	**-0.386**	-0.028	**-0.233**	-0.035	**0.118**	**0.128**	**-0.284**	**-0.368**	**-0.120**	-0.047	**0.096**	**0.112**	**-0.126**
(15) ICW	0.009	**0.195**	0.012	0.049	**0.085**	**0.126**	-0.001	-0.006	-0.058	**-0.113**	0.061	0.015	-0.018
(16) BIG4	**0.307**	**0.138**	**0.207**	**0.119**	**-0.106**	**-0.142**	**0.131**	**0.225**	**0.102**	**-0.187**	0.033	**-0.247**	**0.089**
(17) FOREIGN	**0.318**	**0.290**	**0.260**	**0.146**	**-0.119**	**-0.116**	**0.443**	**0.157**	**0.111**	**-0.160**	**0.293**	-0.033	**-0.169***
(18) ETSBO	**-0.116**	-0.054	-0.070	-0.022	0.045	0.063	**-0.086**	**-0.095**	0.019	**0.244**	-0.047	0.034	0.048
(19) INTANGIBLE	**0.170**	-0.000	**0.237**	**0.121**	0.055	0.007	**0.134**	**0.146**	**0.474**	**0.157**	-0.007	**0.150**	**0.236**
(20) CAPX	**0.095**	0.043	**0.186**	0.074	**0.086**	**0.095**	**0.086**	0.020	**0.228**	**0.099**	0.001	0.025	**0.385**
(21) ACQUISITION	**0.095**	0.005	0.078	-0.018	0.076	0.035	0.058	0.082	**0.158**	**0.100**	-0.057	0.057	**0.204**
(22) SD_RET	0.007	0.076	0.019	**0.107**	0.039	**0.093**	-0.018	**-0.120**	**0.248**	**0.152**	**0.177**	**0.176**	**0.160**
(23) INST_PCT	**0.223**	0.015	**0.163**	**0.088**	-0.011	-0.009	**0.164**	**0.142**	**0.206**	0.062	0.015	**-0.127**	**0.187**
(24) SHROUT	**0.601**	**0.240**	**0.397**	**0.119**	-0.075	-0.070	**0.491**	**0.695**	**0.212**	-0.081	**0.164**	**-0.134**	-0.000
(25) RETURNS	-0.032	0.064	0.023	0.047	-0.049	-0.068	-0.023	-0.036	0.073	**0.164**	0.055	**0.159**	**0.088**
(26) SHAREPRICE	**0.136**	-0.014	0.070	-0.024	0.013	-0.023	**0.127**	**0.135**	0.011	-0.044	**-0.089**	-0.037	0.000

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
(14) REPORT_DAYS	1.000												
(15) ICW	**0.326**	1.000											
(16) BIG4	**-0.468**	-0.066	1.000										
(17) FOREIGN	**-0.107**	-0.021	0.036	1.000									
(18) ETSBO	**0.119**	-0.024	**-0.208**	-0.056	1.000								
(19) INTANGIBLE	-0.044	-0.005	**0.101**	0.071	-0.075	1.000							
(20) CAPX	-0.043	-0.002	0.032	-0.010	0.016	**0.119**	1.000						
(21) ACQUISITION	-0.055	-0.021	0.045	-0.056	-0.028	**0.275**	**0.138**	1.000					
(22) SD_RET	**0.185**	0.065	**-0.185**	0.058	0.051	**0.151**	0.004	**0.113**	1.000				
(23) INST_PCT	**-0.407**	**-0.115**	**0.468**	0.044	-0.038	**0.137**	0.026	0.069	-0.041	1.000			
(24) SHROUT	**-0.572**	-0.043	**0.471**	**0.212**	**-0.175**	**0.189**	**0.086**	0.079	-0.030	**0.329**	1.000		
(25) RETURNS	**0.111**	0.030	-0.080	0.034	0.036	**0.091**	0.018	-0.052	**-0.084**	-0.012	**-0.097**	1.000	
(26) SHAREPRICE	**-0.158**	-0.029	0.060	**0.086***	-0.037	-0.030	-0.024	**0.091**	**-0.217**	**0.092**	**-0.179**	**0.083**	1.000

Table 2 (Continued)
Panel C: 2X2 Analysis

Variable: SC_UTBINC

	Pre	Post	Post-Pre
Covered	0.0007	0.0003	-0.0004 (-3.12)***
Not Covered	0.0002	0.0004	0.0002 (1.08)

Variable: SC_UTB

	Pre	Post	Post-Pre
Covered	0.0155	0.0068	-0.0095 (-3.21)***
Not Covered	0.0026	0.0094	0.0068 (1.67)*

