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Abstract

Using an international sample of firms from 31 countries, we study the relation between auditor quality and corporate tax aggressiveness. Using an indicator variable for tax aggressiveness when the firm's corporate tax avoidance measure is within the top quintile of each country-industry combination, we find strong evidence that auditor quality is negatively associated with the likelihood of tax aggressiveness, even after controlling for other institutional determinants such as home-country tax system characteristics. We also find that the negative relation between auditor quality and the likelihood of tax aggressiveness is more pronounced in countries where investor protection is stronger, auditor litigation risk is higher, the audit environment is better, and capital market pressure is higher.

Keywords: Auditor Quality; Corporate Tax Aggressiveness; Investor Protection; Litigation Risk; Audit Environment; Capital Market Pressure.

JEL Codes: M42; M48; H20; F30.

1. Introduction

We examine the relation between auditor quality and corporate tax aggressiveness for a sample of firms from 31 countries.[1] Prior research examining the determinants of corporate tax aggressiveness is primarily conducted in the U.S., where all firms operate under the same tax system, financial accounting standards, and institutional regimes.[2] A notable exception is Atwood et al. (2012), who document that home-country tax system characteristics—required book-tax conformity, worldwide versus territorial approach, and strength of tax enforcement—reduce corporate tax avoidance. Our study complements Atwood et al. (2012) by examining whether auditor quality is also related to tax aggressiveness across countries. To our knowledge, none of the prior studies has specifically considered the role of auditor quality in corporate tax aggressiveness in an international setting. Additionally, we also consider whether differences in country-level institutional characteristics systematically affect the relation between auditor quality and corporate tax aggressiveness.

In this study, we use an international setting to study the relation between auditor quality and corporate tax aggressiveness for three important reasons. First, tax aggressiveness is a world-wide phenomenon that has attracted increased attention. The media has recently reported many incidences of corporate tax aggressiveness by multinational firms.[3] This focus on corporate tax aggressiveness is not confined only to developed economies, but is also prevalent in emerging economies around the

[1] In this paper, we follow Hanlon and Heitzman (2010) and define tax avoidance broadly as the reduction in explicit taxes paid. Hanlon and Heitzman (2010) state that "if tax avoidance represents a continuum of tax planning strategies where something like municipal bond investments are at one end (lower explicit tax, perfectly legal), then terms such as "noncompliance," "evasion," "aggressiveness," and "sheltering" would be closer to the other end of the continuum. Therefore, we define tax aggressiveness as tax planning strategies at the more aggressive end of the tax avoidance spectrum that are more likely to push the envelope of tax law, and to include the more aggressive tax-related activities that auditors presumably are more concerned about in their audits.

[2] See Hanlon and Heitzman (2010) for a review of the tax avoidance literature.

[3] These incidences include but are not limited to editorials in leading news outlets such as Bloomberg's "The Great Corporate Tax Dodge," the *New York Times*' "But Nobody Pays That," *The Times*' "Secrets of Tax Avoiders," and the *Guardian*'s "Tax Gap."

world.[4] However, there is scant research on the determinants on tax aggressiveness in an international setting (e.g., Atwood et al. 2012). Second, prior evidence on the role of the auditor in corporate tax aggressiveness focuses primarily on U.S. firms (e.g., Donohoe and Knechel 2014; Klassen et al. 2015) and prior studies (e.g., McGuire et al. 2012) mainly focus on how auditors influence tax aggressiveness in the U.S. through the provision of auditor-provided tax services (APTS). However, there is little evidence on how auditor quality relates to tax aggressiveness internationally. One reason for this gap in the literature is that information on APTS is not available for many countries. Hence, rather than using APTS as a surrogate for auditor quality, we use Big N auditors to proxy for auditor quality because prior studies indicate that Big N auditors are associated with higher audit quality around the world (e.g., Choi and Wong 2007; Choi et al. 2008; Francis and Wang 2008; Kanagaretnam et al. 2010). Moreover, the results from the U.S. studies may not be generalizable to non-U.S. settings because the exposure to litigation risk of Big N auditors and the proportion of clients audited by Big N auditors in non-U.S. countries are much lower than in the U.S. Third, an advantage of examining tax aggressiveness in an international context is that the extent of auditors' influence on tax aggressiveness likely depends on each country's institutional environment and it is ex-ante unclear whether Big N auditors play a bigger or a smaller role in countries with stronger institutions compared to countries with weaker institutions. Our study attempts to shed some light on these issues.

The primary role of auditors is to express an opinion on whether the financial statements and related disclosures present fairly, in all material respects, the client firm's financial condition in conformity with generally accepted accounting principles (GAAP). Part of the audit engagement includes evaluating the validity and reasonableness of the recognition and disclosure of tax-related

[4] For example, a recent report by Confederation of Indian Industry (CII) and global services firm Ernst & Young (EY) indicates that countries like India and China are looking at tax base erosion, which is a major area of concern.

items in the financial statements, and thus auditors may indirectly influence tax aggressiveness. Aggressive tax planning by clients likely increases the litigation risk faced by auditors because shareholders often attempt to hold auditors responsible for tax-related deficiencies in the financial statements (Donohoe and Knechel 2014). In the event that the firm is prosecuted by the tax authority for being tax non-compliant, the auditor could be implicated and be accused of failure to ensure disclosure of adequate tax reserves. In addition, if tax aggressive transactions are challenged by the tax authority, a substantial tax claim and related interest and penalties can lead to the client facing financial difficulties and having to restate financial reports, both of which are closely related to auditors' litigation risk and reputational penalty (Stice 1991; Hennes et al. 2014). Furthermore, tax aggressive behavior calls into question the integrity and risk profile of management (e.g., Hanlon et al. 2012, footnote 11), casting doubt on the quality of other compliance activities and the overall control environment, thus further heightening the litigation and reputational risks of the auditor.[5] Hence auditors are likely to impose a stricter reporting standard on aggressive tax planning activities, which will in turn indirectly influence the level of tax aggressiveness of clients.

This study empirically investigates the ambiguous relation between Big N auditors and tax aggressiveness. On the one hand, Big N auditors are likely to be negatively associated with firms' tax aggressiveness because of litigation exposure and reputational concerns (Watts and Zimmerman 1983; Palmrose 1988; Shu 2000). Loss of reputation, as Arthur Andersen learned the hard way, could put a Big N auditor out of business (Huang and Li 2009). Litigation risk also motivates Big N auditors to remain vigilant and independent. Hindo (2003) reports that Deloitte and Touche, Ernst and Young, and PricewaterhouseCoopers resigned from more than 1,200 clients following the Enron-Andersen scandal in order to reduce the risk of litigation. On the other hand, prior studies also show that tax

[5] There is also a potential financial reporting benefit from being tax aggressive because a lower tax expense results in higher post-tax earnings. A high quality audit can reduce this benefit by ensuring that the tax expense is not understated.

aggressiveness does not necessarily increase audit risk or tarnish auditor reputation. For example, Lennox et al. (2013) find that clients with greater tax aggressiveness are less likely to commit accounting frauds, presumably because tax aggressiveness could lead to greater IRS scrutiny of the accounting transactions, and therefore clients are less likely to manipulate earnings aggressively at the same time. Gallemore et al. (2014) document that firms and their top executives do not seem to bear reputational costs from aggressive tax sheltering activities. They also report no evidence of increased auditor turnover in the three years following tax shelter revelation. These two studies suggest that tax aggressiveness does not have a direct bearing on audit risk and reputation. Given the conflicting findings of prior research, the association between Big N auditors and tax aggressiveness is ultimately an empirical question.

The effect of Big N auditors on tax aggressiveness may not be uniform across countries due to the differences in country-level institutional features. In additional cross-sectional analyses, we therefore consider several country-level institutional characteristics, including investor protection, auditor litigation risk, audit environment, and stock market pressure, that may systematically affect the relation between auditor quality and corporate tax aggressiveness. There are competing views on how institutional features such as investor protection may affect the relation between auditor quality and tax aggressiveness. One view is that a high quality auditor may serve as an alternative governance mechanism when legal enforcement and investor protection are weak (Choi and Wong 2007). The alternate view contends that, as investor protection becomes stronger, the likelihood of detecting client misreporting increases and litigation losses increase. Thus, auditors have stronger incentives to enforce higher financial reporting quality, which will indirectly dampen tax aggressiveness when investor protection is strong (Francis and Wang 2008). Because of the competing views on the role of institutions, we empirically test how investor protection, auditor

litigation risk, and audit environment affect the relation between Big N auditors and tax aggressiveness. In addition, prior research suggests that firms manage earnings to meet or beat the market expectations when faced with strong capital market pressure (Teoh et al. 1998; Bartov et al. 2002; Graham et al. 2005). Hence, we also investigate how stock market pressure influences the relation between Big N auditors and tax aggressiveness.

We examine the relation between auditor quality and tax aggressiveness using a large non-U.S. sample of 41,958 firm-year observations across 31 countries spanning the years 1995 to 2007. Following prior studies, we use an indicator variable for Big N membership to proxy for auditor quality (e.g., Teoh and Wong 1993; Becker et al. 1998; Fan and Wong 2005; Choi and Wong 2007; Behn et al. 2008). We follow Atwood et al. (2012) and measure tax avoidance as the difference between the firm's "unmanaged tax amount" (the home-country statutory corporate tax rate times pre-tax earnings before exceptional items) and its "managed tax amount" (current taxes paid). This difference reflects the extent to which managers pursue strategies to reduce taxes paid. To capture tax aggressiveness, we use an indicator variable that equals one if the firm's corporate tax avoidance measure is within the top quintile of each country-industry combination, and zero otherwise. This measure attempts to capture the aggressive tax-related activities that auditors presumably are concerned about in their audits and thus is more closely related to our research question.[6]

Based on logistic estimation, we find that Big N auditors are associated with a lower likelihood of corporate tax aggressiveness, after controlling for factors that have been shown to affect tax aggressiveness in an international setting (e.g., Atwood et al. 2012). We also find that the

[6] Measures of tax aggressiveness used in the extant literature include DTAX (Frank et al. 2009), tax shelter prediction score (Wilson 2009), and unrecognized tax benefit (UTB) prediction score (Rego and Wilson 2012). However, because we use an international sample of firms from Compustat Global, many of the variables required to compute these measures of tax aggressiveness are either not available or not applicable in settings outside the U.S. (e.g., tax shelter prediction score, and UTB prediction score). If our measure merely picks up clients' non-risky tax planning activities which auditors are presumably less concerned about, we should observe no association between auditor quality and tax aggressiveness. However, we find a strong negative association which is consistent with our hypothesis.

negative association between Big N auditors and the likelihood of tax aggressiveness is more pronounced when investor protection is stronger, when the audit environment is better, when auditors are exposed to higher litigation risk, and when capital market pressure on firms is stronger. We also find that firms audited by industry specialist auditors exhibit a lower likelihood of tax aggressiveness and that Big N auditors are associated with a lower likelihood of tax aggressiveness in the post-2002 period after the demise of Arthur Andersen. Our results are robust to a number of sensitivity tests, including using two alternate measures of tax aggressiveness and two alternate proxies for auditor quality, examining firms that switch auditors during the sample period, and excluding firms from the U.K., which comprise the largest proportion of our sample.

Our study makes several important contributions to the literature. First, it adds to the audit literature on the effects of Big N auditors. This literature suggests that Big N auditors provide a valuable service by enhancing financial reporting quality around the world. We contribute to this research by documenting that Big N auditors are associated with a lower likelihood of tax aggressiveness across countries, and this result holds after controlling for the various components of accruals that proxy for earnings management. Second, we contribute to prior research by documenting that the association between auditor quality and the likelihood of tax aggressiveness varies with different characteristics of the institutional environment. This evidence is important as most of the research on tax aggressiveness is conducted primarily in the U.S., where all firms operate under the same institutional setting. We exploit the cross-country differences in institutional structures to examine how these institutional characteristics moderate the relation between auditor quality and the likelihood of tax aggressiveness, which cannot be examined in a single country setting such as the U.S. Third, we contribute to the literature that investigates cross-country determinants of tax aggressiveness. Atwood et al. (2012) find that tax aggressiveness across countries is associated

with country-level tax system characteristics, i.e., required book-tax conformity, worldwide versus territorial approach, and perceived strength of tax enforcement. We add to their findings by showing that auditor quality is also associated with the likelihood of tax aggressiveness, after explicitly controlling for the tax system characteristics in a country. Fourth, our study should be of interest to tax policymakers concerned about declining corporate tax revenues and the increasing gap between reported earnings and taxable income. Policymakers suggest that formal actions such as tightening tax loopholes and increasing tax enforcement are likely to result in lower tax avoidance (Shulman 2009; DOT 2011; Gravelle 2011; Hufbauer 2011; Keener 2011; Zrust 2011). Our findings suggest that firms employing high quality auditors exhibit a lower likelihood of tax aggressiveness; however, this relation varies with a country's institutional environment.

