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Audit Firm Tenure, Corporate Tax Avoidance, and Firm Value

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1. Introduction

This article examines the impact of audit firm tenure on the association between tax avoidance and firm valuation. Specifically, we investigate whether extended audit firm tenure creates firm value by enhancing wealth transfer from government to shareholders or destroys firm value by exacerbating managerial rent extraction through tax planning activities.

The first motivation of our study comes from recent heated debate on mandatory audit firm rotation (PCAOB, 2011, 2012; EC, 2010, 2011, 2012). In its eight-year inspection work on publicly listed companies, Public Company Accounting Oversight Board (PCAOB) has witnessed instances where auditors fall short of independence, objectivity, and skepticism in auditing long-lasting clients. However, empirical evidence predominantly finds that audit firm tenure increases the information role (e.g., Myers, Myers, and Omer, 2003; Ghosh and Moon, 2005) and insurance role of external auditors (e.g., Mansi, Maxwell, and Miller, 2004). Given the high cost of mandatory audit firm rotation on both public-listed firms and their external auditors, it is conceivable that, on July 8, 2013, the U.S. House of Representatives approved a bipartisan bill, H.R. 1564, the Audit Integrity and Job Protection Act, that which would prohibit the PCAOB from implementing mandatory audit firm rotation for public companies. Yet the bill would have to be approved by the Senate (which has not taken up this issue) and to be signed by the president to become law. Even though the PCAOB decided not to pursue mandatory audit firm rotation, it is still puzzling why regulators worldwide were interested in requiring mandatory audit firm rotation despite the strong resistance from the profession and the academics. We propose to examine the governance role of external auditors to unravel this seemingly puzzle.

The information asymmetry and potential conflicts of interest between managers and shareholders create a governance role for external auditors (Jensen and Meckling, 1976; Watts and Zimmerman, 1983; Fan and Wong, 2005). The auditor's independent verification of the financial statements adds credibility to the report and reduces information risk (the risk that the financial statements may be false or misleading). The opacity of tax avoidance activities creates opportunities for managers to pursue activities designed to manipulate earnings and mislead investors (Desai and Dharmapala, 2006; Frank, Lynch, and Rego, 2009; Wilson, 2009). In this high information asymmetry context, the monitoring role of external auditors is vital to the efficient allocation of resources in the capital markets.

The second motivation of our study derives from recent studies on the economic consequences of tax avoidance. The traditional view holds that the tax savings created from transferring wealth from the government to the shareholders to enhance firm value. However, the value maximization perspective may not be descriptive in a world where the agency cost exists between managers and shareholders. Managers may as well expropriate the tax savings to maximize their personal wealth or simply use tax expense as a last resort to manipulate earnings (Dhaliwal, Gleason, and Mills, 2004). Managerial opportunistic behavior for rent extraction or earnings manipulation decreases firm value. Consistent with the agency cost view of tax avoidance activities , recent research provides evidence that tax avoidance does not necessarily increase firm value (Desai and Dharmapala, 2009) or even positively associated with stock price crash risk (Kim, Li, and Zhang, 2010).

We argue that auditor experience is extremely important in the context of complex and opaque tax avoidance activities. Auditors who ensure more accurate reporting of these complex business decisions can provide investors with more accurate information which is rewarded through higher firm value. Hence, we conjecture that extended auditor-client relationship should constrain managerial opportunistic behavior to maximize firm value rather than to maximize personal wealth, if the firm-specific experience gained over time facilitates the monitoring role of external auditors as the auditor knows more about the client. This is in line with the notion that longer audit firm tenure strengthens the information role

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(e.g., Johnson, Khurana, and Reynolds, 2002; Myers, Myers, and Omar, 2003; Ghosh and Moon, 2005; Gul, Fung, and Jaggi, 2009) and the insurance role of external auditors (e.g., Mansi, Maxwell, and Miller, 2004). In contrast, extended audit firm tenure would exacerbate managerial opportunistic behavior and hence destroy firm value, if the economic incentives or close personal relationship developed over time clouds auditors' judgment and reduces their professional skepticism. The is consistent with the findings that the propensity for firms to meet or beat analysts' benchmarks (Davis, Soo, and Trompeter, 2009) and the cost of common equity (Boone, Khurana, and Raman, 2008) exhibit a U-shaped pattern, suggesting that both actual and perceived audit quality decreases with audit firm tenure. Consequently, we predict that audit firm tenure should positively moderate the association between tax avoidance and firm value if the auditor's information intermediary lessens the information asymmetry between managers and shareholders and hence provides firm value to the capital markets. Conversely, audit firm tenure should negatively moderate the association between tax avoidance and firm value if the extended tenure term impairs auditor independence or undermines auditor professional skepticism.

Using a large sample of U.S. firms covering the period of 2000 to 2013 and examining four measures of tax avoidance, we regress firm value on audit firm tenure, tax avoidance, and the interaction between tax avoidance and firm value, after controlling for other factors documented by prior literature to affect firm value. We find that a significant and positive moderating effect of audit firm tenure on the association between firm value and each of the following tax avoidance measures: total book-tax-differences (BTD), Desai-Dharmapala (2006) residual book-tax-differences (DDBTD), Manzon-Plesko (2002) book-tax-differences (MPBTD), and Wilson's (2009) sheltering probability (Shelter). Our inference is robust to industry-adjusted tax avoidance measures, alternative measures of firm value, an orthogonal regression analysis, and a stepwise regression analysis.

Our further analyses reveal several new insights. First, we find that tax avoidance has a negative effect on firm value for initial audit engagement, suggesting that the independence gain from new audit engagements may lead to a loss for auditors' governance role to constrain managers' rent extraction due to lack of client-specific knowledge. Second, we find that absent tax avoidance, audit firm tenure has a negative impact on firm value. This is consistent with the argument that extended auditor tenure is perceived to impair auditor independence and investors price discount the value of the firm. Third, we document that audit firm tenure is negatively associated with tax avoidance, suggesting that extended tenure enhances an auditor's ability to constrain tax avoidance activities.

Our study contributes to several strands of the extant research. First, we extend audit firm tenure literature from investigating the information role and the insurance role of auditors to examining the impact of the governance role of auditors. Second, we shed light on the moderating effect of audit firm tenure on the association between tax avoidance and firm valuation. We add to the literature examining how various governance mechanisms can alleviate managers' rent extraction via tax avoidance activities. Third, our additional analysis reveals that extended audit firm tenure is associated with lower level of tax avoidance, extending the line of research examining the determinants of tax avoidance (Dyreng, Hanlon, and Maydew, 2010; Robinson Sikes, and Weaver, 2010; McGuire, Omer, and Wang, 2012).

The remainder of the article proceeds as follows: Section 2 presents prior literature and develops the hypothesis, Section 3 delineates the research design, Section 4 reports the empirical results, and Section 5 concludes the article.

2. Background and Hypothesis Development

Income tax represents a significant cost to a firm and its shareholders because U.S. firms may need to pay more than one-third of pre-tax profits to the federal, state, and local government. Tax avoidance is traditionally viewed as a tax saving device to transfer wealth from the government to shareholders and thus enhances after-tax firm value. However, the agency perspective of tax avoidance (Desai and Dharmapala, 2006; Desai, Dyck, and Zingales, 2007; Desai and Dharmapala, 2009) suggests that the obfuscatory tax avoidance activities may exacerbate managerial rent extraction and reduce after-tax firm value. In Jensen and Meckling's (1976) model of managerial rent extraction, managerial consumption of firm resources for personal benefit represents agency costs that maximize managers' own utility instead of shareholders' utility.

Empirical studies provide evidence to support the view that decreasing cash payments to tax authorities is not necessarily enhancing shareholder value. For example, Brown, Drake, and Martin (2016) find that managers' bonus payouts are positively associated with tax performance in terms of GAAP and current effective tax rates. Several studies suggest that equity investors and debt holders do not perceive aggressive tax strategies as value-enhancing. For example, Hanlon and Slemrod (2009) show that stock price reacts negatively to news about corporate tax aggressiveness, suggesting that

investors discount more on the value created from aggressive tax reduction strategies than from less aggressive tax planning strategies. Also, Kim, Li, and Zhang (2011) present that corporate tax avoidance is positively associated with firm-specific stock price crash risk because tax avoidance activities facilitate managerial rent extraction and bad news hoarding activities by providing tools and masks for managers to manufacture earnings and conceal negative operating outcomes for extended periods. Further, Hasan, Hoi, Wu, and Zhang (2014) document that firms with greater tax avoidance incur higher spreads when obtaining bank loans, suggesting that banks perceive tax avoidance as creating significant risks. However, two recent studies raise some tension on the association between tax avoidance and firm value, suggesting that managerial rent extraction may not be widespread in the U.S. (Blayblock, 2016; Seidman and Stomberg, 2017). Ultimately, whether tax avoidance has a positive or negative association with firm value is an empirical question.

To mitigate the agency costs associated with tax planning activities, managers can either provide more detailed disclosures (Hope, Ma, and Thomas, 2013; Inger, Meckfessel, Zhou, and Fan, 2018; Balakrishnan, Blouin, and Guay, 2019)[1] or forgone tax savings to avoid the potential price discount (Chen, Chen, Cheng, and Shevlin, 2010). However, a principal's losses can be more directly reduced through a strong monitoring of internal and external control systems, such as corporate governance, institutional ownership, and external auditors. For instance, Kim, Li, and Zhang (2011) find that the positive relation between tax avoidance and crash risk is attenuated when firms have strong external monitoring mechanisms such as high institutional ownership, high analyst coverage, and greater takeover threat from corporate control markets. Further, Wilson (2009) document that positive abnormal returns for well-governed firms during the period of active tax shelter involvements as well as the 24-month period before first tax shelter activity and after final tax shelter activity. More directly, Desai and Dharmapala (2009) examine the effect of external governance, as proxied by institutional ownership, on the association between book-tax difference and firm value for 4,492 firm-year observations (862 distinct firms) for a sample period of 1993–2001. They find that corporate tax avoidance increases firm value only for well-governed firms.

While above studies demonstrate that governance plays an important role in the association between tax avoidance and firm value, no study thus far has examined how the monitoring of external auditors impacts the relation between tax avoidance and firm value. The governance role for external auditors derives from the information asymmetry and potential conflict of interest between managers and shareholders under agency framework (Jensen and Meckling, 1976; Watts and Zimmerman, 1983; Fan and Wong, 2015). Motivated by recent heated debate on mandatory audit firm rotation, this study focuses on how audit firm tenure, which represents the depth of firm-specific expertise of an auditor on the client firm, moderating the association between tax avoidance and firm value.