This table presents descriptive statistics for the sample of firm-year observations. Variables are utilized in my tests of H1 and subsequent tests of firm-risk. Unless otherwise specified, I winsorize all continuous variables at 1% and 99% to mitigate the effect of outliers. In panel A I present the summary statistics for all primary variables. Panel B presents the pairwise correlation matrix of all primary variables with bolded coefficients representing statistical significance at 5 percent or greater. Panel C reports a simple 2X2 analysis examining the average current year increases to UTBs *(SC_UTBINC)* and ending balance of UTBs (*SC_UTB*) in the pre and post ORSA period for insurers that are subject to ORSA (Covered) versus those that are not (Not Covered). T statistics are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 3
ORSA Regulation and UTBs – Initial Analysis without Firm Fixed Effects

	(1)	(2)	(3)	(4)
VARIABLES	LN_UTBINC	SC_UTBINC	LN_UTB	SC_UTB
COVERED*POST	**-0.310*******	**-0.001*******	**-0.798*******	**-0.018*******
	(-2.95)	**(-2.72)**	**(-3.20)**	**(-2.85)**
COVERED	0.202	-0.000	0.679*	0.006
	(1.46)	(-0.43)	(1.88)	(0.76)
SIZE	0.000***	0.000	0.000***	0.000**
	(4.24)	(0.51)	(8.56)	(2.20)
LEVERAGE	-0.268	0.001	1.869*	0.051
	(-0.38)	(0.53)	(1.90)	(0.97)
ROA	1.383**	0.004*	-1.847*	-0.021
	(2.00)	(1.90)	(-1.79)	(-0.56)
LOSS	0.155	0.001*	0.045	0.011**
	(1.42)	(1.93)	(0.30)	(2.52)
TOBINQ	-0.158	-0.001	-1.112***	-0.016**
	(-0.62)	(-1.50)	(-2.63)	(-2.17)
SALES_GROWTH	-0.044	0.000	0.195*	0.017***
	(-0.76)	(0.72)	(1.92)	(3.49)
NOLCF	0.218*	0.001	0.314*	0.014**
	(1.65)	(1.59)	(1.65)	(2.15)
COV_RATIO	-0.310*	-0.000	-0.425*	-0.010*
	(-1.66)	(-0.64)	(-1.69)	(-1.74)
REPORT_DAYS	-0.003	-0.000	-0.008**	0.000
	(-1.40)	(-0.96)	(-2.23)	(0.27)
ICW	-0.088	0.001	0.333	0.037
	(-0.29)	(0.58)	(0.37)	(1.18)
BIG4	0.143	0.001**	0.420	0.007
	(1.02)	(2.10)	(1.35)	(0.85)
FOREIGN	2.309	-0.001	7.922**	0.063
	(1.27)	(-0.17)	(2.17)	(0.77)
ETSBO	-60.518	-0.039	-115.154	0.345
	(-1.58)	(-0.57)	(-1.44)	(0.32)
INTANGIBLE	0.433	0.000	-0.438	-0.023*
	(1.59)	(0.46)	(-0.73)	(-1.75)
CAPX	8.559***	0.009	7.266***	0.055
	(2.78)	(1.51)	(2.79)	(0.59)
ACQUISITION	-1.378	-0.003**	1.028	0.002
	(-1.53)	(-2.26)	(0.85)	(0.15)
Constant	0.565*	0.001	1.252***	-0.002
	(1.97)	(1.65)	(2.77)	(-0.16)
Observations	807	807	807	807
R-squared	0.490	0.172	0.693	0.413
Sample	Full	Full	Full	Full
Fixed Effects	State/SIC/Year	State/SIC/Year	State/SIC/Year	State/SIC/Year

This table reports the post period effect of enhanced risk information through ORSA regulation on firms' use of uncertain tax positions measured by current year increases to UTBs (*LN_UTBINC* and *SC_UTBINC*) and year end UTB balances (*LN_UTB* and *SC_UTB*) using a difference-in-differences design with industry (4 digit SIC), state, and year fixed effects. Reported p-values are based on two-tailed tests. Standard errors are clustered by firm. Robust t-statistics are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4
ORSA Regulation and UTBs – Primary Analysis
Panel A: Effect of ORSA Implementation on UTB – Full Sample of U.S. Insurers