Our study is subject to several limitations. First, our cross-country firm-level measure of tax aggressiveness is based on a simple difference between the home-country statutory tax rate and the cash effective tax rate. To the extent that this measure is influenced by the firm's foreign operations which are taxed at a different statutory tax rate, it will be noisy. However, this noise is likely to bias against finding the documented results. Second, because firms' incentive to be tax aggressive is likely to be influenced by home-country norms, tax system characteristics, and other institutional factors, our findings could be affected by the extent to which these factors are correlated with our test variable and not controlled for in our empirical estimation. Third, because we cannot directly observe or identify the specific mechanisms through which auditor quality affects tax aggressiveness, we note that the reported relations between high quality auditors and tax aggressiveness across countries are observed associations, and may not result from underlying causal relations. For instance, due to data limitation, we are not able to observe whether high quality auditors influence tax aggressiveness through an external audit procedure solely and/or through the provision of APTS and thus, we are not

able to conclude how external auditors influence tax aggressiveness in our study. Future studies with access to finer data can take this step to further our understanding of the channels through which external auditors influence corporate tax aggressiveness. Finally, firms' choice of external auditors is not exogenous. For instance, it is possible that firms seeking to be tax aggressive may choose a low quality auditor to avoid scrutiny by their external auditors, which is also consistent with our findings (reverse causality). Our results should be interpreted cautiously in light of these limitations.

The rest of this paper is organized as follows. In section two, we discuss related research on tax aggressiveness and develop our predictions on the relation between auditor quality and corporate tax aggressiveness, and how that relation may vary with institutional characteristics. We describe the measures of our main variables of interest and the research design in section three. We discuss the main results in section four and the results of additional analyses and robustness checks in section five. We provide our conclusions in section six.

2. Research Background and Hypotheses

2.1 Prior Research on Tax Avoidance and Tax Aggressiveness

Using predominantly U.S. data, prior research has identified several firm characteristics that are associated with tax avoidance across firms. These characteristics include firm size, profitability, leverage, capital intensity, and foreign operations (Stickney and McGee 1982; Zimmerman 1983; Porcano 1986; Shevlin and Porter 1992; Gupta and Newberry 1997; Rego 2003). More recent research reports that companies accused of tax sheltering are more profitable, report larger book-tax differences, have higher R&D spending and lower leverage, and operate subsidiaries in foreign tax havens (Graham and Tucker 2006; Wilson 2009; Lisowsky 2010). Further, firms' ownership structure (family ownership and dual class share structure) and corporate social responsibility (CSR) efforts are related to tax avoidance behavior (Chen et al. 2010; Hoi et al. 2013; McGuire et al. 2014).

Prior studies primarily explore tax avoidance across firms within one country, mainly within the U.S. One notable exception is Atwood et al. (2012) who examine whether three home-country tax system characteristics – required book-tax conformity, worldwide versus territorial approach, and perceived strength of tax enforcement – are related to corporate tax avoidance. They find that, on average, a firm exhibits lower tax avoidance when required book-tax conformity is higher, a worldwide approach is used, and tax enforcement is perceived to be stronger. We extend this line of research by examining the relation between auditor quality and corporate tax aggressiveness in a cross-country setting. In our analysis, we explicitly control for the three tax system characteristics studied in Atwood et al. (2012).

2.2 Auditors' Role in Tax Aggressiveness

The primary role of auditors is to express an opinion on whether the financial statements and related disclosures present fairly, in all material respects, the client firm's financial condition in conformity with generally accepted accounting principles (GAAP). Because income taxes could amount to as much as one-half of a public firm's net income, an auditor should always consider the amount as material to financial statements. Hence, auditors evaluate the validity of accrued taxes payable and tax contingent liabilities on the balance sheet, income tax expense on the income statement, and the related note disclosures to provide adequate assurance to the investing public about the appropriateness of these items and disclosures (Barrett 2004). Because any material information about questionable tax transactions tends to be hidden in these accounts and disclosures, auditors also have to assess whether their clients engage in potentially abusive tax transactions that can be challenged if uncovered by the tax authority. Auditors, if necessary, could require clients to reflect correctly the tax-related items on the financial statements, for example, by recording a contingency reserve or unrecognized tax benefit adjustment, hence increasing reported tax expense and reducing

the financial statement benefits of engaging in tax avoidance. By ensuring that book and taxable income are correctly reported in the financial statements, auditors indirectly reduce firms' abilities and incentives to avoid tax because a large book-tax difference can be a potential red flag (Hanlon 2005), which increases the probability of detection by the tax authorities.

Auditors have incentives to influence clients' aggressive tax activities for several reasons. First, firms that engage in aggressive tax behavior have a higher likelihood of misstatements and restatements because managers can use various accounts, such as valuation allowances, tax contingency reserves, and estimates of accrued taxes, to manage earnings (Dhaliwal et al. 2004; Frank and Rego 2006; Hanlon and Heitzman 2010; Gupta et al. 2015). Because a client's aggressive financial reporting is positively associated with auditor litigation risk (Heninger 2001; Palmrose and Scholz 2004), tax aggressiveness can increase the litigation risk of the auditor when tax-related misstatements and restatements occur.[7] Second, recent studies show that news about a firm's involvement in aggressive tax planning reduces stock price (Hanlon and Slemrod 2009) and increases stock price crash risk (Kim et al. 2011). The potential loss in shareholders' wealth can also precipitate lawsuits against the firm and its auditor (Francis et al. 1994; Grundfest and Perino 1997). Hence, auditors who audit clients who are tax aggressive face higher engagement risk.

Lastly, tax aggressive behavior calls into question the integrity and risk profile/appetite of management and exacerbates the agency problems between the firm and its stakeholders. Studies have shown that aggressive tax behavior is driven by "tone at the top" (Desai and Dharmapala 2006; Dyreng et al. 2010), and tax aggressiveness could indicate management's attitude towards compliance with rules and regulations (Hanlon et al. 2012, footnote 11). A weak tone at the top and its effect on the control environment can increase the likelihood that the stakeholders might not be

[7] In the U.S. setting, Donohoe and Knechel (2014, footnote 6) document various instances where companies and shareholders file lawsuits against auditors for tax-related deficiencies in the financial statements.

able to uncover potential financial misconduct within the firm. Self-serving managers also have incentives to use tax avoidance activities to mask rent-seeking behavior (Desai and Dharmapala 2006), which again increases the risk faced by auditors.

2.3 Big N Auditors, Auditor Quality, and Tax Aggressiveness

Using economic theory, DeAngelo (1981) argues that auditor size is a proxy for auditor reputation and audit quality, and that Big N auditors with valuable reputations at stake have more incentive to ensure that their clients' financial statements properly reflect the underlying transactions. Consistent with the notion that Big N auditors enhance the credibility of financial statements, prior studies document that Big N auditors are associated with higher financial reporting quality in public firms around the world (Khurana and Raman 2004; Choi et al. 2008; Francis and Wang 2008; Kanagaretnam et al. 2010). Besides reputational concerns, extant theory and evidence indicates that Big N auditors provide more implicit insurance coverage in the event of audit failure (Watts and Zimmerman 1986; Dye 1993; Mansi et al. 2004). In other words, Big N auditors with "deep pockets" have stronger incentives to lower the expected costs of litigation by supplying superior audits. Consistent with the "deep pockets" explanation, Khurana and Raman (2004) find that the audit quality differentiation between Big N and non-Big N auditors is positively affected by country-level litigation risk. Lys and Watts (1994) also find that lawsuits against auditors are more likely to occur for clients with income-increasing accruals. The results of these studies, coupled with the demise of Arthur Andersen, highlight the potential liability of auditors and the importance for auditors to mitigate the possibility of lawsuits against them.

In summary, Big N auditors improve accounting transparency to avoid tarnishing their reputations and becoming entangled in costly litigation by better constraining managers from distorting reported earnings. Prior evidence suggests that tax aggressiveness may be associated with

aggressive financial reporting behavior as managers seek to report both higher book income and lower taxable income at the same time (Frank et al. 2009). Donohoe and Knechel (2014) argue that clients' greater tax aggressiveness can expose an auditor to litigation, regulatory, and reputational costs, and hence, audit effort is a function of clients' tax position. They find that auditors charge a higher fee premium to clients who are more tax aggressive, presumably to compensate for bearing higher risk. Klassen et al. (2015) find that tax returns prepared by auditors are associated with less aggressive tax positions. Taken together, these studies suggest that auditors most likely are concerned about the clients' tax position as it inevitably affects the audit and engagement risks faced by auditors. Therefore, Big N auditors concerned about risky tax aggressive activities mitigate their exposure to litigation and reputation risks by ensuring appropriate tax reporting, which will in turn dampen the firms' incentives to engage in tax aggressive activities.

However, the association between auditor quality and risky tax aggressive activities may be ambiguous in light of prior studies. Using proprietary data from the IRS, Lisowsky (2010) finds that Big N auditors are positively associated with tax sheltering activities, as these auditors are viewed as promoters of tax services. Similarly, McGuire et al. (2012) report that external audit firms providing both audit and tax services, that are either industry tax or overall specialists (both audit and tax), are associated with increased levels of tax aggressiveness for their clients. The evidence suggests that audit firms with tax or overall expertise employ their knowledge to devise tax avoidance strategies that benefit the firm rather than using their expertise to constrain firms' tax planning opportunities. Erickson et al. (2004) find that firms with aggressive financial reporting are associated with lower tax aggressiveness. They attribute their evidence that fraud firms overpay their taxes to managers trying to avoid arousing suspicion from government agencies, including the SEC and the IRS, and outside investors. Lennox et al. (2013) also find that clients with greater tax aggressiveness are less likely to

commit accounting frauds, consistent with the notion that committing fraud reduces the benefit from undertaking aggressive tax positions and would be viewed as a red flag by the IRS. Gallemore et al. (2014) investigate whether firms and their top executives bear reputational costs from engaging in tax sheltering activities. They examine the reputational costs that prior research has shown firms and managers face in cases of alleged misconduct: increased CEO and CFO turnover, auditor turnover, lost sales, increased advertising costs, and decreased media reputation. In particular, they report no evidence of auditor turnover when clients are accused of engaging in tax sheltering activities. Collectively, the above studies suggest no direct relation between tax aggressiveness and audit risk or auditor reputation loss. Consequently, the association between Big N auditors and tax aggressiveness is ultimately an empirical question. Because of the ambiguity in the relation, we posit the following non-directional hypothesis stated in null form:

H1: Auditor quality is unrelated to a firm's tax aggressiveness.

2.4 Role of Institutions in the Relation between Auditor Quality and Tax Aggressiveness

The relation between auditor quality and tax aggressiveness may not be uniform across different country-level institutional environments. We explore the interactions between auditor quality and these institutional features, and their joint effects on tax aggressiveness. We consider three country-level institutional characteristics – investor protection, auditor litigation risk and audit environment, and the importance of capital market pressure.

2.4.1 Investor Protection

While the quality of institutions, such as the strength of investor protection, is likely to improve information quality in general, it is not obvious whether the benefits of having a high quality auditor matter more when investor protection is stronger. There are opposing views on how the behavior of Big N auditors differs across investor protection regimes. One view is that Big N auditors allow less

managerial discretion and press for more disclosure and transparency only when investor protection is strong. As investor protection becomes stronger, the likelihood of detecting client misreporting increases, litigation losses become larger, and Big N auditors have more reputational capital at risk.[8] Consistent with this idea, Francis and Wang (2008) find that Big N audits are associated with higher earnings quality as investor protection becomes stronger. Michas (2011) finds that earnings quality is higher in countries with better professional development for auditors but, again, only for Big N clients. Hossain et al. (2010) find that firms with better governance are more likely to employ Big N auditors, and this relation is more pronounced when the strength of legal enforcement is stronger. Collectively, these studies suggest that the benefits from employing high-quality auditors are greater when investor protection is stronger because both auditors and firms are subject to more severe legal punishments for opportunistic behavior.

The opposing view is that firms in weaker investor protection regimes may demand high-quality auditors to substitute for the weak governance. Consistent with this view, Choi and Wong (2007) find that firms with debt or equity issuances are more likely to hire Big N auditors when investor protection is weaker, suggesting that Big N auditors play a more important governance function in weak investor-protection countries. Furthermore, Fan and Wong (2005) find that East-Asian companies with more agency conflicts are more likely to hire Big N auditors. Han et al. (2012) show that Big N audits are positively associated with disclosure transparency and that this association is stronger in code-law than in common-law countries.

Because of the two competing views, we state the following non-directional hypothesis in null form:

[8] Fan and Wong (2005) provide several reasons why audit quality is lower in weak investor protection regime. First, the institutional environment supports an opaque business environment which limits the effectiveness of the audit function. Second, external audit loses its value when auditor's adverse opinion does not result in significant consequence in these countries where investor protection is weak. Third, the lack of audit expertise in these countries weakens the independent auditors' monitoring role.

H2a: The relation between auditor quality and tax aggressiveness does not vary with the level of investor protection in the country.

2.4.2 Auditor Litigation Risk and Audit Environment

Auditor litigation risk likely affects auditors' incentives and behavior, and litigation risk differs between countries (Wingate 1997; Khurana and Raman 2004). When litigation risk is high, Big N auditors are subject to greater exposure to civil lawsuits and regulatory sanctions for low quality work such as issuing a clean opinion on materially inaccurate financial statements (Guedhami and Pittman 2006). Faced with higher litigation risk, Big N auditors will likely react by tightly constraining managers' discretion over firms' accounting policies and estimates, including aggressive tax planning. In contrast, non-Big N auditors with less reputation capital at stake and without the "deep pockets" of the Big N auditors have stronger incentives to accept, for example, aggressive tax planning to avoid dismissal by their clients. Hence Big N auditors may be associated with a lower likelihood of tax aggressiveness when litigation risk is higher, since litigation and regulatory forces discipline them to insist that managers refrain from distorting the financial statements through aggressive tax activities.