Prior literature suggests that tax expense is a difficult account for firms to estimate and a difficult account for auditors to assess because of the complexity of the tax law and the substantial judgment involved in estimating the various components of tax expense (Dhaliwal et al., 2004).[2] Tax expense demands a thorough understanding of both financial reporting standards and the tax law that surrounds firms' various tax strategies. From an information-learning perspective, the firm-specific experience and knowledge gained over time from extended tenure can facilitate the auditor to know more about the client and its tax planning strategies. Most U.S. studies on audit firm tenure document that earnings quality increases with tenure, supporting the learning effect explanation. For instance, Chung and Kallapur (2003) and Myers et al. (2003) find that discretionary accruals are negatively related to auditor tenure. One recent study conducted by Brooks and Guo (2015) suggest that the propensity for firms to use effective tax rate changes to manage earnings and to meet or beat analysts' earnings forecasts within the quantitative materiality threshold decreases with audit firm tenure. Mansi et al. (2004) examine whether the influence of reported earnings on debt ratings varies with tenure and document a negative association between tenure and cost of debt. The primary aim of Mansi et al. (2004) is to purge the information effects of tenure and

[1] Hope, Ma, and Thomas (2013) show that corporate tax planning has a negative impact on U.S. multinational firms' geographic earnings disclosure. Inger, Meckfessel, Zhou, and Fan (2018) document a positive impact of tax avoidance on tax footnote readability for firms with tax avoidance below the industry-year median, consistent with the notion that managers provide straightforward disclosures in order to highlight their good performance in terms of tax savings. Balakrishnan, Blouin, and Guay (2019) investigate the association between tax aggressiveness and corporate transparency, suggesting that aggressive tax planning is associated with lower corporate transparency, as proxied by information asymmetry, analysts' forecast errors, and earnings quality. Further, they find that managers at tax-aggressive firms increase tax disclosures in attempting to mitigate agency cost associated with transparency problem.

[2] For example, Mills (1998) reports that proposed IRS audit adjustments for reportable transactions explicitly forbidden by the IRS are positively associated with large BTDs. Gleason and Mills (2011, 4-5) states that the auditor's evaluation of a client's tax reserve estimate involves "reviewing tax returns, workpapers, and IRS correspondence to identify areas of tax risk; evaluating managers' own risk analysis; seeking outside legal opinions; and conducting tax research to assess the probability of loss."

other control variables related to debt ratings and ultimately examine the insurance role of tenure on the cost of debt. Ghosh and Moon (2005), on the other hand, emphasize the information role of tenure and provide insights into any changes in the perceived credibility of reported earnings with extended auditor tenure. They find that audit firm tenure is positively related to earnings response coefficients (ERCs), suggesting that both investors and information intermediaries perceive long tenure as improving earnings quality.

Recent research suggests that large positive book-tax differences (BTDs) signal both book and tax aggressiveness (Frank, Lynch, and Rego, 2009; Wilson, 2009).[3] Hanlon (2005) and Blaylock et al. (2012) study the effect of book-tax differences on earnings and accruals persistence and find that firms with large BTDs exhibit lower earnings and accruals persistence.[4] To the extent that tax aggressiveness is highly correlated with financial reporting aggressiveness and earnings quality increases with audit firm tenure, we would expect that longer firm-specific expertise can help constrain managerial opportunities for rent extraction to maximize firm value. Thus, from the learning perspective, longer auditor tenure should increase the after-tax value of the firm if the auditor's monitoring role alleviates the information asymmetry between managers and shareholders and provides value to the capital market.

However, proponents of mandatory audit firm rotation argue that extended auditor-client relationship impairs auditor independence and undermines auditor's professional skepticism. Lack of an independent and questioning mindset would be detrimental to audit quality and may increase the likelihood of either failing to detect or unwilling to report generally accepted accounting principles (GAAP) violations in auditing the client's internal control and financial statements (Kinney et al., 2004). A few empirical studies provide evidence to suggest that the economic or social bonding between the auditor and the client developed over repeated audit engagements may exacerbate managerial opportunistic behavior. For example, Davis et al. (2009) present evidence that managers' propensity to manipulate earnings increases with audit firm tenure in later years of service in a pre-SOX environment. Boone et al. (2008) document that the cost of equity capital increases in later years of audit firm tenure, suggesting that investors perceive long tenure as compromising financial reporting quality in a pre-SOX period.

When failing to effectively monitor managers' financial reporting responsibility is coupled with pernicious corporate tax avoidance activities, firm value is likely to be negatively affected. One reason is that longer auditor tenure would exacerbate managerial opportunistic behavior and self-serving bias for rent-extraction. The other reason is that investors may perceive that extended audit firm tenure diminishes auditor's independence and credibility, thus destroying firm value. Therefore, from the bonding perspective, auditors with long tenure may negatively impact the association between tax avoidance and firm value.

Since the learning perspective and the bonding perspective lead to predictions with different directions, we state our hypothesis in a null form as follows:

H1: Audit firm tenure has no impact on the association between tax avoidance and firm value.

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[3] Using the differences between pre-tax book income and pre-tax taxable income as a proxy for tax aggressiveness for 33 identified tax shelter firms for the period of 1995 to 2002, Wilson (2009) find larger tax aggressiveness and more aggressive financial reporting practices for these firms than a matched sample of control firms absent tax shelter activities. The tax aggressiveness measures in Wilson (2009) includes both temporary and permanent differences, and thus both discretionary and non-discretionary. Frank et al. (2009) develop a measure of tax aggressiveness capturing discretionary permanent component of *BTDs.* Although tax shelter activity can generate both temporary and permanent differences, Frank et al. (2009) argue that the most efficient tax shelter is the one that creates permanent book-tax differences (Weisbach 2002; Shevlin 2002). They further argue that certain permanent (and temporary) differences are the result of regular business operations rather than the result of tax planning. Using performance-adjusted discretionary accruals based on modified Jones model (Dechow et al., 1995) and performance-matched procedure in Francis et al. (2005), Frank et al. (2009) find a significant positive relation between tax aggressiveness and financial reporting aggressiveness for the sample period of 1992 to 2005, suggesting that nonconformity allows firms to manage book income upward and tax income downward simultaneously.

[4] Hanlon (2005) find that firms with large *BTDs* exhibit lower earnings and accruals persistence than firms with small book-tax differences for the sample period of 1994 to 2000. Blaylock et al. (2012) extend Hanlon (2005) to examine the differential effect of the sources of book-tax temporary differences on earnings and accruals persistence. They find that earnings and accruals persistence is significantly lower when large positive book-tax temporary differences arise primarily from earnings management than when large positive *BTDs* derive predominantly from either tax avoidance or fundamental firm characteristics.

3. Research Design

Multivariate Model

To examine the impact of audit firm tenure on the association between tax avoidance and firm valuation, we run the following panel data regression:[5]

$$Q_{it} = \beta_0 + \beta_1 TA_{i,t} + \beta_2 LEN_{i,t} + \beta_3 TA*LTEN_{i,t} + \beta_4 SIZE_{i,t-1} + \beta_5 OR_{i,t} + \beta_6 NOL_{i,t} + \beta_7 RVOL_{i,t} + \beta_8 LEV_{i,t} + \beta_9 IOR_{i,t} + \beta_{10} absFI_{i,t} + \beta_{11} R\&D_{i,t} + \beta_{12} INTANG_{i,t} + \beta_{13} ROA_{i,t} + \beta_{14} AGE_{i,t} + \beta_{15} MtB_{i,t-1} + \beta_{16} NAnalyst_{i,t} + \beta_{17} AntiEindex_{i,t-1} + \beta_{18} BigN_{i,t} + \beta_{19} DumIND + \beta_{20} DumYrs + \mu_{it} \quad (1)$$

Where Q_{it} is *Tobin's Q*, our dependent variable. We measure *Tobin's Q* as the sum of a firm's total assets (*AT*) plus the market value of equity (*PRCC_F*CSHO*) less the book value of equity (*CEQ*), scaled by total assets (*AT*), to proxy for firm value. *LTEN* is the natural logarithm of audit firm tenure, which is measured as the consecutive number of years the auditor has served the same client. *TA* is one of the four tax avoidance measures: *BTD*, *MPBTD*, *DDBTD*, and *Shelter*. *BTD* is total book-tax differences, reflecting tax avoidance activities that generate both permanent and temporary differences between financial statement income and taxable income. Prior literature suggests that larger *BTD*s are associated with higher proposed IRS audit adjustments (Mills 1998) as well as the probabilities of tax sheltering (Wilson 2009). Accordingly, larger values of *BTD* represent higher levels of tax avoidance.[6] The *BTD* is calculated as pre-tax income less estimated taxable income scaled by total assets at the beginning of year (*AT*). Our second proxy for tax avoidance is the Manzon and Plesko's (2002) book-tax differences (*MPBTD*). *MPBTD* focuses on domestic *BTD* and thus can avoid the problems related to inferring applicable foreign tax rates.[7] *MPBTD* captures tax strategies that lead to both temporary and permanent differences between book income and taxable income. A positive value for *MPBTD* suggests that firms understate taxable income to the IRS relative to its book income. Large values of the *MPBTD* are indicative of greater levels of tax avoidance. Our third proxy for tax avoidance is the Desai and Dharmapala (2006) residual book-tax difference (*DDBTD*). The Desai and Dharmapala (2006) measure partially purge the book-tax difference caused by earnings management activities. Larger values of *DDBTD* imply greater levels of tax avoidance.[8] Our fourth proxy for tax avoidance is *Shelter*. *Shelter* is calculated using Wilson's (2009) sheltering probability to capture incidence of the most aggressive avoidance practices. The positive (negative) coefficient (β_1) on *LTEN* suggests that *LTEN* has a positive (negative) association with firm value for firms with average level of tax avoidance. The positive (negative) coefficient (β_2) on *TA* suggests that *TA* has a positive (negative) association with firm value for firms with average length of audit firm tenure. Our primary variable of interest is the interaction between tenure and tax avoidance (*TA*LTEN*). A significant positive (negative) coefficient on β_3 indicates that audit firm tenure positively (negatively) moderates the association between tax avoidance and firm valuation.

