UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master's Thesis in Accounting and Financial Management
Supervisor: Niuosha Samani
Graduate School
Spring 2019

Does the design of CEO equity-based compensation contracts mitigate agency costs? Evidence from the U.K.

Axel Olof Persson*
School of Business, Economics and Law at the University of Gothenburg

Filip Pettersson**
School of Business, Economics and Law at the University of Gothenburg

*gusperax@student.gu.se **guspettefi@student.gu.se

Abstract: Using a sample of 185 U.K. firms over the time-period 2013 to 2017, we investigate if the degree of granted CEO equity-based compensation is positively associated with audit fees. Further, we investigate whether the design of CEO equity-based compensation contracts is associated with variations in audit fees. We find audit fees to significantly increase when higher degrees of equity-based compensation are granted for CEOs, consistent with the notion that auditors perceive highly incentivised CEOs as more prone to act opportunistically. Further, our findings suggest that the design of CEO equity-based compensation contracts is associated with variations in audit fees, where firms with market-based performance targets present higher audit fees, as compared to accounting- or combination-based targets. Conversely, firms applying accounting-based targets present lower audit fees. Our findings highlight the importance of an adequate design of CEO equity-based compensation contracts, to mitigate agency costs to the greatest extent.

Keywords: Equity-based compensation; Opportunistic behaviour; Audit fees.

Acknowledgements: We would like to thank our supervisor Niuosha Samani, providing us with insightful comments and guidance. We also extend our gratitude to seminar leader Mari Paananen and other seminar discussants, providing relevant feedback during the process of our writing.

Table of Contents

1. Introduction

We examine if audit fees are affected by the proportion of granted CEO equity-based compensation (EBC)[1], with the aim of investigating whether the design[2] of compensation contracts influence CEOs to act opportunistically. We extend prior research, suggesting that higher degrees of granted CEO EBC to total compensation increases opportunistic behaviour, thereby increasing audit fees, a proxy for agency costs[3] (Chen, Gul, Veeraraghavan, & Zolotoy, 2015; Kim, Li & Li, 2015; Qu, Yao & Percy, 2018). Our primary motivation for this study stems from the expressed concerns by the Public Company Accounting Oversight Board[4] (PCAOB) regarding unintended negative effects of incentive contracts. In 2013, the PCAOB proposed an auditing standard that would require auditors to be more aware of, and consequently increase their efforts, when auditing firms associated with the risk of incentivised managers. In order to reach performance targets, fraudulent behaviour could occur, implying an increased risk of misstatements in financial reports (PCAOB, 2013).

Prior research (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018) investigating the association between CEO EBC and audit fees build on two different streams of literature. The first stream investigates the relation between EBC and the risk of opportunistic behaviour, where managers with EBC has greater incentives to act opportunistically (e.g., Cheng & Warfield, 2005; Bergstresser & Philippon, 2006; Burns & Kedia, 2006; Efendi, Srivastava & Swanson, 2007; Sanders & Hambrick, 2007). The second stream examines the association between managerial opportunistic behaviour and audit risk, where firms that display a heightened risk face higher audit fees (e.g., Bedard & Johnstone, 2004; Hogan & Wilkins, 2008; Charles, Glover, & Sharp, 2010; Gopal, Sun, Wang & Yang, 2013).

Wysocki (2010) state that research investigating these streams of literature separately are rich, but empirical evidence linking these two is scarce, highlighting an existing literature gap. Followingly, the PCAOB's (2013) concerns generated a new stream of literature where Chen et al. (2015) and Kim et al. (2015) were amongst the first to provide empirical evidence on the direct association between CEO EBC and audit fees. The authors' findings suggest that higher degrees of CEO EBC increase audit fees. Further, Qu et al. (2018) extend prior research

[1] EBC regard the issuance of shares or the right to buy shares. EBC can take two forms, as stock options or restricted stock, and the latter becomes transferable only if employees stay with the firm over a certain time-period and reach specific predetermined targets (International Accounting Standards Board [IASB], 2004).
[2] Contractual design refers to performance target and vesting period.
[3] More specifically, the agency costs of monitoring.
[4] The PCAOB is a U.S. non-profit corporation established by the U.S. congress, aiming to protect investors and the public interest from fraudulent behaviour conducted by firms (PCAOB, 2013).

by examining the design of CEO EBC contracts and its relation to audit fees, analysing the effects of different performance targets and vesting periods. The authors find that CEOs act more opportunistically when performance targets are accounting-based, and when compensation contracts have shorter vesting periods. Based on prior findings, we expect that higher degrees of CEO EBC are positively associated with audit fees, and that the design of CEO EBC contracts is associated with variations in audit fees.

We use a sample of 185 U.K. firms over the time-period 2013 to 2017, since the U.K. has amongst the highest total executive compensation in Europe, and by far the largest proportion of EBC to total compensation, more than double the amount of the European average[5] (Conyon, Fernandes, Ferreira, Matos & Murphy, 2013). For decades, executive pay has been highly debated and criticised in the U.K., and regulators have consequently acted in response to the criticism (Ferri & Maber, 2013). The U.K. was the first country to mandate an annual shareholder vote on executive pay proposed by the remuneration committee, and implemented in 2002, its aim was to provide transparency and accountability (ibid.). In comparison, the U.S. did not mandate shareholders to vote on executive pay until 2011. Due to the enforcement- and legal environment in the U.K.[6], the country is deemed mildly legislative (Seetharaman, Gul & Lynn, 2002).

Our study establishes several findings. Firstly, we observe a positive association between CEO EBC and audit fees, implying that auditors perceive a heightened risk of opportunistic behaviour when CEOs are granted higher degrees of EBC. Secondly, we find that the design of CEO EBC contracts is associated with variations in audit fees, where firms with market-based performance targets present higher audit fees, as compared to accounting- or combination-based targets. Conversely, firms applying accounting-based targets present lower audit fees. Thirdly, our study suggests that the vesting period of CEO EBC contracts does not affect auditors' perception of audit risk.

We conduct several robustness checks to validate our results, controlling for heteroscedasticity, heterogeneity and multicollinearity. We also conduct Heckman's (1979)

[5] Approximately 45 percent of EBC to total compensation compared with the European average of 20 percent (Conyon et al., 2013).

[6] In the U.K., all publicly traded firms on the London Stock Exchange (LSE) report under IFRS, and share-based compensation is disclosed in accordance with IFRS 2 (IASB, 2004). The standard requires firms to provide transparency on what the share-based compensation is based upon, such as performance targets and vesting period (ibid.). Beside IFRS disclosure requirements, the U.K. has required firms listed on the LSE to follow the principles provided by the U.K. Corporate Governance Code (Financial Reporting Council, 2018). These principles establish how a remuneration committee should be structured, that remuneration reports have to be transparent and why the chosen performance targets are relevant (ibid.).

two-stage procedure to mitigate potential selection bias and perform a two-stage least squares (2SLS) regression model to control for potential endogeneity.

Numerous studies investigate the EBC and audit fee literature separately, although, empirical evidence linking these two is scarce. Consequently, Wysocki (2010) address an existing literature gap. Deriving from the PCAOB's (2013) concerns, Chen et al. (2015) and Kim et al. (2015) were amongst the first investigating the direct association between CEO EBC and audit fees. Our study makes several contributions, firstly, Qu et al. (2018) extend prior research by adding attributes related to the design of CEO EBC contracts. However, the findings presented by Qu et al. (2018) have several limitations. The authors include stock options, and we argue that these should be excluded since stock options are independent of performance targets set by the remuneration committee (Bird & Bird, 2018). Consequently, stock options are not applicable when investigating the association between the design of CEO EBC contracts and audit fees, since performance targets relate to contractual design. Further, Qu et al. (2018) do not disclose how firms' performance targets are defined, which becomes problematic since the authors main hypotheses are tested with manually obtained data, lacking adequate explanations. Hence, there exists a need to extend prior research (Chen et al., 2015; Kim et al., 2015) and to strengthen the results provided by Qu et al. (2018) by excluding stock options and provide more transparent definitions. Secondly, prior studies (Chen et al., 2015; Kim et al., 2015) gain motivation from the PCAOB's (2013) concerns, but the authors base their empirical evidence from the years prior the report, making our study unique by analysing the time-period post the report. Thirdly, we add empirical evidence to the audit fee literature by extending the audit fee model, adding several attributes related to CEO EBC, such as contractual design, to further identify the determinants of audit fees. Taken together, EBC is an alignment tool that may create unintended effects, and we address the literature gap by providing empirical evidence on the association between CEO EBC contractual design and audit fees.

Our study proceeds as follows. In section two, we discuss related literature within the field of executive compensation and audit fees, where we subsequently develop our hypotheses. In section three, we provide our data collection process, sample selection, model design, variables description, descriptive statistics and conducted robustness checks. Our results and analyses are presented in the fourth section and finally, section five presents our conclusions and suggestions for future research.