The audit environment also affects auditors' behavior in dealing with clients' aggressive tax planning. Given the information asymmetry problems between firms' managers and their capital providers (Jensen and Meckling 1976), external auditors are engaged to provide assurance about the quality of information provided by the managers. However, the extent to which auditors fulfill this role depends on their effectiveness. Brown et al. (2014) suggest that factors relating to audit licensing, training and oversight as well as levels of audit fees and litigation risk, will affect the skills and training of auditors and their incentives to carry out their role effectively. We predict that as the quality of the audit environment increases, the role of auditor quality is more pronounced in influencing tax aggressiveness.

However, the effect of auditor litigation risk and audit environment on the relation between auditor quality and tax aggressiveness is not obvious. For example, it is possible that Big N auditors influence aggressive tax activities regardless of the level of litigation risk. Prior studies (e.g., Weber et al. 2008; Skinner and Srinivasan 2012) find that auditors continue to provide high quality audits in countries, such as Germany and Japan, where litigation risk is virtually non-existent. Big N auditors are also likely to provide consistent audit quality around the world (Simunic and Stein 1987). These Big N audit firms have built global networks of national partnerships to allow their local offices to access global information, knowledge and experience. They attempt to develop and maintain a uniform global reputation and promote themselves as being single international firms that maintain a uniform level of audit quality across the world. Consequently, Big N auditors may similarly influence clients' financial reporting, including aggressive tax planning, even when litigation risk is low or the audit environment is poor. Hence whether Big N auditors play a bigger role in high or low litigation risk and audit environments is an empirical question. Accordingly, we state the following non-directional hypothesis in null form:

H2b: The relation between auditor quality and tax aggressiveness does not vary with the level of auditor litigation risk and the quality of the audit environment in the country.

2.4.3 Capital Market Pressure

We also investigate how stock market development and capital market pressure influences the behavior of Big N auditors regarding tax aggressiveness. We expect Big N auditors to play a bigger role when the size of the capital market is larger. Firms in countries with larger capital markets have greater access to equity financing. Due to the greater information asymmetries between the firm and equity investors, firms may be more concerned about the quality of financial information to reduce information asymmetry between the investors and the firm. The sheer size of the capital market increases the pressure for firms to report favorable information to secure external financing. Prior

research shows that managers are likely to manage earnings when faced with strong capital market pressure. For example, Rangan (1998), Teoh et al. (1998), and Shivakumar (2000) show that firms manage earnings upward prior to equity issuance. The market also assigns a premium to firms that meet or beat analyst expectations (Bartov et al. 2002; Kasznik and McNichols 2002) and penalizes firms for missing expectations (Skinner and Sloan 2002). Survey evidence in Graham et al. (2005) points to capital market pressure as the primary reason why managers avoid missing expectations. We expect auditor quality to play a more important role when capital market pressure is stronger. Based on the above discussion, we state our final hypothesis as follows:

> *H2c: The relation between auditor quality and tax aggressiveness is more pronounced when the level of capital market pressure in the country is higher.*

3. Research Design

3.1 Measure of Tax Aggressiveness

Following Hanlon and Heitzman (2010) and Atwood et al. (2012), we define tax avoidance broadly as the reduction in the explicit taxes paid.[9] We measure tax avoidance as the difference between the tax on pre-tax income computed at the home-country statutory corporate tax rate and the taxes actually paid, expressed as a percentage of pre-tax income. We focus on cash taxes paid because it is less sensitive to home-country financial accounting standards than other tax avoidance measures such as effective tax rates, where tax expense recognized is influenced by local GAAP. In particular, our measure of tax avoidance (*TAXAVOID*) for firm *i* in year *t* is computed as follows:

$$TAXAVOID_{it} = \frac{[\sum_{t-2}^{t}(PTEBX \times \tau)_{it} - \sum_{t-2}^{t} CTP_{it}]}{\sum_{t-2}^{t} PTEBX_{it}} \quad (1)$$

[9] As in Dyreng et al. (2008) and Atwood et al. (2012), this measure of tax avoidance does not necessarily imply that firms are engaging in improper or illegal behavior, and this measure is not able to differentiate between tax avoiding activities that would be considered prudent tax planning versus activities that would be considered abusive tax sheltering. As noted by Atwood et al. (2012), while it may be more interesting to examine specific actions taken to avoid tax (e.g., the strategic location of subsidiaries in foreign countries, the amount of income shifted, investments in tax shelters, etc.), specific actions are usually not observable empirically in the international setting and thus limiting our choice of empirical measure of tax avoidance.

where *PTEBX* refers to pre-tax earnings before exceptional items, τ refers to home-country statutory corporate tax rate, and *CTP* refers to current taxes paid. We compute this measure using a three-year window because this time period is adequate to reduce the effects of items that reverse in just one year.[10] Following Atwood et al. (2012), we require the denominator in (1) to be positive; hence, our sample only includes firms that are profitable in the three-year window. This measure of tax avoidance indicates the amount of taxes that the firm is able to avoid relative to the amount of taxes it is supposed to pay based on the home-country statutory tax rate ("unmanaged tax amount"), and the extent of tax avoidance is increasing in this measure. Because we intend to capture the more aggressive tax avoidance activities that auditors presumably care more about in the course of their audit, we use the indicator variable *TAXAGGR*, which equals one if *TAXAVOID* is in the top quintile in each country-industry combination, and zero otherwise to proxy for tax aggressiveness.

3.2 Measure of Auditor quality

Auditors provide assurance of the accounting information supplied to outside investors. The literature has consistently provided evidence that Big N auditors are quality differentiated from non–Big N auditors in the U.S. and around the world.[11] Big N auditors are better able to detect material misstatements in financial statements and more willing to report what they find than are non-Big N auditors. Big N auditors are associated with higher expertise because they not only have more

[10] We do not compute this measure over longer windows, such as five-year or ten-year windows (e.g., Dyreng et al. 2008), to avoid limiting our sample size. As noted by Dyreng et al. (2008), tax avoidance measures that are estimated over shorter periods of time may be imperfect because they include payments to (and refunds from) the tax authorities upon settling of tax disputes that arose years ago. Tax avoidance measures that are estimated over longer periods mitigate this concern because the income to which these taxes relate will more likely be included in the same ratio as the taxes. As a sensitivity check, we also use a longer horizon of five years to compute tax avoidance, and find qualitatively unchanged results.

[11] Firth (1985), Simon et al. (1986), Chung and Lindsay (1988), Simon et al. (1992), Craswell et al. (1995), and DeFond, et al. (2000) document the existence of a Big N brand-name fee premium in New Zealand, India, Canada, Singapore, Australia, and Hong Kong, hence providing support to the view that Big N auditors are quality differentiated from non-Big N auditors in these countries. Some recent cross-country research implies that Big N auditors' stronger incentives to identify material accounting misstatements and to resist client pressure to waive their correction generalizes outside the U.S. (Fan and Wong 2005; Choi and Wong 2007). In contrast, Vander Bauwhede and Willekens (2004) find no audit-quality differentiation between Big N and non-Big N auditors in a sample of private firms in Belgium, which may be attributable to the specific audit environment in Belgium.

resources but also devote more resources to specialized staff training, peer reviews, and investment in information technology than non-Big N auditors (Craswell et al. 1995). Similarly, Big N auditors are more independent because they have higher reputation capital at stake relative to non-Big N auditors. Following prior studies (Teoh and Wong 1993; Becker et al. 1998; Fan and Wong 2005; Choi and Wong 2007), we use an indicator variable for Big N/non–Big N membership to proxy for auditor quality.[12]

3.3 Empirical Models – Main Analyses

To test H1, we estimate the following pooled cross-sectional logistic regression:

$$TAXAGGR_{it} = \alpha + \beta BIGN_{it} + \psi CONTROLS_{it} + YEAR\_FE + IND\_FE + \varepsilon_{it} \quad (2)$$

where *TAXAGGR* is an indicator variable that equals one if *TAXAVOID* is in the top quintile in each country-industry combination, and zero otherwise, *BIGN* is the measure of auditor quality, and *CONTROLS* is a vector of firm-level and country-level controls, and *YEAR_FE* and *IND_FE* are time and industry indicators, respectively.[13] Because we conduct our estimation on a pooled sample, we cluster the standard errors by firm and include time and industry fixed-effects in our regressions (Petersen 2009).[14] The Appendix includes the detailed definitions of all the variables.

[12] While a large body of audit literature generally finds that Big N auditors are associated with higher audit quality as compared to non-Big N auditors even after controlling for self-selection, Lawrence et al. (2011) report that the Big N quality differentiation disappears after controlling for self-section using a Propensity Score Matching (PSM) research design. DeFond et al. (2014) investigate whether Lawrence et al.'s (2011) finding is sensitive to research design choices inherent in PSM, and find that in a large majority of design choices (94 to 100 percent of the sample), Big N auditors provide higher audit quality than non-Big N auditors. DeFond et al. (2014) also utilize an alternative matching procedure and find evidence consistent with higher Big N audit quality.

[13] Industries are defined as in the classification in Frankel et al. (2002), which is based on the following SIC codes: agriculture (0100–0999), mining and construction (1000–1999, excluding 1300–1399), food (2000–2111), textiles and printing/publishing (2200–2799), chemicals (2800–2824, 2840–2899), pharmaceuticals (2830–2836), extractive (2900–2999, 1300–1399), durable manufacturers (3000–3999, excluding 3570–3579 and 3670–3679), transportation (4000–4899), utilities (4900–4999), retail (5000–5999), services (7000–8999, excluding 7370–7379) and computers (3570–3579, 3670–3679, 7370–7379).

[14] Petersen (2009) suggests that in the presence of cross-sectional and time-series dependence, one dependence effect can be addressed parametrically (e.g., including time indicators for cross-sectional dependence) and then standard errors clustered on the other dependence effect (e.g., clustering by firms for time-series dependence) can be estimated. As we have more firm than year observations, we use year indicators and cluster by firm because a larger number of clusters lead to standard errors that are less biased.

We select *CONTROLS* that are factors documented by prior literature to be associated with tax avoidance (e.g., Atwood et al. 2012). The first set of controls includes country-level variables (*WW*, *BTAXC*, *TAXRATE*, *TAXENF*, *PCTEQ*, and *EARNVOL*). We control for various characteristics of the country's tax system, including 1) whether the country's tax system follows a worldwide or a territorial approach (*WW*), 2) required book-tax conformity in the country (*BTAXC*), 3) country's statutory tax rate (*TAXRATE*),[15] and 4) strength of tax enforcement in the country (*TAXENF*), because Atwood et al. (2012) find that these tax system characteristics are associated with firms' incentives to avoid taxes.[16] We include the country average of managers' variable pay as a percentage of total compensation (*PCTEQ*), because prior literature suggests that managerial compensation incentives affect tax aggressiveness (Desai and Dharmapala 2006; Armstrong et al. 2012; Atwood et al. 2012; Rego and Wilson 2012).[17] We also include earnings volatility (*EARNVOL*) as a control because Atwood et al. (2010) report that *BTAXC* is positively correlated with the cross-sectional variance in pre-tax income, and hence it is important to include this variable to ensure that the effect of *BTAXC* on tax aggressiveness is not overstated due to cross-country differences in earnings volatility. We control for economic development measured by the log of real GDP per capita (*LGDP*) and a time trend variable (*TREND*) to capture the fact that statutory tax rates have been declining over time and may affect corporate tax aggressiveness over time.

[15] We include the statutory tax rate as a control variable following Atwood et al. (2012), who highlight that because the measure of tax avoidance includes the statutory tax rate in its computation, it is important to control for the statutory tax rate to avoid a potential mechanical relation.

[16] We hand-collect each country's annual statutory corporate tax rate and whether the tax system is worldwide or territorial from various sources such as Ernst and Young's Worldwide Corporate Tax Guide, KPMG's Corporate and Indirect Tax Rate Survey, PwC's Worldwide Tax Summaries, PwC's "Evolution of Territorial Tax Systems in the OECD" report, etc.

[17] Atwood et al. (2012) use the country average of managers' variable pay as a percentage of management compensation from Towers Perrin (2005), which reports the pay components of CEOs across 26 countries. We do not have access to data from the Towers Perrin's report. Instead, we obtain equity–based compensation data from Bryan et al. (2010) who provide average equity-based compensation for 43 countries. The use of this variable also explains why our sample includes 32 countries, whereas Atwood et al. (2012)'s sample includes only 22 countries.

The second set of controls includes firm-level variables that are documented to be associated with tax avoidance. We control for firm performance using pre-tax return on assets (*PROA*) because profitable firms have greater incentives to be tax aggressive. We control for firm size (*SIZE*) because larger firms have more resources and ability to avoid taxes. On the other hand, profitable and larger firms may avoid paying lower taxes to mitigate additional political scrutiny on paying their fair share of taxes. We control for tax planning opportunities, such as research and development tax credits and interest deductibility on debt, using research and development intensity (*R&D*) and leverage (*LEV*). We control for sales growth (*GROWTH*) because firms with higher sales growth enjoy greater marginal benefits from tax planning and hence have greater incentives to avoid taxes (Edwards et al. 2012). We control for firms with multinational operations (*MULTI*) because operations in different countries may present opportunities to avoid taxes through income shifting. Lastly, we control for various components of accruals (*ΔWC*, *ΔNCO* and *ΔFIN*) based on the reliability classification developed by Richardson et al. (2005) and used in Atwood et al. (2012). It is important to control for accruals so that we are able to determine whether auditor quality relates to tax aggressiveness solely through accruals or also through other non-accrual-related tax-planning strategies, such as the use of tax havens, tax shelters, income shifting, cost sharing arrangements, etc.