Control variables are selected based on determinants of firm value documented by prior literature (e.g., Morck, Shleifer, and Vishny, 1988; Mehran, 1995; Desai and Dharmapala, 2009). We control for changes in firm size over time using prior-year sales (*SIZE*), because assets and market value enter into the definition of *Q* and so would be mechanically correlated with the dependent variable. We include the value of stock option grants to executives as a fraction of total compensation (*OR*) because a substantial literature (e.g., Morck, Shleifer, and Vishny, 1988; Mehran, 1995) provides evidence that stock-based compensation is a determinant of firm value, presumably through incentive-alignment effects. In addition, the structure of executive compensation plays a central role in Desai and Dharmapala (2006). Since *NOL* Carryforwards are not considered in the measure of tax avoidance (and because *NOLs* can affect the incentive to engage in

[5] We perform a Hausman specification test, which indicates a fixed model should be used rather than a random effects model (Hausman 1978).

[6] Prior literature also suggests that temporary book-tax differences also signal earnings management and thus, poor earnings quality (Phillips, 2003; Hanlon, 2005). Consistent with this notion, Blaylock et al. (2012) provide evidence that is consistent with temporary book-tax differences representing both tax avoidance and earnings management activities.

[7] Dyreng and Lindsey (2009) indicate that it is problematic to estimate foreign tax liabilities by multiplying foreign tax expense by the U.S. federal statutory rate in the calculation of total BTD because U. S. firms tend to pay a much lower rate on foreign income, especially those with tax haven subsidiaries. Studies used *MPBTD* include Cheng, Huang, Li, and Stanfield (2012).

[8] A comprehensive discussion of these and other tax avoidance measures can be found in Hanlon and Heitzman (2010).

tax avoidance), we include an indicator variable *NOL* as well. *NOL* is coded as 1 if there is a tax loss carryforward (*TLCF* is positive) during year *t*; zero otherwise.[9]

To control for changes over time in the risk associated with a firm's stock price, we include stock return volatility ($RVOL_{it}$) and leverage (*LEV*). We also control for institutional ownership (IOR_{it}) as institutional investors have greater incentives and capacity to monitor managerial performance. Desai and Dharmapala (2009) indicate that the effect of tax avoidance on firm value is a function of firm governance as proxied by institutional investors. The higher is IOR_{it}, the greater the degree of scrutiny to which managerial actions are subjected, and the less important are agency problems between managers and shareholders. We control for foreign income (*absFI*) because the tax avoidance measure is restricted to domestic U.S. tax expense and U.S. federal taxes, but tax liabilities and the incentives for tax avoidance may be influenced by foreign activity under the U.S. system of worldwide taxation. As tax shields can affect the value of engaging in tax avoidance, changes in firms' leverage are controlled for by including measures of long-term debt and debt in current liabilities. Changes in intangibles that affect *Q* but are imperfectly measured in the book value of assets are proxied for by research and development expenditure (*R&D*) and intangibles (*INTANG*). Additionally, we control for firm age (*Age*) and prior-year market-to-book ratio (*MtB*) since audit firm tenure may simply capture the increase of firm value due to its growth cycle. We also included the number of financial analysts following the firm (*NAnalyst*), anti-entrenchment index (*AntiEindex*)[10], and a dummy variable for Big-4/5 firms (*BigN*) to further control for other external governance characteristics. To the extent that investors perceive that *BigN* auditors, analysts, and institutional investors act as monitoring mechanisms to constrain managers' opportunistic behavior, we expect a positive impact of *NAnlyst*, *AntiEindex*, and *BigN* on firm value.

4. Empirical Results

4.1 Sample Selection and Descriptive Statistics

The data used to test the hypothesis described above are drawn from publicly available sources, with financial accounting data from Standard and Poor's Compustat database, executive compensation data from Standard and Poor's Execucomp database, return data from CRSP, institutional ownership data come from Thomson Reuters' Ownership database, financial analysts data from I/B/E/S, and governance data from RiskMetrics. The initial sample consists of 89,720 firm-year observations for the period of 2000 to 2013, with auditor identifications. Our sample starts in 2000 because Audit Analytics data begins in 2000. Table 1 Panel A delineates the detailed sample selection procedures[11]. After eliminating missing observations to calculate our interest and control variables, we have a final sample of 11,163 firm-year observations for our first four tax avoidance measures: book-tax differences (*BTD*), Manzon-Plesko (2002) book-tax differences (*MPBTD*), Desai-Dharmapala (2006) residual book-tax differences (*DDBTD*), and the probability of engaging in tax sheltering activities (*Shelter*) based on Wilson (2009). After deleting missing data to calculate tax shelter (*Shelter*), we have 10,014 firm-year observations for our fourth measure of tax avoidance (*Shelter*). All continuous variables are winsorized at 1% and 99% level. [see Table 1, pg 123]

Table 2 presents descriptive statistics for all variables used in our main analysis. The mean value of firm value (*Q*) is 1.861, relatively lower than the value of 2.312 reported in Desai and Dharmapala (2009). This result suggests that our sample firms are more mature than their sample firms. The mean (median) of audit firm tenure (*TEN*) is around 18 (13),

[9] Our inference does not change when we use a continuous variable of *NOL*, which is net operating loss carryforwards scaled by assets (with missing values treated as zeros).

[10] Bebchuk, Cohen, and Ferrell (2009) create an entrenchment index (*Eindex*) which ranges from 0 to 6, with a higher value indicating stronger managerial entrenchment. We negate *Eindex* to generate *AntiEindex* so that higher value of *AntiEindex* refers to higher corporate governance.

[11] We eliminated 11,148 firm-year observations without pre-tax income, 33,287 firm-year observations with missing stock return data in CRSP, 13,015 firm-year observations with missing institutional ownership data from Thomson Reuters' Ownership database, 17,750 firm-year observations that do not have executive compensation data from Standard and Poor's Execucomp database, 509 firm-year observations with missing data to calculate control variables, and 2,628 firm-year observations without auditor-provided tax services, and 220 firm-year observations that have maximum audit firm tenure less than five years. We restrict our sample to firms with auditors that provide joint audit and tax services because we believe that these auditors would have higher incentives and better knowledge to monitor their clients on tax issues than auditor who do not provide tax services to the clients. We removed the observations with maximum audit firm tenure less than five years to be consistent with prior literature (Myers, Myers, and Omer, 2003) to address the concern that our results may be driven by firms with more frequent auditor changes.

indicating that the distribution of tenure is right-skewed. The mean (median) of the logarithm of audit firm tenure (*LTEN*) is 2.542 (2.565). The means and medians of our tax avoidance measures, *BTD*, *MPBTD*, *DDBTD*, and *Shelter* are consistent with prior studies. More specifically, the means of *BTD*, Manzon-Plesko (2002) book-tax difference (*MPBTD*), Desai-Dharmapala (2006) residual book-tax difference (*DDBTD*), and *Shelter* are 0.024, 0.017, -0.003, and 0.832, respectively. [see Table 2, pg 124]

Table 3 reports the Spearman/Pearson correlation matrix among the variables for our sample of firm-year observations. *LTEN* has a significant negative correlation with *Q*, suggesting that firm value decreases with audit firm tenure. The correlation between *Q* and our tax avoidance proxies are significantly correlated for both Spearman and Pearson correlations. *LTEN* is not uniformly correlated with our measures of tax avoidance proxies. Specifically, *LTEN* is positively (negatively) correlated with *BTD* and *Shelter* (*MPBTD*, and *DDBTD*). Furthermore, all control variables are correlated with *Q* in a manner that is broadly consistent with prior literature. [see Table 3, pg 125]

4.2 Multivariate Analysis

Table 4 reports the regression analysis on the impact of audit firm tenure on the association between tax avoidance and firm value. The dependent variable is firm value (*Q*). We use *BTD*, *MPBTD*, *DDBTD*, and *Shelter* to capture tax avoidance activities. Note that we adjust all the continuous variables by sample means before we run the regression, hence the coefficient on *LTEN* (*TA*) reflects the average effect of *LTEN* (*TA*) on firm value when *TA* (*LTEN*) is at the sample mean value. All models are significant at p-value < 0.01, and there is no evidence of multicollinearity threats as VIF's are all under 4, well below the threshold of 10 suggested by Kennedy (2008). We find that an insignificant negative coefficient on *LTEN* across all the tax avoidance proxies, suggesting that audit firm tenure has no impact on firm value for our sample firms with an average level of tax avoidance activities. Similarly, we find the coefficients on our tax avoidance measure are generally insignificant except for *BTD*. However, our primary interest variable, the interaction term between *LTEN* and tax avoidance measures, loads significantly positive across all the tax avoidance measures: *BTD* (coefficient = 0.386 and t = 4.85), *MPBTD* (coefficient = 0.880 and t = 7.09), *DDBTD* (coefficient = 0.415 and t = 3.24), and *Shelter* (coefficient = 0.047 and t = 5.69). Overall, these results suggest that long tenure enhances the external auditor's monitoring role in constraining manager's rent extraction behavior for tax avoidance. Desai and Dharmapala (2009) suggest that book-tax differences increases firm value more in well-governed firms (as proxied by the percentage of institutional ownerships) than in poorly governed firms.

The coefficients on the control variables are generally in the predicted direction, with *Q* increasing in growth, profitability, institutional ownership, the ratio of stock option grants to executives, the number of analysts following the firm and corporate governance strength and decreasing in firm age and leverage. [see Table 4, pg 127]

4.3 Additional Analyses and Robustness Test

4.3.1 Industry-Adjusted Firm Value and Tax Avoidance

Table 5 presents the results with industry-adjusted *Q* and industry-adjusted tax avoidance measures. We find the coefficient on *LTEN* to be insignificantly different from zero, suggesting that audit firm tenure has no effect on *Q* when industry-adjusted tax avoidance is at sample mean value. Similarly, we find the coefficient on industry-adjusted tax avoidance to be significantly positive for all tax avoidance measures except for *MPBTD*. However, we find a consistent and significantly positive coefficient on the interaction term between industry-adjusted tax avoidance measures and *LTEN* for all tax avoidance measures: *BTD* (coefficient = 0.371 and t = 4.64), *MPBTD* (coefficient = 0.817 and t = 6.41), *DDBTD* (coefficient = 0.394 and t = 3.02), and *Shelter* (coefficient = 0.050 and t = 6.07). Therefore, we conclude that our main conclusion that audit firm tenure positively moderates the association between tax avoidance is robust to control for exogenous shocks from the economy on industry-wide tax avoidance activities and firm valuation. [see Table 5, pg 128]

4.3.2 Alternative Measures of Firm Value

Panel A, Panel B and Panel C of Table 6 show the results with alternative measures of firm value: *Q2*, *Q*3, and *Q4*. Across all the panels, we continue to observe insignificantly negative loadings on *LTEN* and insignificant coefficient on the tax avoidance measures except for *BTD*. However, the coefficient on the interaction term between tax avoidance and audit firm tenure remains positive and significant for all the tax avoidance specifications across all the panels. These results are consistent with our main conclusion that audit firm tenure positively moderates the association between tax avoidance and firm value. [see Table 6, pg 129]