	(1)	(2)	(3)	(4)
VARIABLES	LN_UTBINC	SC_UTBINC	LN_UTB	SC_UTB
POST_ORSA	**-0.225****	**-0.001****	**-0.497****	**-0.015****
	(-2.29)	**(-2.40)**	**(-2.32)**	**(-2.36)**
SIZE	-0.000	-0.000	0.000	-0.000
	(-0.01)	(-0.97)	(0.59)	(-0.27)
LEVERAGE	1.459	0.002	1.378	0.031
	(1.28)	(0.79)	(0.97)	(0.83)
ROA	0.405	0.003	-1.455	-0.039
	(0.45)	(0.66)	(-1.30)	(-0.82)
LOSS	0.113	0.001	0.002	0.008*
	(1.14)	(1.29)	(0.01)	(1.69)
TOBINQ	0.488	-0.000	0.322	-0.022
	(1.17)	(-0.12)	(0.62)	(-1.21)
SALES_GROWTH	0.006	0.000	0.080	0.014***
	(0.10)	(0.41)	(0.89)	(3.36)
NOLCF	0.100	0.000	0.003	0.015***
	(0.83)	(0.31)	(0.02)	(3.41)
COV_RATIO	-0.235	0.000	-0.503	-0.007
	(-1.02)	(0.57)	(-1.64)	(-1.02)
REPORT_DAYS	0.002	0.000	-0.000	0.000
	(1.01)	(0.89)	(-0.18)	(0.70)
ICW	0.090	0.001	0.557	0.030
	(0.39)	(0.62)	(0.76)	(1.06)
BIG4	0.070	0.000	0.024	-0.012
	(0.56)	(0.78)	(0.08)	(-1.02)
FOREIGN	-0.505	-0.006	-0.260	-0.015
	(-0.20)	(-0.91)	(-0.09)	(-0.17)
ETSBO	-66.548**	-0.047	-159.836**	-0.533
	(-2.19)	(-0.82)	(-2.02)	(-0.70)
INTANGIBLE	0.190	0.001	-0.744	-0.038**
	(0.69)	(1.09)	(-1.06)	(-2.01)
CAPX	6.083	0.010	-3.203	0.054
	(1.37)	(1.50)	(-1.42)	(1.03)
ACQUISITION	-0.953	-0.002**	1.106	0.018
	(-1.11)	(-2.07)	(1.12)	(0.77)
Constant	0.249	-0.000	2.136***	0.025*
	(0.78)	(-0.41)	(4.83)	(1.87)
Observations	807	807	807	807
R-squared	0.649	0.297	0.852	0.656
Sample	Full	Full	Full	Full
Fixed Effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year

Table 4 (Continued)
Panel B: Effect of ORSA Implementation on UTB – Sample of Mid to Large Size Insurers Subject to ORSA Regulation

VARIABLES	(1) LN_UTBINC	(2) SC_UTBINC	(3) LN_UTB	(4) SC_UTB
POST_ORSA	**-0.301****	**-0.001****	**-0.309****	**-0.007****
	(-2.62)	**(-2.24)**	**(-2.01)**	**(-2.25)**
SIZE	-0.000	-0.000	-0.000	0.000
	(-0.11)	(-0.76)	(-0.12)	(0.24)
LEVERAGE	2.485	0.005	2.960	0.083
	(1.57)	(1.09)	(1.38)	(1.23)
ROA	-0.121	0.000	-3.279***	-0.079
	(-0.10)	(0.09)	(-2.67)	(-1.56)
LOSS	0.058	0.000	-0.105	0.005
	(0.46)	(0.38)	(-0.73)	(1.15)
TOBINQ	0.748	0.000	0.857	-0.038
	(1.19)	(0.10)	(1.02)	(-1.43)
SALES_GROWTH	-0.040	0.000	0.016	0.015***
	(-0.61)	(0.30)	(0.19)	(3.58)
NOLCF	0.142	0.000	0.082	0.022***
	(1.08)	(0.64)	(0.48)	(3.39)
COV_RATIO	-0.305	0.001	-0.543	0.000
	(-0.94)	(0.61)	(-1.24)	(0.05)
REPORT_DAYS	0.001	0.000	-0.002	0.000
	(0.79)	(0.70)	(-0.93)	(0.52)
ICW	-0.253**	-0.001**	-0.208	0.002
	(-2.31)	(-2.35)	(-0.39)	(0.09)
BIG4	0.191	0.001	0.227	-0.022
	(0.69)	(1.09)	(0.37)	(-1.04)
FOREIGN	-0.970	-0.008	-0.377	-0.032
	(-0.41)	(-1.30)	(-0.12)	(-0.43)
ETSBO	-126.003**	-0.084	-328.393***	-1.009
	(-2.46)	(-0.72)	(-2.71)	(-0.88)
INTANGIBLE	0.178	0.001	-0.960	-0.047**
	(0.46)	(0.74)	(-1.05)	(-2.07)
CAPX	10.626	0.019**	-7.001	0.145**
	(1.53)	(2.02)	(-1.67)	(2.25)
ACQUISITION	-1.450	-0.004**	1.379	0.028
	(-1.26)	(-2.37)	(1.00)	(0.82)
Constant	0.276	-0.001	2.534***	0.040**
	(0.57)	(-0.55)	(3.45)	(2.02)
Observations	600	600	600	600
R-squared	0.643	0.283	0.843	0.708
Sample	Covered	Covered	Covered	Covered
Fixed Effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year