3.4 Empirical Models – Cross-sectional Analyses

To test H2, we modify equation (2) to include the conditioning variable (*Conditioning_VAR*) and its interaction with *BIGN,* and we estimate the following pooled cross-sectional logistic regression:[18]

[18] Ai and Norton (2003) argue that the interaction effect in a non-linear model, such as the logistic specification of equation (3), cannot be evaluated and interpreted simply by looking at the sign, magnitude, and statistical significance of the coefficient on the interaction term. Rather, interpreting the interaction effect requires computation of modified statistics based on cross-derivatives or cross-differences. However, Greene (2010) contends that the modified statistics proposed by Ai and Norton (2003) do not provide meaningful interpretations and statistical inferences. In addition, Kolasinski and Siegel (2011) draw on the extant statistics literature (e.g., Le 1998) and show that the interaction coefficient and test statistic in a standard logistic specification are appropriate for research dealing with non-extreme probabilities and are economically meaningful. Therefore, we continue to estimate and interpret the interaction effects in equation (3).

$$TAXAGGR_{it} = \alpha + \beta BIGN_{it} + \eta BIGN_{it} \times Conditioning\_VAR + \gamma Conditioning\_VAR + \psi CONTROLS_{it} + YEAR\_FE + IND\_FE + \varepsilon_{it} \quad (3)$$

In H2a, we examine the effect of investor protection on the relation between auditor quality and corporate tax aggressiveness. We use three different measures of investor protection to triangulate our results. The first measure is an indicator variable that equals one if the country is a common law country, and zero otherwise (*COMMON*). Prior literature suggests that strict and well-enforced laws to protect minority investors are more prevalent in countries with common law traditions than in countries with code law traditions (e.g., Haw et al. 2004), which implies that the strength of investor protection is stronger in common law countries. The second measure is the legal enforcement index (*LAWE*) reported in La Porta et al. (1998), measured as the mean score of the following three legal enforcement variables: efficiency of the judicial system, rule of law, and corruption. These three variables range from zero to ten, with higher scores indicating greater law enforcement. The strength of investor protection is stronger when the quality of enforcement is higher. The third measure is the anti-self-dealing index (*ANTIDEAL*), based on Djankov et al. (2008). This measure is designed to capture the strength of minority shareholder protection against self-dealing by the controlling shareholder, and focuses on private enforcement mechanisms such as disclosure, approval, and litigation, that govern a specific self-dealing transaction. The strength of investor protection is stronger when anti-self-dealing mechanisms are in place.

In H2b, we focus on auditor litigation risk and the audit environment. We use two indicators to assess the litigation risk of auditors across countries. The first is the liability standard index (*BURDEN*) from La Porta et al. (2006), which equals the arithmetic mean of (1) liability standard for the issuer and its directors, (2) liability standard for the distributor, and (3) liability standard for the accountant. The index is increasing in litigation risk exposure. The second index is the litigation

index (*LITIG*) reported in Wingate (1997) and used in Choi and Wong (2007) and Choi et al. (2008) as a proxy for auditor litigation risk. This index is developed by an international insurance underwriter for one of the Big N audit firms and represents the "risk of doing business as an auditor" in a particular country, with higher values indicating higher litigation risk exposure. Next, we use the audit environment index (*AUDENV*) reported by Brown et al. (2014) to capture differences between countries in relation to the institutional setting for the auditing of financial statements. Brown et al. (2014) measure the quality of the audit environment by considering the presence or absence of a number of factors that are likely to affect the skills and training of auditors and their incentives to carry out their role effectively. These factors include audit licensing, training and oversight, as well as levels of audit fees and litigation risk. Brown et al. (2014) show the audit environment index is useful for distinguishing the audit environment between countries, in addition to the explanatory power provided by more general proxies for legal setting.

In H2c, we test how capital market pressure affects the association between Big N auditors and tax aggressiveness. We use three proxies for capital market pressure. The first measure reflects the importance of the equity market (*EQTY*), and is defined as the mean rank across the following three variables from La Porta et al. (1997): (1) the ratio of the aggregate stock market capitalization held by minorities to gross national product, (2) the number of listed domestic firms relative to the population, and (3) the number of IPOs relative to the population. Each variable is ranked such that higher scores indicate a greater importance of the stock market. The second measure, *STMCAP*, is the stock market capitalization divided by GDP. *STMCAP* is measured annually, with the data obtained from Beck et al. (2009). Third, we use the *DEV* index reported in Hail and Leuz (2006) to identify developed and developing countries. A country is considered to be developing if its equity market is not included in the Morgan Stanley Capital International database. *DEV* is coded one for a developed

country, and zero for a developing country. We expect capital market pressure to be stronger when the equity market is more important, when the size of the stock market is larger, and when the country is more developed.

4. Results

4.1 Sample

We collect financial information on tax aggressiveness, auditor quality, and other firm-level control variables for the period 1995–2007 from the Compustat Global database.[19] We select a sample of non-U.S. countries from the 48 countries listed in La Porta et al. (1998). We drop eleven countries (Columbia, Ecuador, Egypt, Jordan, Kenya, Nigeria, Sri Lanka, Malaysia, Thailand, Uruguay, and Zimbabwe), because of missing information to compute tax avoidance. The country-level institutional variables are either hand-collected (e.g., statutory tax rates, classification of worldwide or territorial tax system, etc.) or based on the data from related studies (e.g., La Porta et al. 1998; 2006). We drop Canada and Pakistan, because the information on country-level compensation data is not available, and Argentina and Venezuela, because each country has less than 100 firm-year observations. Lastly, we drop Japan and Korea because the identity of the auditors is not indicated in the database. These sampling and data availability criteria result in a final sample that includes 31 countries. We also trim each continuous firm-level variable at the 1% and 99% level to mitigate the effects of extreme values. Depending on the availability of data, the final sample size used in the main regression analyses ranges from 39,857 to 41,958 firm-year observations for the 13-year sample period.

4.2 Descriptive Statistics

[19] Our sample period ends in 2007 because we obtain the requisite data from the Legacy Global Compustat database. The last year for which data are available in this database is 2007. The new Global Compustat database, which has the more recent data, does not include pre-tax exceptional items (data item 57 in the old database) and foreign income taxes (data item 51 in the old database). Therefore, we are unable to compute the variable *TAXAVOID*, which requires data item 57 as an input and the variable *BTAXC*, which requires data item 51 as an input, using the new Global Compustat database.

Table 1 reports the sample composition and the median characteristics for each of the 31 countries. The sample size for each country ranges widely from 104 firm-year observations for Peru to 9,602 firm-year observations for the U.K.[20] The median tax avoidance measure (*TAXAVOID*) reported for each country is comparable to that reported in Atwood et al. (2012).

Table 2 reports descriptive statistics of and correlations between the regression variables for the full sample. As observed from Table 2 Panel A, the mean (median) percentage of taxes avoided from pre-tax income (*TAXAVOID*) is 9.7% (10.0%), which based on the mean (median) statutory corporate tax rate (*TAXRATE*) of 32.6% (31.0%), implies that the mean (median) firm in our sample paid a tax rate of 22.9% (21.0%). On average, 53.6% of the firm-year observations in the sample employed Big N auditors.

Table 2 Panel B reports Pearson correlations between the variables in our analyses. We observe a significantly negative correlation between auditor quality (*BIGN*) and aggressive tax avoidance (*TAXAGGR*). Because these are pairwise univariate correlations, we defer the main inferences to multivariate tests, reported in the following section.

4.3 Main Analyses – Test of H1

In this section, we report the results for the test of H1, which examines the association between auditor quality and aggressive tax avoidance measured by *TAXAGGR*, an indicator variable equals one if the tax avoidance is within the top quintile in each country-industry combination, and zero otherwise. In Column 1, we regress tax aggressiveness on auditor quality, country, year, and industry fixed-effects, and exclude the firm-level control variables. In Column 2, we report the results including firm-level control variables, and in Column 3, we report the results including additional

[20] In a robustness test, we exclude sample observations from the U.K. to mitigate concerns that our results are driven by the disproportionately large number of observations from this country. The results are robust to the exclusion of firms from the U.K. (see Section 5.4).

controls for country-level tax system characteristics. In all three columns, we report a negative and statistically significant coefficient on *BIGN*, which is consistent with the notion that auditor quality is negatively related to the likelihood of corporate tax aggressiveness even after controlling for legal institutions such as home-country tax systems.[21]

The coefficients of the control variables are consistent with expectations. Similar to Atwood et al. (2012), we find that tax system characteristics, such as having a worldwide tax system (*WW*), higher required book-tax conformity (*BTAXC*), and greater perceived tax enforcement (*TAXENF*), are associated with lower likelihood of tax aggressiveness. We also find that in countries with higher statutory tax rates (*TAXRATE*) and higher real GDP per capita (*LGDP*), firms are more likely to be tax aggressive, possibly due to the additional incentives to avoid taxes when statutory tax rates are higher, and when the economy is growing. The coefficient on *TREND* is negative and significant, suggesting that the likelihood of tax aggressiveness decreases with declining statutory tax rates over time. Turning to the firm-level control variables, we find that more profitable (*PROA*) and larger (*SIZE*) firms are less likely to be tax aggressive, possibly due to additional political scrutiny of such firms. We also find that firms with higher leverage (*LEV*) and sales growth (*GROWTH*) are more likely to be tax aggressive, consistent with greater opportunities to avoid taxes for firms with more debt and greater marginal benefits of avoiding taxes for growth firms. Consistent with Atwood et al. (2012), we find that firms with multi-national operations are less likely to be tax aggressive. Lastly, consistent with prior studies (Frank et al. 2009; Wilson 2009; Lisowsky 2010; Atwood et al. 2012), we find that all three components of accruals are positively associated with the likelihood of tax aggressiveness. This result indicates that the relation between auditor quality and the likelihood of tax

[21] We also compute the marginal effect of *BIGN*, which indicates that employing a Big N auditor rather than a non-big N auditor reduces the likelihood of tax aggressiveness by 4.18%. This magnitude is comparable with the effect of three tax system characteristics examined by Atwood et al. (2012) on tax aggressiveness. Specifically, the marginal effect of *WW*, *BTAXC*, and *TAXENF* on tax aggressiveness is 4.12%, 3.76%, and 1.79%, respectively.

aggressiveness that we document is not solely driven by accruals management, but is also related to the use of other tax planning strategies.[22]

Overall, the results indicate that auditor quality is significantly negatively associated with tax aggressiveness, consistent with the reasoning that high quality auditors are concerned about risky tax avoidance activities, possibly due to reputational concerns and litigation exposure.

4.4 Cross-sectional Analyses – Tests of H2

In this section, we test cross-sectional variation in the relation between auditor quality and tax aggressiveness. In particular, we are interested in whether differences in institutional characteristics affect the relationship between Big N auditors and tax aggressiveness. In H2a, we examine the moderating role of investor protection (measured by *COMMON*, *LAWE*, and *ANTIDEAL*). The results of our tests are presented in Table 4. The results indicate that for all three measures of investor protection, the negative association between auditor quality and the likelihood of tax aggressiveness is accentuated in countries with higher investor protection. Our results are consistent with Francis and Wang (2008) but inconsistent with Choi et al. (2008), and suggest that the negative association between Big N auditors and the likelihood of tax aggressiveness is more pronounced when investor protection is higher.

In H2b, we examine the moderating role of auditor litigation risk (*BURDEN*, *LITIG*) and the audit environment (*AUDENV*). The results presented in Table 5 indicate that the coefficients on the interaction between *BIGN*BURDEN*, *BIGN*LITIG*, and *BIGN*AUDENV* are all negative and significant at conventional levels. The evidence indicates that the negative relation between *BIGN*

[22] The correlations between some variables in the model are very high. For example, the correlation between *PROA* and *GROWTH* is 0.82, and the correlation between the country-level institutional controls such as *TAXENF*, *PCTEQ*, and *LGDP* are also highly correlated with our institutional variables used in testing H2 (see Table 2). Given this high level of correlation, we check the variance inflation factor (VIF) in this and all other empirical tests to ensure that multicollinearity is not driving our results. The VIFs are all less than 10, indicating that multicollinearity is not a serious concern (Neter et al. 1996; Kennedy 2008). As a second sensitivity check, we re-estimate the regressions after removing *GROWTH*, *TAXENF*, *PCTEQ*, and *LGDP*. Our results are robust to the exclusion of these variables.

and the likelihood of tax aggressiveness is more pronounced in countries where auditors are faced with higher litigation risk and a better audit environment.

In H2c, we examine the moderating role of the capital market pressure which is proxied by the importance of the equity market (*EQTY*), stock market capitalization (*STMCAP*), and an indicator variable for developed economy (*DEV*). We expect the auditor to play a greater role in countries where the capital market pressure is higher. The results of our tests, presented in Table 6, indicate that the coefficients on the interactions *BIGN*EQTY*, *BIGN*STMCAP*, and *BIGN*DEV* are all negative and significant at the 1% level, consistent with our prediction that the negative relation between Big N auditors and the likelihood of tax aggressiveness is more pronounced in countries where capital market pressure is higher.

Overall, the results presented in Tables 4 through 6 indicate that the negative association between Big N auditors and the likelihood of tax aggressiveness is more pronounced when investor protection is higher, auditors' exposure to litigation is higher, the audit environment is better, and capital market pressure is higher.