4.3.3 Orthogonal Regression

As noted in table 2, audit firm tenure and firm age are highly correlated – with a Spearman (Pearson) correlation of 0.641 (0.631). To mitigate the concern that the relation between audit firm tenure and tax avoidance is an artifact of tax avoidance activities in a firm's life cycle, we employ a two-step procedure to purge out the firm age effect on audit firm tenure. Specifically, we regress audit firm tenure on firm age in our first stage; then we use the residual of the first-stage regression - the orthogonalized audit firm tenure - to replace the tenure variable *LTEN* and the interaction term of *TA*LTEN* in our main regressions. Similar to our main results with *LTEN*, we continue to find that the orthogonal tenure (*OLTEN*) remains insignificant. Also, we find that the coefficient on tax avoidance measure remains insignificant except for *BTD* (coefficient = 0.179 and t = 2.51). More importantly, we find that the coefficient loads significantly positive on the interaction term between each of the tax avoidance measures and *OLTEN*: *BTD*OLTEN* (coefficient = 0.447 and t = 2.51), *MPBTD*OLTEN* (coefficient = 1.371 and t = 10.25), *DDBTD*OLTEN* (coefficient = 0.582 and t = 4.19), and *Shelter*OLTEN* (coefficient = 0.066 and t = 7.50). Hence, these results indicate that our inferences are generally robust to the consideration of multicollinearity problem between audit firm tenure and firm age. [see Table 7, pg 130]

4.3.4 Alternative Measures of Audit Firm Tenure

Table 8 presents the results for the stepwise regression model. We find that the coefficients on the two-year tenure intervals are generally negative, but the significance level varies across different measures of tax avoidance. This result suggests that firm value is of a lower level for higher tenure-group firms relative to initial two-year engagements. Interestingly, we find a consistent and significantly negative coefficient on tax avoidance measures across all the models, indicating that tax avoidance activities generally decrease firm value for initial two-year audit engagements. However, we find a significantly positive coefficient on the interaction between tax avoidance and higher-level tenure groups across all tax avoidance measures, although the significance level varies across these tax avoidance measures. These results generally support our main conclusion that audit firm tenure positively moderates the impact of tax avoidance on firm value. [see Table 8, pg 131]

4.3.5 Does Audit Firm Tenure Impact Tax Avoidance?

We conjecture that if audit firm tenure negatively affects an external auditor's ability to constrain earnings management and tax aggressiveness is positively associated with financial reporting aggressiveness, then we should observe a positive relation between audit firm tenure and tax avoidance. In contrast, if audit firm tenure facilities external auditor's ability to constrain earnings management because client-specific knowledge developed over time and tax aggressiveness is positively associated with financial reporting aggressiveness, then a negative relation between audit firm tenure would exist. Hence, we do not predict a sign on audit firm tenure since whether audit firm tenure has a positive impact on tax avoidance is unclear as a prior.

To examine the association between tax avoidance and audit firm tenure, we estimate the following OLS regression based on determinants documented in McGuire, Omer, and Wang (2012):

$$\begin{aligned} TA_{it} = {} & \alpha_0 + \alpha_1 LTEN_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 ABACC_{i,t} + \alpha_4 EQINC_{i,t} + \alpha_5 NOL_{i,t} + \alpha_6 \Delta NOL_{i,t} \\ & + \alpha_7 absFI_{i,t} + \alpha_8 R\&D_{i,t} + \alpha_9 INTANG_{i,t} + \alpha_{10} LEV_{i,t} + \alpha_{11} MtB_{i,t} + \alpha_{12} PPE_{i,t} \\ & + \alpha_{13} ROA_{i,t} + \alpha_{14} CASH_{i,t} + \alpha_{15} DEP_{i,t} + \alpha_{16} Big4_{i,t} + \alpha_{17} Tier2_{i,t} + \alpha_{18} EXPERT_{i,t} \\ & + \beta_{19} DumIND_i + v_{it} \end{aligned} \quad (2)$$

where all variables are defined in Appendix A and discussed below. The dependent variable *TA* is one of our proxies for tax avoidance discussed previously plus GAAP ETR (*ETR*) and cash ETR (*CashETR*). We include effective tax rates so that our analysis can be more directly comparable to prior literature (e.g., McGuire et al. 2012). Our variable of interest is *LTEN*. We expect a positive (negative) coefficient (α_1) on *LTEN* if audit firm tenure increases (decreases) a client firm's tax avoidance when book-tax differences (book ETR and cash ETRs) are used as our measures of tax avoidance.

In addition to our variables of interest, we control for other factors that are associated with tax avoidance according to prior literature. We control for firm size (*SIZE*), growth opportunities (*MtB*), firm profitability (*ROA*), and firms' need to avoid income taxes (Rego, 2003; Chen et al., 2010) using net operating loss carryforwards (*NOL* and Δ*NOL*) and cash holdings (*CASH*). Prior studies generally predict and find a negative (positive) association between *NOL* and book-tax differences (effective tax rates). We also control for firm characteristics that affect a firm's income tax liability: absolute value of foreign income (*absFI*), depreciation expense (*DEP*), property, plant, and equipment (*PPE*), intangible assets

(*INTANG*), and equity income (*EQINC*). Moreover, we control for the level of firms' abnormal accruals (*ABACC*) because Frank et al. (2009) documents a positive relation between financial reporting aggressiveness and tax avoidance. To control for a firm's capital structure on its expected tax liability, we include leverage (*LEV*), calculated as long-term debt scaled by lagged total assets. we do not predict a sign on *LEV*, because highly leveraged firms may have either a stronger motivation to avoid taxes in order to preserve cash to serve the heavy debt burdens or a weaker motivation due to the debt tax shield (Badertscher et al., 2013). Furthermore, following McGuire et al. (2012), we control for other auditor characteristics: *BigN* (whether the auditor is a Big 4/5 accounting firm), *Tier 2* (whether the auditor is a second-tier audit firm), and *EXPERT* (whether the auditor is a tax expert). [see Table 9, pg 132]

Table 9 presents our tests of the association between audit firm tenure and tax avoidance across each of our proxies for tax avoidance. The control variables are generally associated with tax avoidance in a manner consistent with prior research. The R^2 values indicate that each model has reasonable explanatory power. Lower (Higher) values of *ETR* and *CashETR* (*BTD*, *MPBTD*, *DDBTD*, and *Shelter*) represent higher levels of tax avoidance.

We find a positive (negative) coefficient on *LTEN* for *ETR* and *CashETR* (*BTD*, *MPBTD*, *DDBTD*, and *Shelter*), suggesting that the level of tax avoidance decreases with audit firm tenure. The impact of audit firm tenure on tax avoidance is economically significant. In un-tabulated analysis, we determine that one standard deviation longer of *LTEN* increases *ETR* (coefficient = .007, t = 3.30) and *CashETR* (coefficient = 0.013, t = 4.42) by 2.56 percent and 3.48 percent, respectively. In contrast, one standard deviation shorter of *LTEN* decreases *BTD* (coefficient = -0.003, t = 2.69), *MPBTD* (coefficient = -0.003, t = 2.13), *DDBTD* (coefficient = -0.006, t=3.86), *Shelter* (coefficient = -0.010, t = 6.44) by 1.52 percent, 1.38 percent, 2.97 percent, and 2.30 percent, respectively.

4.3.6 Robustness Tests

We have done a serious of robustness tests. First, to address the concern that firm effects may negate the need for industry fixed effects, we find our results hold when we drop industry dummies from the regressions. Second, we rerun our main results with a larger sample without eliminating firm-year observations absent auditor-provided tax services. We observe that our inference continues to hold. Third, we also CPI-adjust our variables to control for the impact of economic fluctuations on our dependent and independent variables. Panel A of Table 10 indicates a negative and insignificant coefficient on *LTEN*, suggesting that audit firm tenure has no significant effect on firm value when tax avoidance is at sample average. In contrast, we observe a significant and positive coefficient on *TA* except for *Shelter*, indicating that tax avoidance increases firm value when audit firm tenure is at sample mean. However, we document a significant and positive loading on the interaction term *TA_LTEN*, supporting our previous finding for a positive moderating effect on the relation between tax avoidance and firm value. [see Table 10, pg 133]

Fourth, recall the coefficients on audit firm tenure (*LTEN*) and tax avoidance measures (*TA*) reported on Table 4 reflects the effect of average *TA* and average *LTEN* on firm value. To more directly observe the effect of tax avoidance on firm value when audit firm tenure is at its initial year, we continue to CPI-adjust our variables and rerun equation (1) without demeaning all the variables before running the panel data regression. Panel B of Table 10 reports this result. We find a significant and negative coefficient on *LTEN* for each of the tax avoidance measures except for *DDBTD*, which is negative but insignificant. This result suggests that firm value decreases with audit firm tenure for firms without any tax avoidance activities. However, we find a negative and significant loading on each of the tax avoidance measures across all the models, suggesting that tax avoidance negatively affect firm value during initial year of audit.[12] This result indicates that auditor's monitoring role for first-year audit engagement negatively affect the association between tax avoidance and firm value. Consistent to our main results on Table 4, we observe a positive and significant loading on the interaction term between tax avoidance and audit firm tenure (*TA_LTEN*) across all the models when *BTD* (coefficient = 0.873, t = *6.91*), *MPBTD* (coefficient = 1.029, t = *6.86*), *DDBTD* (coefficient = 0.409, t = *2.64*), and *Shelter* (coefficient = 0.053, t = *5.37*) are tax avoidance measures.

Finally, to address the concern that audit firm tenure may be correlated with the tenure of chief executive officer (CEO), we rerun our equation (1) without demeaning any of our variables by adding an additional control for CEO tenure (*LCEOTEN*). *LCEOTEN* is measured as the natural logarithm of CEO tenure. This additional control variable reduces our

[12] Note that we measure *LTEN* as the natural logarithm of the number of years the auditor has served its client. When audit firm tenure is at first year, *LTEN* would be equal to 0. In this situation the coefficient on each of the *TA* measures captures the effect of TA on firm value when *LTEN* equals 0 (that is, when audit firm tenure is at its initial year of audit engagement).

sample to 10,783 firm-year observations (1,589 distinct firms). Panel C of Table 10 reports the results. We find a positive and insignificant coefficient on *LCEOTEN* across all the models except for *Shelter*, which is significant. We continue to find similar results in Panel B as previously reported in Panel A except that the coefficients on *LTEN*, *TA*, and *TA_LTEN* and the t-statistics in Panel B are slightly larger than those in Panel A.

