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ORIGINAL RESEARCH

The effect of chief financial officers' accounting expertise on corporate tax avoidance: the role of compensation design

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Abstract
Accounting expertise is closely related to corporate tax planning, and hence, corporate chief financial officers (CFOs) with accounting expertise may have advantages in exploiting tax planning opportunities. By manually collecting CFOs' autobiographic information and identifying their accounting-related work experience, we empirically examine whether a CFO with accounting expertise is more likely than a CFO without such expertise to exploit tax planning opportunities, resulting in greater corporate tax avoidance. We find that CFOs with accounting expertise are negatively associated with corporate effective tax rates. The average effective tax rate of firms with accounting expert CFOs is approximately 19.4% lower than that of their counterparts with non-accounting expert CFOs, *ceteris paribus*. Moreover, the abnormal variable compensation of CFOs with accounting expertise is negatively associated with corporate effective tax rates. The results suggest that the accounting expertise and compensation schemes of CFOs can have a significant effect on the aggressiveness of corporate tax planning.

Keywords Tax avoidance · Effective tax rate · Compensation design · Chief financial officer

JEL Classification M41 · H26 · J33

1 Introduction

Recent studies have explored the effects of senior managers' personal characteristics on firm business decisions and the economic consequences (Bantel and Jackson 1989; Bertrand and Schoar 2003; Ge et al. 2011). Bantel and Jackson (1989) find that the education

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levels of senior managers are positively related to firm performance. Bertrand and Schoar (2003) show that the age of senior managers is positively associated with the conservatism of firms' investment strategies. Ge et al. (2011) show that senior managers' demographic characteristics, such as sex, age and education background, have an effect on firms' financial performance. The findings of previous studies suggest that the work experience and personal characteristics of senior managers may have a profound effect on firms' various decisions and operating performance. However, few prior studies have examined the effects of personal characteristics of the top executive on corporate tax planning.

Corporate chief financial officers (CFOs) are the key executives responsible for preparing companies' financial reporting as well as tax returns. Few prior studies have addressed the effect of CFO accounting expertise on corporate effective tax rates (ETRs). Accounting expertise is closely related to corporate taxation in that the determination of taxable income is mainly based on accounting books with the adjustments for book-tax income differences when firms file tax returns. Therefore, accounting expertise helps executives manage their firms' income taxes while accounting for the effect of tax consequences on financial reporting. For example, the growing book-tax gap suggests that the substantial discretion available in GAAP provides firms the opportunity to manage their book earnings upward without affecting their taxable income (Phillips 2003; Hanlon 2005). Furthermore, prior studies consider the most advantageous type of tax planning one that creates a permanent wedge between financial and taxable incomes—i.e., enabling firms to manage taxable income downward without impacting book income, or vice versa. The increasing trend in permanent book-tax differences since the late 1990s suggests that firms have the opportunity to engage in aggressive financial and tax reporting behaviors in the same reporting period (U.S. Congress Joint Committee on Taxation 1999; Weisbach 2002; McGill and Outslay 2004).

The developments in international taxation and accounting standards also demand competent accounting expertise in dealing with corporate income tax compliance. Companies are now facing increasingly complex international tax compliance issues. For example, base erosion and profit shifting (BEPS) action plans require profit splitting among corporate transfer-pricing transactions to conform to the economic substance of those transactions, which often calls for the analysis of the related parties' financial statements. Accounting expertise helps to prepare the financial analysis for tax purposes. Furthermore, both tax regulations and accounting standards demand heightened transparency on tax shelter transactions and income tax information. For example, firms are required to file Form 8886 for specified tax shelter transactions and to disclose uncertain tax position according to FIN 48 (or ASC 740-10) in financial statements. Accounting expertise is essential to properly address such complex disclosures. We thus conjecture that an accounting expert CFO may have the advantage of dealing with tax planning over a CFO without accounting expertise.

By constructing a data set that tracks the movement of executives across firms over time, Dyreng et al. (2010) show that individual top executives have incremental effects on their firms' tax avoidance that cannot be explained by characteristics of the firm. However, they cannot attribute the executive fixed effects to a specific personal characteristic or education background. Furthermore, the executives in their sample include different positions, such as CEOs, CFOs, and other titles, such as presidents and vice-presidents, making it difficult to identify the extent of the CFO effect on corporate tax avoidance. Unlike Dyreng et al. (2010), our study specifically examines the effect of the accounting expertise of CFOs on corporate tax avoidance. In addition, we investigate the moderating effect of compensation design on the relation between CFO with accounting expertise and corporate tax avoidance. Compensation incentives play an essential role in motivating managers to link effort

to performance (Core and Guay 1999; Carter et al. 2007; Hoitash et al. 2012). We expect that the accounting expertise of CFOs is positively related to corporate tax avoidance and that the compensation design for CFOs with accounting expertise will motivate them to further explore tax planning opportunities.

By using a sample of firms with neither CEO nor CFO turnovers during 2010–2012 from the ExecuComp database, we are able to ensure a consistent company-wide tax planning policy under the same management within a company. We then manually collect CFOs' work background and autobiographic information from S&P Capital IQ files to identify CFO's accounting expertise and conduct the two-stage regression estimation to control for the potential endogeneity problem that arises when firms may self-select their CFOs with accounting expertise. Our results show that, *ceteris paribus*, CFOs with accounting expertise are associated with lower ETRs, suggesting that CFOs with accounting expertise are more likely to explore tax planning opportunities. Furthermore, we find that the abnormal variable pay of CFO with accounting expertise is negatively associated with corporate ETRs, consistent with our expectations that compensation design, such as variable pay, has an effect on the efforts of CFOs with accounting expertise in exploiting corporate tax planning opportunities.

Our study makes the following contributions. First, it contributes to the existing literature on corporate tax avoidance. Prior studies have addressed the effects of firm characteristics and corporate governance on corporate tax avoidance (Chen et al. 2010; Armstrong et al. 2012; McGuire et al. 2012). However, little is known about whether CFOs' accounting expertise and compensation design affect corporate tax avoidance. Our study fills this gap in the literature.

Second, our empirical findings complement the literature on managerial compensation designs. Agency theory applies to how to design an efficient compensation scheme to drive managers' effort to better firm performance. However, efficient compensation schemes may vary with the characteristics of executives in driving efforts toward better results. Our study considers both the incentive design and expertise of executives in examining the relationship between the incentive compensation of accounting expert CFOs and corporate tax avoidance. Our findings help further understand the impact of CFO compensation design interacted with accounting expertise on corporate tax avoidance.

The remainder of this paper proceeds as follows. Section 2 discusses the related literature. Section 3 develops the research hypotheses and describes the research design and data. Section 4 reports our empirical findings. Section 5 discusses robust and additional tests, and Sect. 6 concludes.

2 Related literature

2.1 Effects of personal characteristics of top managers on corporate decisions

The upper echelons theory (Hambrick and Mason 1984) suggests that the experiences, values, and personalities of executives greatly influence their interpretations of the situations they face and, in turn, affect their corporate decision making. Prior research has documented the evidence that various firm policies and decisions are associated with top managers' personal characteristics, such as demographic characteristics (Bantel and Jackson 1989; Bertrand and Schoar 2003; Barua et al. 2010; Francis et al. 2013; Cotei and Farhat 2017). Bantel and Jackson (1989) show that top manager education levels and diversity

in function areas of expertise are positively associated with banks' innovative ability. Bertrand and Schoar (2003) also show that company-wide policies and performance are affected by the turnovers of top managers with different ages and educational backgrounds. Barua et al. (2010) and Francis et al. (2013) indicate that female CFOs tend to be more conservative in corporate financial reporting, and thus, companies with female CFOs have lower discretionary accruals and lower accrual estimation errors than their counterparts with male CFOs. Cotei and Farhat (2017) show that owners' characteristics, such as experience, education, age, gender, and race, have a significant impact on the decision to lease assets for small startup firms.