Table 4 (continued)

Panel C: Effect of ORSA Implementation on UTB – Tobit Regression of UTB Increases

VARIABLES	(1) LN_UTBINC	(2) SC_UTBINC	(3) LN_UTBINC	(4) SC_UTBINC
COVERED*POST	**-1.357***** **(-3.78)**	**-0.003***** **(-3.07)**	**-0.529**** **(-2.22)**	**-0.002***** **(-2.92)**
COVERED	1.656*** (4.31)	0.002*** (2.64)		
SIZE	0.000*** (3.55)	0.000 (0.70)	0.000*** (3.70)	0.000 (0.88)
LEVERAGE	-3.929** (-2.37)	-0.004 (-1.16)	-4.832*** (-2.75)	-0.003 (-0.86)
ROA	-1.230 (-0.58)	-0.000 (-0.03)	-3.279 (-1.16)	-0.001 (-0.17)
LOSS	0.128 (0.46)	0.001 (1.15)	-0.060 (-0.19)	-0.000 (-0.00)
TOBINQ	1.010 (1.62)	0.001 (0.68)	1.623** (2.29)	0.001 (0.38)
SALES_GROWTH	-0.089 (-0.82)	0.000 (0.32)	-0.091 (-0.64)	0.000 (0.21)
NOLCF	0.417 (1.45)	0.001 (1.57)	0.504* (1.76)	0.002** (2.21)
COV_RATIO	-0.023** (-2.21)	-0.000** (-2.02)	-0.026** (-2.14)	-0.000 (-1.34)
REPORT_DAYS	-1.071** (-2.40)	-0.002* (-1.66)	-1.124*** (-2.62)	-0.001 (-1.40)
ICW	0.530 (0.71)	0.002 (0.84)	-0.953** (-2.09)	-0.003*** (-2.63)
BIG4	1.351** (2.45)	0.004*** (2.83)	0.917 (1.36)	0.002 (1.62)
FOREIGN	6.917* (1.92)	0.007 (0.81)	5.640 (1.61)	0.003 (0.41)
ETSBO	-330.286** (-2.32)	-0.583* (-1.75)	-299.071** (-2.08)	-0.377 (-1.24)
INTANGIBLE	0.875 (1.56)	0.001 (0.75)	1.033* (1.66)	0.001 (0.97)
CAPX	14.631*** (2.99)	0.021** (2.49)	17.138*** (3.53)	0.025*** (2.86)
ACQUISITION	-3.503 (-1.63)	-0.007* (-1.69)	-3.520 (-1.59)	-0.008** (-2.01)
Constant	-1.262 (-1.10)	-0.004* (-1.79)	0.620 (0.55)	0.001 (0.53)
Observations	807	807	600	600
Pseudo R2	0.304	0.208	0.262	0.147
Sample	Full	Full	Covered	Covered
Fixed Effects	State/SIC/Year	State/SIC/Year	State/SIC/Year	State/SIC/Year

Table 4 (continued)
Panel D: Effect of ORSA Implementation on UTBs –Matched Sample

VARIABLES	(1) LN_UTBINC	(2) SC_UTBINC	(3) LN_UTB	(4) SC_UTB
POST_ORSA	**-0.335****	**-0.001****	**-0.628****	**-0.014****
	(-2.62)	**(-2.26)**	**(-2.05)**	**(-2.03)**
SIZE	0.000	0.000	0.000	-0.000
	(1.18)	(0.42)	(0.45)	(-0.31)
LEVERAGE	0.839	-0.000	-0.026	0.064
	(0.75)	(-0.07)	(-0.02)	(1.23)
ROA	0.349	0.004	-1.765	0.011
	(0.46)	(1.26)	(-1.46)	(0.25)
LOSS	0.044	0.000	0.001	0.008
	(0.41)	(0.93)	(0.01)	(1.58)
TOBINQ	-0.022	-0.001	-0.111	-0.017
	(-0.08)	(-0.93)	(-0.17)	(-1.05)
SALE_GROW	-0.016	-0.000	0.139	0.012**
	(-0.45)	(-1.11)	(0.87)	(2.15)
NOLCF	-0.003	0.000	-0.024	0.016***
	(-0.03)	(0.04)	(-0.17)	(3.38)
COV_RATIO	-0.276	-0.000	-0.587	-0.013*
	(-0.80)	(-0.21)	(-1.27)	(-1.73)
REPORT_DAYS	0.002	0.000	0.000	0.000
	(0.80)	(0.60)	(0.06)	(0.30)
ICW	0.156	0.001	0.820	0.051*
	(0.65)	(0.82)	(1.09)	(1.79)
BIG4	0.014	-0.000	-0.422	-0.025
	(0.17)	(-0.02)	(-1.31)	(-1.65)
FOREIGN	-2.307	-0.005	-2.667	-0.096
	(-1.01)	(-0.66)	(-0.81)	(-0.98)
ETSBO	-41.843	-0.049	-135.625**	-0.626
	(-1.61)	(-0.95)	(-2.30)	(-0.79)
INTANGIBLE	0.324	0.001	-1.200**	-0.056***
	(1.29)	(1.15)	(-2.01)	(-3.04)
CAPX	0.130	0.000	-2.763	-0.033
	(0.08)	(0.04)	(-1.03)	(-0.54)
ACQUISITION	-0.710	-0.002**	0.572	0.019
	(-1.41)	(-2.03)	(0.65)	(0.78)
Constant	1.173***	0.001*	3.952***	0.037**
	(5.56)	(1.72)	(7.90)	(2.33)
Observations	593	593	593	593
R-squared	0.538	0.319	0.772	0.683
Sample	CEM	CEM	CEM	CEM
Fixed Effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year