5. Conclusion

Regulators expressed concern that managers may engage in tax avoidance to maximize personal wealth instead of enhancing shareholder wealth because of the potential agency costs derived from complex tax avoidance activities. Regulators also expressed concerns that lack of professional skepticism associated with extended auditor-client relationship may compromise external auditor's governance role to create significant value to investors. However, an auditor's ability to provide a quality audit is jointly determined by auditor experience and auditor independence. We argue that if the experience gained in an auditor's ability to correctly assess tax avoidance activities outweighs the independence loss associated with extended auditor-client relationship, then audit firm tenure should reduce the agency costs associated with tax avoidance, thus enhancing firm value. Conversely, if the independence loss exceeds the experience gain associated with long tenure, then audit firm tenure would exacerbate managers' rent extraction behavior, thus destroying firm value. Using a sample of 11,163 firm-year observations for the period of 2000–2013, we find that audit firm tenure positively moderates the association between corporate tax avoidance and firm valuation. Our findings suggest that longer audit firm tenure constrains managers' ability to rent extract the tax savings to maximize personal wealth. Hence, this finding suggests that mandatory auditor rotation may negatively affect the external auditor's monitoring role in the capital market, rendering empirical support for PCAOB's recent decision to forgone pursuing mandatory audit firm rotation in the U.S.

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Table 1: Sample Selection

Criteria	N
Firm-year observations from the intersection between Compustat and Audit Analytics between fiscal year 2000 and fiscal year 2013 for public-listed firms with auditor identifications	89,720
Less observations with missing pretax income	(11,148)
Less observations with missing return data from CRSP database	(33,287)
Less observations with missing institutional ownership data	(13,015)
Less observations with missing option ratio data from RiskMetrics database	(17,750)
Less observations with missing data to calculate control variables	(509)
Less observations with non-auditor provided tax services	(2,628)
Less observations with maximum audit firm tenure less than five years	(220)
Resulting sample for tax avoidance measures: *BTD*, *MPBTD*, and *DDBTD*, for the sample period of 2000 to 2013	**11,163**
Less missing data to calculate Shelter	(-1,149)
Resulting sample for tax avoidance measure – *Shelter* for the sample period of 2000 to 2013	**10,014**

Table 2: Descriptive Statistics

Panel A: Sample Descriptive Statistics

Variables	*N*	*MEAN*	*STD*	*Q1*	*MEDIAN*	*Q3*
Q	*11,163*	*1.861*	*1.230*	*1.120*	*1.470*	*2.110*
T	*11,163*	*18.390*	*15.709*	*7.000*	*13.000*	*25.000*
LTEN	*11,163*	*2.542*	*0.9166*	*1.9459*	*2.5649*	*3.2189*
BTD	*11,163*	*0.024*	*0.108*	*0.001*	*0.020*	*0.048*
MPBTD	*11,163*	*0.017*	*0.073*	*-0.005*	*0.015*	*0.038*
DDBTD	*11,163*	*-0.003*	*0.070*	*-0.029*	*-0.003*	*0.018*
Shelter	*10,014*	*0.832*	*0.229*	*0.758*	*0.937*	*0.993*
AGE	*11,163*	*2.887*	*0.604*	*2.485*	*2.996*	*3.401*
SIZE	*11,163*	*7.415*	*1.582*	*6.317*	*7.313*	*8.464*
MtB	*11,163*	*2.988*	*5.724*	*1.481*	*2.203*	*3.482*
NOL	*11,163*	*0.622*	*0.485*	*0.000*	*1.000*	*1.000*
absFI	*11,163*	*0.025*	*0.040*	*0.000*	*0.003*	*0.037*
RandD	*11,163*	*0.047*	*0.376*	*0.000*	*0.000*	*0.030*
INTANG	*11,163*	*0.299*	*0.464*	*0.033*	*0.145*	*0.392*
ROA	*11,163*	*0.053*	*0.098*	*0.024*	*0.050*	*0.086*
LEV	*11,163*	*0.220*	*0.189*	*0.052*	*0.192*	*0.346*
RVOL	*11,163*	*0.098*	*0.057*	*0.060*	*0.085*	*0.120*
BigN	*11,163*	*0.958*	*0.202*	*1.000*	*1.000*	*1.000*
IOR	*11,163*	*0.715*	*0.188*	*0.608*	*0.745*	*0.847*
OR	*11,163*	*0.127*	*0.223*	*0.000*	*0.000*	*0.198*
NAnalyst	*11,163*	*10.406*	*7.260*	*5.000*	*9.000*	*15.000*
AntiEindex	*11,163*	*-2.263*	*1.231*	*-3.000*	*-2.000*	*-1.000*

This table reports sample descriptive statistics for 11,163 firm-year observations (1,786 distinct firms). Refer to Appendix A for variable definitions.

Table 3: Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11
Q	*1*		**-0.016**	**0.193**	**0.047**	**0.056**	**0.028**	**-0.022**	**-0.163**	**0.703**	**0.169**	**0.288**
LTEN	*2*	**-0.054**		**0.028**	-0.016	**-0.139**	**0.232**	**0.394**	**0.290**	0.010	0.013	**0.149**
BTD	*3*	**0.033**	0.006		**0.571**	**0.138**	**0.247**	**0.098**	**0.028**	**0.157**	**0.074**	**0.122**
MPBTD	*4*	**-0.032**	-0.010	**0.359**		**0.545**	**0.188**	-0.006	**-0.038**	**0.059**	-0.013	**-0.212**
DDBTD	*5*	**0.069**	**-0.112**	**0.322**	**0.566**		**-0.060**	**-0.232**	**-0.202**	**0.023**	**-0.020**	**-0.157**
Shelter	*6*	**-0.047**	**0.225**	**0.257**	**0.443**	**0.039**		**0.277**	**0.745**	**0.166**	**-0.049**	**0.282**
AGE	*7*	**-0.098**	**0.351**	**0.024**	-0.009	**-0.148**	**0.240**		**0.387**	**-0.020**	**0.031**	**0.261**
SIZE	*8*	**-0.190**	**0.295**	**0.043**	**0.036**	**-0.190**	**0.709**	**0.359**		-0.007	**-0.045**	**0.181**
MtB	*9*	**0.272**	0.001	0.016	**0.050**	**0.025**	**0.063**	**-0.021**	-0.007		**0.089**	**0.212**
NOL	*10*	**0.096**	0.011	**0.042**	-0.006	-0.010	**-0.044**	**0.046**	**-0.039**	**0.026**		**0.100**
absFI	*11*	**0.238**	**0.095**	**0.099**	**-0.096**	**-0.099**	**0.297**	**0.155**	**0.152**	**0.090**	**0.052**	
RD	*12*	**0.139**	**-0.026**	**-0.098**	**-0.292**	**-0.044**	**-0.217**	**-0.020**	**-0.166**	**0.026**	**0.021**	0.010
INTANG	*13*	**-0.086**	**-0.023**	**-0.022**	**-0.054**	0.005	**0.083**	**-0.103**	0.009	-0.004	**-0.029**	**-0.023**
ROA	*14*	**0.217**	**0.044**	**0.313**	**0.607**	**0.200**	**0.558**	**0.054**	**0.107**	**0.145**	**0.072**	**0.221**
LEV	*15*	**-0.162**	-0.005	0.010	-0.009	**-0.064**	**-0.052**	**0.168**	**0.144**	**-0.059**	**-0.031**	**-0.133**
Rvol	*16*	-0.001	**-0.129**	**-0.087**	**-0.177**	0.015	**-0.360**	**-0.141**	**-0.262**	-0.003	**0.046**	**-0.016**
BiqN	*17*	**-0.038**	**0.142**	-0.001	-0.004	**-0.047**	**0.144**	**0.051**	**0.219**	0.006	-0.012	**0.048**
IOR	*18*	**0.045**	0.008	**0.040**	**0.053**	**0.037**	**0.029**	**0.051**	**0.017**	**0.036**	**0.121**	**0.093**
OR	*19*	**0.181**	**-0.096**	0.014	0.001	**0.032**	**-0.043**	**-0.115**	**-0.069**	**0.071**	**0.036**	**-0.017**
NAnalyst	*20*	**0.158**	**0.136**	**0.067**	**0.025**	**-0.024**	**0.542**	**0.046**	**0.525**	**0.095**	**-0.027**	**0.205**
AntiEindex	*21*	**0.098**	**-0.050**	**-0.034**	-0.002	**0.027**	**-0.099**	**-0.037**	**-0.140**	**0.029**	**0.044**	**-0.031**

Table 3: Correlation Matrix (continued)

