

CFO Age and Real Earnings Management

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List of Acronyms

13F	Thomson-Reuters Institutional Holdings
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COGS	Cost of Goods Sold
CPI	Consumer Price Index
CRSP	Center for Research in Security Prices
ISS	Institutional Shareholder Services
LIFO	Last In First Out
R&D	Research and Development
REM	Real Earnings Management
S&P 500	Standard & Poor 500 Index
SEC	The U.S. Securities and Exchange Commission
SG&A	Selling, General and Administrative Expenses
SIC	Standard Industry Classification
SOX	Sarbanes-Oxley
US	United States

Abstract

This study examines the relationship between chief financial officer (CFO) age and real earnings management. Real earnings management is proxied by abnormal operating cash flows, abnormal production costs and abnormal discretionary expenses. Based on the extant literature, I develop two competing hypotheses in relation to CFO age and real earnings management. Using a sample of publicly listed US companies over the period from 2007 to 2018, I find a significant positive relationship between CFO age and real earnings management, implying that younger (older) CFOs engage less (more) in real earnings management. I also find that the negative relationship between younger CFO and real earnings management is more pronounced in the presence of younger CEO, CEO-chair separation and higher level of institutional ownership. Findings from the empirical analysis remain robust across alternative metrics of CFO age and real earnings management. Using two-stage least squares estimation, I show that the documented finding is not subject to the endogeneity problem. Overall, this study contributes to corporate governance literature and earnings management literature by identifying a robust relationship between CFO age and real earnings management.

Keywords: CFO age, real earnings management, CEO age, career horizon, corporate governance

Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Date: 9 November 2020

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1. Introduction

In this study, I investigate the relationship between Chief Financial Officer (CFO) age and firms' real earnings management.¹ I also investigate whether this relationship, if any, is moderated by firm-level corporate governance. This study is built on the prior literature demonstrating that age difference plays an important role in corporate decision-making processes and it explains behavioural differences of human (e.g., conservatism, risk-taking, career concerns etc.), which in turn affects financial reporting quality (Huang et al., 2012).

This study is motivated by the regulations that outline the roles and responsibilities of the key corporate executives to minimize fraudulent financial reporting. For example, the Sarbanes–Oxley Act (SOX) of 2002 requires the CEO and CFO to certify that financial reports of their firms are accurate and complete and that they have established and maintained adequate internal controls for public disclosure. Given that age plays an important role in explaining differences of human behaviours and that financial reporting of a firm is under the direct control of a CFO, who is held personally responsible for the financial reporting, it is worthwhile to investigate how CFO age affects real earnings management of a firm. This study is also motivated by the high-profile corporate scandals (e.g., Enron, Tyco, WorldCom) demonstrating that CFOs of firms are directly involved in financial manipulations including overstating revenues, understating expenses, overstating the value of corporate assets, or underreporting the existence of liabilities. For example, Andrew Fastow, former CFO of Enron Corporation, was found guilty of unethical accounting manipulations. Similarly, Mark Swartz, former CFO of Tyco (a New Jersey-based blue-chip Swiss security systems company), was found responsible for questionable accounting practices, including large loans made to the CEO that were then forgiven. In a recent case in 2018, the former CFO of Bankrate Inc. was sentenced to 10 years in prison for orchestrating a complex accounting

¹ Roychowdhury (2006) defines real earnings management “as departures from normal operational practices, motivated by managers’ desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations. These departures do not necessarily contribute to firm value even though they enable managers to meet reporting goals” (p. 337). The author also contends that managers employ real earnings management through sales manipulation, reduction of discretionary expenditures, and overproduction to report lower cost of goods sold.

and securities fraud scheme.² Given the overwhelming evidence above, it is important to examine how CFO age, an important characteristic that explains human decision making, affects real earnings management. Finally, the accounting, finance, management, and psychology literature that demonstrates considerable age-based behavioural differences among executives and individuals also instigates this study (Wallach and Kogan 1961; Sundaram and Yermack 2007; Huang et al., 2012).