In addition to the effects of demographic characteristics, the accounting professional experience of top managers may influence firms' financial reporting. Prior studies show that companies with accounting expert CFOs tend to be more conservative with external financial reporting and precise in financial disclosure styles and thus are negatively associated with a probability of financial statement restatements or material errors in financial statements (Aier et al. 2005; Bamber et al. 2010; Ge et al. 2011; Hoitash et al. 2016). Rakhman (2009) also shows that companies with accounting expert CFOs tend to have better earnings persistence and earnings informativeness.

Recent studies investigate the effect of top mangers' characteristics on corporate tax avoidance (Dyreng et al. 2010; Francis et al. 2015; Law and Mills 2017). Francis et al. (2015) find that firms with female CFOs are associated with less tax avoidance. Law and Mills (2017) indicate that managers with military experience tend to avoid conducting aggressive tax planning strategies and believe that avoiding taxes would be unethical. Dyreng et al. (2010) investigate whether top executives have an incremental effect on their firms' tax avoidance that cannot be explained by firm characteristics. Their results indicate that the individual fixed effects of the executives between the top and bottom quartiles account for approximately 11 percent of GAAP ETRs, suggesting that individual executives appear to be an important determinant in firms' tax avoidance. The results of Dyreng et al. (2010), however, do not separate the effect of CFOs on corporate tax avoidance from that of other top executives and cannot attribute the tone of executive fixed effects to a specific type of expertise.

The trend in global anti-tax-avoidance cooperation and the demand for greater transparency in tax positions highlight the necessity of accounting and tax expertise in dealing with corporate tax compliance. CFOs are the key executives responsible for preparing company financial reports and tax returns. The prior studies, however, have not addressed the effect of CFOs' accounting expertise on corporate tax avoidance. We thus seek to fill the research gap by investigating the relationship between CFOs' accounting expertise and corporate tax avoidance.

2.2 Effects of compensation design of top managers on performance and tax avoidance

Efficient managerial compensation design has long been a focal topic of corporate governance regarding its potential to reduce agency costs and enhance firm performance (Core and Guay 1999; Carter et al. 2007; Hoitash et al. 2012). Prior literature shows the importance of incentive compensation design for the improvement of individual manager and firm performance Hoitash(Gerhart and Milkovich 1990; Mehran 1995; Banker et al. 1996, 2000; Hayes and Schaefer 2000).

Incentive compensation, such as variable pay, provides individual managers with an economic incentive to improve firm performance. Using large-scale, longitudinal data on approximately 14,000 top- and middle-level managers, Gerhart and Milkovich (1990) show that variable pay, such as bonus and long-term incentives, is positively associated with firms' financial performance, whereas the association between fixed pay and financial performance is not significant. Mehran (1995) and Banker et al. (1996) also find a positive relation between the percent of incentive compensation of executive compensation and firm performance. Additionally, Hayes and Schaefer (2000) show that the abnormal compensation of top managers is positively associated with the future performance of a firm.

In addition to the effect of compensation on firm performance, prior studies have examined the effect of incentive compensation on corporate tax avoidance. Phillips (2003), Desai and Dharmapala (2006), Robinson et al. (2010), and Armstrong et al. (2012) document that incentive compensation is positively related to corporate tax avoidance because greater incentive compensation helps align the incentives of agents and principals, resulting in lower corporate ETRs. In addition, Schmittdiel (2014) finds that companies with greater tax planning opportunities are more likely to link CEOs' bonuses to corporate income taxes. Hansen et al. (2017) find that both CEOs and CFOs are compensated for the earnings generated by changes in ETRs (i.e., the tax component of earnings) when the firms pay bonuses based on after-tax earnings.

Previous studies suggest that agency theory applies to link the incentive design of executives to corporate tax avoidance. Our paper extends prior studies by incorporating compensation design as a moderating factor in examining the effect of CFO accounting expertise on exploring corporate tax planning opportunities.

3 Research methods

3.1 Research hypothesis

Previous studies find that female managers and managers with military experience are less aggressive in tax avoidance (Francis et al. 2015; Law and Mills 2017). Dyreng et al. (2010) also show that the intangible tone of top executives is associated with corporate tax avoidance. Our subject of interest is the effect of accounting expert CFOs on corporate tax avoidance.

Accounting expertise is closely related to corporate financial reporting and tax planning because taxable income is determined mainly based on financial income with the adjustments for book-tax income differences. Frank et al. (2009) indicate that corporate financial reporting strategies are closely related to tax planning strategies. The most advantageous type of tax planning enables firms to manage taxable income downward without impacting book income, or vice versa (U.S. Congress Joint Committee on Taxation 1999; Weisbach 2002; McGill and Outslay 2004). The growing trend in the book-tax gap suggests that accounting expertise can help executives better manage their firms' income taxes by taking advantage of the substantial discretions available in GAAP (Phillips et al. 2003; Hanlon 2005).

Furthermore, the recent development in accounting standards and increasing awareness of global anti-tax avoidance demand competent accounting expertise in dealing with corporate income tax compliance. For example, ASC 740-10 (or FIN 48) requires firms to reflect uncertain tax benefits in accounting for income taxes. US taxpayers are also required

to file Form 8886 when participating in the specified tax shelter transactions. The demand for greater transparency in tax position highlights the importance of accounting expertise in dealing with increasingly complex tax compliance. CFOs are those primarily responsible for corporate financial reporting and tax-return preparation. Therefore, we conjecture that CFOs with accounting expertise are more likely to explore tax planning opportunities while accounting for the effect of tax consequences on financial reporting. Accordingly, we propose our first hypothesis as follows.

H1 *Ceteris paribus*, the accounting expertise of chief financial officers is positively associated with the level of corporate tax avoidance.

Previous research shows that management compensation schemes have a profound effect on managerial behavior and corporate operating performance and that incentive compensation, such as variable pay, provides managers with an economic incentive to improve firm performance (Gerhart and Milkovich 1990; Mehran 1995; Banker et al. 1996, 2000). Hayes and Schaefer (2000) and Combs and Skill (2003) also find that abnormal compensation is positively associated with firm performance.

In addition, prior research documents the positive effect of incentive compensation on corporate tax avoidance. Phillips (2003), Desai and Dharmapala (2006), Robinson et al. (2010), Armstrong et al. (2012) and Hansen et al. (2017) find that greater incentive compensation helps motivate executives to exploit aggressive tax planning opportunities, resulting in lower corporate ETRs. As agency theory suggests that compensation incentives play an important role in linking managers' effort to performance, we thus incorporate compensation design as a moderating factor in examining the effect of CFO accounting expertise on corporate tax avoidance. We expect that greater compensation incentives will better incentivize CFOs with accounting expertise to utilize this expertise to explore tax planning opportunities, resulting in a lower corporate tax. Hence, we state our second hypothesis as follows.