Variable		***RandD***	***INTANG***	***ROA***	***LEV***	***RVOL***	***BigN***	***IOR***	***OR***	***NAnalyst***	***AntiEindex***
		12	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*
Q	*1*	***0.399***	*-0.003*	***0.682***	***-0.258***	***-0.020***	*-0.013*	***0.127***	***0.151***	***0.188***	***0.074***
LTEN	*2*	***0.052***	***0.017***	***0.029***	***0.021***	***-0.137***	***0.141***	***-0.035***	***-0.075***	***0.121***	***-0.048***
BTD	*3*	***0.056***	***-0.029***	***0.368***	***0.076***	***-0.106***	***0.019***	***0.028***	***0.031***	***0.095***	***-0.042***
MPBTD	*4*	***-0.114***	***-0.060***	***0.234***	***0.091***	***-0.152***	***0.020***	*-0.011*	***0.038***	*0.009*	***-0.024***
DDBTD	*5*	***-0.018***	*-0.014*	***0.104***	***-0.063***	***0.037***	***-0.039***	***0.052***	***0.046***	***-0.035***	***0.023***
Shelter	*6*	*-0.004*	***0.114***	***0.251***	***0.044***	***-0.363***	***0.162***	***-0.048***	***-0.052***	***0.600***	***-0.123***
AGE	*7*	***0.072***	***-0.043***	***0.105***	***0.208***	***-0.160***	***0.050***	***-0.026***	***-0.135***	***0.039***	***-0.047***
SIZE	*8*	***-0.170***	***0.085***	*0.012*	***0.231***	***-0.305***	***0.217***	***-0.037***	***-0.052***	***0.538***	***-0.149***
MtB	*9*	***0.263***	***0.033***	***0.533***	***-0.125***	***-0.044***	*0.015*	***0.091***	***0.125***	***0.264***	***0.038***
NOL	*10*	***0.081***	***-0.033***	***0.170***	***-0.046***	***0.081***	*-0.012*	***0.132***	***0.037***	***-0.027***	***0.042***
absFI	*11*	***0.458***	***0.189***	***0.313***	***-0.118***	***0.037***	***0.073***	***0.159***	***-0.036***	***0.162***	***-0.067***
RandD	*12*		***0.190***	***0.201***	***-0.272***	***0.153***	*0.000*	***0.063***	***0.099***	***0.064***	*-0.014*
INTANG	*13*	***0.074***		***-0.064***	***0.073***	***-0.071***	***0.035***	***0.088***	***-0.043***	***0.166***	***-0.092***
ROA	*14*	***-0.360***	***-0.073***		***-0.225***	***-0.077***	*-0.003*	***0.143***	***0.031***	***0.190***	***0.041***
LEV	*15*	*0.010*	***0.094***	***-0.155***		***-0.143***	***0.114***	***0.017***	***-0.050***	***-0.020***	***-0.109***
Rvol	*16*	***0.089***	***-0.042***	***-0.218***	***-0.055***		***-0.090***	***0.071***	*0.013*	***-0.136***	***0.031***
BigN	*17*	***-0.050***	*-0.002*	*-0.004*	***0.094***	***-0.092***		***0.064***	***0.066***	***0.170***	***-0.088***
IOR	*18*	***-0.038***	***0.044***	***0.140***	***0.021***	***-0.057***	***0.090***		***-0.101***	***0.105***	***-0.093***
OR	*19*	***0.051***	*-0.015*	*-0.005*	***-0.076***	***0.065***	***0.059***	***-0.040***		***0.046***	***0.068***
NAnalyst	*20*	*0.002*	***0.134***	***0.137***	***-0.054***	***-0.143***	***0.149***	***0.086***	***0.097***		***-0.104***
AntiEindex	*21*	***0.026***	***-0.063***	*0.010*	***-0.078***	*0.015*	***-0.091***	***-0.106***	***0.073***	***-0.090***	

All coefficients in bold are significant at 5% level. Left lower corner of the table reports average Spearman correlation coefficients, upper right corner reports average Pearson correlation coefficients. Refer to Appendix A for all variable definitions.

Table 4: The Impact of Audit Firm Tenure on Tax Avoidance and Firm Value

	Tax Avoidance Measures							
	Model 1		Model 2		Model 3		Model 4	
Variables	*BTD*		*MPBTD*		*DDBTD*		*Shelter*	
LTEN	-0.021	*(-1.35)*	*(-1.23)*	*(-1.23)*	-0.020	*(-1.23)*	-0.001	*(-0.07)*
TA	0.174	*(2.40)***	*-0.36*	*(0.96)*	0.049	(0.36)	-0.028	*(-1.58)*
*TA*LTEN*	0.386	*(4.85)****	0.880	*(7.09)****	0.415	*(3.24)****	0.047	*(5.69)****
NOL	0.027	*(1.21)*	0.027	*(1.23)*	0.026	*(1.18)*	0.032	*(1.39)*
AGE	-0.200	*(-3.29)****	-0.216	*(-3.55)****	-0.212	*(-3.47)****	-0.430	*(-5.49)****
SIZE	-0.342	*(-14.82)****	-0.341	*(-14.76)****	*-0.337*	*(-14.60)****	-0.323	*(-12.34)****
MtB	0.012	*(9.68)****	0.012	*(9.82)****	0.012	*(9.92)****	0.012	*(9.48)****
absFI	2.204	*(6.64)****	2.259	*(6.70)****	2.272	*(6.79)****	2.249	*(6.39)****
RandD	0.190	*(7.20)****	0.191	*(7.31)****	0.199	*(7.62)****	0.196	*(7.16)****
INTANG	-0.404	*(-13.57)****	-0.408	*(-13.74)****	-0.41	*(-13.76)****	-0.400	*(-12.36)****
ROA	1.480	*(13.52)****	1.625	*(12.41)****	1.498	*(13.27)****	1.863	*(9.72)****
LEV	-0.487	*(-6.33)****	-0.451	*(-5.87)****	-0.471	*(-6.13)****	-0.521	*(-6.21)****
RVOL	0.222	*(1.38)*	0.204	*(1.26)*	0.223	*(1.38)*	-0.005	*(-0.03)*
BigN	-0.15	*(-1.89)**	-0.132	*(-1.67)**	-0.137	*(-1.73)**	-0.120	*(-1.35)*
IOR	0.106	*(1.68)**	0.105	*(1.68)**	0.107	*(1.69)**	0.150	*(2.11)***
OR	0.442	*(9.32)****	0.445	*(9.40)****	0.443	*(9.33)****	0.424	*(8.34)****
NAnalyst	0.019	*(9.24)****	0.019	*(9.03)****	0.019	*(9.09)****	0.020	*(8.89)****
AntiEindex	0.028	*(2.99)****	0.028	*(3.00)****	0.027	*(2.93)****	0.027	*(2.63)****
N	11,163		11,163		11,163		10,014	
R^2_Within	23.10%		23.30%		23.00%		24.30%	
R^2_Between	14.30%		15.10%		14.10%		16.90%	
R^2_Overall	18.80%		19.30%		18.60%		22.10%	
rho	0.796		0.793		0.795		0.784	

This table reports panel data fixed-effects regression results for 11,163 firm-year observations (1,786 distinct firms) in Model 1 to Model 3 and 10,014 firm-year observations (1,589 distinct firms) in Model 4 for the 14 years from 2000 to 2013. *****,**,*** indicate that the coefficients are statistically significant from zero at 1%, 5%, and 10% of significance on a two-tailed t test. The dependent variable is firm value (*TobinsQ)*, measured as market value of assets divided by book value of assets, following Desai and Dharmapala (2009). Fixed industry and year effects are included in the regressions but are omitted from the table for brevity. See Appendix A for variable definitions.

Table 5: The Impact of Audit Firm Tenure on Industry-Adjusted Tax Avoidance and Firm Value

	Tax Avoidance Measures			
Variables	Model 1	Model 2	Model 3	Model 4
	BTD	*MPBTD*	*DDBTD*	*Shelter*
LTEN	-0.001	0.004	0.001	0.013
	(-0.04)	*(0.23)*	*(0.09)*	*(0.75)*
AdjTA	0.222 ***	0.349 **	0.124	-0.012
	(3.06)	*(2.37)*	*(0.92)*	*(-0.84)*
*AdjTA*LTEN*	0.371 ***	0.817 ***	0.394 ***	0.050 ***
	(4.64)	*(6.41)*	*(3.02)*	*(6.07)*
Controls	Included	Included	Included	Included
N	11,163	11,163	11,163	10,014
R^2*_Within*	13.80%	14.00%	13.70%	14.50%
R^2*_Between*	3.10%	6.40%	6.00%	8.70%
R^2*_Overall*	5.00%	9.00%	8.70%	11.70%
rho	0.811	0.785	0.786	0.775

This table reports panel data fixed-effects regression results for 11,163 firm-year observations (1,786 distinct firms) in Model 1 to Model 3 and 10,014 firm-year observations (1,589 distinct firms) in Model 4 for the 14 years from 2000 to 2013. *****,**,*** indicate that the coefficients are statistically significant from zero at 1%, 5%, and 10% of significance on a two-tailed t test. T statistics with robust standard errors are presented in parentheses and in *italics*. The dependent variable is firm value (*TobinsQ)*, measured as market value of assets divided by book value of assets, following Desai and Dharmapala (2009). Controls and fixed industry and year effects are included in the regressions but are omitted from the table for brevity. See Appendix A for variable definitions.

Table 6: The Impact of Audit Firm Tenure on Tax Avoidance and Firm Value – Alternative Measures of Firm Value

	Model 1		Model 2		Model 3		Model 4	
Panel A: Firm Value = *Q2*								
	BTD		*MPBTD*		*DDBTD*		*Shelter*	
LTEN	-0.021		-0.019		-0.019		-0.001	
	(-1.33)		*(-1.21)*		*(-1.21)*		*(-0.07)*	
TA	0.179	**	0.174		0.078		-0.021	
	(2.46)		*(1.18)*		*(0.57)*		*(-1.23)*	
*TA*LTEN*	0.388	***	0.881	***	0.421	***	0.046	***
	(4.87)		*(7.10)*		*(3.29)*		*(5.64)*	
N	11,163		11,163		11,163		11,163	
R^2_*Within*	22.90%		23.10%		22.80%		24.00%	
R^2_*Between*	13.70%		14.40%		13.50%		16.30%	
R^2_*Overall*	18.20%		18.70%		18.00%		21.60%	
rho	0.795		0.793		0.795		0.783	
Panel B: Firm Value = *Q3*								
	BTD		*MPBTD*		*DDBTD*		*Shelter*	
LTEN	-0.017		-0.015		-0.015		0.002	
	(-1.09)		*(-0.97)*		*(-0.97)*		*(0.12)*	
TA	0.19	***	0.244	*	0.140		0.001	
	(2.63)		*(1.67)*		*(1.04)*		*(-0.03)*	
*TA*LTEN*	0.384	***	0.894	***	0.433	***	0.046	***
	(4.85)		*(7.25)*		*(3.40)*		*(5.69)*	
N	11,163		11,163		11,163		11,163	
R^2_*Within*	20.90%		21.10%		20.80%		22.10%	
R^2_*Between*	12.70%		13.50%		12.70%		14.40%	
R^2_*Overall*	17.70%		18.20%		17.60%		19.80%	
rho	0.780		0.777		0.779		0.772	
Panel C: Firm Value = *Q4*								
	BTD		*MPBTD*		*DDBTD*		*Shelter*	
LTEN	-0.018		-0.016		-0.017		0.002	
	(-1.17)		*(-1.05)*		*(-1.05)*		*(0.10)*	
TA	0.181	**	0.201		0.074		-0.014	
	(2.50)		*(1.37)*		*(0.55)*		*(-0.82)*	
*TA*LTEN*	0.388	***	0.880	***	0.403	***	0.047	***
	(4.91)		*(7.13)*		*(3.16)*		*(5.74)*	
N	11,163		11,163		11,163		10,014	
R^2_*Within*	23.40%		23.60%		23.30%		24.60%	
R^2_*Between*	17.80%		18.50%		17.60%		20.00%	
R^2_*Overall*	22.10%		22.60%		21.90%		25.20%	
rho	0.792		0.790		0.791		0.776	

This table reports panel data fixed-effects regression results for 11,163 firm-year observations (1,786 distinct firms) in Model 1 to Model 3 and 10,014 firm-year observations (1,589 distinct firms) in Model 4 for the 14 years from 2000 to 2013. *****,**,*** indicate that the coefficients are statistically significant from zero at 1%, 5%, and 10% of significance on a two-tailed t test. T statistics with robust standard errors are presented in parentheses and in *italics*. Controls and fixed industry and year effects are included in the regressions are included in the regression but are omitted from the table for brevity. See Appendix A for variable definitions.