This study focuses on the relationship between CFO age (rather than CEO age) and real earnings management (rather than accrual management) for the following reasons. First, albeit the CFO typically oversees the firm's financial reporting process and they are primarily responsible for financial reporting (e.g., choosing accounting methods and making accounting adjustments), extant studies predominately focus on CEO characteristics and earnings management (Ali and Zhang, 2015; Huang et al., 2012; Kuang et al., 2014; Yu et al., 2010). Accordingly, little is known about how CFO characteristics (age in particular) affect financial reporting quality. Second, I focus on real earnings management because past studies report a decline in discretionary accruals and a rise in real earnings management after the passage of SOX 2002 (e.g., Cohen et al. 2008; Hutton et al. 2009). Similarly, Malik (2015) shows that US companies manipulate earnings through real activities to avoid reporting losses or to meet the analysts' predictions. Bruns and Merchant (1990) report that real activities are more preferred than accruals by executives to manipulate earnings.

In this study, I develop two competing hypotheses in relation to CFO age and real earnings management. Prior studies suggest that older individuals, including corporate executives, exhibit more conservative and ethical behaviour (Deshpande, 1997; Mudrack, 1989; Peterson et al., 2001; Vroom and Pahl, 1971). In addition, older executives are also concerned with job security and reputation capital (Ge et al., 2011). Moreover, when executives approach retirement, they tend to avoid any aggressive or unethical actions which could jeopardize their after-retirement benefits (Carlsson and Karlsson, 1970). Studies also indicate that CFOs are primarily responsible for

² <https://www.justice.gov/opa/pr/former-chief-financial-officer-bankrate-inc-sentenced-10-years-prison-orchestrating-complex>

corporate financial reporting and CFO traits (e.g., gender, tenure, narcissism) affect financial reporting and the corporate information environment (Ham et al., 2017; Muttakin et al., 2019; Sun et al., 2019; Taylor, 1975). Given that real earnings management is considered as aggressive and unethical and it could endanger the CFO's reputation and career life, I predict that older CFOs avoid real earnings management.

On the other hand, previous research also provides evidence suggesting a positive (negative) relationship between older (young) CFO and real earnings management, which is quite the opposite to my previous prediction. In particular, horizon problem theory proposes that while younger executives manage companies more carefully because of career concerns and the existence of stringent supervision and evaluation from the external job market, older executives nearing retirement tend to manage earnings more aggressively in order to boost their compensation at the expense of destroying the long-term value of the companies (Gibbons and Murphy, 1992). Demers and Wang (2010) argue that older executives are more likely to conduct earnings management because the marginal benefits of doing so outweighs relevant costs. In addition, Chevalier and Ellison (1999) document that younger managers are less motivated to conduct earnings management since they are more likely to be fired or punished for poor performance or taking "bold actions". Based on the above evidence, I hypothesize that compared to older CFOs, younger CFOs are associated with less real earnings management.

I closely follow the model implemented by Roychowdhury (2006) to capture the extent of real earnings management. I use three individual metrics (abnormal operating cash flows, abnormal discretionary expenses, abnormal production costs) and two comprehensive metrics (the combination of abnormal discretionary expenses and production costs; and the combination of abnormal discretionary expenses and operating cash flows) to measure real earnings management (Cohen and Zarowin, 2010; Roychowdhury, 2006).

Using a sample of US publicly traded companies for the period from 2007 to 2018, I find a significant negative relationship between young CFO and real earnings management, suggesting

that younger CFOs are less likely to engage in real earnings management than their older counterparts. This finding remains robust after controlling for other variables which could potentially impact real earnings management. Further, inference from the main regression results remains robust when alternative metrics of CFO age are used in the regression model. When I decompose the real earnings management, I find that young CFO is related to less abnormal discretionary expenses and abnormal operating cash flows. To address the potential endogeneity problem, I use two-stage least square regression. The findings, which are consistent with my baseline regression results, suggest that my documented empirical results are not driven by endogeneity. In additional analysis, I find that the relationship between young CFO and real earnings management is more pronounced in the presence of young CEO and higher level of institutional ownership. Finally, the negative relationship between young CFO and real earnings management persists only for the subsample of firms without CEO-Chair duality.