This table reports the post period effect of enhanced risk information through ORSA regulation on firms' use of uncertain tax positions measured by current year increases to UTBs (*LN_UTBINC* and *SC_UTBINC*) and year end UTB balances (*LN_UTB* and *SC_UTB*). Panel A presents the effect within the full sample of public U.S. insurers, including those that are never subject to ORSA regulation in the control group. Panel B presents the effect within the sub-sample of public U.S. insurers (Covered) that are subject to ORSA regulation because they have revenues in excess of $500 million. Panel C presents the results of a non-linear Tobit analysis for UTB increases as these are highly censored around 0. Due to inconsistent estimation of Tobit analysis with firm fixed effects, I replace firm fixed effects with state and 4 digit SIC fixed effects in Panel C. Panel D reports the analysis within a coarsened exact matched sample of ORSA covered firm-years to smaller, non-covered firm years on *SIZE* and *ROA*. Reported p-values are based on two-tailed tests. Standard errors are clustered by firm. Robust t-statistics are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 5
Interactive Effect of ORSA Regulation and Firms' Pre-ORSA Risk Environment

VARIABLES	(1) LN_UTBINC	(2) SC_UTBINC	(3) LN_UTB	(4) SC_UTB
POST_ORSA	**-0.406*****	**-0.001****	**-1.074*****	**-0.026*****
	(-2.82)	**(-2.56)**	**(-3.59)**	**(-3.01)**
*COVRANK*POST_ORSA*	0.430*	0.001	1.367***	0.025***
	(1.96)	(1.03)	(3.75)	(2.90)
Test: Interaction + Post = 0	**0.046**	**-0.000**	**0.324**	**-0.003**
	[0.86]	**[0.23]**	**[0.21]**	**[0.87]**
Observations	807	807	807	807
R-squared	0.653	0.299	0.862	0.672
Controls	Yes	Yes	Yes	Yes
Sample	Full	Full	Full	Full
Fixed Effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year

This table reports the post period effect of enhanced risk information through ORSA regulation on firms' use of uncertain tax positions measured by current year increases to UTBs (*LN_UTBINC* and *SC_UTBINC*) and the ending balance of UTBs (*LN_UTB* and *SC_UTB*) with an interaction of the tercile of firms' pre-ORSA Coverage Ratio transformed between 0 and 1 (*COVRANK*). For this test, coverage ratio is inverted such that a higher coverage ratio represents greater revenue to surplus (total assets less long-term debt), thus a firm with a high coverage ratio has less financial cushion to manage risks and is more likely to have a robust risk management framework prior to ORSA regulation. Tests of the effect within the top tercile of *COVRANK* are represented by (Interaction + Post = 0) F-tests. Reported p-values are based on two tailed tests except where predicted. Standard errors are clustered by firm. Robust t-statistics are in parentheses. F-test probability values are in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table 6
The Relation between UTBs and Firm Risk