H2 *Ceteris paribus*, the abnormal compensation of chief financial officers with accounting expertise is positively associated with the level of corporate tax avoidance.

3.2 Empirical models and variable definitions

3.2.1 Effect of CFO with accounting expertise on tax aggressiveness

H1 tests whether the expertise of a CFO has an effect on corporate tax avoidance. To address the potential self-selection problem of a CFO with/without accounting expertise within the companies, we adopt Heckman's (1979) two-stage regression estimation. We first estimate the inverse Mills ratio (*MILLS*) in Model (1) by running a probit regression on whether CFO has accounting expertise and then include *MILLS* in Model (2) as a control variable to control for the self-selection problem of firms choosing CFOs with/without accounting expertise. The two-stage regression models are as follows.

Stage 1 Probit estimation of firms' selection of a CFO with accounting expertise

$$\begin{aligned} CFO\_ACC_{it} = {} & \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 NOL_{it} + \alpha_3 FOREIGN_{it} + \alpha_4 BTM_{it} + \alpha_5 MBA_{it} \\ & + \alpha_6 GENDER_{it} + \alpha_7 AGE_{it} + \varepsilon_{it} \end{aligned} \tag{1}$$

The subscripts i and t denote firm and year, respectively. The dependent variable *CFO_ACC* is a dummy variable that equals 1 if the firm has a CFO with accounting expertise and 0 otherwise. We identify a CFO as having accounting expertise if he or she meets one of following criteria: (a) has been a partner of an accounting firm, (b) self-identifies as possessing accounting expertise in his or her autobiography, or (c) has been a CFO of another company and has an accountant degree. The following are brief definitions of the independent variables.

SIZE	firm size, measured as the natural log value of total assets;
NOL	a dummy variable that equals 1 if the firm has net operating loss carryforward and 0 otherwise;
FOREIGN	foreign earnings, measured as foreign earnings ÷ total assets at year t − 1;
BTM	book to market ratio, measured as book value of shareholder equity divided by market value of shareholder equity;
MBA	a dummy variable that equals 1 if the firm's CFO has an MBA degree and 0 otherwise;
GENDER	a dummy variable that equals 1 if the firm's CFO is male and 0 otherwise; and
AGE	age of CFO, measured by the value of the CFO's age

Independent variables

Omer et al. (2006) and Bernard et al. (2015) show that firms with more complex operations are more likely to hire a CFO with accounting expertise to address complex accounting and tax issues. Therefore, we include *SIZE*, *NOL* and *FOREIGN* to control for the complexity of firms' operation in Model (1). *BTM* is used to control for the growth opportunities of firms. McGuire et al. (2012) and Klassen et al. (2013) indicate that firms with more growth opportunities tend to appoint accounting firms to address tax planning. Following previous studies, we also include the education background (*MBA*), gender (*GENDER*), and age (*AGE*) of CFOs to control for the effects of personal demographic characteristics in Model (1).

Stage 2 Effects of CFO with accounting expertise on tax aggressiveness

We next construct Model (2) to examine the effect of CFOs with accounting expertise on tax avoidance. We control for the potential endogeneity between *CFO_ACC* and *ETR* by including the inverse Mills ratio (*MILLS*) obtained from Model (1) in Model (2). Following prior studies (Chen et al. 2001; Rego 2003; Cook et al. 2008; Dyreng et al. 2010; Hanlon and Heitzman 2010; Robinson et al. 2010; McGuire et al. 2012; Hansen et al. 2017; Cordis and Kirby 2018), we use corporate ETRs (*ETR*s) as the proxy variable to measure the levels of corporate tax avoidance in that the ETR summarizes the overall tax burden of a company in a statistic. *ETR* is defined as income tax expenses divided by pretax income. Model (2) is as follows.

$$\begin{aligned} ETR_{it} = {} & \beta_0 + \beta_1 CFO\_ACC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 FOREIGN_{it} \\ & + \beta_6 BTM_{it} + \beta_7 NOL_{it} + \beta_8 DEP_{it} + \beta_9 EQINC_{it} + \beta_{10} MILLS_{it} + IND + \varepsilon_{it} \end{aligned} \quad (2)$$

where *LEV* debt ratio, measured as long-term liabilities ÷ total assets; *ROA* return on assets, measured as net income ÷ average total assets; *DEP* depreciation and amortization

expense, measured as (depreciation expense + amortization expense) ÷ total assets at the beginning of year t; *EQINC* investment income of equity method investments, measured as investment income under the equity method ÷ total assets at the beginning of year t; and *IND* dummy variables for firms' industry membership.

In H1, we hypothesize that the accounting expertise of CFOs is positively associated with the level of corporate tax avoidance, and we therefore expect the coefficient on *CFO_ACC* to be negative in Model (2).

Following prior ETR studies (Slemrod and Blumenthal 1996; Mills et al. 1998; Omer et al. 2006; Cook et al. 2008; Frank et al. 2009; Lassila et al. 2010; Krishnan and Visvanathan 2011; McGuire et al. 2012; Klassen et al. 2013), we also control for the factors associated with *ETR,* such as tax shields (*NOL*, *DEP*), financing policy (*LEV*), tax complexity (*FOREIGN*, *EQINC*), profitability (*ROA*), growth opportunities (*BTM*), firm size (*SIZE*), and industry membership (*IND*) in Model (2).

As for the instrumental variables used for estimating Model (2), we select proxy variables for tax planning opportunities (measured by the number of segments and the ratio of property, plant and equipment to total assets), audit quality (measured by discretionary accruals and the dummy variable for corporate financial statements being audited by Big Four accounting firms), and non-audit services (measured by the non-audit fees scaled by total assets) to control for their potential indirect effects on *ETR* through the independent variables of Model (2). Following the exclusion restrictions noted in Lennox et al. (2012, 596), we exclude the independent variables *MBA*, *GENDER*, and *AGE* in the probit estimation from Model (2) to satisfy exclusion restrictions and conduct the Sargan test of the overidentifying restrictions to examine whether the selected instrumental variables for Model (2) are valid.

3.2.2 Effect of CFO compensation on tax avoidance

H2 examines the effect of the compensation scheme of CFOs with accounting expertise on tax avoidance. We separate the compensation of CFOs into fixed and variable pay and construct Model (3) to test the effects of abnormal fixed and variable pay of CFO compensation on corporate tax avoidance. Model (3) is as follows.

$$\begin{aligned} ETR_{it} = {} & \eta_0 + \eta_1 CFO\_ACC_{it} + \eta_2 AB\_FIXED_{it} + \eta_3 AB\_VAR_{it} + \eta_4 CFO\_ACC \times AB\_FIXED_{it} \\ & + \eta_5 CFO\_ACC \times AB\_VAR_{it} + \eta_6 SIZE_{it} + \eta_7 LEV_{it} + \eta_8 ROA_{it} + \eta_9 FOREIGN_{it} \\ & + \eta_{10} BTM_{it} + \eta_{11} NOL_{it} + \eta_{12} DEP_{it} + \eta_{13} EQINC_{it} + \eta_{14} MILLS_{it} + IND + \varepsilon_{it} \end{aligned} \quad (3)$$

where *AB_FIXED* abnormal fixed compensation of CFO, measured by taking the residuals from Model (4); and *AB_VAR* abnormal variable compensation of CFO, measured by taking the residuals from Model (5).