5. Additional Analyses And Sensitivity Checks

5.1 Alternate Measures of Tax Aggressiveness

In our main analysis, we use an indicator variable to capture tax aggressiveness. We also test the robustness of our results using two alternate measures of corporate tax avoidance. First, we use the continuous tax avoidance measure (*TAXAVOID*) as the dependent variable. Second, because of the potential concern that *TAXAGGR* may not reflect and adequately control for different tax planning opportunities that vary across different countries and different industries, we compute tax aggressiveness based on the country-industry mean-adjusted tax avoidance (*ADJ_TAXAGGR*), i.e.,

the firm-year specific *TAXAVOID* minus the mean *TAXAVOID* in each country-industry combination. The results of the analyses using these two alternate measures of tax aggressiveness are reported in Table 7. We continue to find that *BIGN* is negatively associated with these two alternate proxies of tax aggressiveness.

5.2 Alternate Proxies for Auditor Quality

To strengthen our inferences that high quality auditors play a role in influencing corporate tax aggressiveness, we explore alternate proxies that represent different dimensions of auditor quality beyond the Big N/non-Big N dichotomy. Prior studies (e.g., Balsam et al. 2003; Kwon et al. 2007) show that audits provided by industry specialist auditors have higher quality. Therefore, if high quality auditors are negatively associated with corporate tax aggressiveness, we should observe that industry specialist auditors that presumably provide higher quality audits have a more pronounced effect. We measure auditor industry specialization as: 1) the auditor with the largest industry market share in the respective country-industry combination (*SPEC1*); and 2) the industry market share of the auditor is above a certain threshold (as outlined in Neal and Riley 2004) in the respective country-industry combination (*SPEC2*).[23]

Following prior studies (e.g., Kwon et al. 2007), we restrict our study to clients of Big N auditors to control for brand name so that any incremental effect that we observe from our alternative proxies of auditor quality will reflect variation in audit quality unexplained by the Big N/non-Big N dichotomy. The results are presented in Table 8. We observe that both measures of auditor industry specialization (*SPEC1* and *SPEC2*) are significantly associated with lower likelihood of corporate tax

[23] Following Neal and Riley (2004), the appropriate cut off for the market share is given by (1/n) * 1.2, where n is the number of big international audit firms. There are Big 6 auditors during the period 1993 to 1997, Big 5 and Big 4 auditors, respectively, after the merger between Coopers and Lybrand and Price Waterhouse in 1998, and the demise of Arthur Andersen in 2001. Conceptually, industry market share would be measured as audit fees earned by an auditor in an industry, as a proportion of the total audit fees earned by all auditors that served in that particular industry. Because of limitation of audit fees data in the international context, we follow Kwon et al. (2007) and compute market share based on the audit clients' assets. To ensure that Big N auditors develop significant expertise in each industry, we require a minimum of 50 clients in each industry in a given year.

aggressiveness among firms audited by the Big N auditors. These results confirm our conclusion that auditor quality is negatively related to the likelihood of corporate tax aggressiveness.

5.3 Tax Aggressiveness of Clients that Switched Auditors

A potential concern with the previous analyses is that auditor choice may not be exogenous. Omitted variables may be correlated with both the choice for a Big N auditor and tax aggressiveness. These potential omitted variables could also be related to firms' incentives and inclinations to be tax aggressive in a given country, and thus our findings may be spurious. Our cross-sectional analyses mitigate this concern because it is harder for an omitted correlated variable to explain both our main and our cross-sectional findings. Also, in all our main and cross-sectional analyses, we include additional controls for country-level institutional variables such as tax system characteristics, and thus it is more difficult to find an omitted latent institutional variable that explains both auditor quality and tax aggressiveness in our analyses.

In this section, we provide some exploratory evidence on the change in tax aggressiveness for firms that switch from a non-Big N to a Big N auditor, and vice versa. Such a change analysis will mitigate concerns about self-selection bias and unobserved heterogeneity, and increase confidence in the observed association between the underlying constructs under investigation. We compare the change in tax avoidance (i.e., $\Delta TAXAVOID = TAXAVOID_t - TAXAVOID_{t-1}$) for firms that change auditors from year *t-1* to year *t*.[24] We expect to find a decrease (increase) in tax avoidance for firms switching from a non-Big N (Big N) to a Big N (non-Big N) auditor. We report the univariate results, based on non-parametric tests, in Table 9. Overall, there are 5,118 clients that switched auditors during the sample period. Consistent with our expectation, tax avoidance decreases by 0.85% (median) for firms that switch from a non-Big N to a Big N auditor, whereas it increases by 1.00%

[24] We examine the change in tax avoidance (*TAXAVOID*) instead of tax aggressiveness (*TAXAGGR*) because the latter is an indicator variable and thus there is little variation in this variable for a given firm across two time periods, which reduces the power of our test substantially.

(median) for firms that switch from a Big N to a non-Big N auditor. The change in tax avoidance is statistically significant at 1% for both groups of switchers. Overall, the univariate analysis presented in Table 9 is consistent with the notion that Big N auditors are associated with lower tax aggressiveness.

5.4 Additional Robustness Checks

In this section, we discuss a few additional robustness checks. As highlighted earlier, a significant portion of our firm-year observations consists of firms from the U.K. To mitigate the concern that our results are driven by observations from the U.K., we re-estimate the main model after excluding U.K. firms. The untabulated results indicate that *BIGN* is still associated with lower likelihood of tax aggressiveness ($z = -4.96$, $p=0.00$).

Boone et al. (2010) examine audit quality for Big 4 and second-tier auditors (Grant Thornton and BDO Seidman) and find that there are no actual audit quality differences, in terms of going concern opinions and abnormal accruals, between Big N auditors and second-tier auditors. As another sensitivity check, we include an additional indicator variable for the second-tier auditor in the model. Interestingly, the (untabulated) results indicate that both the Big N auditors and the second-tier auditors are significantly associated with lower likelihood of tax aggressiveness ($z=-6.38$ and $z=-2.46$ respectively), a result that is consistent with Boone et al. (2010).

The collapse of Arthur Andersen led to changes in the U.S. and other countries to improve the quality of audit from 2002 onwards. Key initiatives to increase auditor independence include restricting the provision of non-audit services to audit clients, requiring firm audit partner rotation and introducing independent oversight bodies with the power to review audit firms' working papers and to take any corrective action deemed necessary (Zhang 2007; Hart 2009). Hence, we assess whether the relation between Big N auditors and tax aggressiveness differs between the pre- and post-2002

periods. The results are reported in Table 10, which indicate that Big N auditors are associated with lower likelihood of tax aggressiveness in both the pre- and the post-2002 period. However, the negative and significant interaction term *BIGN*POST* suggests that Big N auditors are more negatively associated with the likelihood of tax aggressiveness in the post-2002 period, consistent with higher audit quality in the post-Enron era.

In our main cross-sectional tests, we include institutional variables one at a time to assess how these institutions may affect the behavior of Big N auditor on tax aggressiveness. In our final sensitivity check, we re-estimate the regression with all three principal components (*IP* for the investor protection proxies, *AUDIT* for the auditor litigation risk and enforcement proxies, and *MARKET* for the capital market pressure proxies) in the same regression. Untabulated results indicate that the coefficient on *BIGN*LEGAL* is negative and marginally significant (z=-1.64, p=0.10), the coefficient on *BIGN*MARKET* is negative and significant (z=-4.38, p=0.00), while the coefficient on *BIGN*AUDIT* is statistically insignificant. The results suggest that when all three principal components are included in the same regression specification, the effect of *AUDIT* appears to be subsumed by *IP* and *MARKET*. However, caution is required in interpreting these results as the correlation between *IP* and *AUDIT* is high (0.67).

6. Conclusion

Prior studies primarily explore the determinants of tax aggressiveness across firms within one country, and mainly within the U.S. A notable exception is Atwood et al. (2012), who document that tax system characteristics such as required book-tax conformity, worldwide versus territorial approach, and strength of tax enforcement are related to tax avoidance. We extend this important line of research by examining whether auditor quality, proxied by Big N auditors, also relates to corporate

tax aggressiveness. Following Atwood et al. (2012), we measure tax avoidance broadly as the difference between the tax on pre-tax income computed at the home-country statutory corporate tax rate and the taxes actually paid. To capture tax aggressiveness, we use an indicator variable which equals one if the firm's tax avoidance measure is within the top quintile of each country-industry combination, and zero otherwise. This measure attempts to capture the aggressive tax-related activities that auditors presumably are concerned about in their audits and thus more closely related to our research question.

Using a large sample of firm-year observations from 31 countries and logistic estimation, we find robust evidence that auditor quality is negatively associated with the likelihood of tax aggressiveness, even after controlling for legal institutions such as tax system characteristics that have been documented to be associated with the likelihood of tax aggressiveness (Atwood et al. 2012). In additional analyses, we find that auditor quality has a more pronounced relation with the likelihood of tax aggressiveness when investor protection is stronger, auditor litigation risk is higher, the audit environment is better, and capital market pressure is higher. Finally, we find that firms audited by industry specialist auditors exhibit lower likelihood of tax aggressiveness, strengthening our inferences that high quality auditors are associated with lower corporate tax aggressiveness. We also find that the negative relation between Big N auditors and the likelihood of tax aggressiveness is more pronounced in the post-2002 period after the collapse of Arthur Andersen, presumably because of the key initiatives implemented to improve audit quality following the Enron scandal. We subject our results to a number of robustness tests, including using two alternate measures of tax aggressiveness and excluding firms from the U.K., and provide exploratory evidence on the change in tax aggressiveness for firms that switch auditors during the sample period. Our main inference that

firms audited by a Big N auditor are associated with lower tax aggressiveness is robust to these additional tests.

Our study is subject to several limitations. First, our cross-country firm-level measure of tax aggressiveness is based on a simple difference between the home-country statutory tax rate and the cash effective tax rate. To the extent that this measure is influenced by the firm's foreign operations which are taxed at a different statutory tax rate, it will be noisy. However, this noise is likely to bias against finding the documented results. Second, because firms' incentive to be tax aggressive is likely to be influenced by home-country norms, tax system characteristics, and other institutional factors, our findings could be affected by the extent to which these factors are correlated with our test variable and not controlled for in our empirical estimation. Third, because we cannot directly observe or identify the specific mechanisms through which auditor quality affects tax aggressiveness, we note that the reported relations between high quality auditors and tax aggressiveness across countries are observed associations, and may not result from underlying causal relations. For instance, due to data limitation, we are not able to observe whether high quality auditors influence tax aggressiveness through an external audit procedure solely and/or through the provision of APTS and thus, we are not able to conclude how external auditors influence tax aggressiveness in our study. Future studies with access to finer data can take this step to further our understanding of how external auditors specifically influence corporate tax aggressiveness. Finally, firms' choice of external auditors is not exogenous. For instance, an alternate explanation for our findings is that firms seeking to be tax aggressive may choose a lower quality auditor to avoid scrutiny by their external auditors. Our results should be interpreted cautiously in light of these limitations.

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APPENDIX: Variable Definitions

TAXAVOID	=	Measure of tax avoidance, defined as: $\frac{[\sum_{t-2}^{t}(PTEBX \times \tau)_{it} - \sum_{t-2}^{t} CTP_{it}]}{\sum_{t-2}^{t} PTEBX_{it}}$ where *PTEBX* is pre-tax earnings before exceptional items, τ is home-country statutory corporate tax rate, and *CTP* is current taxes paid. The extent of tax avoidance is increasing in this measure.
TAXAGGR	=	An indicator variable that equals one if T*AXAVOID* (defined above) is within the top quintile in each country-industry combination, and zero otherwise. This variable captures tax aggressiveness.
ADJ_TAXAGGR	=	Country-industry mean-adjusted measure of tax aggressiveness, computed as the firm-year specific *TAXAVOID* minus the mean *TAXAVOID* in each country-industry combination. The extent of tax aggressiveness is increasing in this measure.
BIGN	=	Indicator variable that equals one if the firm's auditor is a Big N auditor, and zero otherwise.
COMMON	=	An indicator variable that equals one if the country is a common law country, and zero otherwise.
LAWE	=	The mean score of three legal enforcement variables reported in La Porta et al. (1998). The three variables are (1) the mean for 1980–1983 of a variable provided by Business International Corp., capturing the efficiency and integrity of the judicial system; (2) the mean for 1982–1995 of a rule of law variable obtained from International Country Risk; and (3) the mean for 1982–1995 of a corruption variable that assesses the corruption in government, obtained from International Country Risk. The law enforcement index values range from zero to ten, with higher scores for greater law enforcement.
ANTIDEAL	=	Anti-self-dealing index of the country, based on Djankov et al. (2008).
BURDEN	=	The arithmetic mean of (1) liability standard for the issuer and its directors, (2) liability standard for the distributor, and (3) liability standard for the accountant. The index is increasing in litigation risk exposure. Data from La Porta et al. (2006).
LITIG	=	Auditor litigation risk index from Wingate (1997), which is a direct proxy for legal liability of audit firms in each country and measures the level of litigiousness in a country. The rating is developed by an international insurance underwriter for one of the Big N audit firms. The variable ranges from 1 to 15 and represents the "risk of doing business as an auditor"