This study contributes to the literature in a number of important ways. First, my study contributes to the corporate governance literature. Prior studies show that CEO age affects financial restatements and meeting or beating of analyst earnings forecasts (Huang et al., 2012), riskiness of corporate policies (Serfling, 2014) and acquisition behaviour (Yim, 2013). However, there has been less focus on how CFO age affects corporate financial reporting. Given that the CFO oversees financial reporting of a firm, it is important to understand how CFO age affects corporate real earnings management (an important aspect of corporate financial reporting and the information environment). This study fills that gap in previous literature. Second, this study also contributes to the earnings management literature. Prior literature demonstrates that executive-specific factors have considerable influence on firms' accounting choices and disclosures (Ge et al., 2011; Geiger and North, 2006; Mian, 2001). For example, studies show that CFO narcissism is related to more discretionary accrual, less timely loss recognition, and a higher probability of restatements (Ham et al., 2017), and that longer CFO tenure and CFO board membership increase accounting conservatism (Muttakin et al., 2019). However, the extent to which CFO-specific

factors (e.g., age) affect real earnings management rather than other metrics of financial reporting quality is unexplored. This is an important omission given the fact that there is a decline in discretionary accruals and a rise in real earnings management after the passage of SOX 2002 (e.g., Cohen et al., 2008; Hutton et al., 2009).

Third, this study confirms and extends the conclusions of prior research. My study reports that younger CFOs are correlated with less real earnings management. This finding complements Demers and Wang (2010), who present a negative correlation between real earnings management and younger CEOs. In addition, my finding is consistent with previous studies arguing for a positive relationship between executives' age and real earnings management (Brickley et al., 1999; Chevalier and Ellison, 1999; Graham et al. 2005). Finally, given that creative accounting conducted by CFOs could cause tremendous business consequences (e.g., the collapse of the giant Enron Corporation), my findings that younger CFOs are correlated with less real earnings management are likely to be of interest to regulatory bodies and the market in general. While evaluating and detecting real earnings management, the SEC and auditors should pay more attention to the financial statements prepared by firms with older CFOs. In addition, investors could consider CFO age as an important determinant in evaluating the quality of a firm's financial statement.

The remainder of this paper is organized as follows. Section 2 provides a background on CFOs' earnings manipulation, Section 3 provides the literature review and hypothesis development. Section 4 presents research methodology, Section 5 describes the empirical results, and Section 6 concludes the study.

2. Background: CFO's earnings manipulations — The case of Andrew Fastow (ex-CFO of Enron Corporation)

Earnings manipulations by Andrew Fastow, former CFO of Enron Corporation, provide overwhelming evidence on the extent of financial manipulations and misreporting by some CFOs.

Andrew Fastow was found to be responsible for manipulating financial statements of Enron. He designed a complex web of companies with the dual purpose of raising money for Enron and covering Enron's losses. Under the protection of these companies, Enron's audited balance sheet appeared to be debt free, while in reality, Enron owed more than 30 billion dollars. Even more, Fastow maintained personal stakes in those ghost companies and stole millions of dollars from Enron's shareholders. Fastow also neglected some basic accounting practices such as cash-on-hand and total liabilities on financial reports. As the officer who was held to be responsible for connecting with investors of Enron Corporation, Fastow pressured some of Enron's largest investment banks to keep providing funds to Enron or lose Enron's future business. Finally, the financial manipulation of Enron was revealed, leaving thousands of employees unemployed and billions of dollars unpaid.

Regulators (e.g., Securities Exchange Commission (SEC)) started to pay more attention to the activities of CFOs after the collapse of high-profile corporations like Enron Corporation. For instance, the Sarbanes–Oxley (SOX) Act 2002 was introduced after the collapse of Enron Corporation. Section 302, 404 and 906 of SOX require the CEO and CFO not only to certify various aspects of financial reports but also to be responsible for any misleading information presented in financial statements. Executives such as CFOs are expected to engage less in unethical behaviours after they are held personally responsible for companies' financial reporting unless they want to be punished. Price Waterhouse Coopers (2008) reported that CFO turnover for Fortune 500 and S&P 500 companies increased from 13% in 2003 to 17% in 2007 while CEO turnover remained more stable. In addition, about 60% of the CFOs manipulating financial reports were charged by SEC, and those charged CFOs faced various penalties including future employment restrictions (Feng et al., 2011). These facts clearly demonstrate that the focus of regulatory bodies shifts from CEOs to CFOs, implying the importance of investigating the CFO's influence upon financial statements.