Table 7: The Impact of Audit Firm Tenure on Tax Avoidance and Firm Value—Orthoganized Tenure

	Model 1		Model 2		Model 3		Model 4	
	BTD		*MPBTD*		*DDBTD*		*Shelter*	
OLTEN	-0.022		-0.018		-0.019		0.003	
	(-1.39)		*(-1.15)*		*(-1.20)*		*(0.15)*	
TA	0.179	**	0.052		0.024		-0.030	*
	(2.51)		*(0.37)*		*(0.18)*		*(-1.74)*	
*TA*OLTEN*	0.447	***	1.371	***	0.582	***	0.066	***
	(5.70)		*(10.25)*		*(4.19)*		*(7.50)*	
N	11,163		11,163		11,163		10,014	
R^2*_Within*	23.20%		23.80%		23.10%		24.50%	
R^2*_Between*	14.30%		15.30%		14.10%		17.00%	
R^2*_Overall*	18.80%		19.60%		18.70%		21.90%	
rho	0.796		0.793		0.795		0.785	

This table reports panel data fixed-effects regression results for 11,163 firm-year observations (1,786 distinct firms) in Model 1 to Model 3 and 10,014 firm-year observations (1,589 distinct firms) in Model 4 for the 14 years from 2000 to 2013. *****,**,*** indicate that the coefficients are statistically significant from zero at 1%, 5%, and 10% of significance on a two-tailed t test. T statistics with robust standard errors are presented in parentheses and in *italics*. Controls and fixed industry and year effects are included in the regressions are included in the regression but are omitted from the table for brevity. See Appendix A for variable definitions.

Table 8: The Impact of Audit Firm Tenure on Tax Avoidance and Firm Value—Alternative Measure of Tenure

	Model 1		Model 2		Model 3		Model 4	
	BTD		*MPBTD*		*DDBTD*		*Shelter*	
dT3_4	-0.006	*(-0.17)*	-0.055	*(-1.48)*	0.011	*(0.31)*	-0.097	*(-1.86)**
dT5_6	-0.038	*(-1.05)*	-0.075	*(-2.07)***	0.01	*(-0.01)*	-0.109	*(-2.17)***
dT7_8	-0.044	*(-1.19)*	-0.079	*(-2.14)***	-0.013	*(-0.37)*	-0.197	*(-*
dT9_10	-0.061	*(-1.60)*	-0.079	*(-2.05)***	-0.017	*(-0.44)*	-0.209	*(-*
dT11_12	-0.063	*(-1.55)*	-0.094	*(-2.29)***	-0.024	*(-0.60)*	-0.333	*(-*
dT13_14	-0.057	*(-1.27)*	-0.084	*(-1.87)**	-0.022	*(-0.49)*	-0.284	*(-*
dT15_16	-0.044	*(-0.92)*	-0.064	*(-1.34)*	-0.006	*(-0.14)*	-0.253	*(-*
dT17_18	-0.038	*(-0.75)*	-0.055	*(-1.09)*	-0.004	*(-0.09)*	-0.221	*(-*
dT19plus	-0.065	*(-1.29)*	-0.100	*(-1.98)***	-0.037	*(-0.74)*	-0.212	*(-*
TA	**-1.357**	***(-6.81)******	**-3.918**	***(-***	**-1.597**	***(-4.38)******	**-0.264**	***(-***
*TA*dT3_4*	1.049	*(3.31)****	3.762	*(8.79)****	2.564	*(6.08)****	0.160	*(5.96)****
*TA*dT5_6*	1.420	*(5.39)****	3.855	*(9.61)****	1.124	*(2.45)***	0.185	*(7.41)****
*TA*dT7_8*	1.198	*(3.73)****	3.684	*(9.20)****	0.511	*(1.17)*	0.190	*(7.78)****
*TA*dT9_10*	1.869	*(6.96)****	3.578	*(7.85)****	0.948	*(2.05)***	0.209	*(7.73)****
*TA*dT11_12*	1.677	*(7.29)****	4.252	*(8.04)****	1.184	*(2.47)***	0.282	*(9.60)****
*TA*dT13_14*	1.750	*(4.62)****	4.388	*(8.02)****	1.998	*(4.10)****	0.268	*(9.21)****
*TA*dT15_16*	1.662	*(5.19)****	3.995	*(7.59)****	2.084	*(3.89)****	0.268	*(8.50)****
*TA*dT17_18*	1.510	*(3.49)****	3.552	*(6.82)****	2.025	*(3.68)****	0.225	*(7.54)****
*TA*dT19plus*	1.184	*(4.36)****	4.192	*(9.92)****	2.153	*(4.86)****	0.190	*(7.10)****
N	11,163		11,163		11,163		10,014	
R^2_Within	23.50%		24.00%		23.50%		21.30%	
R^2_Between	7.30%		14.00%		6.90%		18.10%	
R^2_Overall	11.60%		19.40%		11.10%		23.70%	
rho	0.816		0.798		0.818		0.766	

This table reports panel data fixed-effects regression results for 11,163 firm-year observations (1,786 distinct firms) in Model 1 to Model 3 and 10,014 firm-year observations (1,589 distinct firms) in Model 4 for the 14 years from 2000 to 2013. *****,**,*** indicate that the coefficients are statistically significant from zero at 1%, 5%, and 10% of significance on a two-tailed t test. T statistics with robust standard errors are presented in parentheses and in *italics*. Controls and fixed industry and year effects are included in the regressions are included in the regression but are omitted from the table for brevity. See Appendix A for variable definitions.

Table 9: Audit Firm Tenure and Tax Avoidance

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	ETR	*CashETR*	*BTD*	*MPBTD*	*DDBTD*	*Shelter*
LTEN	0.007	0.013	-0.003	-0.003	-0.006	-0.010
	*(3.30)***	*(4.42)***	*(-2.50)***	*(-2.13)***	*(-3.86)***	*(-6.44)***
SIZE	-0.078	-0.139	0.001	0.014	-0.052	0.795
	*(-12.59)***	*(-16.84)***	*(-0.03)*	*(3.17)***	*(-12.56)***	*(180.01)***
ABACC	0.073	-0.033	0.136	0.046	-0.148	0.254
	*(5.33)***	*(-1.83)**	*(19.64)***	*(4.69)***	*(-16.09)***	*(26.04)***
EQINC	-0.666	-0.151	0.042	0.514	-1.142	-0.348
	*(-3.64)***	*(-0.62)*	*(0.45)*	*(3.90)***	*(-9.26)***	*(-2.66)***
NOL	-0.039	-0.006	-0.028	-0.010	-0.036	0.003
	*(-2.10)***	*(-0.24)*	*(-2.96)***	*(-0.75)*	*(-2.90)***	*(0.21)*
ΔNOL	0.037	0.032	-0.063	-0.052	-0.041	-0.022
	*(4.23)***	*(2.72)***	*(-14.32)***	*(-8.31)***	*(-7.02)***	*(-3.44)***
absFI	-0.313	0.230	-0.142	-0.098	-0.308	0.024
	*(-12.19)***	*(6.69)***	*(-10.86)***	*(-5.30)***	*(-17.83)***	*(1.29)*
RandD	-0.133	-0.201	-0.013	-0.061	0.038	0.082
	*(-7.73)***	*(-8.74)***	*(-1.46)*	*(-4.90)***	*(3.32)***	*(6.68)***
INTANG	-0.003	0.001	0.008	0.014	0.008	-0.001
	(-1.41)	*(-0.14)*	*(6.45)***	*(8.51)***	*(5.30)***	*(-0.72)*
LEV	-0.016	-0.052	0.029	0.031	0.011	-0.141
	*(-2.81)***	*(-6.92)***	*(10.14)***	*(7.75)***	*(2.87)***	*(-35.05)***
MtB	-0.024	-0.021	-0.015	0.002	-0.01	-0.035
	(-0.63)	*(-0.41)*	*(-0.75)*	*(0.07)*	*(-0.39)*	*(-1.28)*
PPE	-0.080	-0.103	0.210	0.125	0.029	0.189
	*(-2.25)***	*(-2.18)***	*(11.69)***	*(4.90)***	*(1.22)*	*(7.49)***
ROA	0.083	-0.079	0.727	0.897	0.284	0.711
	*(5.64)***	*(-4.04)***	*(97.33)***	*(84.82)***	*(28.71)***	*(67.66)***
CASH	0.002	-0.016	0.014	0.057	0.028	0.010
	(0.48)	*(-2.78)***	*(6.33)***	*(18.54)***	*(9.65)***	*(3.26)***
DEP	0.123	-0.094	-0.041	-0.078	-0.031	0.235
	*(3.37)***	*(-1.93)**	*(-2.23)***	*(-2.95)***	*(-1.26)*	*(8.98)***
BigN	0.022	0.022	-0.018	-0.024	-0.008	0.051
	*(5.96)***	*(4.46)***	*(-9.62)***	*(-9.18)***	*(-3.34)***	*(19.73)***
Tier2	0.017	0.023	-0.011	-0.019	0.004	0.020
	*(3.41)***	*(3.48)***	*(-4.59)***	*(-5.44)***	*(1.10)*	*(5.65)***
EXPERT	-0.004	-0.003	0.001	0.001	-0.001	0.004
	*(-2.10)***	*(-1.07)*	*(0.59)*	*(0.48)*	*(-1.05)*	*(2.93)***
N	17,302	17,302	17,302	17,302	17,302	17,302
Adj. R^2	0.119	0.080	0.489	0.407	0.138	0.812

This table reports OLS regression results for 17,302 firm-year observations (3,487 distinct firms) for the 14 years from 2000 to 2013. *****,**,*** indicate that the coefficients are statistically significant from zero at 1%, 5%, and 10% of significance. Industry fixed effects are included in the regression but are omitted from the table for brevity. See Appendix A for variable definitions.