VARIABLES	Pred.	(1) STD_RET	(2) STD_RET	(3) STD_RET	(4) STD_RET
POST_ORSA	**(-)**	**-0.026******	**-0.020****	**-0.019****	**-0.016****
		(-3.23)	**(-2.36)**	**(-2.35)**	**(-1.77)**
POST*SC_UTB	**(-)**			**-0.430****	**-0.363****
				(-2.24)	**(-2.03)**
SC_UTB	**(+)**			**0.205****	**0.251***
				(1.84)	**(1.45)**
SIZE		0.000	0.000	0.000	0.000
		(0.52)	(1.02)	(0.68)	(1.03)
LEVERAGE		-0.071	-0.134	-0.067	-0.133
		(-0.73)	(-1.19)	(-0.70)	(-1.19)
ROA		0.135	0.136	0.162*	0.192
		(1.54)	(1.16)	(1.90)	(1.59)
LOSS		0.030***	0.033***	0.030***	0.033***
		(3.38)	(2.79)	(3.32)	(2.96)
TOBINQ		-0.094***	-0.107**	-0.088***	-0.101**
		(-2.99)	(-2.61)	(-2.99)	(-2.62)
SALE_GROW		0.033***	0.037***	0.032***	0.036***
		(3.47)	(3.97)	(3.49)	(4.12)
NOLCF		-0.004	0.002	-0.010	-0.004
		(-0.46)	(0.29)	(-1.03)	(-0.38)
COV_RATIO		0.008	-0.008	0.007	-0.009
		(0.53)	(-0.50)	(0.43)	(-0.61)
REPORT_DAYS		0.000***	0.000***	0.000***	0.000***
		(3.70)	(3.99)	(3.89)	(4.05)
ICW		-0.017	-0.025	-0.026*	-0.027
		(-1.42)	(-1.33)	(-1.94)	(-1.41)
BIG4		0.015	0.026	0.017	0.023
		(1.12)	(0.83)	(1.15)	(0.77)
FOREIGN		-0.006	0.014	-0.012	0.011
		(-0.05)	(0.11)	(-0.11)	(0.10)
ETSBO		-1.218	-0.893	-1.179	-0.558
		(-0.42)	(-0.30)	(-0.41)	(-0.18)
INTANGIBLE		-0.002	0.026	-0.002	0.021
		(-0.10)	(1.23)	(-0.12)	(1.09)
CAPX		0.142	-0.035	0.086	-0.085
		(1.37)	(-0.27)	(0.89)	(-0.76)
ACQUISITION		-0.032	-0.111*	-0.025	-0.097
		(-0.59)	(-1.76)	(-0.50)	(-1.64)
INST_PCT		-0.013	-0.023	-0.004	-0.010
		(-0.71)	(-0.99)	(-0.25)	(-0.49)
SHARES		-0.014	-0.021	-0.012	-0.018
		(-0.80)	(-1.07)	(-0.74)	(-0.99)
RETURN		-0.023***	-0.025***	-0.026***	-0.030***
		(-3.04)	(-2.97)	(-3.10)	(-3.12)
SHAREPRICE		0.000**	0.000**	0.000**	0.000**
		(2.30)	(2.16)	(2.20)	(2.07)
Constant		0.214***	0.266***	0.195***	0.242***
		(2.66)	(2.84)	(2.72)	(2.77)
Test: UTB+POST*UTB=0				-0.225	-0.112
				[0.35]	[0.69]
Observations		667	533	667	533
R-squared		0.645	0.693	0.651	0.699
Sample		Full	Covered	Full	Covered
Fixed Effects		Firm/Year	Firm/Year	Firm/Year	Firm/Year

This table reports the relation between UTBs (*SC_UTB* and *LN_UTB*) and firm risk (*SD_RET*) and how this relation changes following enhanced availability of risk information with ORSA regulations. Tests of the relation between UTBs and firm risk post ORSA are represented by (UTB+POST*UTB = 0) F-tests. Reported p-values are based on two tailed tests except where predicted. Standard errors are clustered by firm. Robust t-statistics are in parentheses. F-test probability values are in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table 7
System of Equations: Simultaneous Change in UTBs for High Risk Firms

Equation	Dependent Variable	β_1	β_2	β_3	Obs.	R^2	Controls	Fixed Effects
		POST_ORSA	*SD_RET*	***POST_ORSA*SD_RET***				
(1)	*SC_UTB*	0.0045	0.1772***	**-0.2328*** **	667	0.747	Yes	Firm/Year
		(1.12)	(12.58)	**(6.70)**				
		POST_ORSA	*SC_UTB*	***POST_ORSA*SC_UTB***				
(2)	*SD_RET*	-0.0110	0.6538***	**-0.3772** **	667	0.594	Yes	Firm/Year
		(1.57)	(3.67)	**(2.00)**				

This table reports a system of equations using three-stage least squares estimation which accounts for the simultaneous change in UTBs by high risk firms while also evaluating the post ORSA relation between UTBs and firm risk.