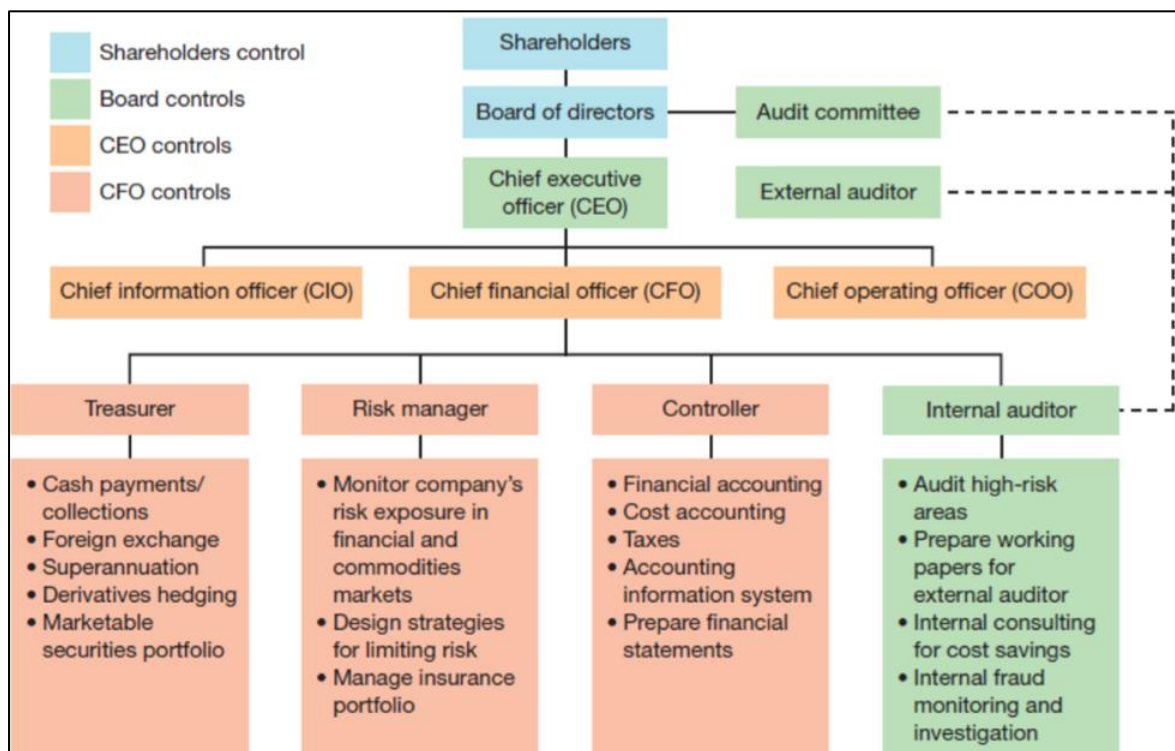
3. Literature review and hypothesis development

3.1. The role of the CFO in a modern corporation

The CFO of a firm is responsible for the overall control of a firm's financial system. The treasurer, risk manager, controller and internal auditor of a firm serve under the supervision of the CFO. In small companies, the CFO may serve the roles of the treasurer, risk manager and controller in one person.

A CFO's duty range could be observed from the following figure (Parrino et al., 2011).

Figure 1: Board structure and the role of CFO



The accounting practices and preparation of financial statements are under the direct control of the CFO. Extant studies suggest that CFO-specific factors have considerable influence on firms' accounting choices and disclosures (Geiger and North, 2006; Ge et al., 2011; Mian, 2001). In fact, a CFO could decide when and what numbers to include in a financial report and whether a company's target is met (Mian, 2001). Studies also suggest that, as the head of the accounting department and the manager of financial reporting, a CFO could use his/her power and profession to influence relevant board's decisions regarding whether a conservative accounting

practice should be followed or not. CFOs can choose to apply strict verification standards on revenues or apply aggressive accounting practices. Moreover, a CFO could use his/her power to affect the classification of leases, change the level of discretionary accruals being used, choose the proper rate of return for pension plan assets, and choose to apply conservative or aggressive accounting for adjusting earnings (Ge et al., 2011). In terms of the magnitude of the impact of a CFO on accounting practice, Ge et al. (2011) document that the magnitude is similar to the effect of the CEO on firms' investment and financing policies. Taken together, existing evidence demonstrates that the CFO's effect on corporate financial reporting is significant and it deserves more research attention.

3.2. Financial reporting manipulation

There is a wide array of manipulation methods available to managers (e.g., CFOs) to use. These manipulation methods require real decisions, pure accounting decisions or the combinations of both. Real decisions include operating decisions, financing decisions and investment decisions. Examples of operating decisions include delaying or accelerating research and development expenditures, maintenance expenditures and sales. Examples of financing decisions and investment decisions include early extinguishment of a debt and sales of fixed assets through which managers could affect gains and losses. Pure accounting decisions include changing accounting principles like depreciation method, changing the useful life of fixed assets, changing the estimations of residual value of property, plant and equipment, changing accounting treatment regarding capitalizing-expensing repairs, adjusting bad debt expenses and delaying previously recognized expenses. Combinations of real decisions and pure accounting decisions include selecting LIFO rather than FIFO and managing purchases to increase income by "eating into a LIFO layer." (Jiambalvo, 1996).