2. Prior literature and hypothesis development

Jensen and Meckling (1976) state that there exists a conflict of interest between the principal (i.e., shareholder) and the agent (i.e., manager), causing agency costs to arise, such as bonding- and monitoring costs and residual loss. There exist several corporate governance tools to mitigate this conflict, one of these are managerial compensation contracts (Shleifer & Vishny, 1997). Our study stands on two different streams of literature related to EBC. The first stream of literature investigates the association between managerial opportunistic behaviour and EBC, and a large proportion of these studies relate to earnings management. Healy and Wahlen (1999) define earnings management as distortion of financial reports, to mislead stakeholders about the firm's economic state or performance, or to affect contractual outcomes dependent on reported accounting numbers. Prior studies suggest that managers with EBC present an increased risk of earnings manipulation through different techniques, such as abnormal accruals or earnings smoothing (e.g., Gul, Chen & Tsui, 2003; Cheng & Warfield, 2005; Burns & Kedia, 2006; Bergstresser & Philippon, 2006; Efendi, Srivastava & Swanson, 2007). Similarly, managers may also act opportunistically by stimulating stock prices by excessive risk-taking, timing disclosures and overinvesting in research and development (Aboody & Kasznik 2000; Rajgopal, & Shevlin, 2002; Sanders & Hambrick, 2007).

The second stream provides evidence on the association between managerial opportunistic behaviour and audit risk. Auditors estimate increased effort and consequently, higher billing rates for clients who display a heightened risk of opportunistic behaviour, and this positive relation is also greater for firms with lower internal control (e.g., Bedard & Johnstone, 2004; Hogan & Wilkins 2008; Charles Glover & Sharp, 2010; Gopal, Sun, Wang & Yang, 2013). The authors argue that auditors will spend more time and demand more compensation per hour, when including manipulation as a risk factor (ibid.). Chen et al. (2015) and Kim et al. (2015) were amongst the first to provide empirical evidence on the direct association between CEO EBC and audit fees. Accordingly, Qu et al. (2018) find a positive and significant relation between the degree of CEO EBC and audit fees. Deriving from prior research and its empirical evidence, our reasoning lead to the first hypothesis:

Hypothesis 1: *There exists a positive and significant relation between the degree of equity-based compensation and audit fees.*

Baker (2000) argues that it is of great importance how CEO EBC contracts are designed. The author state that market-based performance targets[7] reduce noise in observed performance which in turn increases precision in identifying managerial effort. Further, Matolcsy, Riddell and Wright (2009) argue that market-based performance targets are fairer and more objective compared to accounting-based targets, lowering incentives for managers to conduct earnings manipulation. Accordingly, Qu et al. (2018) find that firms applying market-based performance targets present lower audit fees. In contrast, Barclay, Gode and Kothari (2005) state that managers connected to market-based performance targets can act opportunistically by misleading investors, promoting lucrative future projects that may never be realised. Further, Merchant (2006) suggests that it can be difficult to apply market-based performance targets to measure top management performance. The author argues that a significant proportion of the development in stock prices are connected to macroeconomic activities, implying that stock prices are not exclusively dependent on managerial performance.

Applying accounting-based performance targets could incentivise CEOs to act fraudulently for personal gains, misusing existing accounting rules (Watts, 2003). Accordingly, Qu et al. (2018) find that firms applying accounting-based performance targets present higher audit fees, arguing that CEOs are more prone to act opportunistically to increase the likelihood of reaching targets. However, Merchant (2006) argues that accounting-based performance targets are relatively accurate and objective, since measurements of accounting-based targets are evaluated quarterly or monthly, implying that managerial performance is consistently assessed. Further, external auditors possess superior knowledge in accounting, enabling them to investigate potential abuse in the reported financials, suggesting that measurements of managerial performance through accounting numbers are largely objective (ibid.).

Firms also adopt a combination of performance targets, and Merchant (2006) argues that the effects of this design are largely unknown. However, Qu et al. (2018) find combination-based performance targets to be negatively associated with audit fees, based on the notion that this design more completely reflects managerial performance, hence, motivating optimal decision-making.

Lastly, EBC contracts with extended vesting periods attract CEOs to remain with the firm, thereby promoting a more long-term focus (Bebchuk & Fried, 2010; Cadman & Sunder, 2014). Managers are more likely to manipulate current earnings if their compensation is based on short-term targets, which consequently increases auditors' perception of audit risk (Vafeas

[7] Baker (2000) exemplifies a market-based performance target as the development of the firm's stock price compared with peers.

& Waegelein, 2007). Accordingly, Qu et al. (2018) add vesting period to their audit fee model, suggesting that there exists a significant and negative association between contractual length and audit fees. The authors argue that longer vesting periods decrease the risk of managerial opportunistic behaviour. Similar to Qu et al. (2018), we expect different performance targets and vesting periods to affect auditors' perception of audit risk and consequently, the degree of audit fees. Due to contracting arguments by prior research, we do not specify the sign of the relation and state the following hypothesis:

Hypothesis 2: *The design of CEO EBC contracts is associated with variations in audit fees.*

3. Research design

3.1 Data collection and sample selection

We have gathered audit fee- and financial data from Bloomberg, except institutional ownership and firm complexity which have been obtained from Datastream and Thomson Reuters, respectively. CEO EBC and total compensation has been partly obtained from Bloomberg, but due to missing observations, a majority has been manually gathered from annual reports. When gathering CEO EBC data, we exclude stock options, since these do not relate to any performance target set by the remuneration committee. By only examining restricted stocks, we can control for performance targets, to analyse how the design of CEO EBC contracts affect audit fees. Motivated by analysing the time-period post the PCAOB's (2013) report, our sample stretches over a five-year time-period from 2013 to 2017. Data has been obtained by screening U.K. firms in 2017 by total assets, from largest to smallest, excluding financial firms since their business structure significantly differs compared to non-financial firms.

Our initial sample consists of 200 firms over a five-year time-period, totalling 947 firm-year observations[8]. Further, a significant proportion of these firms do not grant CEO EBC over the entire time-period. Prior research drops CEO EBC observations equalling 0, arguing that the relation between CEO EBC and audit fees is otherwise difficult to identify in a randomised sample (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). Accordingly, we exclude 364 observations, receiving a sample of 187 firms and 584 firm-year observations. Lastly, we exclude the real estate industry due to insufficient data, and our final data-set contain 185 firms and 579 firm-year observations. Industry distribution is presented in Appendix table 1.

[8] Initially, we receive 1000 firm-year observations. However, 53 observations were removed due to missing data.

3.2 Model design

To investigate the relation between CEO EBC and audit fees, corresponding with our first hypothesis, we follow prior research (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018) and add CEO EBC attributes to the proposed audit fee model by Simunic (1980). Specifically, we estimate the following regression model:

$$LAUDITFEE_{it} = \alpha_0 + \alpha_1 EQUITYCOMP_{it} + \sum_{i=1}^{m} \beta_{it}\, Controls_{it} + \sum_{k=1}^{k} \gamma_k Ind_{it} + \sum_{y=2013}^{y} \delta_y Yr_i + \varepsilon_{it} \quad (1)$$

where *i* denotes firm and *t* denotes year, *Ind* is industry fixed effects based on the Global Industry Classification Standard (GICS)[9], *Yr* is year fixed effects, and ε represents the error term. The dependent variable is the logarithmic value of audit fees (*LAUDITFEE*) and the independent variable is the ratio of CEO EBC to total compensation (*EQUITYCOMP*), with the underlying assumption that higher degrees of CEO EBC increases the potential risk of opportunistic behaviour. We include several control variables, denoted *Controls*, and all variables are described in table 1 below. The regression is estimated by a pooled ordinary least squares (OLS) model with clustering at firm level.