To calculate abnormal fixed and variable pay of CFO compensation, we construct Models (4) and (5) to estimate the expected fixed (*FIXED_PAY*) and variable (*VARIABLE_PAY*) components of CFO compensation, respectively. Models (4) and (5), separately, regress fixed and variable pay of CFOs on factors associated with management compensation, including firm size (*SIZE*), financial performance (*ROE*), financial leverage (*LEV*), book to market ratio (*BTM*), variability of profitability (*ROA_STD*), financial constraint (*CASH_CONSTR*), equity interest (*CFO_OWNED*) and CFO demographic characteristics variables, such as *GENDER*, *AGE*, *CPA*, and *MBA* (Hogan and McPheters 1980; Core and Guay 1999,2001; Carter et al. 2007). Models (4) and (5) are as follows.

Table 1 Sample selection procedures

	Number of firm-year observations
Total firm-year observations selected from the ExecuComp files excluding the finance, insurance, and utility industries during 2010–2012	4641
Less	
Firm-year observations with either CEO or CFO turnover during 2010–2012	2274
Firm-year observations missing CFOs' background, education and autobiographic information	303
Firm-year observations without the Compustat financial statements data files	573
Firm-year observations with missing data on compensation of CFOs	522
Final sample	969

$$FIXED\_PAY_{it} = \gamma_0 + \gamma_1 SIZE_{it} + \gamma_2 ROE_{it} + \gamma_3 LEV_{it} + \gamma_4 BTM_{it} + \gamma_5 ROA\_STD_{it} + \gamma_6 CASH\_CONSTR_{it} + \gamma_7 CFO\_OWNED_{it} + \gamma_8 GENDER_{it} + \gamma_9 AGE_{it} + \gamma_{10} CPA_{it} + \gamma_{11} MBA_{it} + \varepsilon_{it} \quad (4)$$

$$VARIABLE\_PAY_{it} = \delta_0 + \delta_1 SIZE_{it} + \delta_2 ROE_{it} + \delta_3 LEV_{it} + \delta_4 BTM_{it} + \delta_5 ROA\_STD_{it} + \delta_6 CASH\_CONSTRIt + \delta_7 CFO\_OWNED_{it} + \delta_8 GENDER_{it} + \delta_9 AGE_{it} + \delta_{10} CPA_{it} + \delta_{11} MBA_{it} + \varepsilon_{it} \quad (5)$$

where *FIXED_PAY* CFO's fixed compensation, measured as CFO's fixed salaries ÷ total assets at the beginning of year t; *VARIABLE_PAY* CFO's variable compensation, measured as (CFO's total compensation—CFO's fixed salaries) ÷ total assets at the beginning of year t; *ROA_STD* operating risk, measured by the standard deviation of returns on assets over the preceding 10 years; *CASH_CONSTR* cash constraint, measured by (cash dividend—cash flow from investing activities—cash flow from operating activities) ÷ total assets at the beginning of year t; *CFO_OWNED* CFO's ownership, measured by the percentage of shares owned by CFO; and *CPA* a dummy variable that equals 1 if a CFO has a CPA license and 0 otherwise.

3.2.3 Data and sample selection

Table 1 outlines the sample selection procedures. Our sample is selected from the ExecuComp database. We start with firms having neither CEO nor CFO turnovers from 2010–2012 to ensure a consistent company-wide tax planning policy with the same management. We delete firms in the financial industry (SIC codes 6000–6999) and utilities industry (SIC codes 4900–4999) because of their particular regulatory constraints. CFO's fixed salaries, variable bonuses and payments, and total compensation are collected from ExecuComp files. We also hand collect CFOs' background, education, and autobiographic information from S&P Capital IQ files to identify CFOs' accounting expertise. Financial statement variables are from the Compustat files. Our final sample consists of 969 firm-year observations.

Table 2 Descriptive statistics (N = 969)

Variables	Mean	Std. Dev	Min.	Max.
ETR	0.283	0.164	0.000	1.000
CFO_ACC	0.250	0.433	0.000	1.000
AB_FIXED	0.000	0.000	−0.001	0.001
AB_VAR	0.000	0.001	−0.002	0.003
SIZE	7.608	1.596	4.713	11.363
NOL	0.630	0.483	0.000	1.000
FOREIGN	0.040	0.047	−0.025	0.201
BTM	0.466	0.243	0.033	0.998
LEV	0.154	0.148	0.000	0.581
ROA	0.078	0.053	−0.038	0.199
DEP	0.044	0.026	0.010	0.150
EQINC	0.001	0.004	−0.003	0.029
FIXED_PAY	0.000	0.001	0.000	0.003
VARIABLE_PAY	0.001	0.001	0.000	0.007
ROE	0.240	0.283	−0.081	2.617
ROA_STD	0.094	0.091	0.010	0.643
CASH_CONSTR	−0.009	0.105	−0.296	0.367
CFO_OWNED	0.139	0.216	0.000	1.226
CPA	0.404	0.491	0.000	1.000
MBA	0.456	0.498	0.000	1.000
GENDER	0.938	0.241	0.000	1.000
AGE	52.706	6.530	37.000	77.000

4 Empirical results

4.1 Descriptive statistics

Table 2 profiles the descriptive statistics of our sample firms for the selected variables. The mean value of *ETR* is 0.283, which is less than the current US statutory tax rate of 35%. The mean value of *CFO_ACC* is 0.25, indicating that approximately one-fourth of the companies in our sample have CFOs with accounting expertise. The mean values for *GENDER*, *AGE*, and *MBA* are 0.94, 52.71 and 0.46, respectively. The statistics on CFO demographic characteristics in our sample show that men dominate in the CFO position and that nearly half of CFOs received an MBA degree.

ETR effective tax rate, measured as current income tax expense divided by income before tax;

CFO_ACC CFO with accounting expertise, a dummy variable that equals 1 if a firm has a CFO with accounting expertise, and 0 otherwise;

AB_FIXED abnormal fixed compensation of CFO, measured by taking the residuals from Model (4);

AB_VAR abnormal variable compensation of CFO, measured by taking the residuals from Model (5);

SIZE firm size, measured as the natural log value of total assets at year t;

NOL	net operating loss carryforward, a dummy variable that equals 1 if a firm has net operating loss carryforward, and 0 otherwise;
FOREIGN	foreign earnings, measured as foreign earnings ÷ total assets at year t − 1;
BTM	book-to-market ratio, measured as book value of shareholder equity ÷ market value of shareholder equity;
LEV	debt ratio, measured as long-term liabilities ÷ total assets at year t;
ROA	pre-tax return on assets, measured as income before tax divided by average assets;
DEP	depreciation and amortization expense, measured as (depreciation expense + amortization expense) ÷ total assets at year t − 1;
EQINC	investment income, measured as investment income under the equity method ÷ total assets at year t − 1;
FIXED_PAY	CFO's fixed compensation, measured as CFO's fixed salaries ÷ total assets at year t − 1;
VARIABLE_PAY	CFO's variable compensation, measured as (CFO's total compensation – CFO's fixed salaries) ÷ total assets at year t − 1;
ROE	pre-tax return on equity, measured as income before tax divided by average shareholder equity;
ROA_STD	operating risk, measured by the standard deviation of returns on assets over the preceding 10 years;
CASH_CONSTR	cash constraint, measured as (cash dividend—cash flow from investing activities- cash flow from operating activities) ÷ total assets at year t − 1;
CFO_OWNED	CFO's ownership, measured by the percentage of shares owned by CFO;
CPA	CPA license, a dummy variable that equals 1 if a CFO has a CPA license and 0 otherwise;
MBA	MBA degree, a dummy variable that equals 1 if a CFO has an MBA degree and zero otherwise;
GENDER	gender of CFO, a dummy variable that equals 1 if a CFO is male and 0 otherwise; and
AGE	age of CFO, measured by the value of CFO's age.