The manipulation methods of financial reporting mentioned above are unethical as they cover the true financial position and performance of companies. Firms involved in this unethical

behavior would face serious results once those earnings management decisions are revealed. Dechow et al. (1996) document that equity value declines by as large as nine percent once the market learns that the SEC is investigating a company because of earnings management.

3.3. CFOs' characteristics and financial reporting quality

Upper echelons theory of Hambrick and Mason (1984) suggests that top executives' personal characteristics affect their decision-making styles. This theory points out that outcomes of a corporation's strategy and effectiveness are the reflections of the characteristics of powerful actors in that organization. Prior studies contend that since main stakeholders (e.g., shareholders and creditors) evaluate and compare executives' talents mainly through key financial results from financial reports, top executives have inherent incentives to present a rosier picture in financial statements. Given that CFOs are the key decision makers of firms and they have dominant power and influence on their firms' financial statements, it is intuitive to argue that CFOs, in general, and CFO characteristics, in particular, could shape firms' financial reporting quality.

Prior studies propose a number of possible incentives that may motivate CFOs to engage in aggressive financial reporting. For instance, CFOs may present favourable financial results by adopting more discretionary accruals to maximize their compensation in the form of a bonus, which is tied to a financial target (Healy and Wahlen, 1999). Gibbons and Murphy (1992) argue that the labour market evaluates workers' abilities by the output of their jobs and then bases future wages on these constantly updated results. CFOs could manage to increase their future compensation by signalling the labour market that they have outstanding abilities to deliver superior output. Since financial results are one of the most important components of a CFO's working output, CFOs have incentives to manipulate financial statements to signal their abilities to the labour market. In addition to the compensation-based incentives, CFOs may manipulate financial reports to secure their jobs. This argument is based on the observations that CFO turnover is preceded by negative excess returns, a decline in operating return on assets and a significant

negative stock-price decrease (Mian, 2001). Fudenberg and Tirole (1995) report that CFOs could use discretionary accruals to present smooth income strings across different financial periods to signal their outstanding managerial abilities so that they can retain their jobs. Specifically, they tend to increase discretionary accruals when the current financial results are poor and a good expectation is made for future financial performance, and vice versa. Graham et al. (2005) provide evidence that career concerns are the most important determinant of earnings management decisions. Previous studies also provide examples of other incentives for earnings management such as meeting debt contracts (Dhaliwal, 1980), meeting regulatory requirements (Watts and Zimmerman, 1978), negotiation of union contracts (Liberty and Zimmerman, 1986) and desire for external financing (Aharony et al., 1993).

Extant literature provides convincing evidence that CFO characteristics have considerable implications for financial reporting properties. For example, building on upper echelons theory, Ge et al. (2011) show that accounting choices are influenced by differences in CFOs' individual characteristics that arise from numerous factors including their dispositions, personal situations and prior experiences. Geiger and North (2006) posit that the appointment of a new CFO should correspond with a significant change in discretionary accruals if CFOs possess significant influence on financial reports. Using a sample of 712 firms from 1994 to 2000 that appointed new CFOs, the authors find that the appointment of a new CFO is associated with a significant decrease in discretionary accruals, lending support to the proposition that CFOs have material control over firms' financial reporting. Ham et al. (2017) use CFO signature size as the measurement of narcissism, and they show that CFO narcissism is related to more earnings management.

Prior studies also show that CFO gender has an important impact on financial reporting quality. For example, Yu et al. (2010) show that female CFOs are associated with more income-decreasing discretionary accruals, implying that female CFOs follow more conservative earnings management strategies. Similarly, Barua et al. (2010) show that female CFOs are associated with lower performance-matched absolute discretionary accruals and lower absolute accrual estimation

errors. Huang and Kisgen (2008) document that female CFOs are more cautious in evaluating acquisition and issuing debt.