We investigate if the design of CEO EBC contracts is associated with variations in audit fees, corresponding with our second hypothesis. We follow prior research (Qu et al., 2018) by extending model (1) and estimate three separate regression models, adding market- (*MARK*), accounting- (*ACC*) and combination-based (*COMB*) performance targets. In this study, we make the assumption that when a firm has more than two thirds of a compensation contract connected to one target, it is considered a majority and therefore, either market- or accounting-based. With no majority, the compensation contract's performance target is defined as combination-based. Further, we add *VESTING* as independent variable, which was included as a control variable in model (1). Finally, for our second hypothesis, the variable of interest is the interaction term between *EQUITYCOMP* and each performance target. Specifically, we estimate the following regression models:

$$LAUDITFEE_{it} = \alpha_0 + \alpha_1 EQUITYCOMP_{it} + \alpha_2 MARK_{it} + \alpha_3 (EQUITYCOMP_{it} * MARK_{it}) + \alpha_4 VESTING_{it} + \sum_{i=1}^{m} \beta_{it}\, Controls_{it} + \sum_{k=1}^{k} \gamma_k Ind_{it} + \sum_{y=2013}^{y} \delta_y Yr_i + \varepsilon_{it} \quad (2)$$

[9] Specifically, we assign a one-digit code to each of the 10 sectors, based on the GICS.

$$LAUDITFEE_{it} = \alpha_0 + \alpha_1 EQUITYCOMP_{it} + \alpha_2 ACC_{it} + \alpha_3 (EQUITYCOMP_{it} * ACC_{it}) + \alpha_4 VESTING_{it} + \sum_{i=1}^{m} \beta_{it}\, Controls_{it} + \sum_{k=1}^{k} \gamma_k Ind_{it} + \sum_{y=2013}^{y} \delta_y Yr_i + \varepsilon_{it} \quad (3)$$

$$LAUDITFEE_{it} = \alpha_0 + \alpha_1 EQUITYCOMP_{it} + \alpha_2 COMB_{it} + \alpha_3 (EQUITYCOMP_{it} * COMB_{it}) + \alpha_4 VESTING_{it} + \sum_{i=1}^{m} \beta_{it}\, Controls_{it} + \sum_{k=1}^{k} \gamma_k Ind_{it} + \sum_{y=2013}^{y} \delta_y Yr_i + \varepsilon_{it} \quad (4)$$

Table 1: Variables description

Variable	Description
LAUDITFEE	Audit fees, defined as the natural logarithm of external audit fees. Data has been obtained from Bloomberg.
EQUITYCOMP	CEO equity-based compensation, defined as total CEO equity-based compensation divided by total CEO compensation that includes salary, bonuses and other variable pay. Data has been obtained from Bloomberg and manually gathered from annual reports.
SIZE	Firm size, defined as the natural logarithm of total assets. Data has been obtained from Bloomberg.
NONAUDIT	Non-audit fees, defined as the natural logarithm of non-audit fees. Data has been obtained from Bloomberg.
REVG	Revenue growth, defined as the change in revenues from the previous year. Data has been obtained from Bloomberg.
ROA	Return on assets, defined as the trailing 12-months net income divided by average total assets. Data has been obtained from Bloomberg.
MTB	Market-to-book, defined as the average market capitalisation divided by the average book value. Data has been obtained from Bloomberg.
LEV	Leverage, defined as long-term debt divided by total assets. Data has been obtained from Bloomberg.
QUICK	Quick-ratio, defined as current assets subtracted by inventories, divided by total assets. Data has been obtained from Bloomberg.
TANG	Tangibility, defined as property, plant and equipment divided by total assets. Data has been obtained from Bloomberg.
CAPEX	Capital expenditures, defined as capital expenses divided by total assets. Data has been obtained from Bloomberg.
RECINV	Receivables and inventory ratio, defined as receivables plus inventories divided by total assets. Data has been obtained from Bloomberg.
CASH	Cash-ratio, defined as cash and cash equivalents divided by total assets. Data has been obtained from Bloomberg.
INSTOWN	Institutional ownership, defined as the percent of dispersed shares, where a value of 100 mean that 100 percent of outstanding shares are dispersed to small owners, therefore, no institutional owners exist. To be regarded as an institutional owner, the investor must own more than 5 percent of the outstanding shares. Data has been obtained from Datastream.
CEOAGE	CEO age, defined as the age of the CEO. Data has been obtained from Bloomberg and manually gathered from company reports.
TENURE	CEO tenure, defined as the natural logarithm of the number of years the CEO has had the position as CEO. Data has been obtained from Bloomberg and manually gathered from company reports.
VESTING	Vesting period, defined as the number of years before exercising equity-based compensation is permitted. Data has been manually gathered from annual reports.

AUDITSIZE	Audit committee size, defined as the number of committee members that sit on the audit committee. Data has been obtained from Bloomberg and manually gathered from annual reports.
AUDITTEN	Audit tenure, defined as the number of years the auditor has been consequently employed by the firm. Data has been obtained from Bloomberg and manually gathered from annual reports.
ROYCHOW	Real activities manipulation, defined by Roychowdhury (2006) as abnormal cash flows, calculated as the residual (ε_{it}) from the following cross-sectional regression for every industry and year: $CFO_{it}/A_{it-1} = \alpha_0 + \alpha_1(1/A_{it-1}) + \beta_1(S_{it}/A_{it-1}) + \beta_2(\Delta S_{it}/A_{it-1}) + \varepsilon_{it}$. Data has been obtained from Bloomberg.
DECHOW	Discretionary accruals, defined as the Modified Jones Model suggested by Dechow, Sloan and Sweeney (1995). Discretionary accruals are calculated as the residual (ε_{it}) by the following regression: $TAC_{it}/TA_{it-1} = \alpha_0 + \beta_1(1/TA_{it-1}) + \beta_2((\Delta REV_{it} - \Delta REC_{it})/TA_{it-1}) + \beta_3(PPE_{it}/TA_{it-1}) + \varepsilon_{it}$ where: $TAC_{it} = (\Delta CA_{it} - \Delta CL_{it} + \Delta Cash_{it} + \Delta STD_{it} - DEP_{it})/(A_{it-1})$. Data has been obtained from Bloomberg.
MARK	Dummy equal to 1 if the firm's performance targets are market-based, and 0 otherwise. Defined as a market-based target if more than two thirds of the total stated targets are market-based, according to the firm's remuneration report. Data has been manually gathered from annual reports.
ACC	Dummy equal to 1 if the firm's performance targets are accounting-based, and 0 otherwise. Defined as an accounting-based target if more than two thirds of the total stated targets are accounting-based, according to the firm's remuneration report. Data has been manually gathered from annual reports.
COMB	Dummy equal to 1 if the firm's performance targets are combination-based, and 0 otherwise. Defined as a combination-based target if less than two thirds of the total stated targets are either market- or accounting-based, according to the firm's remuneration report. Data has been manually gathered from annual reports.
LOSS	Dummy equal to 1 if the firm incurred net income losses in the current or previous year, 0 otherwise. Data has been obtained from Bloomberg.
COMPLEX	Dummy equal to 1 if the industry is considered highly-legislative, and 0 otherwise. Defined as firms with the SIC-codes 2833-2838, 3570-3577, 3600-3674, 5200-5961, 7370-7374 and 8731-8734. SIC-codes has been obtained from Thomson Reuters.

3.3 Control variables

In our regression models, we control for firm financials, CEO attributes, corporate governance mechanisms and firm complexity. Prior studies suggest audit fees to be positively associated with firm size, receivables and inventories to assets, non-audit fees, loss in the current or previous year, leverage and capital expenditures (Simunic, 1980; Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). Conversely, several factors are expected to be negatively associated with audit fees, such as revenue growth, quick-ratio, book-to-market ratio, tangibility and return on assets (ibid.).

Prior research argues that CEO attributes such as tenure and age are negatively associated with opportunistic behaviour (Gotti, Han, Higgs & Kang, 2012; Chen et al., 2015; Ali & Zhang, 2015; Yasser & Mamun, 2015; Hou & Lovett, 2017). Further, CEOs could abuse their power, influencing the CFO to act opportunistically with the use of discretionary accruals

(Feng, Ge, Luo & Shevlin, 2011). Consequently, we control for abnormal accruals, applying the modified Jones model suggested by Dechow, Sloan and Sweeney (1995) in accordance with prior research (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). Similarly, CEOs can be involved in real activities manipulation[10], affecting operations to temporarily increase sales or reduce expenses in order to reach performance targets (Dechow & Sloan, 1991; Roychowdhury, 2006). Prior findings suggest that executives are more prone to conduct real activities manipulation compared to accrual-based manipulation, since it is more difficult for auditors to detect fraud when operational activities are manipulated (Graham, Harvey & Rajgopal, 2005; Cohen, Dey & Lys, 2008). To control for real activities manipulation, we adopt Roychowdhury's (2006) suggested model to detect real earnings management, based on operating cash flows.

Stronger corporate governance mechanisms in firms will reduce the risk of opportunistic behaviour and consequently, decrease audit fees (Simunic, 1980; Knechel & Willekens, 2006). Prior studies provide evidence of a positive relation between audit committee size and audit fees, since larger committees demand greater effort (Beasley, Carcello, Hermanson & Neal, 2009; Gul, Fung & Jaggi, 2009). Therefore, we include audit committee size as a control variable. Additionally, we control for auditor tenure which is suggested by prior research to be positively associated with audit fees (Chen et al., 2015; Qu et al., 2018). We also control for institutional ownership in accordance with prior research (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). Velury and Jenkins (2006) argue that investors with greater ownership will demand stronger corporate governance and higher audit quality compared to non-institutional owners. Lastly, we control for firm complexity since firms that operate in highly legislative industries are generally charged with higher audit fees (Seetharaman et al., 2002; Zaman, Hudaib & Haniffa, 2011).