Table 10: The Impact of Audit Firm Tenure on Tax Avoidance and Firm Value -Robustness Checks

Panel A: CPI-Adjusted Q and TA variables				
	Model 1	Model 2	Model 3	Model 4
	BTD	*MPBTD*	*DDBTD*	*Shelter*
LTEN	-0.030	-0.028	-0.028	-0.005
	(-1.54)	*(-1.46)*	*(-1.46)*	*(-0.24)*
TA	0.441	0.358	0.184	-0.012
	*(2.87)***	*(2.01)**	*(1.12)*	*(-0.59)*
TA_LTEN	0.869	1.026	0.384	0.054
	*(6.85)***	*(6.81)***	*(2.47)**	*(5.47)***
N	11163	11163	11163	10014
R^2_Within	0.305	0.305	0.302	0.316
R^2_Between	0.100	0.101	0.095	0.123
R^2_Overall	0.158	0.159	0.154	0.19
rho	0.798	0.798	0.800	0.791
Panel B: CPI-adjusting Q and TA variables and without demeaning variables before running the regression				
	Model 1	Model 2	Model 3	Model 4
	BTD	*MPBTD*	*DDBTD*	*Shelter*
LTEN	-0.047	-0.046	-0.027	-0.089
	*(-2.42)***	*(-2.36)***	*(-1.40)*	*(-3.64)****
TA	-1.769	-2.25	-0.847	-0.153
	*(-5.71)****	*(-6.07)****	*(-2.24)***	*(-4.75)****
TA_LTEN	0.873	1.029	0.409	0.053
	*(6.91)****	*(6.86)****	*(2.64)****	*(5.37)****
N	11163	11163	11163	10014
R^2_Within	0.311	0.311	0.308	0.321
R^2_Between	0.126	0.127	0.120	0.145
R^2_Overall	0.187	0.188	0.182	0.214
rho	0.792	0.791	0.793	0.786
Panel C: Without demeaning variables before running the regression and controlling for CEO tenure (*LCEOTEN*)				
	Model 1	Model 2	Model 3	Model 4
	BTD	*MPBTD*	*DDBTD*	*Shelter*
LTEN	-0.037	-0.039	-0.022	-0.085
	*(-2.30)***	*(-2.40)***	*(-1.35)*	*(-4.17)****
TA	-0.988	-2.289	-1.136	-0.147
	*(-5.38)****	*(-7.37)****	*(-3.52)****	*(-5.45)****
TA_LTEN	0.461	0.982	0.486	0.05
	*(5.84)****	*(7.86)****	*(3.70)****	*(6.16)****

LCEOTEN	0.013	0.013	0.014	0.023
	(1.15)	*(1.13)*	*(1.20)*	*(1.82)**
N	10,783	10,783	10,783	9,690
R^2*_Within*	0.231	0.233	0.229	0.244
R^2*_Between*	0.122	0.132	0.122	0.154
R^2*_Overall*	0.166	0.173	0.165	0.202
rho	0.802	0.800	0.802	0.793

This table reports panel data fixed-effects regression results for 11,163 firm-year observations (1,786 distinct firms) in Model 1 to Model 3 and 9,690 firm-year observations (1,589 distinct firms) in Model 4 for the 14 years from 2000 to 2013. *****,**,*** indicate that the coefficients are statistically significant from zero at 1%, 5%, and 10% of significance on a two-tailed t test. T statistics with robust standard errors are presented in parentheses and in *italics*. Controls and fixed industry and year effects are included in the regressions are included in the regression but are omitted from the table for brevity. See Appendix A for variable definitions.

Appendix A: Variable Definitions

Dependent Variable		
Q	=	Tobin's q, calculated as market value of assets divided by book value of assets, [Total assets (AT) + market value of equity (PRCC_F*CSHO) – book value of equity (CEQ)]/total assets (AT), following Desai and Dharmapala (2009).
Interest Variables		
LTEN	=	Audit firm tenure, calculated as the natural log of the number of consecutive years that the firm has retained the auditor.
BTD	=	Book-tax difference, calculated as the ratio of (Pretax Income (PI) minus Estimated Taxable Income) / Total Assets (AT), where Estimated Taxable Income = (Current U.S. Tax Expense (TXFED) + Current Foreign Tax Expense (TXFO)) / (35% minus Change in Tax Loss Carry Forward (ΔTLCF)). If TXFED and TXFO are missing, we calculate the sum of (TXFED+TXFO) as (TXT-TXDI-TXS-TXO).
MP_BTD	=	Manzon-Plesko (2002) book-tax difference, which equals U.S. domestic income (PIDOM) minus U.S. domestic taxable income minus state income taxes (TXS) minus other income taxes (TXO) minus equity in earnings (ESUB), scaled by lagged assets (AT). U.S. domestic taxable income is estimated as the current federal tax expense (TXFED) divided by the statutory maximum corporate tax rate.
DD_BTD	=	Desai-Dharmapala (2006) residual book-tax difference, which equals the residual from the following firm fixed-effect regression: $BT_{i,t} = \beta_1 TA_{i,t} + \mu_i + \varepsilon_{i,t}$, where *BT* is the Manzon-Plesko book-tax difference, *TA* is total accruals measured using the cash flow method per Hribar and Collins (2002). Both variables are scaled by lagged total assets and are winsorized at 1% and 99% levels for regression purposes.
Shelter	=	We use Wilson's (2009) sheltering probability to capture incidence of the most aggressive avoidance practices as follows. We use the regression model reported in Table 5 Column 3 in Wilson (2009). The sheltering probability equation is: $\boldsymbol{Shelter\_PROB_{it}} = -4.86 + 5.20*BTD_{it} + 4.08*DA_{it} + 0.41*LEV_{it} + 0.76*AT_{it} + 3.51*ROA_{it} + 1.72*FI_{it} + 2.43*RandD_{it}$; where $Shelter\_PROB_{it}$ is the sheltering probability for firm *i* in year *t*, BTD_{it} is a book-tax difference measure as defined by Kim et al. (2011), DA_{it} is discretionary accruals from the performance-adjusted modified cross-sectional Jones Model. LEV_{it} is firm leverage, AT_{it} is the log of total assets for firm *i* in year *t*, ROA_{it} is return on assets, FI_{it} is a dummy variable set equal to one for firm-years that report foreign income and zero otherwise, and $RandD_{it}$ is research and development expense ratio. Following Kim et al. (2011), we define *BTD* as book income less taxable income scaled by lagged assets (AT). Book income is pretax income (PI) in year *t*. Taxable income is calculated by summing current federal tax expense (TXFED) and current foreign tax expense (TXFO) and dividing by the statutory tax rate and then subtracting deferred taxes (TXDI), state income taxes (TXS) and other income taxes (TXO) from total income taxes (TXT) in year *t*.
TA	=	One of the above tax avoidance measures.

*TA*LTEN*	=	An interaction term between each of the tax avoidance measure (*TA*) and the natural logarithm of audit firm tenure (*LTEN*).
Control Variables		
NOL	=	Indicator variable coded as 1 if there is a tax loss carryforward (TLCF is positive) during year t; zero otherwise.
Age	=	Natural logarithm of (1+the number of years that the firm has been in Compustat), following Inger (2014), Brooks, Cheng, Johnston, and Reichelt (2017).
SIZE	=	Natural logarithm of total sales (SALE) at year *t-1*.
MtB	=	Market-to-book ratio at year *t-1*.
RD	=	Research and Development expense (XRD) at time *t*, divided by total assets (AT) at time *t-1*.
absFI	=	Absolute value of pre-tax foreign income for year *t* (PIFO), scaled by total assets (AT) at year *t*.
RD	=	RandD expense for year *t* (XRD), scaled by total assets at the beginning of year *t* (AT).
INTANG	=	Intangible assets at time t divided by total assets (AT) at year *t*.
ROA	=	Return on assets, measured as pretax income (PI) less extraordinary items (XI) less special items (SPI), divided by total assets (AT) at year *t*.
LEV	=	Long-term debt to asset ratio at the end of year, calculated as long-term debt (DLTT) scaled by total asset (AT) at the end of year *t*;
RVOL	=	Stock return volatility, measured as the standard deviation of monthly stock returns.
BigN	=	Indicator variable equal to 1 of audited by a Big 4/5 auditor; 0 otherwise.
IOR	=	Institutional ownership for firm i, year t, defined as the fraction of a firm's outstanding shares owned by institutional investors.
OR	=	Option ratio, calculated as the value of stock option grants to executives as a fraction of total compensation.
NAnalsyt	=	Number of analysts following the firm in IBES consensus forecasts.
AntiEindex	=	Anti-Entrenchment index, calculated as (-1)*Entrenchment index, following Bebchuk et al. (2009).
Variables Used in Additional Analyses and Robustness Tests		
AdjTA	=	Industry mean-adjusted tax avoidance measures.
Q2	=	calculated as total assets (AT) plus market value of equity (PRCC_F*CSHO) minus book value of equity (CEQ) minus deferred taxes, deflated by total assets (AT); [Brown and Caylor 2006].
Q3	=	measured as total debt (DLTT + DLC) + preferred stock (PSTKRV) + market value of equity (PRCC_F*CSHO) / Total asset (AT) [Chung and Pruitt (1994)].
Q4	=	Market-to-book ratio.
OLTEN	=	Orthoganized audit firm tenure, estimated as the residual from regressing the natural log of audit firm tenure (*LTEN*) on firm age (*AGE*).
ETR	=	Effective tax rate, defined as total tax expense (TXT) divided by pre-tax book income (PI) less special items (SPI). We truncate the values of *ETRs* at 0 and 1.
CashETR	=	Cash effective tax rate, defined as cash taxes paid (TXPD) divided by pre-tax book income (PI) less special items (SPI). We truncate the values of *CashETRs* at 0 and 1.
ABACC	=	Abnormal accruals for year *t* based on performance-adjusted modified Jones Model.

ΔNOL	=	The change in a firm's tax loss carryforwards from prior to current period, scaled by lagged total assets.
PPE	=	Gross property, plant, and equipment (PPENG) at year *t.*
EQINC	=	Equity in earnings (EQINC) at time *t*, divided by total assets (AT) at year *t-1*.
Cash	=	Cash (CHE) at year *t.*
DEP		Depreciation and amortization expense for year t (DP) divided by total assets at the beginning of year (AT).
Tier2	=	Second-tier auditors, an indicator variable equal to 1 if the audit firm is either Grant Thornton LLP and BDO Seidman L.L.P and 0 otherwise.
EXPERT	=	Tax expert, an indicator variable equal to 1 if an audit firm is a tax expert and 0 otherwise. Tax expert is defined as tax service market share in a given MSA (city) and industry (two-digit SIC) market that is greater than or equal to 25 percent from 2000 to 2002 or 30 percent in years 2003 and after, following McGuire, Omer, and Wong (2012).
LCEOTEN	=	CEO tenure, calculated as the natural log of the number of consecutive years that the CEO has been serviced in the firm.