Previous studies also report that CFOs with long tenure and board membership are associated with higher-quality financial reporting because they would not risk their long-established reputation by adopting aggressive accounting practices (Habib and Hossain, 2013). In a related study, Khan (2019) incorporates the inter-organizational embeddedness perspective in CFO literature and documents that CFOs holding outside directorships have a lower likelihood of accounting misstatements. Aier et al. (2005) show a negative relationship between CFO financial expertise and accounting restatements. Finally, Dowdell and Krishnan (2004) extend the literature by investigating whether a former employee of the company's auditors being appointed to the position of CFO (i.e., affiliated CFO) has any impact on firms' financial reporting quality. The authors show that firms with affiliated CFOs are associated with greater earnings management than firms with unaffiliated CFOs.

In sum, the above discussion demonstrates that CFO characteristics have a significant influence on firms' financial reporting quality. However, there is a lack of evidence on whether CFO age affects financial reporting quality. This study extends the prior literature by investigating whether such a relationship exists.

3.4. Age, executive decision making and real earnings management

Extant literature suggests that age has important implications for executives' decision making (Huang et al., 2012; Sun et al., 2019). A number of possible explanations have been proposed to explain such age-based differences including conservatism, ethical standards, reputation concerns and career concerns. The aging-conservatism thesis indicates that people are more likely to become more conservative as they get older because of resistance to change, reluctance to take risks, cognitive rigidity or some similar characteristic (Glenn, 1974; Truett, 1993). In support of this argument, Abdel-Khalik (2014) finds that older executives are more risk averse. Taylor (1975)

finds support for this age-conservatism argument. The author shows that older men are more conservative in decision making and that older managers are less confident about their decisions, seek more accurate information and take longer to reach a decision. In an early study, Vroom and Pahl (1971) also report a significant negative relationship between age and both risk taking and the value placed upon risk. Hambrick and Mason (1984) indicate that older managers are more conservative in developing strategies because they are more concerned about the future financial security of their company.

Prior studies also propose that older people are associated with more ethical decision making. For example, Deshpande (1997) demonstrates that older managers view activities such as giving gifts/favours in exchange for preferential treatment, divulging confidential information, concealing one's error, falsifying reports, and calling in sick to take a day off as more unethical. Mudrack (1989) suggests that older men are exposed to traditional culture and customs longer, which prompts them to be more ethical. Dawson (1997) reports that a higher ethical belief is observed in older business professionals. Younger men are more likely to possess some characteristics like narcissism which could lead to unethical behaviour (Twenge and Campbell, 2009). Loe et al. (2000) also report a positive association between age and ethical decision making.

Older executives are more concerned about their reputation capital. Over time, executives have developed reputation in the labour market and social circles in the community. They are less likely to engage in unethical and risky activities that pose serious threats to their long-established reputation. Instead, they are more likely to adopt conservative strategies and actions in order to protect their reputation capital. Finally, the career concern-based argument posits that older executives tend to be more conservative as they are more likely to be replaced and they have well-established spending traits, expectations about retirement income and limited opportunities for promotion (Wiersema and Bantel, 1992). Taylor (1975) reports that the lack of confidence makes older executives to be conservative in making decisions. Older executives might perceive their career security as more important when they approach retirement, and they avoid any aggressive

or unethical actions which could risk their after-retirement benefits (Carlsson and Karlsson, 1970). Peterson et al. (2001) point out that as an individual executive gets older and has a family afterwards, they take responsibilities for others rather than only for himself/herself. This could prompt an older executive to avoid risks that he/she might have taken in earlier career life.

Although the aforementioned discussion provides convincing evidence suggesting that older executives are associated with conservatism and less financial reporting manipulation, another school of thought suggests that older executives are associated with more earnings management for a number of reasons. For example, horizon problem theory argues that younger executives manage companies more carefully since they are more likely to serve the company in the long term. Therefore, they exhibit greater care when taking decisions and managing the company. On the other hand, if managers expect to stay with the company for a short period of time (the case for the older executive), they exhibit less care about the long-term performance of the firm. In addition, the career of an older executive is relatively more stable, they are less closely assessed by the external job market, and their decisions are mainly driven by their compensation incentives (Davidson et al., 2007). In a recent study, Fang et al. (2018) show that managerial slack increases in the last two years of CEO tenure compared to earlier years. Dechow and Sloan (1991) find that executives like CEOs spend less R&D expenditures before retirement. Conyon and Florou (2003) document that executives such as CEOs cut capital expenditures when they become older. In sum, horizon problem theory points out that older executives have incentives to make decisions that may enhance their personal benefits at the expense of the shareholders and they are more (less) concerned with the short-term (long-term) performance of the firm. Thus, in the context of my study, it is possible that CFOs with near to retirement horizon may choose to increase the firm's earnings temporarily to boost their own after-retirement wealth, sacrificing the long-term value of their firm.