3.4 Descriptive statistics

In table 2, we present descriptive statistics for our final data-set, and the initial data-set is provided in Appendix table 2. When dropping CEO EBC observations equalling 0, mean values for audit fees (*LAUDITFEE*) and CEO EBC to total compensation (*EQUITYCOMP)* increases in the final data-set, although, the control variables do not significantly differ. We can observe mean and median values for audit fees of approximately 2.6 and 0.6 million U.S.

[10] Real activity manipulation regard opportunistic behaviour conducted by CEOs, departing from normal operational activities, for example, by temporarily increase sales or reduce expenses (Roychowdhury, 2006).

dollars, respectively, corresponding with prior research[11] (Chen et al., 2015; Kim et al., 2015). In an Australian context, Qu et al. (2018) deviate by presenting mean and median values of 9.5 and 0.9 million U.S. dollars, respectively. The independent variable *EQUITYCOMP* presents a mean value of approximately 39 percent, compared with 28 percent as shown by Qu et al. (2018), suggesting that U.K. firms on average grant higher degrees of CEO EBC compared to Australian firms. In this study, we define how performance targets are selected, which has the implication that the value of our performance targets *MARK, ACC* and *COMB* significantly differ compared to Qu et al. (2018)[12]. Lastly, we can observe that the independent variable *VESTING* presents a mean and median value of 3.6 and 3 years, respectively[13].

The correlation matrix in table 3 present that *LAUDITFEE* and *EQUITYCOMP* are positively correlated to approximately 22 percent, at a 5 percent significance level. Further, *LAUDITFEE* is significantly and highly correlated with total assets (*SIZE*) with a correlation coefficient of 80 percent. Thus, it is important to include size as a control variable when investigating the relation between CEO EBC and audit fees. However, *LAUDITFEE* is not significantly correlated with our other independent variables *MARK*, *ACC*, *COMB* or *VESTING*.

Table 2: Descriptive statistics

Variable	Obs.	Min	Max	Mean	Median	Std. deviation
*LAUDITFEE**	579	-4.962	3.689	-0.223	-0.498	1.501
		(0.007)	(40.005)	(2.581)	(0.608)	(5.349)
EQUITYCOMP	579	0.009	88.363	39.314	39.808	22.408
SIZE	579	4.077	12.630	7.759	7.702	1.659
NONAUDIT	579	-6.215	3.681	-0.925	-0.947	1.562
REVG	579	-67.779	84.369	7.503	5.923	18.354
ROA	579	-21.978	31.803	6.747	6.356	8.085
MTB	579	-9.055	20.666	3.841	2.831	4.004
LEV	579	0.000	75.562	19.913	18.985	17.467
QUICK	579	19.633	505.730	116.426	95.706	87.148
TANG	579	0.218	89.137	27.725	19.056	26.435
CAPEX	579	0.000	96.311	8.460	3.685	15.491
RECINV	579	0.326	88.641	20.156	14.238	18.943
CASH	579	0.300	57.206	9.950	6.924	10.506
INSTOWN	579	31.000	100.000	83.382	89.000	15.671
CEOAGE	579	39.000	69.000	53.392	53.000	5.665
TENURE	579	-2.230	3.548	1.504	1.734	1.125
VESTING	579	3.000	6.000	3.644	3.000	0.913

[11] Chen et al. (2015) and Kim et al. (2015) analyse U.S. firms, presenting mean values of 2.9 and 2.6 million U.S. dollars, respectively. However, Chen et al. (2015) and Kim et al. (2015) show higher median values of 1.4 and 1.3 million U.S. dollars, respectively.

[12] Qu et al. (2018) do not define what determines a performance target, therefore, we cannot fairly compare the author's performance target statistics with our data.

[13] Qu et al. (2018) define vesting period as a dummy variable, equalling 1 if the value is above the median, and 0 otherwise. However, the authors do not specify the underlying values of this variable, making comparison with our data difficult.

AUDITSIZE	579	2.000	7.000	3.825	4.000	1.013
AUDITTEN	579	1.000	36.000	9.928	8.000	7.872
ROYCHOW	579	-0.172	0.218	0.004	-0.003	0.066
DECHOW	579	0.000	0.275	0.035	0.002	0.039

		Dummy = 1		Dummy = 0	
		Observations	Percentage	Observations	Percentage
MARK	579	124	21.4%	455	78.6%
ACC	579	186	32.1%	393	67.9%
COMB	579	269	46.5%	310	53.5%
LOSS	579	91	15.7%	488	84.3%
COMPLEX	579	142	24.5%	437	75.5%

* In parentheses, values are presented in millions of U.S. dollars.
All non-logarithmic values have been winsorized at the 1 percent level, in order to adjust for potential outliers. All variables calculated as a ratio is presented in percentage. Lastly, dummy variables are presented with descriptive of how many observations that either take the value of 1 or 0 in the data-set, and their respective percentage, rounded to one decimal.

Table 3: Correlation matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. *LAUDITFEE*											
2. *EQUITYCOMP*	**0.221**										
3. *SIZE*	**0.801**	**0.168**									
4. *NONAUDIT*	**0.591**	**0.167**	**0.588**								
5. *REVG*	-0.078	**0.111**	**-0.086**	-0.073							
6. *ROA*	-0.054	**0.226**	**-0.115**	-0.021	**0.127**						
7. *MTB*	-0.014	**0.102**	**-0.096**	-0.019	0.041	**0.384**					
8. *LEV*	**0.268**	-0.027	**0.353**	**0.160**	**-0.127**	**-0.119**	-0.030				
9. *QUICK*	**-0.222**	**-0.182**	**-0.276**	**-0.093**	-0.041	**-0.179**	-0.076	**-0.199**			
10. *TANG*	-0.012	**-0.117**	**0.227**	-0.036	**-0.240**	**-0.184**	**-0.157**	**0.383**	-0.068		
11. *CAPEX*	0.006	-0.059	**0.102**	-0.039	**-0.178**	**-0.315**	**-0.127**	**0.200**	**0.156**	**0.462**	
12. *RECINV*	**-0.186**	**0.082**	**-0.185**	**-0.163**	**0.098**	**0.305**	0.075	**-0.321**	**-0.101**	**-0.435**	**-0.299**
13. *CASH*	**-0.187**	-0.037	**-0.293**	-0.078	-0.025	-0.041	0.036	**-0.302**	**0.522**	**-0.240**	0.074
14. *INSTOWN*	**0.217**	0.022	**0.239**	**0.245**	-0.041	**0.091**	-0.002	0.022	-0.011	**-0.131**	-0.037
15. *CEOAGE*	**0.174**	0.030	**0.136**	**0.130**	-0.044	0.039	**-0.136**	-0.024	-0.035	-0.039	-0.016
16. *TENURE*	**-0.101**	**0.124**	**-0.167**	-0.061	-0.013	-0.010	0.019	**-0.125**	**0.099**	**-0.106**	0.045
17. *VESTING*	0.063	0.011	**0.149**	-0.008	-0.016	-0.054	0.024	0.064	**-0.089**	0.077	-0.004
18. *AUDITSIZE*	**0.379**	0.072	**0.333**	**0.256**	-0.070	**0.104**	0.073	**0.093**	**-0.109**	**-0.186**	-0.069
19. *AUDITTEN*	**0.141**	0.049	**0.184**	**0.120**	-0.071	-0.011	-0.008	0.041	-0.039	0.073	-0.003
20. *ROYCHOW*	**0.102**	**0.165**	0.024	-0.005	0.076	**0.404**	**0.280**	0.017	**-0.080**	0.061	0.056
21. *DECHOW*	-0.059	0.015	**-0.136**	-0.022	**0.105**	-0.069	-0.053	-0.024	**0.175**	**-0.093**	0.057
22. *ACC*	0.021	-0.001	0.051	-0.002	-0.040	**0.093**	0.025	**-0.140**	**-0.164**	0.013	**-0.123**
23. *MARK*	0.008	-0.044	0.045	0.012	-0.000	**-0.202**	**-0.096**	**0.129**	**0.186**	**0.099**	**0.271**
24. *COMB*	-0.026	0.037	**-0.084**	-0.009	0.038	0.080	0.055	0.025	0.000	**-0.095**	**-0.108**
25. *LOSS*	0.008	**-0.151**	0.013	-0.065	**-0.218**	**-0.594**	**-0.160**	**0.080**	**0.266**	**0.195**	**0.316**
26. *COMPLEX*	**-0.133**	0.059	-0.071	**-0.081**	**0.088**	0.013	**0.162**	-0.065	0.019	0.037	**-0.083**

Table 3: Correlation matrix cont. (1)