Table 3 presents the correlation coefficients for the dependent and independent variables of Models (1–5). *CFO_ACC* is positively related to *CPA* but negatively related to *MBA*. The results are consistent with the notion that accounting expertise is more related to professional education than to general management education. *ETR*, however, is insignificantly related to our variable of interest *CFO_ACC*. The univariate test result does not lend support to our hypotheses. As the univariate relations do not control for the effects of other factors, we conduct further regression estimations of Models (1) to (3) to test our hypotheses.

4.2 Empirical results and analysis

Table 4 presents the probit estimation results of Model (1), and Table 5 presents the regression results of Model (2). The *p*-values of the χ^2-statistic of Model (1) and the F-statistic of Model (2) are significant at 0.0001, suggesting that both models have an overall

Table 3 Correlation matrix

	CFO_ACC	*ETR*	*CFO_ACC×AB_FIXED*	*CFO_ACC×AB_VAR*	*CPA*	*MBA*	*GENDER*	*AGE*
CFO_ACC	1	0.01	0.01	−0.01	0.25	−0.12	0.03	0.06
		(0.86)	(0.77)	(0.80)	(0.00)	(0.00)	(0.36)	(0.07)
ETR	0.00	1	0.02	−0.08	0.05	−0.06	−0.09	−0.06
	(0.95)		(0.62)	(0.02)	(0.13)	(0.07)	(0.00)	(0.04)
CFO_ACC×AB_FIXED	−0.09	0.02	1	0.57	−0.01	−0.06	−0.01	−0.09
	(0.00)	(0.48)		(0.00)	(0.77)	(0.08)	(0.70)	(0.01)
CFO_ACC×AB_VAR	−0.06	−0.01	0.43	1	0.01	0.00	−0.02	−0.04
	(0.05)	(0.85)	(0.00)		(0.66)	(0.92)	(0.57)	(0.22)
CPA	0.25	0.06	−0.08	−0.01	1	−0.19	0.05	−0.15
	(0.00)	(0.06)	(0.01)	(0.82)	(1.00)	(0.00)	(0.09)	(0.00)
MBA	−0.12	−0.09	0.00	0.00	−0.19	1	−0.02	0.00
	(0.00)	(0.01)	(0.97)	(0.88)	(0.00)		(0.48)	(0.98)
GENDER	0.03	−0.05	−0.05	−0.06	0.05	−0.02	1	0.02
	(0.36)	(0.10)	(0.14)	(0.06)	(0.09)	(0.48)		(0.47)
AGE	0.08	−0.07	−0.10	−0.06	−0.14	0.00	0.02	1
	(0.01)	(0.03)	(0.00)	(0.07)	(0.00)	(0.97)	(0.48)	

p-value is reported in parentheses. The upper (lower) triangle reports the Pearson (Spearman) correlation
See Table 2 for variable definitions

Table 4 Probit estimation of firms' selection of a CFO with accounting expertise $CFO\_ACC_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 NOL_{it} + \alpha_3 FOREIGN_{it} + \alpha_4 BTM_{it} + \alpha_5 MBA_{it} + \alpha_6 GENDER_{it} + \alpha_7 AGE_{it} + \varepsilon_{it}$ (1)

	Coeff.	Std. error	*t*-statistic	*p*-value
Intercept	−1.111	0.466	−2.380	0.017
SIZE	−0.045	0.029	−1.580	0.114
NOL	0.064	0.092	0.690	0.488
FORIGN	−0.402	0.984	−0.410	0.683
BTM	0.099	0.188	0.520	0.601
MBA	−0.306	0.090	−3.380	0.001
GENDER	0.178	0.194	0.920	0.358
AGE	0.013	0.007	1.850	0.065
Log likelihood	−533.92 (p-value < 0.001)			
N	969			

See Table 2 for variable definitions

satisfactory goodness of fit. We conduct the Sargan test of the overidentifying restrictions to examine whether the selected instrumental variables for Model (2) are valid. The joint null hypothesis of the test is that the instruments are valid, i.e., uncorrelated with the error terms in Model (2), and the excluded instruments are correctly excluded from Model (2). The results of the Sargan test show that the p value of the χ^2-statistic for rejecting the null hypothesis is 0.24, suggesting that our results satisfy the overidentifying restrictions tests.

Table 5 The impact of CFO with accounting expertise on tax aggressiveness $ETR_{it} = \beta_0 + \beta_1 CFO\_ACC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 FOREIGN_{it} + \beta_6 BTM_{it} + \beta_7 NOL_{it} + \beta_8 DEP_{it} + \beta_9 EQINC_{it} + \beta_{10} MILLS_{it} + IND + \varepsilon_{it}$ (2)

	Coeff.	Std. error	*t*-statistic	*p*-value
Intercept	0.427	0.078	5.500	0.000
CFO_ACC	−0.194	0.110	−1.760	0.079
SIZE	−0.004	0.004	−0.890	0.374
LEV	−0.087	0.048	−1.830	0.067
ROA	−0.756	0.136	−5.560	0.000
FOREIGN	−0.682	0.148	−4.600	0.000
BTM	−0.025	0.028	−0.890	0.374
NOL	−0.018	0.012	−1.490	0.136
DEP	−0.105	0.283	−0.370	0.709
EQINC	−4.389	1.440	−3.050	0.002
MILLS	0.076	0.041	1.840	0.067
IND	YES			
Adjusted R^2	0.14			
F statistic	7.84 (p-value < 0.001)			
N	969			

See Table 2 for variable definitions

Consistent with our H1, the results of Table 5 show that the coefficient on *CFO_ACC* is significantly negative (*p*-value = 0.079), suggesting that companies with accounting expert CFOs are associated with lower ETRs. CFOs with accounting expertise are more likely to exploit tax planning opportunities, resulting in a lower ETR. Regarding the economic significance, the coefficient of *CFO_ACC* is −0.194, indicating that, *ceteris paribus*, the average ETR of firms with accounting expert CFOs is approximately 19.4% lower than that of their counterparts with non-accounting expert CFOs. These results suggest that CFOs with accounting expertise have a noticeable effect on the level of corporate tax avoidance. The coefficient on *LEV* is significantly negative (*p*-value = 0.067), consistent with the notion that interest tax shield lowers corporate taxes. In addition, the coefficients on *FOREIGN* and *EQINC* are negative and significant (*p*-values < 0.01), suggesting that tax complexity provides companies with greater opportunities to exploit aggressive tax planning.

Table 6 reports the regression results of Model (3). The *p*-value of the F-statistic of Model (3) is significant at 0.001, suggesting that the model has an overall satisfactory goodness of fit. In addition, the results of the Sargan test show that the *p*-value of the χ^2-statistic for rejecting the null hypothesis that overidentifying restrictions are valid is 0.22, suggesting that the results satisfy the overidentifying restrictions and that the instrumental variables of Model (3) are valid as well.