Equation 1 is specified as:

$$SC\_UTB_{i,t} = \alpha + \beta_1 POST\_ORSA + \beta_2 SD\_RET + \beta_3 POST\_ORSA * SD\_RET + \beta_2 SIZE + \beta_4 LEVERAGE + \beta_5 ROA + \beta_6 LOSS + \beta_7 TOBINQ + \beta_8 SALES\_GROWTH + \beta_9 NOLCF + \beta_{10} COV\_RATIO + \beta_{11} REPORT\_DAYS + \beta_{12} ICW + \beta_{13} BIG4 + \beta_{14} FOREIGN + \beta_{15} ETSBO + \beta_{16} INANGIBLE + \beta_{17} CAPX + \beta_{18} ACQUISITION + \delta_1 Firm + \delta_2 Year$$

Equation 2 is specified as:

$$SD\_RET_{i,t+1} = \alpha + \beta_1 POST\_ORSA + \beta_2 SC\_UTB + \beta_3 POST\_ORSA * SC\_UTB + \beta_2 SIZE + \beta_4 LEVERAGE + \beta_5 ROA + \beta_6 LOSS + \beta_7 TOBINQ + \beta_8 SHOUT + \beta_9 RET + \beta_{10} SHAREPRICE + \beta_{11} INST\_PCT + \delta_1 Firm + \delta_2 Year$$

β_2 is predicted to be positive. β_3 is predicted to be negative. Standard errors are clustered by firm. Robust z-statistics are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 8
Effect of ORSA Regulation on Cash Taxes Paid

VARIABLES	Pred.	(1) HS_ETR (Δ)	(2) HS_ETR (Δ)	(3) CETR	(4) CETR
POST_ORSA	**(+)**	**0.002*** **	**0.003*** **	**0.040** **	**0.048*** **
		(3.17)	**(3.48)**	**(2.33)**	**(2.58)**
SIZE		-0.000*	-0.000	-0.000	-0.000
		(-1.99)	(-1.11)	(-1.61)	(-0.44)
LEVERAGE		-0.028**	-0.025	-0.190	-0.167
		(-2.28)	(-1.31)	(-1.02)	(-0.68)
ROA		-0.118***	-0.145***	0.187	-0.057
		(-4.27)	(-5.63)	(0.47)	(-0.12)
LOSS		0.002	0.002*		
		(1.50)	(1.78)		
*ROA*LOSS*		-0.203***	-0.163***		
		(-4.75)	(-3.71)		
TOBINQ		0.015***	0.013**	0.105	-0.008
		(4.06)	(2.05)	(1.64)	(-0.09)
SALE_GROW		-0.003**	-0.003*	-0.027	0.008
		(-2.14)	(-1.77)	(-0.72)	(0.33)
NOLCF		0.004**	0.004*	-0.003	0.007
		(2.16)	(1.95)	(-0.10)	(0.26)
COV_RATIO		0.002	0.001	0.010	0.000
		(0.76)	(0.36)	(0.23)	(0.01)
REPORT_DAYS		-0.000	-0.001	-0.016	0.003
		(-0.17)	(-0.33)	(-0.32)	(0.06)
ICW		0.001	-0.001	0.122***	0.095
		(0.93)	(-0.49)	(2.75)	(1.62)
BIG4		-0.003**	-0.004*	0.040	-0.035
		(-2.25)	(-1.82)	(0.99)	(-0.48)
FOREIGN		-0.008	-0.009	-0.337	-0.387
		(-0.70)	(-0.83)	(-0.91)	(-1.15)
ETSBO		-0.627	0.159	5.912	17.640
		(-0.95)	(0.40)	(0.63)	(1.31)
INTANGIBLE		0.000	0.001	-0.013	-0.005
		(0.04)	(0.42)	(-0.27)	(-0.11)
CAPX		-0.043	-0.025	-0.425	0.206
		(-1.61)	(-1.41)	(-0.80)	(0.30)
ACQUISITION		-0.008	-0.002	-0.041	-0.142
		(-0.91)	(-0.39)	(-0.26)	(-0.83)
Constant		0.001	0.003	0.283	0.300
		(0.22)	(0.56)	(1.42)	(1.40)
Observations		807	600	678	521
R-squared		0.836	0.773	0.508	0.540
Sample		Full	Covered	Full	Covered
Fixed Effects		Firm/Year	Firm/Year	Firm/Year	Firm/Year

This table reports the post period effect of enhanced risk information through ORSA regulation on firms' cash taxes paid measured by the Henry and Sansing (2018) measure of ETRs (*HS_ETR (Δ)*) and cash effective tax rates (*CETR*). Tests of *CETR* are limited to profitable firm-year observations. Reported p-values are based on two-tailed tests except where predicted. Robust t-statistics are in parentheses.