Variable	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
12. *RECINV*											
13. *CASH*	**-0.079**										
14. *INSTOWN*	0.071	-0.063									
15. *CEOAGE*	0.030	**-0.119**	**0.108**								
16. *TENURE*	**0.103**	0.031	**-0.111**	**0.337**							
17. *VESTING*	-0.007	-0.049	0.062	-0.021	-0.037						
18. *AUDITSIZE*	**0.096**	-0.095	**0.159**	**0.092**	-0.024	0.076					
19. *AUDITTEN*	0.015	**-0.101**	0.071	-0.021	-0.019	0.024	**0.091**				
20. *ROYCHOW*	-0.053	**0.098**	0.022	-0.068	**-0.118**	-0.022	0.064	**-0.093**			
21. *DECHOW*	-0.020	**0.258**	-0.044	-0.075	-0.008	**-0.086**	-0.070	0.029	0.078		
22. ACC	0.027	-0.014	-0.022	0.058	-0.039	0.031	0.056	-0.047	-0.014	**-0.094**	
23. *MARK*	-0.044	0.027	**-0.127**	0.009	0.023	-0.075	-0.068	0.053	0.003	**0.080**	**-0.359**
24. *COMB*	0.011	-0.009	**0.125**	-0.062	0.017	0.033	0.004	0.001	0.010	0.022	**-0.641**
25. *LOSS*	**-0.275**	**0.168**	**-0.109**	-0.039	-0.007	0.075	-0.007	0.021	**-0.191**	**0.093**	**-0.170**
26. *COMPLEX*	-0.024	**0.126**	**-0.096**	**-0.089**	0.071	**0.080**	-0.042	**-0.081**	**0.156**	**0.104**	**0.181**

Table 3: Correlation matrix cont. (2)

Variable	(23)	(24)	(25)	(26)
23. *MARK*				
24. *COMB*	**-0.486**			
25. *LOSS*	**0.239**	-0.038		
26. *COMPLEX*	**-0.102**	**-0.086**	-0.046	

This table presents the correlation between all regressed variables. Significant correlations at a 5 percent level are marked in bold.

3.5 Robustness checks

Before conducting the regression models, we investigate whether multicollinearity exists between our variables. We observe that no variables correlate to such degree that they have to be excluded from the model (O'Brien, 2007), strengthened by a conducted VIF-test, which is presented in Appendix table 3. The regressions are estimated using a pooled OLS model, however, this model induces the problem of suffering from potential heteroscedasticity. To control for this, we generate robust standard errors by clustering at firm level, allowing the standard errors to correlate within the clusters, in this case the specific firm. Further, we include year and industry fixed effects to control for potential heterogeneity.

Since we exclude observations that do not grant any CEO EBC, we can assume that the regression models will potentially suffer from endogeneity issues derived from selection bias. We control for selection bias by conducting Heckman's (1979) two-stage procedure. In the first stage, we include CEO tenure as instrument variable[14], arguing that the length of a CEO

[14] We have also manually gathered data for CEO ownership to employ as instrument variable, defined as the percentage of shares held by the CEO in relation to total outstanding shares. The variable was not deemed adequate, as it did not significantly correlate with, nor affected the degree of *EQUITYCOMP*. However, prior research has employed this variable as instrument (Qu et al., 2018).

employment should correspond with an increase in CEO EBC. To assess if CEO tenure is a plausible instrument, we regress the variable against audit fees, including all controls but exclude *EQUITYCOMP*. The results show that there exists no significant association between CEO tenure and audit fees. We test the association between CEO tenure and *EQUTIYCOMP*, including all controls, and receive positive and significant results at a 5 percent level. Further, CEO tenure and *EQUTIYCOMP* are correlated to approximately 12 percent, at a 1 percent significance level. Therefore, we argue that CEO tenure is an adequate instrument. In the first stage of Heckman's (1979) two-stage procedure, we include all control variables and add CEO tenure as instrument, we also control for both year and industry fixed effects. Additionally, we obtain robustness by implementing bootstrap standard errors. We estimate the probability of firms granting CEO EBC by generating the dummy variable *D_EQUITYCOMP,* equal to 1 if the firm grants CEO EBC and 0 otherwise. The first stage is conducted to estimate the inverse Mills ratio (*IMR*) to correct for sample selection bias, and the probit model is specified in the following way:

$$\Pr(D\_EQUITYCOMP_{it} = 1) = \Lambda\left[\lambda_0 + \lambda_1 TENURE_{it} + \sum_{i=1}^{n} \varphi_{it} Controls_{it} + \sum_{k=1}^{k} \gamma_k Ind_{it} + \sum_{y=2013}^{y} \delta_y Yr_i + \eta_{it}\right] \quad (5)$$

For the second stage, we include the *IMR* (λ) estimated in equation (5) to control for potential selection bias. Specifically, we estimate the following regression model:

$$LAUDITFEE_{it} = \alpha_0 + \alpha_1 EQUITYCOMP_{it} + \sum_{i=1}^{m} \beta_{it}\, Controls_{it} + \sum_{k=1}^{k} \gamma_k Ind_{it} + \sum_{y=2013}^{y} \delta_y Yr_i + \lambda_{it} + \varepsilon_{it} \quad (6)$$

Lastly, our regression models may suffer from other sources of endogeneity. We partially mitigate endogeneity issues by including valid control variables, but also by estimating a two stage least squares (2SLS) regression model, retaining CEO tenure as instrument. We will also perform a Durbin-Wu-Hausman test to conclude whether our models are endogenous.

4. Results and analysis

4.1 The association between CEO EBC and audit fees

In the first model (*INITIAL*) we analyse our initial data-set and observe the independent variable *EQUITYCOMP* to be insignificant, implying that the degree of CEO EBC does not affect audit fees. This is to be expected, since prior studies (Chen et al., 2015; Kim et al., 2015;

Qu et al., 2018) state that the association between CEO EBC and audit fees is difficult to identify in a randomised sample, due to significant amounts of CEO EBC observations equalling 0. However, in our second model (*BASE*) when only including firms with granted CEO EBC, we find a positive and significant association between the degree of granted CEO EBC and audit fees, at a 10 percent level. The magnitude of the coefficient suggests that an increase in CEO EBC by 1 percentage unit increases audit fees by approximately 0.4 percent. Our findings suggest that higher degrees of CEO EBC affect perceived audit risk, thereby requiring auditors to increase their effort and consequently, billing rates.

Our findings from the second model (*BASE*) support our first hypothesis and stands in accordance with prior research (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). Several control variables present results consistent with prior research where *SIZE*, *NONAUDIT* and *AUDITSIZE* are positively and significantly associated with audit fees (Simunic, 1980; Beasley, 2009; Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). The variables *REVG* and *TANG* both present negative and significant effect on audit fees, also in line with prior studies (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). Further, prior research suggests that there exists a positive relation between *RECINV* and audit fees (Chen et al., 2015; Kim et al., 2015; Qu et al., 2018). Conversely, we find this relation to be negative and significant.

We also control for different forms of managerial opportunistic behaviour, and *ROYCHOW* present positive and significant effect on audit fees. Consequently, this association implies that auditors perceive a heightened audit risk when there exist signs of real activities manipulation (Graham et al., 2005; Cohen et al., 2008). Lastly, *DECHOW* is positive and significantly related to audit fees, suggesting that auditors perceive a heightened audit risk when CEOs have the ability to misuse their power over the CFO to manipulate accruals (Feng et al., 2011).

Table 4: Regression results (H1)

Variable	Model 1 (*INITIAL*)	Model 2 (*BASE*)	Model 3 (*HECK*)	Model 4 (*2SLS*)
EQUITYCOMP	0.000	0.004*	0.004**	0.007
	(0.62)	(1.83)	(2.56)	(0.40)
SIZE	0.647***	0.658***	0.655***	0.691***
	(15.07)	(14.27)	(18.66)	(10.38)
NONAUDIT	0.109***	0.082**	0.101***	0.099**
	(2.90)	(2.08)	(3.29)	(2.24)
REVG	-0.002	-0.004**	-0.002	-0.003
	(-1.33)	(-2.21)	(-1.23)	(-1.35)
ROA	0.006	-0.004	0.002	-0.002
	(1.13)	(-0.54)	(0.33)	(-0.17)