The results of Table 6 show that the coefficient on *CFO_ACC*×*AB_FIXED* is positive but nonsignificant, while the coefficient on *CFO_ACC*×*AB_VAR* is negative and significant (*p*-value = 0.047). The results indicate that the abnormal variable pay of CFOs with accounting expertise is negatively related to ETRs, consistent with our H2. Higher variable pay may drive CFOs with accounting expertise to exploit more aggressive tax planning, resulting in a lower ETR. However, the effect is not salient for companies paying higher

Table 6 The impact of compensation of CFO with accounting expertise on tax aggressiveness $ETR_{it} = \eta_0 + \eta_1 CFO\_ACC_{it} + \eta_2 AB\_FIXED_{it} + \eta_3 AB\_VAR_{it} + \eta_4 CFO\_ACC \times AB\_FIXED_{it} + \eta_5 CFO\_ACC \times AB\_VAR_{it} + \eta_6 SIZE_{it} + \eta_7 LEV_{it} + \eta_8 ROA_{it} + \eta_9 FOREIGN_{it} + \eta_{10} BTM_{it} + \eta_{11} NOL_{it} + \eta_{12} DEP_{it} + \eta_{13} EQINC_{it} + \eta_{14} MILLS_{it} + IND + \varepsilon_{it}$ (3)

	Coeff.	Std. error	*t*-statistic	*p*-value
Intercept	0.421	0.077	5.500	0.000
CFO_ACC	− 0.179	0.108	− 1.650	0.099
AB_FIXED	4.343	29.176	0.150	0.882
AB_VAR	− 6.826	12.147	− 0.560	0.574
CFO_ACC×*AB_FIXED*	53.546	53.507	1.000	0.317
CFO_ACC×*AB_VAR*	− 44.637	22.439	− 1.990	0.047
SIZE	− 0.005	0.004	− 1.060	0.289
LEV	− 0.084	0.047	− 1.790	0.073
ROA	− 0.759	0.134	− 5.660	0.000
FOREIGN	− 0.670	0.146	− 4.600	0.000
BTM	− 0.023	0.027	− 0.820	0.410
NOL	− 0.018	0.012	− 1.560	0.120
DEP	− 0.095	0.278	− 0.340	0.733
EQINC	− 4.253	1.412	− 3.010	0.003
MILLS	0.080	0.041	1.960	0.050
IND	YES			
Adjusted R^2	0.15			
F statistic	7.25 (p-value < 0.001)			
N	969			

See Table 2 for variable definitions

Table 7 The impact of CFO with accounting expertise on tax aggressiveness-changing the definition of CFO_ACC $ETR_{it} = \beta_0 + \beta_1 CFO\_ACC\_NEW_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 FOREIGN_{it} + \beta_6 BTM_{it} + \beta_7 NOL_{it} + \beta_8 DEP_{it} + \beta_9 EQINC_{it} + \beta_{10} MILLS_{it} + IND + \varepsilon_{it}$

	Coeff.	Std. error	*t*-statistic	*p*-value
Intercept	0.488	0.071	6.890	0.000
CFO_ACC_NEW	− 0.111	0.062	− 1.790	0.073
SIZE	− 0.014	0.005	− 2.730	0.006
LEV	− 0.079	0.044	− 1.800	0.072
ROA	− 0.776	0.125	− 6.230	0.000
FOREIGN	− 0.845	0.147	− 5.770	0.000
BTM	− 0.032	0.025	− 1.280	0.201
NOL	0.000	0.012	0.000	1.000
DEP	0.043	0.246	0.180	0.860
EQINC	− 4.599	1.322	− 3.480	0.001
MILLS	0.224	0.062	3.620	0.000
IND	YES			
Adjusted R^2	0.14			
F statistic	7.84 (p-value < 0.001)			
N	969			

CFO_ACC_NEW is a dummy variable that equals 1 if the CFO have CPA license or the CFO had been a CFO of another company, and 0 otherwise

See Table 2 for other variable definitions

fixed pay to their CFO with accounting expertise. The difference in the effects between variable and fixed pay interacted with accounting expert CFOs is consistent with the notion that a variable compensation scheme provides a greater incentive than a fixed compensation scheme to motivate executive effort toward the desired results. The coefficients on *LEV*, *FOREIGN* and *EQINC* remain negative and significant (*p*-value = 0.073, 0.000 and 0.003, respectively), consistent with the notion of the interest tax shield effect and tax complexity effect.

5 Robust and additional tests

5.1 Alternative definition of CFO with accounting expertise

A potential concern with our findings is whether our results are robust to different definitions of CFO with accounting expertise. To address this concern, we follow the definition of CFO with accounting expertise in Bedard et al. (2014), where a CFO with accounting expertise is either (1) a CFO having a CPA license or (2) a CFO who has worked as a CFO for other companies. We reconstruct our variable of interest, *CFO_ACC*, according to this definition (*CFO_ACC_NEW*) and conduct regression tests for Models (2) and (3). Tables 7

Table 8 The impact of compensation of CFO with accounting expertise on tax aggressiveness-changing the definition of CFO_ACC $ETR_{it} = \eta_0 + \eta_1 CFO\_ACC\_NEW_{it} + \eta_2 AB\_FIXED_{it} + \eta_3 AB\_VAR_{it} + \eta_4 CFO\_ACC\_NEW \times AB\_FIXED_{it} + \eta_5 CFO\_ACC\_NEW \times AB\_VAR_{it} + \eta_6 SIZE_{it} + \eta_7 LEV_{it} + \eta_8 ROA_{it} + \eta_9 FOREIGN_{it} + \eta_{10} BTM_{it} + \eta_{11} NOL_{it} + \eta_{12} DEP_{it} + \eta_{13} EQINC_{it} + \eta_{14} MILLS_{it} + IND + \varepsilon_{it}$

Variable	Coeff.	Std. error	*t*-statistic	*p*-value
Intercept	0.491	0.072	6.830	0.000
CFO_ACC_NEW	−0.107	0.062	−1.720	0.085
AB_FIXED	−0.207	27.063	−0.010	0.994
AB_VAR	−6.772	11.277	−0.600	0.548
CFO_ACC_NEW×*AB_FIXED*	53.596	49.693	1.080	0.281
CFO_ACC_NEW×*AB_VAR*	−44.894	20.828	−2.160	0.031
SIZE	−0.015	0.005	−2.900	0.004
LEV	−0.076	0.043	−1.740	0.082
ROA	−0.781	0.125	−6.270	0.000
FOREIGN	−0.834	0.146	−5.710	0.000
BTM	−0.031	0.025	−1.230	0.218
NOL	0.000	0.012	−0.010	0.989
DEP	0.040	0.245	0.160	0.869
EQINC	−4.455	1.314	−3.390	0.001
MILLS	0.230	0.062	3.720	0.000
IND	YES			
Adjusted R^2	0.190			
F statistic	8.77 (p-value < 0.001)			
N	969			

CFO_ACC_NEW is a dummy variable that equals 1 if the CFO have CPA license or the CFO had been a CFO of another company, and 0 otherwise