		in a particular country, with higher score indicating higher level of litigiousness.
AUDENV	=	Audit environment index in year 2002 reported by Brown et al. (2014) to capture differences between countries in relation to the institutional setting for the auditing of financial statements, with higher values indicating better audit environment.
EQTY	=	The mean rank across three variables used in La Porta et al. (1997) (1) the ratio of the aggregate stock market capitalization held by minorities to gross national product, (2) the number of listed domestic firms relative to the population, and (3) the number of IPOs relative to the population. Each variable is ranked such that higher scores indicate a greater importance of the stock market.
STMCAP	=	Annual stock market capitalization divided by GDP from Beck et al. (2009).
DEV	=	An indicator equals one for the developed country, and zero for the developing country. A country is considered to be developing if its equity market is not included in the Morgan Stanley Capital International database (Hail and Leuz 2006).
TAXRATE	=	Country statutory tax rate.
EARNVOL	=	The scaled descending rank, between zero and one, of cross-sectional pre-tax earnings volatility by country-year, following Atwood et al. (2012). Pre-tax earnings are defined as pre-tax income before exceptional items, divided by lagged total assets.
WW	=	Indicator variable that equals one if the home-country adopts a worldwide tax system, and zero if the home-country adopts a territorial tax system.
BTAXC	=	Proxy for the level of required book-tax conformity, following Atwood et al. (2010). *BTAXC* is computed based on the conditional variance of current tax expense from the following model, estimated by country-year: $CTE_t = \theta_0 + \theta_1 PTBI_t + \theta_2 ForPTBI_t + \theta_3 DIV_t + e_t$ where *CTE* is current tax expense, *PTBI* is pre-tax book income, *ForPTBI* is estimated foreign pre-tax book income, *DIV* is total dividends, and all variables are scaled by average total assets. *BTAXC* is then computed as the scaled ranking of the root mean squared errors (RMSE) from these country-year regressions, and RMSEs are ranked in descending order so that higher values of *BTAXC* indicate higher required book-tax conformity.
TAXENF	=	Proxy for the level of tax enforcement in the country, based on the 1996 World Competitiveness Report.
PCTEQ	=	Sum of the value of option compensation and restricted stock compensation divided by total compensation at the country

		level, to proxy for CEO incentives. Data is obtained from Bryan et al. (2010).
LGDP	=	Log of Real historical Gross Domestic Product per capita (in billions of 2005 dollars). Source: www.ers.usda.gov/datafiles/International_Macroeconomic_Data/...Data
TREND	=	Time trend variable, defined as the current fiscal year minus the first fiscal year in our sample (1995).
PROA	=	Pre-tax return on assets.
SIZE	=	Natural logarithm of total assets (in U.S. dollars).
R&D	=	Research and development expenditures scaled by total assets.
LEV	=	Total liabilities scaled by total assets
GROWTH	=	Percentage change in sales.
MULTI	=	Indicator variable that equals zero if foreign income taxes is missing or zero, and equals one otherwise.
ΔWC	=	Change in current operating assets minus current operating liabilities, scaled by total assets.
ΔNCO	=	Change in noncurrent operating assets minus noncurrent operating liabilities, scaled by total assets.
ΔFIN	=	Change in financial assets minus financial liabilities, scaled by total assets.
SPEC1	=	An indicator that equals one if the auditor has the largest industry market share in the respective country-industry combination, and zero otherwise.
SPEC2	=	An indicator that equals one if the industry market share of the auditor is more than 20 percent for the period prior to 1998, 24 percent for the period 1998 to 2001, and 30 percent for the period after 2002 (Neal and Riley 2004), and zero otherwise.

TABLE 1
Sample Composition and Median Characteristics by Country

Country	*N*	*TAXAVOID*	*BIGN*	*COMMON*	*LAWE*	*ANTIDEAL*	*BURDEN*	*LITIG*	*AUDENV*	*EQTY*	*STMCAP*	*DEV*	*TAXENF*	*WW*
Australia	3,469	0.26	0	1	9.51	0.79	0.66	10.00	16	24.00	108.39	1	4.58	0
Austria	616	0.14	0	0	9.36	0.21	0.11	3.61	12	7.00	15.43	1	3.60	0
Belgium	662	0.11	1	0	9.44	0.54	0.44	4.82	12	11.30	73.82	1	2.27	0
Brazil	441	0.09	1	0	6.13	0.29	0.33	4.82	8	-	57.07	0	2.14	1
Chile	341	0.04	1	0	6.52	0.63	0.33	2.42	2	-	-	0	4.20	1
Denmark	1,065	0.05	1	0	10.00	0.47	0.55	4.82	15	20.00	57.68	1	3.70	0
Finland	974	0.01	1	0	10.00	0.46	0.66	3.61	10	13.70	114.61	1	3.53	0
France	3,968	0.08	0	0	8.68	0.38	0.22	6.22	15	9.30	77.87	1	3.86	0
Germany	4,039	0.17	0	0	9.05	0.28	0.00	6.22	13	5.00	45.37	1	3.41	0
Greece	497	0.10	0	0	6.82	0.23	0.50	3.61	7	11.50	67.46	0	2.36	1
Hong Kong	709	0.05	1	1	8.91	0.96	0.66	10.00	16	28.80	358.58	1	4.56	0
India	1,360	0.20	0	1	5.58	0.55	0.66	2.42	9	14.00	34.26	0	2.16	1
Indonesia	812	0.10	0	0	2.88	0.68	0.66	3.61	6	4.70	24.31	0	2.53	1
Ireland	418	0.11	1	1	8.36	0.79	0.44	6.22	15	17.30	62.40	1	3.55	1
Israel	137	0.14	0	1	7.72	0.71	0.66	-	10	-	68.27	0	3.69	1
Italy	1,481	0.08	1	0	7.07	0.39	0.22	6.22	15	6.50	44.55	1	1.77	0
Mexico	300	0.12	1	0	5.37	0.18	0.11	4.82	8	-	20.38	0	2.46	1
Netherlands	1,312	0.11	1	0	10.00	0.21	0.89	6.22	7	19.30	102.66	1	3.40	0
New Zealand	504	0.12	1	1	10.00	0.95	0.44	10.00	14	-	39.09	1	5.00	0
Norway	819	0.14	1	0	10.00	0.44	0.39	6.22	15	20.30	38.10	1	3.96	1
Peru	104	0.14	0	0	4.65	0.41	0.66	2.42	9	-	26.32	0	2.66	1
Philippines	496	0.14	0	0	3.47	0.24	1.00	3.61	4	5.70	41.88	0	1.83	1
Portugal	254	0.13	0	0	7.19	0.49	0.66	3.61	7	11.80	42.40	0	2.18	0
Singapore	1,793	0.04	1	1	8.93	1.00	0.66	4.82	13	28.80	188.99	1	5.05	0
South Africa	672	0.27	0	0	6.45	0.81	0.66	4.82	9	16.30	209.40	0	2.40	1
Spain	1,013	0.16	1	0	7.14	0.37	0.66	4.82	12	7.20	75.51	1	1.91	0
Sweden	1,638	0.06	1	0	10.00	0.34	0.28	4.82	17	16.70	104.38	1	3.39	1
Switzerland	1,773	0.07	1	0	10.00	0.27	0.44	6.22	15	24.80	229.04	1	4.49	0
Taiwan	415	0.17	1	0	7.37	0.56	0.66	3.61	8	13.30	-	0	3.25	1
Turkey	274	0.21	1	0	4.79	0.43	0.22	2.42	10	-	23.12	0	2.07	1
United Kingdom	9,602	0.05	1	1	9.22	0.93	0.66	10.00	18	25.00	139.46	1	4.67	1

TABLE 1 (continued)

Country	*BTAXC*	*TAXRATE*	*PCTEQ*	*LGDP*	*EARNVOL*	*PROA*	*SIZE*	*R&D*	*LEV*	*GROWTH*	*MULTI*	*ΔWC*	*ΔNCO*	*ΔFIN*
Australia	0.14	0.30	0.31	10.42	0.22	0.09	5.16	0.00	0.19	0.09	0	0.01	0.03	0.00
Austria	0.76	0.34	0.00	10.48	0.82	0.05	7.13	0.00	0.24	0.04	0	0.00	0.01	0.00
Belgium	0.76	0.40	0.00	10.43	0.60	0.06	6.59	0.00	0.22	0.05	0	0.00	0.01	0.00
Brazil	0.48	0.34	0.02	8.58	0.64	0.09	7.98	0.00	0.25	0.10	0	0.01	0.02	-0.03
Chile	0.88	0.17	0.00	8.89	0.11	0.08	8.60	0.00	0.24	0.05	0	0.01	0.01	0.01
Denmark	0.36	0.30	0.11	10.73	0.62	0.07	7.55	0.00	0.24	0.06	0	0.01	0.02	0.00
Finland	0.43	0.28	0.03	10.45	0.60	0.08	6.64	0.00	0.22	0.04	0	0.01	0.01	0.00
France	0.48	0.34	0.14	10.41	0.35	0.06	6.47	0.00	0.21	0.05	0	0.00	0.01	0.00
Germany	0.12	0.38	0.05	10.42	0.40	0.07	6.16	0.00	0.16	0.04	0	0.01	0.01	0.00
Greece	0.76	0.35	0.00	9.85	0.69	0.07	6.33	0.00	0.29	0.09	0	0.01	0.03	-0.04
Hong Kong	0.79	0.18	0.01	10.07	0.38	0.07	8.00	0.00	0.16	0.07	1	0.00	0.01	0.00
India	0.24	0.37	0.14	6.43	0.16	0.12	9.22	0.00	0.21	0.12	0	0.01	0.02	0.01
Indonesia	0.33	0.30	0.00	7.10	0.09	0.08	7.65	0.00	0.24	0.08	0	0.02	0.01	0.00
Ireland	0.69	0.24	0.11	10.61	0.45	0.09	5.92	0.00	0.28	0.13	1	0.01	0.04	-0.01
Israel	0.71	0.36	0.16	9.80	0.69	0.06	7.39	0.01	0.26	0.09	0	0.00	0.01	-0.01
Italy	0.57	0.40	0.05	10.30	0.69	0.06	7.26	0.00	0.24	0.04	0	0.00	0.01	-0.01
Mexico	0.40	0.33	0.00	8.87	0.05	0.10	9.10	0.00	0.23	0.08	0	0.00	0.03	0.00
Netherlands	0.40	0.35	0.25	10.50	0.45	0.08	6.64	0.00	0.22	0.05	0	0.00	0.01	0.00
New Zealand	0.50	0.33	0.42	10.07	0.44	0.09	5.66	0.00	0.27	0.06	0	0.01	0.02	0.00
Norway	0.10	0.28	0.00	11.03	0.38	0.07	7.58	0.00	0.29	0.09	0	0.01	0.02	-0.01
Peru	0.88	0.30	0.00	7.90	0.62	0.14	7.06	0.00	0.23	0.06	0	0.01	0.01	0.00
Philippines	0.49	0.32	0.00	6.98	0.53	0.07	8.78	0.00	0.21	0.05	0	0.01	0.01	0.00
Portugal	0.86	0.35	0.00	9.70	1.02	0.05	7.91	0.00	0.35	0.06	0	0.00	0.02	-0.01
Singapore	0.64	0.22	0.13	10.15	0.38	0.07	5.17	0.00	0.15	0.07	0	0.01	0.01	0.00
South Africa	0.17	0.38	0.31	8.45	0.51	0.16	7.51	0.00	0.12	0.14	0	0.01	0.03	0.00
Spain	0.74	0.35	0.02	10.11	0.20	0.07	7.76	0.00	0.22	0.08	0	0.00	0.02	-0.01
Sweden	0.36	0.28	0.09	10.52	0.45	0.09	8.26	0.00	0.20	0.07	0	0.01	0.02	0.00
Switzerland	0.69	0.25	0.04	10.78	0.78	0.07	6.66	0.00	0.22	0.04	0	0.01	0.01	0.01
Taiwan	0.90	0.25	0.00	9.53	0.18	0.06	9.61	0.00	0.23	0.07	0	0.00	0.02	0.00
Turkey	0.44	0.33	0.00	8.33	0.36	0.11	8.19	0.00	0.16	0.26	0	0.03	0.05	-0.01
United Kingdom	0.19	0.30	0.20	10.44	0.20	0.09	5.00	0.00	0.18	0.07	1	0.00	0.02	0.00

This table provides the sample composition and selected mean characteristics by country. The detailed definitions of the variables are provided in the Appendix. All continuous variables are trimmed at the 1 and 99 percentiles.