MTB	0.024*	0.011	0.019	0.011
	(1.94)	(0.72)	(1.38)	(0.73)
LEV	0.005	0.005	0.003	0.004
	(1.23)	(1.12)	(0.84)	(1.06)
QUICK	-0.000	-0.001	-0.001	-0.001
	(-0.26)	(-1.32)	(-1.05)	(-1.47)
TANG	-0.011***	-0.011***	-0.011***	-0.013***
	(-3.74)	(-4.04)	(-5.79)	(-3.63)
CAPEX	-0.002	-0.003	-0.002	-0.002
	(-0.43)	(-0.83)	(-0.58)	(-0.40)
RECINV	-0.007**	-0.007**	-0.010***	-0.007**
	(-2.37)	(-2.09)	(-6.41)	(-2.02)
CASH	0.025	-0.142	0.003	-0.039
	(0.46)	(-0.26)	(0.54)	(-0.06)
INSTOWN	-0.002	-0.001	-0.001	-0.002
	(-0.57)	(-0.15)	(-0.19)	(-0.52)
CEOAGE	0.019**	0.009	0.014**	0.009
	(2.36)	(1.15)	(2.40)	(1.08)
TENURE	-0.052	-0.024		
	(-1.39)	(-0.67)		
VESTING	-0.111**	-0.030	-0.091**	-0.025
	(-2.06)	(-0.56)	(-2.07)	(-0.47)
AUDITSIZE	0.054	0.100**	0.119***	0.083
	(1.26)	(2.18)	(3.33)	(1.59)
AUDITTEN	-0.000	-0.001	0.000	-0.000
	(-0.03)	(-0.12)	(0.10)	(-0.04)
ROYCHOW	1.103*	2.589***	1.887***	2.802***
	(1.77)	(3.86)	(2.97)	(3.73)
DECHOW	-0.302	1.566*	-0.807	1.634**
	(-0.48)	(1.95)	(-0.95)	(2.12)
LOSS	0.250**	0.057	0.184	0.051
	(2.00)	(0.41)	(0.99)	(0.34)
COMPLEX	-0.296**	0.008	-0.275***	-0.009
	(-2.26)	(0.05)	(-3.45)	(-0.05)
IMR			0.16	
			(0.47)	
Fixed effect for year	Yes	Yes	Yes	Yes
Fixed effect for industry	Yes	Yes	Yes	Yes
Clustered at firm level	Yes	Yes	No(*)	Yes
Observations	947	579	579	579
R-squared	0.707	0.776	0.687(**)	0.756
F-value	30.47	37.27	6700.66(***)	1237.72(***)

***, **, * indicate significance at a 1, 5, and 10 percent level, respectively.
(*) Instead, we apply bootstrap standard errors.
(**) Adj. R-squared.
(***) Wald Chi-squared test statistic.
This table reports the regression results when investigating the first hypothesis. The third model (*HECK*) correct for potential selection bias, including the *IMR* as a control variable. The fourth model (*2SLS*) address potential endogeneity issues. In both robustness models, *TENURE* act as instrument.

Due to dropping a significant proportion of observations, our second model (*BASE*) may suffer from selection bias, as discussed in section 3.5 Robustness checks. Therefore, we conduct Heckman's (1979) two-stage procedure in our third model (*HECK*) to correct for potential selection bias, derived from our non-randomly selected sample. Results from Heckman's (1979) correction suggest that our second model (*BASE*) does not suffer from significant selection bias, as the *IMR* present insignificant results. Further, we can observe a rho (ρ) of 0.21, indicating that our second model (*BASE*) suffer from slight selection bias. Additionally, we observe that *EQUITYCOMP* is significant at a 5 percent level, retaining similar coefficient and sign as in the second model (*BASE*). Taken together, we argue that Heckman's (1979) two-stage procedure provide adequate robustness and support our findings in the second model (*BASE*).

In our fourth model (*2SLS*) when controlling for potential endogeneity, we observe *EQUITYCOMP* to lose its significance. Our Durbin-Wu-Hausman test conclude that we cannot reject the null hypothesis, providing indications that the fourth model (*2SLS*) is exogenous, suggesting that our second model (*BASE*) does not suffer from endogeneity.

4.2 The association between the design of CEO EBC contracts and audit fees

We employ three models testing whether the design of CEO EBC contracts is associated with variations in audit fees. Firstly, we include market-based performance targets in our fifth model (*MARK*) and observe the interaction term (*EQUITYCOMP*MARK*) to be positive and significant at a 5 percent level, however, *EQUITYCOMP* loses its significance compared to the second model (*BASE*). Our findings suggest that auditors perceive a heightened audit risk when CEOs are connected to market-based performance targets, as compared to accounting- or combination-based targets. Contrary, Qu et al. (2018) suggests that CEOs connected to market-based performance targets act less opportunistically, derived from the notion that managers are more fairly and objectively assessed. However, applying market-based performance targets connected to the firm's stock price could increase the risk of managerial opportunistic behaviour, stemming from several sources. Actions that potentially generate higher stock returns, such as discretionary accounting choices, real activities manipulation or disclosure timing, could be subject to manipulation (Aboody & Kasznik, 2000; Barclay et al., 2005; Merchant, 2006; Sanders & Hambrick, 2007). Accordingly, auditors will increase their effort to detect potential fraud, resulting in higher audit fees. Based on our findings, we suggest that the design of CEO EBC contracts is associated with variations in audit fees, corresponding with our second hypothesis.

Table 5: Regression results (H2)

Variable	Model 5 (*MARK*)	Model 6 (*ACC*)	Model 7 (*COMB*)
MARK	-0.420		
	(-1.56)		
ACC		0.431**	
		(2.19)	
COMB			0.022
			(0.10)
*(EQUITYCOMP*MARK)*	0.012**		
	(2.37)		
*(EQUITYCOMP*ACC)*		-0.010**	
		(-2.35)	
*(EQUITYCOMP*COMB)*			-0.002
			(-0.50)
EQUITYCOMP	0.000	0.007***	0.005
	(0.17)	(2.79)	(1.62)
SIZE	0.657***	0.659***	0.656***
	(14.42)	(14.44)	(14.24)
NONAUDIT	0.088**	0.084**	0.084**
	(2.24)	(2.17)	(2.12)
REVG	-0.004**	-0.004**	-0.004**
	(-2.04)	(-2.26)	(-2.21)
ROA	-0.005	-0.002	-0.004
	(-0.74)	(-0.41)	(-0.60)
MTB	0.012	0.013	0.011
	(0.78)	(0.82)	(0.73)
LEV	0.004	0.004	0.005
	(1.16)	(1.14)	(1.16)
QUICK	-0.001	-0.001	-0.001
	(-1.11)	(-1.06)	(-1.25)
TANG	-0.011***	-0.010***	-0.011***
	(-4.12)	(-3.75)	(-4.07)
CAPEX	-0.003	-0.003	-0.003
	(-1.00)	(-0.84)	(-0.86)
RECINV	-0.006**	-0.006**	-0.007**
	(-2.03)	(-1.94)	(-2.11)
CASH	-0.112	-0.020	-0.195
	(-0.23)	(-0.04)	(-0.36)
INSTOWN	-0.001	-0.001	-0.000
	(-0.21)	(-0.30)	(-0.03)
CEOAGE	0.008	0.011	0.008
	(1.02)	(1.41)	(0.99)
TENURE	-0.023	-0.031	-0.021
	(-0.67)	(-0.90)	(-0.58)
VESTING	-0.021	-0.029	-0.026
	(-0.41)	(-0.57)	(-0.50)
AUDITSIZE	0.110**	0.097**	0.102**
	(2.50)	(2.14)	(2.23)
AUDITTEN	-0.002	-0.001	-0.001
	(-0.32)	(-0.23)	(-0.15)

ROYCHOW	2.734***	2.537***	2.623***
	(3.94)	(3.74)	(3.87)
DECHOW	1.377*	1.597**	1.557*
	(1.74)	(2.01)	(1.94)
LOSS	0.046	0.079	0.058
	(0.33)	(0.56)	(0.42)
COMPLEX	0.018	-0.008	0.003
	(0.11)	(-0.05)	(0.02)
Fixed effect for year	Yes	Yes	Yes
Fixed effect for industry	Yes	Yes	Yes
Clustered at firm level	Yes	Yes	Yes
Observations	579	579	579
R-squared	0.782	0.779	0.777
F-value	35.11	36.82	35.12

***, **, * indicate significance at a 1, 5, and 10 percent level, respectively.
This table reports the regression results when investigating the second hypothesis.

Secondly, when including accounting-based performance targets in the sixth model (*ACC*), *EQUITYCOMP* becomes significant at a 1 percent level, retaining similar coefficient and sign as presented in the second model (*BASE*). The interaction term (*EQUITYCOMP*ACC*) present a negative and significant effect at a 5 percent level, implying that audit fees decrease when CEO EBC contracts are connected to accounting-based performance targets, as compared to market- or combination-based targets. Contrary, Qu et al. (2018) suggests that CEOs connected to accounting-based performance targets act more fraudulently for personal gains, increasing the likelihood of earnings manipulation. However, auditor's superior accounting knowledge and great access to information via remuneration- and financial reports, enables the auditor to identify and evaluate performance targets connected to compensation contracts (Merchant, 2006). Consequently, auditors can potentially detect irregularities, reducing manager's incentives to act opportunistically, thereby lowering audit fees. Our findings from the sixth model (*ACC*) strengthen our suggestion that the design of CEO EBC contracts is associated with variations in audit fees.