See Table 2 for other variable definitions

Table 9 The impact of compensation of CFO with accounting expertise on tax aggressiveness-dividing the components of incentive payment $ETR_{it} = \eta_0 + \eta_1 CFO\_ACC_{it} + \eta_2 AB\_FIXED_{it} + \eta_3 AB\_BONUS_{it} + \eta_4 AB\_OPTION_{it} + \eta_5 AB\_OTHERS_{it} + \eta_6 CFO\_ACC \times AB\_FIXED_{it} + \eta_7 CFO\_ACC \times AB\_BONUS_{it} + \eta_8 CFO\_ACC \times AB\_OPTION_{it} + \eta_9 CFO\_ACC \times AB\_OTHERS_{it} + \eta_{10} SIZE_{it} + \eta_{11} LEV_{it} + \eta_{12} ROA_{it} + \eta_{13} FOREIGN_{it} + \eta_{14} BTM_{it} + \eta_{15} NOL_{it} + \eta_{16} DEP_{it} + \eta_{17} EQINC_{it} + \eta_{18} MILLS_{it} + IND + \varepsilon_{it}$

	Coeff.	Std. error	*t*-statistic	*p*-value
Intercept	0.402	0.071	5.700	0.000
CFO_ACC	−0.096	0.096	−1.000	0.316
FIXED	10.148	26.871	0.380	0.706
AB_BONUS	29.431	83.815	0.350	0.726
AB_OPTION	−28.580	20.230	−1.410	0.158
AB_OTHERS	1.572	12.320	0.130	0.899
CFO_ACC×AB_FIXED	31.083	48.806	0.640	0.524
CFO_ACC×AB_BONUS	−468.204	168.403	−2.780	0.006
CFO_ACC×AB_OPTION	−0.883	34.386	−0.030	0.980
CFO_ACC×AB_OTHERS	−61.881	24.305	−2.550	0.011
SIZE	−0.005	0.004	−1.100	0.272
LEV	−0.071	0.043	−1.640	0.101
ROA	−0.774	0.124	−6.260	0.000
FOREIGN	−0.670	0.134	−5.010	0.000
BTM	−0.020	0.025	−0.780	0.436
NOL	−0.020	0.011	−1.850	0.065
DEP	−0.059	0.255	−0.230	0.816
EQINC	−3.862	1.307	−2.960	0.003
MILLS	0.075	0.038	1.990	0.047
IND	YES			
Adjusted R^2	0.18			
F statistic	7.69(p-value < 0.001)			
N	969			

See Table 2 for other variable definitions

AB_ BONUS, *AB_OPTION*, and *AB_OTHERS* are abnormal bonus, abnormal option, and abnormal other compensation of CFO, respectively.

Table 10 The impact of CFO with accounting expertise on tax aggressiveness-CFO from within/outside of the company $ETR_{it} = \beta_0 + \beta_1 OUTSIDE_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 FOREIGN_{it} + \beta_6 BTM_{it} + \beta_7 NOL_{it} + \beta_8 DEP_{it} + \beta_9 EQINC_{it} + \beta_{10} MILLS_{it} + IND + \varepsilon_{it}$

Variable	Coeff.	Standard Error	*t*-statistic	*p*-value
Intercept	0.783	0.162	4.850	0.000
OUTSIDE	−0.047	0.026	−1.830	0.069
SIZE	−0.029	0.013	−2.170	0.031
LEV	−0.243	0.112	−2.160	0.032
ROA	−0.987	0.308	−3.210	0.002
FOREIGN	−0.523	0.321	−1.630	0.105
BTM	−0.026	0.064	−0.410	0.681
NOL	−0.020	0.024	−0.830	0.405
DEP	0.653	0.544	1.200	0.232
EQINC	−8.683	2.623	−3.310	0.001
MILLS	−0.155	0.059	−2.620	0.009
IND	YES			
Adjusted R^2	0.14			
F statistic	7.84 (p-value < 0.001)			
N	223			

OUTSIDE is a dummy variable that equals 1 if the CFO is external appointment, and 0 otherwise

See Table 2 for other variable definitions

and 8 present the regression results for Models (2) and (3), respectively, using the alternative measurement of *CFO_ACC_NEW*.

The results remain consistent with those in Tables 5 and 6. The results of Table 7 show that the coefficient on *CFO_ACC_NEW* is negative and significant (*p*-value = 0.07), consistent with our H1 that CFOs with accounting expertise are related to greater corporate tax avoidance. The results of Table 8 show that the coefficient on *CFO_ACC_NEW* × *AB_VAR* is negative and significant (*p*-value = 0.03), supporting our H2 that a higher variable pay scheme interacted with accounting expertise of CFOs results in greater corporate tax avoidance. Hence, our findings are robust to the alternative definition of CFO with accounting expertise.

5.2 Components of variable incentive compensation

The results of Model (3) suggest that variable compensation better motivates accounting expert CFOs to develop more tax planning strategies. To examine the effects of different components of variable compensation interacted with accounting expert CFOs on corporate tax avoidance, we separate the abnormal variable compensation of CFOs (*AB_VAR*) into abnormal bonuses[1] (*AB_BONUS*), abnormal options award (*AB_OPTION*) and others (*AB_OTHERS*). The different components of variable pay may have different risks in the nature of incentive compensation. For example, the value of the option award may be contingent on the future stock returns of the issuing companies. Table 9 presents the results of the regression model for the three components of abnormal variable pay. The coefficients

[1] The definition of bonuses in Execucomp includes the dollar value of a bonus (both cash and non-cash) earned by the named executive officer during the fiscal year.

Table 11 The impact of CFO with accounting expertise on tax aggressiveness-CEO with accounting expertise $ETR_{it} = \beta_0 + \beta_1 CFO\_ACC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 FOREIGN_{it} + \beta_6 BTM_{it} + \beta_7 NOL_{it} + \beta_8 DEP_{it} + \beta_9 EQINC_{it} + \beta_{10} CEO\_ACC_{it} + \beta_{11} MILLS_{it} + IND + \varepsilon_{it}$ (6)

	Coeff.	Std. error	*t*-statistic	*p*-value
Intercept	0.427	0.079	5.410	0.000
CFO_ACC	− 0.193	0.111	− 1.740	0.082
SIZE	− 0.004	0.004	− 0.880	0.381
LEV	− 0.088	0.048	− 1.830	0.067
ROA	− 0.759	0.137	− 5.550	0.000
FOREIGN	− 0.681	0.150	− 4.540	0.000
BTM	− 0.025	0.028	− 0.880	0.377
NOL	− 0.018	0.012	− 1.500	0.135
DEP	− 0.090	0.284	− 0.320	0.750
EQINC	− 4.359	1.444	− 3.020	0.003
CEO_ACC	0.000	0.021	− 0.020	0.984
MILLS	0.075	0.041	1.820	0.069
IND	YES			
Adjusted R^2	0.14			
F statistic	7.45 (p-value < 0.001)			
N	969			

CEO_ACC_NEW is a dummy variable that equals 1 if the CEO has accounting expertise, and 0 otherwise
See Table 2 for other variable definitions

on *CFO_ACC*×*AB_BONUS* and *CFO_ACC*×*AB_OTHERS* are negative and significant (*p*-values = 0.006 and 0.011, respectively). The coefficient on *CFO_ACC*×*AB_OPTION*, however, is negative but nonsignificant, consistent with the notion that executives with accounting backgrounds tend to be more conservative in financial decisions (Bamber et al. 2010; Hoitash et al. 2016) and thus may prefer less risky incentive award instruments, such as bonuses. The results suggest that the risk attribute of different variable compensation instruments may have different effects on motivating accounting expert CFOs to adopt more tax planning strategies.