TABLE 2
Descriptive Statistics and Correlations

Panel A: Descriptive Statistics

	Mean	Median	Q1	Q3	Std Dev
TAXAGGR	0.198	0.000	0.000	0.000	0.398
TAXAVOID	0.097	0.100	-0.004	0.235	0.217
BIGN	0.536	1.000	0.000	1.000	0.499
COMMON	0.429	0.000	0.000	1.000	0.495
LAWE	8.641	9.223	8.677	9.507	1.550
ANTIDEAL	0.590	0.490	0.340	0.930	0.280
BURDEN	0.487	0.660	0.220	0.660	0.248
LITIG	6.815	6.220	4.820	10.000	2.502
AUDENV	13.944	15.000	12.000	17.000	3.713
EQTY	17.241	19.300	9.300	25.000	8.172
STMCAP	105.520	96.572	52.662	139.464	67.603
DEV	0.860	1.000	1.000	1.000	0.347
TAXENF	3.766	3.860	3.400	4.670	0.970
WW	0.460	0.000	0.000	1.000	0.498
BTAXC	0.394	0.333	0.167	0.595	0.262
TAXRATE	0.326	0.310	0.300	0.360	0.072
PCTEQ	0.130	0.138	0.040	0.197	0.101
LGDP	10.074	10.398	10.261	10.479	0.985
EARNVOL	0.379	0.309	0.182	0.545	0.242
PROA	0.207	0.079	0.040	0.135	2.244
SIZE	6.577	6.447	4.860	8.155	2.340
R&D	0.008	0.000	0.000	0.000	0.028
LEV	0.214	0.200	0.077	0.321	0.170
GROWTH	0.290	0.065	-0.017	0.184	2.818
MULTI	0.196	0.000	0.000	0.000	0.397
Δ*WC*	0.003	0.005	-0.027	0.041	0.110
Δ*NCO*	0.033	0.016	-0.018	0.074	0.178
Δ*FIN*	-0.012	-0.001	-0.063	0.044	0.158

TABLE 2 (continued)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	*TAXAGGR*	1.00													
(2)	*TAXAVOID*	0.53	1.00												
(3)	*BIGN*	-0.09	-0.20	1.00											
(4)	*COMMON*	0.00	-0.02	0.01	1.00										
(5)	*LAWE*	0.00	-0.06	0.15	0.17	1.00									
(6)	*ANTIDEAL*	0.00	-0.07	0.06	0.89	0.12	1.00								
(7)	*BURDEN*	0.00	-0.04	0.05	0.56	-0.07	0.59	1.00							
(8)	*LITIG*	0.00	-0.02	0.08	0.69	0.49	0.65	0.27	1.00						
(9)	*AUDENV*	0.00	-0.09	0.10	0.51	0.62	0.48	-0.04	0.77	1.00					
(10)	*EQTY*	0.00	-0.10	0.15	0.76	0.46	0.75	0.65	0.61	0.52	1.00				
(11)	*STMCAP*	-0.01	-0.12	0.03	0.40	0.34	0.47	0.41	0.39	0.34	0.70	1.00			
(12)	*DEV*	0.00	-0.08	0.15	0.14	0.83	0.12	-0.18	0.53	0.72	0.26	0.23	1.00		
(13)	*TAXENF*	0.00	-0.10	0.10	0.63	0.66	0.63	0.24	0.71	0.64	0.78	0.54	0.54	1.00	
(14)	*WW*	0.01	0.00	0.05	0.31	-0.34	0.34	0.23	0.15	0.03	0.16	-0.03	-0.40	-0.02	1.00
(15)	*BTAXC*	0.01	-0.06	-0.05	-0.32	-0.13	-0.26	-0.08	-0.41	-0.30	-0.17	0.05	-0.11	-0.21	-0.31
(16)	*TAXRATE*	0.04	0.18	-0.03	-0.32	-0.13	-0.40	-0.49	-0.09	-0.10	-0.64	-0.59	-0.01	-0.42	0.08
(17)	*PCTEQ*	0.00	0.07	-0.02	0.65	0.33	0.58	0.45	0.66	0.40	0.57	0.21	0.23	0.53	0.02
(18)	*LGDP*	0.00	-0.09	0.16	-0.01	0.87	0.03	-0.22	0.49	0.63	0.26	0.26	0.86	0.53	-0.37
(19)	*EARNVOL*	0.02	0.01	-0.08	-0.42	0.04	-0.43	-0.21	-0.41	-0.25	-0.22	-0.06	-0.04	-0.26	-0.33
(20)	*PROA*	0.02	0.02	0.00	-0.02	-0.08	-0.01	0.01	-0.04	-0.05	-0.03	-0.03	-0.06	-0.05	0.03
(21)	*SIZE*	-0.06	-0.01	0.13	-0.31	-0.30	-0.31	-0.10	-0.41	-0.34	-0.28	-0.18	-0.33	-0.40	0.03
(22)	*R&D*	-0.02	-0.04	0.02	-0.04	0.10	-0.05	-0.05	0.01	0.05	-0.01	0.02	0.07	0.04	-0.02
(23)	*LEV*	0.02	-0.01	0.05	-0.08	-0.03	-0.07	-0.01	-0.07	-0.06	-0.05	-0.07	-0.04	-0.06	-0.03
(24)	*GROWTH*	0.04	0.04	-0.01	-0.01	-0.09	0.00	0.02	-0.04	-0.05	-0.03	-0.02	-0.07	-0.05	0.03
(25)	*MULTI*	-0.09	-0.17	0.19	0.34	0.15	0.38	0.17	0.34	0.31	0.32	0.27	0.15	0.29	0.26
(26)	ΔWC	0.03	0.05	-0.02	0.05	-0.01	0.05	0.05	0.01	0.00	0.06	0.03	-0.02	0.03	0.04
(27)	ΔNCO	0.06	0.09	-0.06	0.09	0.03	0.08	0.05	0.09	0.06	0.09	0.04	0.01	0.06	0.05
(28)	ΔFIN	-0.01	-0.03	0.04	-0.03	0.00	-0.03	-0.02	-0.03	-0.02	-0.02	-0.02	-0.01	-0.01	-0.02

TABLE 2 (continued)

		(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	
(15)	*BTAXC*	1.00													
(16)	*TAXRATE*	-0.29	1.00												
(17)	*PCTEQ*	-0.40	-0.05	1.00											
(18)	*LGDP*	0.00	-0.08	0.14	1.00										
(19)	*EARNVOL*	0.40	0.00	-0.34	0.07	1.00									
(20)	*PROA*	-0.01	-0.01	-0.03	-0.07	-0.06	1.00								
(21)	*SIZE*	0.19	0.07	-0.32	-0.32	0.09	0.09	1.00							
(22)	*R&D*	-0.02	0.00	-0.03	0.08	0.03	0.00	-0.03	1.00						
(23)	*LEV*	0.05	-0.01	-0.06	-0.01	0.07	0.00	0.21	-0.10	1.00					
(24)	*GROWTH*	0.00	-0.01	-0.03	-0.07	-0.06	0.82	0.11	0.00	0.03	1.00				
(25)	*MULTI*	-0.13	-0.17	0.13	0.13	-0.19	-0.01	0.00	0.11	0.00	-0.01	1.00			
(26)	Δ*WC*	-0.02	-0.04	0.03	-0.03	-0.04	0.11	0.05	0.00	0.05	0.18	0.01	1.00		
(27)	Δ*NCO*	-0.05	-0.05	0.08	0.01	-0.06	0.18	0.06	0.00	0.06	0.30	0.03	0.14	1.00	
(28)	Δ*FIN*	0.01	0.01	-0.03	-0.02	0.02	-0.08	-0.04	0.01	-0.18	-0.15	-0.02	-0.34	-0.56	1.00

This table provides the descriptive statistics (Panel A) and Pearson correlations (Panel B) of the main variables used in this study. Correlation is significant at 1% (two-tailed) if the correlation coefficient is greater than 0.01. The detailed definitions of the variables are provided in the Appendix. All continuous variables are trimmed at the 1 and 99 percentiles.

TABLE 3
Relation between Auditor Quality and Tax Aggressiveness

	(1)	(2)	(3)
BIGN	-0.533	-0.363	-0.274
	(-11.49)***	(-7.64)***	(-6.03)***
TAXRATE			1.990
			(4.74)***
WW			-0.271
			(-5.36)***
BTAXC			-0.248
			(-2.92)***
TAXENF			-0.118
			(-2.93)***
PCTEQ			0.211
			(0.77)
EARNVOL			0.301
			(3.43)***
LGDP			0.071
			(2.34)**
TREND			-0.022
			(-2.79)***
PROA		-0.025	-0.024
		(-2.26)**	(-2.16)**
SIZE		-0.118	-0.119
		(-8.41)***	(-8.62)***
R&D		-0.747	-1.004
		(-1.05)	(-1.44)
LEV		0.851	0.813
		(6.69)***	(6.42)***
GROWTH		0.031	0.032
		(3.34)***	(3.41)***
MULTI		-0.645	-0.537
		(-9.23)***	(-8.31)***
Δ*WC*		0.586	0.613
		(4.26)***	(4.46)***
Δ*NCO*		1.048	1.080
		(9.23)***	(9.50)***
Δ*FIN*		0.986	1.000
		(7.95)***	(7.99)***
Constant	-0.919	-0.570	-2.642
	(-4.35)***	(-2.62)***	(-7.25)***
N	41,958	41,958	41,958
Pseudo R-sq	0.0176	0.0378	0.0388

This table reports the regression results of the relation between auditor quality and tax aggressiveness. The dependent variable is tax aggressiveness (*TAXAGGR*), which is an indicator equals one if the tax avoidance is within the top quintile in each country-industry combination, and zero otherwise. Column 1 shows the results excluding control variables; Column 2 shows the results including control variables, but without country-level tax system controls; and Column 3 shows the results including additional controls for country-level tax system. The regressions in Column 1 and 2 include year, industry, and country fixed effects, while the regression in Column 3 includes year and industry fixed effects. The detailed definitions of all variables are provided in the Appendix. Coefficients on the year, industry and country indicator variables are not tabulated for brevity. The z-statistics reported in parentheses are based on standard errors clustered by firm to control for cross-sectional dependence in the data. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 4
Relation between Auditor Quality and Tax Aggressiveness: The Role of Investor Protection

	(1) *IP=COMMON*	(2) *IP=LAWE*	(3) *IP=ANTIDEAL*
BIGN	-0.139	-0.273	-0.307
	(-2.57)**	(-6.01)***	(-6.69)***
BIGN_IP	-0.356	-0.091	-0.753
	(-4.34)***	(-3.92)***	(-5.18)***
IP	-0.345	-0.062	-0.834
	(-4.12)***	(-1.71)*	(-5.32)***
TAXRATE	2.169	1.924	2.420
	(5.06)***	(4.61)***	(5.41)***
WW	-0.226	-0.273	-0.184
	(-4.30)***	(-5.26)***	(-3.37)***
BTAXC	-0.243	-0.222	-0.221
	(-2.85)***	(-2.61)***	(-2.63)***
TAXENF	-0.086	-0.109	-0.087
	(-1.99)**	(-2.53)**	(-2.09)**
PCTEQ	0.629	0.217	0.811
	(1.95)*	(0.78)	(2.59)***
EARNVOL	0.336	0.320	0.367
	(3.94)***	(3.68)***	(4.38)***
LGDP	0.089	0.025	0.072
	(2.90)***	(0.53)	(2.36)**
TREND	-0.025	-0.023	-0.026
	(-3.20)***	(-2.86)***	(-3.34)***
PROA	-0.023	-0.024	-0.022
	(-2.11)**	(-2.20)**	(-2.04)**
SIZE	-0.116	-0.119	-0.113
	(-8.41)***	(-8.58)***	(-8.06)***
R&D	-0.915	-0.985	-0.852
	(-1.30)	(-1.40)	(-1.21)
LEV	0.820	0.822	0.825
	(6.45)***	(6.48)***	(6.49)***
GROWTH	0.031	0.032	0.030
	(3.46)***	(3.45)***	(3.30)***
MULTI	-0.518	-0.526	-0.532
	(-7.76)***	(-8.11)***	(-7.87)***
Δ*WC*	0.604	0.605	0.602
	(4.41)***	(4.40)***	(4.41)***
Δ*NCO*	1.057	1.068	1.072
	(9.37)***	(9.42)***	(9.49)***
Δ*FIN*	0.979	0.982	0.989
	(7.85)***	(7.86)***	(7.94)***
Constant	-2.828	-2.115	-2.584
	(-7.73)***	(-3.69)***	(-7.08)***
N	41,958	41,958	41,958
Pseudo R-sq	0.0403	0.0394	0.0410

This table reports the regression results of the role investor protection (*IP*) on the relation between auditor quality (*BIGN*) and tax aggressiveness (*TAXAGGR*). *TAXAGGR* is an indicator equals one if the tax avoidance is within the top quintile in each country-industry combination, and zero otherwise. *IP* is proxied by *COMMON* in Column 1, by *LAWE* in Column 2, and *ANTIDEAL* in Column 3. The detailed definitions of all variables are provided in the Appendix. Coefficients on the year and industry indicator variables are not tabulated for brevity. The z-statistics reported in parentheses are based on standard errors clustered by firm to control for cross-sectional dependence in the data. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 5
Relation between Auditor Quality and Tax Aggressiveness:
The Role of Auditor Litigation and the Audit Environment