Thirdly, we analyse combination-based performance targets in our final model (*COMB*) and observe that *EQUITYCOMP* and the interaction term (*EQUITYCOMP*MARK*) present insignificant effects. Qu et al. (2018) find a negative and significant association between combination-based targets and audit fees, arguing that this design motivates optimal managerial decision-making, thereby lowering the risk of opportunistic behaviour.

Lastly, prior research suggests that contractual length is negatively associated with audit fees, decreasing the risk of CEOs acting opportunistically (Vafeas & Waegelein, 2007;

Bebchuk & Fried, 2010; Cadman & Sunder, 2014; Qu et al., 2018). However, we find no evidence that contractual length matter, since *VESTING* provide insignificant results in all three models (*MARK, ACC* and *COMB*), suggesting that auditors do not assess the risk of managerial opportunistic behaviour differently, when vesting period varies.

5. Conclusion and future research

The proposed auditing standard by the PCAOB (2013) highlighted the relevance of investigating the direct association between incentivised managers and audit fees, derived from the unintended negative effects of incentive contracts. Prior research suggests that higher degrees of granted CEO EBC increases opportunistic behaviour, thereby increasing audit fees. Although, empirical evidence regarding this direct relation is scarce. Further, managerial opportunistic behaviour is suggested to be affected by the design of CEO EBC contracts, and this study provides a first step in understanding if contractual design affect auditors' pricing decision.

Our findings imply that the degree of CEO EBC is positively associated with audit fees, and that contractual design affect CEO behaviour, thereby affecting auditors' perceived audit risk. We suggest that auditors price their services higher when auditing firms with highly incentivised CEOs, and that auditors perceive a heightened risk of opportunistic behaviour when market-based performance targets are applied, as compared to accounting- and combination-based targets. Contrary, we find that firms applying accounting-based targets are associated with lower audit fees. However, we find no evidence that contractual length affects perceived audit risk. Based on our findings, we suggest that the design of CEO EBC contracts is associated with variations in audit fees, where accounting-based performance targets mitigate agency costs to the greatest extent. Our contribution highlights the importance of evaluating how the design of CEO EBC contracts affect CEO behaviour, and consequently, auditors' assessment of audit risk.

There exist several limitations of our study. Firstly, our final sample consists of 185 U.K. firms, implying limited generalisability of our findings. Therefore, a cross-country study could strengthen prior research, as well as our findings. Secondly, we investigate CEOs, and future research could extend our analysis by including top management, affecting auditors' perceived audit risk and consequently, pricing decision. Thirdly, our study investigates restricted stocks, which are connected to performance targets and vesting periods. However, we do not investigate how other parts of CEO compensation, such as annual bonuses, stock options and other benefits relate to managerial opportunistic behaviour. Consequently, future

research could include several aspects of CEO compensation, investigating their relation to audit fees. Finally, we extend prior research by controlling for real activities manipulation and observe significant and positive effect in all regression models. Therefore, we argue that future research should incorporate controls for real activities manipulation, when investigating the association between managerial opportunistic behaviour and audit fees.

6. References

Aboody, D. & Kasznik, R. (2000). CEO stock option awards and the timing of corporate voluntary disclosures. *Journal of Accounting and Economics*, 29(1), 73-100.

Ali, A. & Zhang, W. (2015). CEO tenure and earnings management. *Journal of Accounting and Economics*, 59(1), 60-79.

Baker, G. (2000). The use of performance measures in incentive contracting. *American Economic Review*, 90(2), 415-420.

Barclay, M.J., Gode, D. & Kothari, S.P. (2005). Matching Delivered Performance. *Journal of Contemporary Accounting & Economics*, 1(1), 1-25.

Beasley, M., Carcello, J., Hermanson, D. & Neal, T. (2009). The Audit Committee Oversight Process. *Contemporary Accounting Research*, 26(1), 65-122.

Bebchuk, L.A. & Fried, J.M. (2010). How to Tie Equity Compensation to Long-Term Results. *Journal of Applied Corporate Finance*, 22(1), 99-106.

Bedard, J.C. & Johnstone, K.M. (2004). Earnings Manipulation Risk, Corporate Governance Risk, and Auditors' Planning and Pricing Decisions. *The Accounting Review*, 79(2), 277-304.

Bergstresser, D., & Philippon, T. (2006). CEO incentives and earnings management. *Journal of Financial Economics*, 80(3), 511-529.

Bird & Bird. (2018). *Long Term Incentive Plans and Deferred Bonus Plans*. Bird & Bird LLP. https://www.twobirds.com/~/media/pdfs/expertise/employment/employment-incentive/long-term-incentive-plans-and-deferred-bonus-plans.pdf [Accessed 2019-04-10].

Burns, N., & Kedia, S. (2006). The impact of performance-based compensation on misreporting. *Journal of Financial Economics,* 79(1), 35-67.

Cadman, B. & Sunder, J. (2014). Investor Horizon and CEO Horizon Incentives. *The Accounting Review*, 89(4), 1299-1328.

Charles, L., Glover, S. & Sharp, N. (2010). The association between financial reporting risk and audit fees before and after the historic events surrounding SOX. *Auditing: A Journal of Practice & Theory*, 29(1), 15-39.

Chen, Y., Gul, F.A., Veeraraghavan, M. & Zolotoy, L. (2015). Executive Equity Risk-Taking Incentives and Audit Pricing. *The Accounting Review*, 90(6), 2205-2234.

Cheng, Q. & Warfield, T.D. (2005). Equity Incentives and Earnings Management. *The Accounting Review*, 80(2), 441-476.

Cohen, D., Dey, A. & Lys, T. (2008). Real and Accrual Based Earnings Management in the Pre- and Post-Sarbanes-Oxley Periods. *The Accounting Review*, 83(3), 757-787.

Conyon, M., Fernandes, N., Ferreira, M., Matos, P. & Murphy, K. (2013). The Executive Compensation Controversy: A Transatlantic Analysis. In *Executive Remuneration and Employee Performance-Related Pay: A Transatlantic Perspective*, 9-119.

Dechow, P.M. & Sloan, R. (1991). Executive incentives and the horizon problem: An empirical investigation. *Journal of Accounting and Economics*, 14(1), 51-89.

Dechow, P., Sloan, R. & Sweeney, A. (1995). DETECTING EARNINGS MANAGEMENT. *Accounting Review*, 70(2), 193-225.

Efendi, J., Srivastava, A. & Swanson, E.P. (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics*, 85(3), 667-708.

Feng, M., Ge, W., Luo, S. & Shevlin, T. (2011). Why do CFOs become involved in material accounting manipulations? *Journal of Accounting and Economics*, 51(1), 21-36.

Ferri, F. & Maber, D. (2013). Say on Pay Votes and CEO Compensation: Evidence from the UK. *Review of Finance*, 17(2), 527-563.

Financial Reporting Council. (2018). *THE UK CORPORATE GOVERNANCE CODE.* https://www.frc.org.uk/getattachment/88bd8c45-50ea-4841-95b0-d2f4f48069a2/2018-UK-Corporate-Governance-Code-FINAL.PDF [Accessed 2019-03-12].

Gopal, K., Sun L., Wang, Q. & Yang, R. (2013). Client Risk Management: A Pecking Order Analysis of Auditor Response to Upward Earnings Management Risk. *Auditing: A Journal of Practice & Theory*, 32(2), 147-169.

Gotti, G., Han, S., Higgs, J. & Kang, T. (2012). Managerial Stock Ownership, Analyst Coverage, and Audit Fee. *Journal of Accounting, Auditing & Finance* 27(3), 412-437.

Graham, J.R., Harvey, C.R. & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, 40(1), 3-73.

Gul, F.A., Chen, C.J. & Tsui, J.S. (2003). Discretionary accounting accruals, managers' incentives, and audit fees. *Contemporary Accounting Research*, 20(3), 441-464.

Gul, F., Fung, S. & Jaggi, B. (2009). Earnings quality: Some evidence on the role of auditor tenure and auditors' industry expertise. *Journal of Accounting and Economics*, 47(3), 265-287.

Healy, P.M. & Wahlen, J.M. (1999). A Review of the Earnings Management Literature and Its Implications for Standard Setting, *Accounting Horizon*s, 13(4), 365-383.

Heckman, J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*, 47(1), 153-161.

Hogan, C. & Wilkins, M. (2008). Evidence on the audit risk model: Do auditors increase audit fees in the presence of internal control deficiencies? *Contemporary Accounting Research*, 25(1), 219-242.

Hou, W. & Lovett, S. (2017). Stock-Based Incentives and CEO Tenure: Their Effects on Risk-Taking and Performance Extremeness. *Academy of Management Proceedings*, 2017(1), 12943.

IASB. (2004). *IFRS 2 - Share-based Payment*. https://www.iasplus.com/en/standards/ifrs/ifrs2 [Accessed 2019-01-07].

Jensen, M. & Meckling, W. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3(4), 305-360.