Career concern theory argues that the concern of executives about the effects of current performance on future compensation and career growth affects executives' decision making.

Gibbons and Murphy (1992, p. 469) note that, “career concerns arise frequently... whenever the (internal or external) labor market uses a worker’s current output to update its belief about the worker’s ability and then bases future wages on these updated beliefs. In such a setting, the worker will want to take actions the market cannot observe, in an attempt to increase output and thus influence the market’s belief.” They also note that career concerns are relatively stronger when executives are young and farther from retirement. Other studies also suggest that career concern is a more important determinant of earnings management decisions than the other motivations like executives’ bonus compensation, stock and option holdings (Graham et al., 2005). This theory further proposes that younger executives are more likely to be fired if they take bold actions which destroy company values in the long run (Chevalier and Ellison, 1999). Thus, building on this theory, it is possible that a higher level of career concern may preclude younger executives from conducting aggressive real earnings management.

Cost-benefit analysis theory suggests that executives evaluate the benefits and costs associated with earnings management and these costs/benefits vary depending on the career progression of the executives. According to this theory, older managers have stronger incentives to manage earnings upwards because they can enjoy the full benefits of earnings management due to their well-established reputations. Importantly, they may bear no burdens if they have retired before those previous tricks bring future negative influence (Demers and Wang, 2010). However, younger managers, with long tenure ahead, are highly likely to bear the full burden when those previous income-increasing earnings management tricks reverse and bring negative effects in the future (Demers and Wang, 2010). Demers and Wang (2010) show that managing earnings up before retirement by older managers also helps them to sit on the board of other companies after retirement (Brickley et al., 1999). In sum, the benefits of engaging in earnings management outweigh the associated costs for older managers, and such costs versus benefits relation reverses for younger managers.

3.5. CFO age and financial reporting quality: Hypothesis

In this section, I develop my main hypothesis in relation to CFO age and real earnings management. At the outset, I predict that older (younger) CFOs are associated with less (more) real earnings management for three reasons. First, as discussed earlier, human beings including corporate executives become less confident (Taylor, 1975), take more responsibility for others (Dane Peterson et al, 2001), care more about job security and bear age stereotypes as they get older. Accordingly, older executives (CFO in my research setting) are likely to exhibit more conservative and ethical behaviour (Deshpande, 1997). Given that real earnings management (e.g., sales manipulation, reduction of discretionary expenditures, and overproduction to report lower cost of goods sold) is aggressive in nature and widely recognized as unethical behaviour, I argue that older (younger) CFOs are less (more) likely to engage in real earnings management.

Second, older CFOs have less incentive to exercise power to manipulate corporate real earnings to maximize a performance-based bonus or to signal their talents to the labour market for maximizing future compensation (Healy and Wahlen, 1999). This argument is based on the argument that career security is more important when executives approach retirement and this motivates them to avoid any aggressive or unethical actions which could jeopardize their after-retirement benefits (Carlsson and Karlsson, 1970). Finally, prior research suggests that older CFOs are more concerned about their reputation capital, which they have developed over the course of their career. Given that the manipulation of real earnings creates considerable information asymmetry and it deters shareholders and creditors from assessing the firm's financial performance and position accurately, and detection of real earnings management can endanger the corporate and social reputation, older CFOs are less likely to pursue real earnings management to protect their reputation capital.

I, however, have reasons to predict that younger (older) CFOs are associated with less (more) real earnings management. In particular, horizon problem theory argues that actions taken by executives nearing retirement are driven mainly by after-retirement compensation rather than

by career concerns. Real earnings management could be utilized by such older CFOs as effective tools to manage earnings up without being detected in order to boost their compensation to an ideal level. On the other hand, younger CFOs are concerned about their career security because their talents and ability have not been fully assessed and accepted by the external job market. Therefore, younger CFOs are likely to face more severe punishment, including being fired, than older CFOs if they are detected engaging in unethical behaviours, such as conducting real earnings management (Chevalier and Ellison, 1999). This perspective suggests that older (younger) CFOs are associated with more real earnings management.