	(1) *AUDIT=BURDEN*	(2) *AUDIT=LITIG*	(3) *AUDIT=AUDENV*
BIGN	-0.296	-0.290	-0.284
	(-6.46)***	(-6.31)***	(-6.17)***
BIGN_AUDIT	-0.387	-0.070	-0.066
	(-2.36)**	(-4.27)***	(-6.19)***
AUDIT	-0.823	-0.051	-0.055
	(-5.79)***	(-2.63)***	(-4.80)***
TAXRATE	3.460	1.915	1.928
	(6.52)***	(4.54)***	(4.60)***
WW	-0.202	-0.243	-0.235
	(-3.81)***	(-4.50)***	(-4.57)***
BTAXC	-0.261	-0.223	-0.216
	(-3.08)***	(-2.59)***	(-2.50)**
TAXENF	-0.168	-0.106	-0.089
	(-4.05)***	(-2.55)**	(-2.16)**
PCTEQ	1.081	0.381	0.380
	(3.39)***	(1.14)	(1.33)
EARNVOL	0.300	0.338	0.330
	(3.47)***	(3.85)***	(3.83)***
LGDP	0.104	0.028	-0.005
	(3.38)***	(0.79)	(-0.13)
TREND	-0.018	-0.025	-0.024
	(-2.19)**	(-3.16)***	(-3.05)***
PROA	-0.022	-0.023	-0.024
	(-2.04)**	(-2.14)**	(-2.23)**
SIZE	-0.114	-0.115	-0.118
	(-8.23)***	(-8.31)***	(-8.60)***
R&D	-1.067	-1.008	-0.911
	(-1.50)	(-1.41)	(-1.30)
LEV	0.806	0.835	0.835
	(6.36)***	(6.57)***	(6.57)***
GROWTH	0.031	0.031	0.031
	(3.38)***	(3.43)***	(3.48)***
MULTI	-0.538	-0.509	-0.506
	(-8.20)***	(-7.61)***	(-7.65)***
Δ*WC*	0.599	0.606	0.611
	(4.39)***	(4.42)***	(4.44)***
Δ*NCO*	1.083	1.063	1.062
	(9.60)***	(9.39)***	(9.38)***
Δ*FIN*	1.004	0.984	0.974
	(8.05)***	(7.88)***	(7.79)***
Constant	-3.545	-2.116	-1.688
	(-8.78)***	(-4.73)***	(-3.78)***
N	41,958	41,821	41,958
Pseudo R-sq	0.0407	0.0400	0.0408

This table reports the regression results of the role auditor litigation risk and audit environment (*AUDIT*) on the relation between auditor quality (*BIGN*) and tax aggressiveness (*TAXAGGR*). *TAXAGGR* is an indicator equals one if the tax avoidance is within the top quintile in each country-industry combination, and zero otherwise. *AUDIT* is proxied by *BURDEN* in Column 1, by *LITIG* in Column 2, and *AUDENV* in Column 3. The detailed definitions of all variables are provided in the Appendix. Coefficients on the year and industry indicator variables are not tabulated for brevity. The z-statistics reported in parentheses are based on standard errors clustered by firm to control for cross-sectional dependence in the data. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 6
Relation between Auditor Quality and Tax Aggressiveness: The Role of Capital Market Pressure

	(1) *MARKET=EQTY*	(2) *MARKET=STMCAP*	(3) *MARKET=DEV*
BIGN	-0.310	-0.306	-0.273
	(-6.44)***	(-6.59)***	(-5.99)***
BIGN_MARKET	-0.021	-0.003	-0.367
	(-4.08)***	(-4.45)***	(-3.63)***
MARKET	0.045	0.002	0.434
	(6.59)***	(5.04)***	(3.35)***
TAXRATE	4.161	2.391	1.794
	(7.10)***	(5.24)***	(4.21)***
WW	-0.166	-0.241	-0.312
	(-2.97)***	(-4.64)***	(-5.64)***
BTAXC	-0.315	-0.216	-0.243
	(-3.46)***	(-2.48)**	(-2.83)***
TAXENF	-0.037	-0.112	-0.088
	(-0.81)	(-2.74)***	(-2.13)**
PCTEQ	1.119	0.292	0.118
	(3.22)***	(1.07)	(0.43)
EARNVOL	0.297	0.318	0.348
	(3.26)***	(3.55)***	(3.97)***
LGDP	0.039	0.050	-0.012
	(1.27)	(1.63)	(-0.28)
TREND	-0.013	-0.026	-0.021
	(-1.57)	(-3.23)***	(-2.71)***
PROA	-0.023	-0.019	-0.025
	(-2.00)**	(-1.70)*	(-2.24)**
SIZE	-0.119	-0.122	-0.118
	(-8.33)***	(-8.76)***	(-8.56)***
R&D	-0.964	-0.888	-0.963
	(-1.33)	(-1.26)	(-1.38)
LEV	0.905	0.843	0.824
	(6.91)***	(6.62)***	(6.50)***
GROWTH	0.034	0.029	0.032
	(3.59)***	(3.06)***	(3.53)***
MULTI	-0.526	-0.523	-0.539
	(-7.86)***	(-7.88)***	(-8.28)***
Δ*WC*	0.530	0.608	0.604
	(3.81)***	(4.43)***	(4.39)***
Δ*NCO*	1.057	1.093	1.067
	(9.07)***	(9.56)***	(9.39)***
Δ*FIN*	0.976	1.019	0.986
	(7.63)***	(8.10)***	(7.88)***
Constant	-2.623	-2.477	-1.684
	(-6.82)***	(-6.67)***	(-3.39)***
N	39,857	41,169	41,958
Pseudo R-sq	0.0451	0.0411	0.0394

This table reports the regression results of the role capital market pressure (*MARKET*) on the relation between auditor quality (*BIGN*) and tax aggressiveness (*TAXAGGR*). *TAXAGGR* is an indicator equals one if the tax avoidance is within the top quintile in each country-industry combination, and zero otherwise. *MARKET* is proxied by *EQTY* in Column 1, by *STMCAP* in Column 2, and *DEV* in Column 3. The detailed definitions of all variables are provided in the Appendix. Coefficients on the year and industry indicator variables are not tabulated for brevity. The z-statistics reported in parentheses are based on standard errors clustered by firm to control for cross-sectional dependence in the data. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7
Relation between Auditor Quality and Tax Aggressiveness: Alternate Measures for Tax Aggressiveness

	Dependent variable: *TAXAVOID*	Dependent variable: *ADJ_TAXGGR*
BIGN	-0.040	-0.029
	(-10.01)***	(-7.97)***
TAXRATE	0.536	0.182
	(14.70)***	(5.41)***
WW	-0.003	-0.026
	(-0.74)	(-6.87)***
BTAXC	-0.001	-0.029
	(-0.14)	(-4.35)***
TAXENF	-0.004	-0.011
	(-1.11)	(-3.65)***
PCTEQ	0.175	0.032
	(7.59)***	(1.52)
EARNVOL	0.014	0.017
	(1.92)*	(2.46)**
LGDP	0.009	0.005
	(3.49)***	(2.06)**
TREND	-0.001	-0.001
	(-2.20)**	(-0.95)
PROA	-0.001	-0.000
	(-0.56)	(-0.14)
SIZE	-0.005	-0.004
	(-4.28)***	(-3.94)***
R&D	-0.134	-0.070
	(-2.12)**	(-1.20)
LEV	0.026	0.019
	(2.43)**	(1.98)**
GROWTH	0.001	0.000
	(0.48)	(0.36)
MULTI	-0.060	-0.039
	(-12.71)***	(-9.22)***
Δ*WC*	0.084	0.083
	(7.14)***	(7.27)***
Δ*NCO*	0.124	0.107
	(14.94)***	(13.55)***
Δ*FIN*	0.079	0.066
	(8.72)***	(7.47)***
Constant	0.048	-0.111
	(1.58)	(-3.99)***
N	41,958	41,958
R-sq	0.133	0.055

This table reports the regression results of the relation between auditor quality (*BIGN*) and alternative proxies for tax aggressiveness. In Column 1, the dependent variable is continuous variable, *TAXAVOID*. In Column 2, the dependent variable is *ADJ_TAXAGGR*, the country-industry mean-adjusted measure of tax aggressiveness, computed as the firm-year specific *TAXAVOID* minus the mean *TAXAVOID* in each country-industry combination. The detailed definitions of all variables are provided in the Appendix. Coefficients on the year and industry indicator variables are not tabulated for brevity. The t-statistics reported in parentheses are based on standard errors clustered by firm to control for cross-sectional dependence in the data. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 8
Relation between Auditor Quality and Tax Aggressiveness: Alternate Proxies for Auditor Quality

	(1) *AUDSPEC=SPEC1*	(2) *AUDSPEC=SPEC2*
AUDSPEC	-0.505	-0.369
	(-2.93)***	(-2.02)**
TAXRATE	2.643	2.579
	(2.38)**	(2.31)**
WW	0.001	0.001
	(0.01)	(0.00)
BTAXC	-0.341	-0.340
	(-1.39)	(-1.39)
TAXENF	-0.160	-0.162
	(-1.24)	(-1.25)
PCTEQ	0.169	0.255
	(0.16)	(0.24)
EARNVOL	0.367	0.349
	(1.43)	(1.37)
LGDP	-0.126	-0.085
	(-1.15)	(-0.80)
TREND	0.000	-0.017
	(0.01)	(-0.57)
PROA	-0.023	-0.021
	(-0.62)	(-0.56)
SIZE	-0.119	-0.122
	(-3.76)***	(-3.87)***
R&D	-0.054	-0.101
	(-0.04)	(-0.07)
LEV	1.121	1.121
	(3.24)***	(3.24)***
GROWTH	0.051	0.050
	(1.75)*	(1.73)*
MULTI	-0.575	-0.569
	(-4.59)***	(-4.55)***
Δ*WC*	0.618	0.629
	(1.64)	(1.66)*
Δ*NCO*	1.296	1.288
	(4.15)***	(4.13)***
Δ*FIN*	1.134	1.127
	(3.21)***	(3.19)***
Constant	-1.340	-1.701
	(-1.25)	(-1.61)
N	9,530	9,530
Pseudo R-sq	0.0474	0.0465

This table reports the regression results of the relation between auditor quality and tax aggressiveness (*TAXAGGR*), using alternative proxies for auditor quality. The sample is restricted to firms audited by Big N auditors. In Column 1, *SPEC1* is an indicator that equals one if the auditor has the largest industry market share in the respective country-industry combination, and zero otherwise. In Column 2, *SPEC2* is an indicator that equals one if the industry market share of the auditor is more than 20 percent for the period prior to 1998, 24 percent for the period 1998 to 2001, and 30 percent for the period after 2002 (Neal and Riley 2004), and zero otherwise. The detailed definitions of all variables are provided in the Appendix. Coefficients on the year and industry indicator variables are not tabulated for brevity. The z-statistics reported in parentheses are based on standard errors clustered by firm to control for cross-sectional dependence in the data. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE 9
Relation between Auditor Switches and Change in Tax Aggressiveness

	No. of Switches	Median Δ*TAXAVOID*	p-value based on sign tests
Non-Big N to Big N	1,518	-0.85%	p=0.00
Big N to non-Big N	3,600	1.00%	p=0.00
All auditor switches	5,118	0.28%	p=0.00

This table reports the results examining the relation between auditor switches and change in tax avoidance. Δ*TAXAVOID* measures the change in tax avoidance from year t-1 to year t. The table reports the median Δ*TAXAVOID* for firms that switch from a Non-Big N to a Big N auditor, and from a Big N to a non-Big N auditor. The last column depicts two-tailed p-values based on non-parametric sign-tests of whether Δ*TAXAVOID* differs from zero.

TABLE 10
Relation between Auditor Quality and Tax Aggressiveness in the Pre- and Post-2002 Period

	(1) Pre-2002	(2) Post-2002	(3) All
BIGN	-0.129	-0.469	-0.186
	(-2.15)**	(-7.19)***	(-3.25)***
BIGN_POST			-0.439
			(-5.75)***
POST			0.606
			(8.21)***
TAXRATE	2.218	0.579	2.014
	(4.38)***	(0.90)	(4.85)***
WW	-0.047	-0.553	-0.276
	(-0.62)	(-8.67)***	(-5.50)***
BTAXC	-0.102	-0.125	-0.270
	(-0.88)	(-1.03)	(-3.24)***
TAXENF	-0.070	-0.117	-0.129
	(-1.15)	(-2.17)**	(-3.22)***
PCTEQ	0.459	0.480	0.285
	(1.03)	(1.49)	(1.04)
EARNVOL	0.335	0.310	0.311
	(2.99)***	(2.53)**	(3.57)***
LGDP	0.069	0.226	0.077
	(1.78)*	(5.41)***	(2.58)***
TREND	-0.069	0.037	-0.051
	(-5.67)***	(1.84)*	(-5.11)***
PROA	-0.011	-0.059	-0.023
	(-1.00)	(-2.05)**	(-2.14)**
SIZE	-0.106	-0.134	-0.111
	(-5.06)***	(-8.74)***	(-8.15)***
R&D	-1.562	-0.770	-1.120
	(-1.35)	(-0.91)	(-1.60)
LEV	0.972	0.612	0.771
	(5.26)***	(3.93)***	(6.14)***
GROWTH	0.018	0.063	0.031
	(1.92)*	(2.40)**	(3.36)***
MULTI	-0.581	-0.415	-0.549
	(-6.00)***	(-5.38)***	(-8.53)***
ΔWC	0.806	0.399	0.622
	(4.19)***	(1.91)*	(4.52)***
ΔNCO	1.141	1.010	1.109
	(7.26)***	(5.94)***	(9.86)***
ΔFIN	1.143	0.790	0.986
	(6.60)***	(4.40)***	(7.85)***
Constant	-0.955	-4.374	-2.871
	(-1.99)**	(-8.37)***	(-8.08)***
N	22,902	19,056	41,958
Pseudo R-sq	0.0389	0.0521	0.0349

This table reports the regression results of the relation between auditor quality (*BIGN*) and tax aggressiveness (*TAXAGGR*) between the pre- and post-2002 period. Columns 1 and 2 show the results for the pre- and post-2002 period, respectively. Column 3 shows results for the full sample with a variable *POST*, coded one for post-2002 period, and zero otherwise, and an interaction term *BIGN*POST*. The detailed definitions of all variables are provided in the Appendix. Coefficients on the year and industry indicator variables are not tabulated for brevity. The z-statistics reported in parentheses are based on standard errors clustered by firm to control for cross-sectional dependence in the data. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.