Kim, Y., Li, H. & Li., S. (2015). CEO Equity Incentives and Audit Fees. *Contemporary Accounting Research*, 32(2), 608-638.

Knechel, W.R. & Willekens, M. (2006). The Role of Risk Management and Governance in Determining Audit Demand. *Journal of Business Finance & Accounting*, 33(9-10), 1344-1367.

Merchant, A. (2006). Measuring general managers' performances: Market, accounting and combination-of-measures systems*. Accounting, Auditing & Accountability Journal*, 19(6), 893-917.

Matolcsy, Z., Riddell, S. & Wright, A. (2009). Alternative explanations for the association between market values and stock-based compensation expenditure. *Journal of Contemporary Accounting & Economic*s, 5(2), 95-107.

O'Brien, R.M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity*, 41(5), 673-690.

PCAOB. (2013). *Proposed Auditing Standards – Related parties, Proposed amendments to certain PCAOB auditing standards regarding significant unusual transactions and Other*

proposed amendments to PCAOB standards. Washington D.C.: PCAOB. release no. 2013-004. https://pcaobus.org/Rulemaking/Docket038/Release%202013-004_Related%20Parties.pdf [Accessed 2019-03-15].

Qu, X., Yao, D. & Percy, M. (2018). How the Design of CEO Equity-Based Compensation can Lead to Lower Audit Fees: Evidence from Australia. *Journal of Business Ethics*, 1-28.

Rajgopal, S. & Shevlin, T. (2002). Empirical evidence on the relation between stock option compensation and risk taking. *Journal of Accounting and Economics*, 33(2), 145-171.

Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, 42(3), 335-370.

Sanders, G. & Hambrick, D. (2007). Swinging for the fences: The effects of CEO stock options on company risk taking and performance. (chief executive officers) (Report). *Academy of Management Journal*, 50(5), 1055-1078.

Seetharaman, A., Gul, F. & Lynn, S. (2002). Litigation risk and audit fees: Evidence from UK firms cross-listed on US markets. *Journal of Accounting & Economics*, 33(1), 91-115.

Shleifer, A., Vishny, R. (1997). A survey of corporate governance. *Journal of Finance,* 52(2), 737-783.

Simunic, D. A. (1980). The Pricing of Audit Services: Theory and Evidence. *Journal of Accounting Research,* 18(1), 161-190.

Vafeas, N. & Waegelein, J. F. (2007). The association between audit committees, compensation incentives, and corporate audit fees. *Review of Quantitative Finance and Accounting*, 28(3), 241-255.

Velury, U. & Jenkins, D. (2006). Institutional ownership and the quality of earnings. *Journal of Business Research*, 59(9), 1043-1051.

Watts, R.L. (2003), Conservatism in Accounting Part II: Evidence and Research Opportunities, *Accounting Horizons*, 17(4), 287-301.

Wysocki, P. (2010). Corporate compensation policies and audit fees. *Journal of Accounting and Economics*, 49(1), 155-160.

Yasser, Q. & Mamun, A. (2015). The impact of CEO duality attributes on earnings management in the East. *Corporate Governance,* 15(5), 706-718.

Zaman, M., Hudaib, M. & Haniffa, R. (2011). Corporate governance quality, audit fees and non-audit services fees. *Journal of Business Finance & Accounting*: JBFA, 38(1), 165-197.

Appendix

Appendix table 1: Industry distribution

	Initial data-set		Final data-set	
Industry (GICS)	Observations	Percentage	Observations	Percentage
1. Communication services	80	8.4%	51	8.8%
2. Consumer discretionary	224	23.7%	141	24.4%
3. Consumer staples	65	6.9%	41	7.1%
4. Energy	50	5.3%	35	6.0%
5. Health care	65	6.9%	33	5.7%
6. Industrials	278	29.4%	184	31.8%
7. Information technology	45	4.8%	29	5.0%
8. Materials	80	8.4%	40	6.9%
9. Real estate	25	2.6%	0*	0.0%
10. Utilities	35	3.7%	25	4.3%
Total	947	100%	579	100%

* In our final data-set, we excluded 5 remaining observations in the real estate industry.
Percentage regard the number of firms in a specific industry in relation to the total number of firms in the data-set, rounded to one decimal. Industries are classified in accordance with the Global Industry Classification Standard (GICS). The initial data-set is used for the first (*INITIAL*) and third (*HECK*) regression models. The final data-set is used for the remaining regression models (*BASE, MARK, ACC*, *COMB* and *2SLS*).

Appendix table 2: Descriptive statistics (initial data-set)

Variable	Obs.	Min	Max	Mean	Median	Std. deviation
*LAUDITFEE**	947	-4.962 (0.007)	3.689 (40.005)	-0.319 (0.727)	-0.511 (0.600)	1.429 (4.175)
EQUITYCOMP	947	0.000	88.363	23.863	16.435	25.955
SIZE	947	3.638	12.630	7.577	7.494	1.556
NONAUDIT	947	-6.215	3.681	-0.999	-1.012	1.485
REVG	947	-67.779	84.367	6.362	4.748	17.931
ROA	947	-21.978	31.803	6.087	5.727	8.176
MTB	947	-9.055	20.666	3.644	2.613	3.994
LEV	947	0.000	75.562	19.153	17.312	16.802
QUICK	947	19.633	505.730	116.494	96.549	87.152
TANG	947	0.218	89.137	26.697	19.085	24.823
CAPEX	947	0.000	96.311	7.877	3.408	14.697
RECINV	947	0.326	88.642	20.808	15.374	18.731
CASH	947	0.300	85.007	10.089	7.102	10.322
INSTOWN	947	31.000	100.000	81.896	88.000	16.965
CEOAGE	947	39.000	69.000	53.175	53.000	5.809
TENURE	947	-2.526	3.584	1.386	1.566	1.168
VESTING	947	3.000	6.000	3.609	3.000	0.904
AUDITSIZE	947	2.000	7.000	3.779	4.000	0.961
AUDITTEN	947	1.000	36.000	10.012	8.000	7.817
ROYCHOW	947	-0.172	0.218	-0.001	-0.006	0.065
DECHOW	947	0.000	0.275	0.037	0.023	0.044

		Dummy = 1		Dummy = 0	
		Observations	Percentage	Observations	Percentage
MARK	947	182	19.2%	765	80.8%
ACC	947	330	34.8%	617	65.2%
COMB	947	435	45.9%	512	54.1%
LOSS	947	178	18.8%	769	81.2%

COMPLEX	947	232	24.5%	715	75.5%

***** In parentheses, values are presented in millions of U.S. dollars.
All non-logarithmic values have been winsorized at the 1 percent level, in order to adjust for potential outliers. All variables calculated as a ratio is presented in percentage. Lastly, dummy variables are presented with descriptive of how many observations that either take the value of 1 or 0 in the data-set, and their respective percentage, rounded to one decimal.

Appendix table 3: VIF-test results

Variable	Model 1 (*INITIAL*)	Model 2 (*BASE*)	Model 5 (*MARK*)	Model 6 (*ACC*)	Model 7 (*COMB*)
EQUITYCOMP	1.22	1.29	1.73	1.73	2.18
MARK			4.59		
ACC				5.17	
COMB					4.78
INTERACT			4.24	5.37	5.75
SIZE	2.20	2.64	2.64	2.65	2.65
NONAUDIT	1.67	1.99	2.00	2.00	2.00
REVG	1.20	1.26	1.27	1.27	1.27
ROA	1.95	2.52	2.54	2.52	2.55
MTB	1.27	1.44	1.44	1.45	1.44
LEV	1.40	1.62	1.63	1.66	1.62
QUICK	1.49	1.85	1.90	1.91	1.85
TANG	1.88	3.11	3.17	3.20	3.15
CAPEX	1.54	1.85	1.88	1.86	1.85
RECINV	1.46	1.96	1.97	1.97	1.96
CASH	1.64	1.96	1.97	2.00	1.98
INSTOWN	1.22	1.32	1.38	1.33	1.36
CEOAGE	1.25	1.31	1.31	1.32	1.33
TENURE	1.25	1.26	1.26	1.27	1.27
VESTING	1.14	1.18	1.19	1.18	1.19
AUDITSIZE	1.24	1.37	1.38	1.37	1.38
AUDITTEN	1.12	1.12	1.13	1.12	1.12
ROYCHOW	1.09	1.52	1.55	1.53	1.54
DECHOW	1.11	1.25	1.25	1.25	1.26
LOSS	1.72	2.03	2.06	2.08	2.04
COMPLEX	1.12	2.04	2.05	2.09	2.06
Mean	1.42	1.72	1.98	2.05	2.07

This table presents the calculated variance inflation factors (VIF) of the variables, and results show that the highest VIF amongst the variables is 5.75, suggesting that we do not have multicollinearity issues (O'Brien, 2007).