*** p<0.01, ** p<0.05, * p<0.01

Table 9
Effect of ORSA Regulation on Unique Tax Haven Subsidiaries

VARIABLES	Pred.	(1) LN_HAVEN	(2) LN_HAVEN	(3) LN_HAVEN	(4) LN_HAVEN
POST_ORSA	**(-)**	**-0.128*****	**-0.097*****	**-0.123****	**-0.109****
		(-2.83)	**(-2.51)**	**(-2.03)**	**(-1.98)**
SIZE		0.000	0.000	0.000	0.000
		(0.63)	(0.83)	(0.14)	(0.49)
LEVERAGE		0.031	-1.044	0.534	0.074
		(0.07)	(-1.46)	(0.98)	(0.06)
ROA		-0.394	-0.935	-0.067	-0.144
		(-0.88)	(-1.59)	(-0.32)	(-0.43)
LOSS		0.041	0.060	0.029	0.027
		(1.37)	(1.47)	(0.82)	(0.56)
TOBINQ		-0.231	0.046	-0.605**	-0.800*
		(-1.30)	(0.15)	(-2.58)	(-1.78)
SALES_GROWTH		0.089***	0.135***	0.080**	0.105**
		(2.83)	(5.56)	(2.23)	(2.59)
NOLCF		-0.075*	-0.111***	-0.049*	-0.081
		(-1.98)	(-2.90)	(-1.85)	(-1.40)
COV_RATIO		-0.048	-0.214*	-0.049	-0.274
		(-0.63)	(-1.77)	(-0.49)	(-1.36)
REPORT_DAYS		-0.000	0.000	-0.002***	-0.002***
		(-0.41)	(0.20)	(-3.18)	(-3.79)
ICW		0.059	0.045	0.028	0.050
		(1.09)	(0.67)	(0.36)	(0.42)
BIG4		-0.017	-0.021	0.055	0.160*
		(-0.65)	(-0.28)	(0.62)	(1.72)
FOREIGN		-0.378	-0.470	1.182	1.197
		(-0.38)	(-0.50)	(1.19)	(1.30)
ETSBO		-13.735	-31.354	9.236	24.401
		(-0.96)	(-1.39)	(0.81)	(1.27)
INTANGIBLE		0.297***	0.506***	0.101	0.334**
		(2.83)	(3.75)	(0.90)	(2.19)
CAPX		0.531	0.448	0.300	0.077
		(0.92)	(0.44)	(0.52)	(0.07)
ACQUISITION		-0.301	-0.652**	0.002	-0.276
		(-1.14)	(-2.21)	(0.01)	(-0.95)
Constant		0.534***	0.637***	0.654***	0.809***
		(6.15)	(4.07)	(5.29)	(4.90)
Observations		757	564	551	409
R-squared		0.902	0.906	0.916	0.917
Sample		Full	Covered	Full (Dyreng Only)	Covered (Dyreng Only)
Fixed Effects		Firm/Year	Firm/Year	Firm/Year	Firm/Year
Cluster		Firm	Firm	Firm	Firm

This table reports the post period effect of enhanced risk information through ORSA regulation on firms' use of tax haven countries listed in Exhibit 21. *LN_HAVEN* represents the log of 1 plus the number of unique haven countries reported. Columns 1 and 2 relate to the full sample period with hand collected Exhibit 21 data supplementing Scott Dyreng's dataset after 2014 (Dyreng and Lindsey 2009). Columns 3 and 4 report the period limited solely to the public sample available on Scott Dyreng's website, limiting tests to fewer *POST_ORSA* firms. Reported p-values are based on two-tailed tests except where predicted. Robust t-statistics are in parentheses.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 10
Post Period Falsification Test
The Effect of a False Post Test Beginning *t-2*

VARIABLES	(1) LN_UTBINC	(2) SC_UTBINC	(3) LN_UTB	(4) SC_UTB	(5) HS_ETR(Δ)	(6) CETR	(7) LN_HAVEN
POST_FALSE	0.031	-0.000	-0.187	-0.008	0.001	-0.001	-0.034
	(0.27)	(-0.26)	(-0.95)	(-1.27)	(1.05)	(-0.06)	(-0.82)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	807	807	807	807	807	678	757
R-squared	0.637	0.280	0.844	0.599	0.825	0.491	0.913
Sample	Full	Full	Full	Full	Full	Full	Full
Fixed Effects	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year	Firm/Year

This table reports the results of a falsification test using a post period that begins during year *t-2* corresponding to each firm's headquarter state's ORSA implementation. The purpose of these tests are to ensure that decreases to UTBs and increases to cash ETRs are not driven by general time trends or other omitted variables that occur during the expansionary period between 2008 and 2018. Reported p-values are based on two tailed tests except where predicted. Standard errors are clustered by firm. Robust t-statistics in parentheses.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$