5.3 The effect between accounting expert CFOs from within or outside the company

Prior studies find that the decision to employ top management teams from either inside or outside a company affects future corporate strategies and performance (Kotter 1982; Dalton and Kesner 1983; Wiersema and Bantel 1992). Successors of top executives employed from outside a company are more likely to adopt changes in corporate strategies, whereas top executives promoted from within the company are likely to adopt a maintenance strategy. To examine the effects of accounting expert CFOs from outside or within the company on tax avoidance, we separate accounting expert CFOs into those recruited from outside the company and those promoted from within the company. Our test variable is *OUTSIDE,* which is set to one if the accounting expert CFO is recruited from outside of the company and zero if internally promoted from within the company. Table 10 presents the regression results for testing the effect of inside/outside succession of CFOs on corporate tax

Table 12 The impact of compensation of CFO with accounting expertise on tax aggressiveness-CEO with accounting expertise $ETR_{it} = \eta_0 + \eta_1 CFO\_ACC_{it} + \eta_2 AB\_FIXED_{it} + \eta_3 AB\_VAR_{it} + \eta_4 CFO\_ACC \times AB\_FIXED_{it} + \eta_5 CFO\_ACC \times AB\_VAR_{it} + \eta_6 SIZE_{it} + \eta_7 LEV_{it} + \eta_8 ROA_{it} + \eta_9 FOREIGN_{it} + \eta_{10} BTM_{it} + \eta_{11} NOL_{it} + \eta_{12} DEP_{it} + \eta_{13} EQINC_{it} + \eta_{14} CEO\_ACC_{it} + \eta_{15} MILLS_{it} + IND + \epsilon_{it}$ (7)

	Coeff.	Std. error	*t*-statisctic	*p*-value
Intercept	0.422	0.078	5.420	0.000
CFO_ACC	−0.178	0.109	−1.640	0.102
AB_FIXED	4.468	29.213	0.150	0.879
AB_VAR	−6.820	12.182	−0.560	0.576
CFO_ACC×*AB_FIXED*	53.412	53.618	1.000	0.319
CFO_ACC×*AB_VAR*	−44.638	22.479	−1.990	0.047
SIZE	−0.005	0.004	−1.040	0.297
LEV	−0.084	0.047	−1.800	0.073
ROA	−0.762	0.135	−5.650	0.000
FOREIGN	−0.669	0.147	−4.550	0.000
BTM	−0.022	0.028	−0.810	0.416
NOL	−0.018	0.012	−1.560	0.119
DEP	−0.080	0.279	−0.290	0.775
EQINC	−4.222	1.416	−2.980	0.003
CEO_ACC	−0.001	0.020	−0.070	0.946
MILLS	0.080	0.041	1.950	0.052
IND	YES			
Adjusted R^2	0.15			
F statistic	6.94 (p-value < 0.001)			
N	969			

CEO_ACC_NEW is a dummy variable that equals 1 if the CEO has accounting expertise, and 0 otherwise
See Table 2 for other variable definitions

avoidance. The coefficient on *OUTSIDE* is negative and significant (*p*-value = 0.069). The result suggests that accounting expert CFOs recruited from outside the company are likely to adopt more tax planning strategies, resulting in lower *ETR*, consistent with the notion that outside successors of top executives are more likely to adopt changes in corporate strategies.

5.4 Controlling for the effect of CEO with accounting expertise

Baker et al. (2018) indicate that the relative powers of CEOs and CFOs may have an impact on the extent of firms' accruals and real earnings management. In addition, Matsunaga and Yeung (2008) and Jiang et al. (2013) find that companies of CEOs with financial expertise are associated with more conservative earnings reporting and higher earnings quality. CEOs with accounting expertise may have a greater influence in directing corporate tax reporting decisions than their counterparts without accounting expertise. To control for the potential impact of accounting expert CEOs on the relation between CFOs with accounting expertise and corporate tax avoidance, we construct Models (6) and (7) by adding the

variable *CEO_ACC* to Models (2) and (3), respectively. *CEO_ACC* is defined as one if the CEO of the company is an accounting expert and zero otherwise. Models (6) and (7) are as follows.

$$\begin{aligned} ETR_{it} = {} & \beta_0 + \beta_1 CFO\_ACC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 FOREIGN_{it} \\ & + \beta_6 BTM_{it} + \beta_7 NOL_{it} + \beta_8 DEP_{it} + \beta_9 EQINC_{it} + \beta_{10} CEO\_ACC_{it} \\ & + \beta_{11} MILLS_{it} + IND + \varepsilon_{it} \end{aligned} \tag{6}$$

$$\begin{aligned} ETR_{it} = {} & \eta_0 + \eta_1 CFO\_ACC_{it} + \eta_2 AB\_FIXED_{it} + \eta_3 AB\_VAR_{it} \\ & + \eta_4 CFO\_ACC \times AB\_FIXED_{it} + \eta_5 CFO\_ACC \times AB\_VAR_{it} + \eta_6 SIZE_{it} + \eta_7 LEV_{it} \\ & + \eta_8 ROA_{it} + \eta_9 FOREIGN_{it} + \eta_{10} BTM_{it} + \eta_{11} NOL_{it} + \eta_{12} DEP_{it} \\ & + \eta_{13} EQINC_{it} + \eta_{14} CEO\_ACC_{it} + \eta_{15} MILLS_{it} + IND + \varepsilon_{it} \end{aligned} \tag{7}$$

Tables 11 and 12 report the regression results after controlling for the effect of accounting expert CEOs. The results of Tables 11 and 12 show that both of the coefficients on *CFO_ACC* and *CFO_ACC*×*AB_VAR* remain negative and significant (p-values = 0.082 and 0.047, respectively). The results are consistent with those in Tables 5 and 6 after controlling for the effect of the accounting expertise of CEOs.

6 Conclusions

CFOs play an essential role in making a company's financing decisions and driving operating performance. Corporate tax cost affects various business decisions and financial performance. Hence, CFOs with accounting expertise may contribute to corporate financial performance by better exploiting tax planning alternatives. Furthermore, companies may motivate their CFOs to improve their performance by designing efficient managerial compensation schemes, thereby linking compensation to performance. Prior studies have explored the effects of senior managers' work experience and demographic characteristics on corporate strategies as well as operating results (Bantel and Jackson 1989; Bertrand and Schoar 2003; Dyreng et al. 2010). However, few prior studies have directly addressed the effect of CFOs' accounting expertise on firms' tax planning decisions. CFOs are responsible for a company's financial reporting as well as tax compliance. Accounting expertise is closely related to tax decisions. The question of whether CFOs with accounting expertise affect a firm's tax compliance behaviors remains unanswered. We investigate the effect of the accounting expertise of CFOs on corporate tax avoidance. Furthermore, we extend the previous research on the effect of executive incentive compensation on corporate tax avoidance by investigating the interactive effect between incentive compensation schemes and the accounting expertise of CFOs. Our results show that CFOs with accounting expertise are associated with lower ETRs, consistent with the notion that accounting expertise is closely related to corporate tax planning, and thus, CFOs with accounting expertise are better at exploring tax planning opportunities. Furthermore, we find that the abnormal variable pay of CFOs with accounting expertise is negatively associated with corporate ETRs, suggesting that compensation design, such as the use of variable pay, has an effect on motivating CFOs with accounting expertise to exploit more tax planning opportunities. Our results are robust to the alternative definition of CFO with accounting expertise and

various additional tests. The findings of this paper extend prior research on the effects of senior managers' demographic characteristics and compensation designs.

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