Furthermore, cost-benefit analysis theory clearly states that the negative effect of engaging in earnings management outweighs the relative benefit for younger CFOs as their reputation has not been built and a portion of superior performance would be credited to luck. This costs versus benefits relation reverses for older CFOs because they might be retired and sit on the board of other companies when the negative effects of previous income-increasing earnings management begin to appear on financial statements, since real earnings management is hard to be detected in the period it is conducted and brings value-destroying consequences in future. This is ideal for older CFOs, especially those CFOs nearing retirement, because they could avail the benefits of manipulating earnings while probably avoiding the negative consequences because of short-lasting tenure. In sum, the costs versus benefits argument also suggest that younger (older) CFOs are associated with less (more) real earnings management.

Thus, given the above competing arguments, I develop the following non-directional hypothesis:

H1. CFO age is significantly associated with real earnings management.

4. Sample selection and research design

4.1. Sample and data

This study covers US publicly traded firms for the period from 2007 to 2018. My sample starts from 2007 since CFO data are available from this point onwards. Financial data are collected from Compustat, whereas governance data are collected from ExecuComp and Institutional Shareholder Services (ISS). In addition, stock returns and institutional ownership data are sourced from the Center for Research in Security Prices (CRSP) and Thomson-Reuters Institutional Holdings (13F) Database, respectively. Following prior studies (Demers and Wang, 2010; Roychowdhury, 2006), I exclude firm-year observations from regulated industries (Standard Industrial Classification - SIC 4400–5000) and financial sectors (SIC 6000–6999). I also exclude firm-year observations with missing dependent, independent and control variables. I identify CFOs based on executives' classification following ExecuComp (data item CFOANNU=CFO).

After merging all databases and removing observations with missing values, my final sample consists of 8746 firm-years from 1372 unique firms (see Table 1, Panel A). I winsorize all continuous variables at their 1st and 99th percentiles to mitigate the potential impact of outliers.

Table 1: Sample selection and distribution of the sample

This Table presents sample selection (Panel A) and distribution of sample across the industries (Panel B) and over the years (Panel C).

Panel A: Sample selection

Description	Total number of observations
CFO data available from 2007 to 2018 in ExecuComp	26345
Less:	
Missing CFO/CEO data	(2933)
Observations dropped after merging all data set	(7201)
Financial and utility firms (5367+2098)	(7465)
Final sample	8746

Panel B: Industry distribution

Industry category	Observations	% observations
Consumer non-durables	689	7.87
Consumer durables	248	2.84
Manufacturing	1404	16.05
Oil, gas and coal extraction and products	445	5.09
Chemicals and allied products	361	4.13
Computers, software and electronic equipment	2057	23.52
Wholesale, retail and some services	1356	15.50
Healthcare, medical equipment and drugs	953	10.90
Other	1233	14.10
Total	8746	100.00

Panel C: Year-wise sample distribution

Year	Observations
2007	450
2008	411
2009	694
2010	772
2011	793
2012	807
2013	819
2014	811
2015	808
2016	823
2017	837
2018	721
Total	8746

Panel B presents the industry distribution of the sample. I find that electronical (23.52%) and manufacturing (16.05%) sectors correspond to the largest industry representation. Panel C exhibits the distribution of sample over the years. It is observed that firm-year observations have increased over the years since 2008.

4.2. Empirical model

I test the hypothesis based on the following multivariate regression specification:

$$\begin{aligned} REM = & \beta_0 + \beta_1 YOUNG_CFO + \beta_2 CFO_GENDER + \beta_3 RETIREMENT \\ & + \beta_4 YOUNG_CEO + \beta_5 DUAL + \beta_6 SHARES + \beta_7 BONUS \\ & + \beta_8 CEO_GENDER + \beta_9 SIZE + \beta_{10} BIG4 + \beta_{11} LEVERAGE \\ & + \beta_{12} DIVIDENDS + \beta_{13} DEBT + \beta_{14} ACQUISITION + \beta_{15} LOSS \\ & + \beta_{16} INST + \beta_{17} BD_IDP + \beta_{18} DACC + YEAR\ FE + IND\ FE + \varepsilon \end{aligned} \quad (1)$$

where REM represents the real earnings management (Roychowdhury, 2006), which is proxied by five alternative metrics (see Section 4.3), and YOUNG_CFO is my main variable of interest (see Section 4.4 for a detailed discussion). The regression model also includes firm-level controls and year and industry fixed effects (see Section 4.5 for details).

4.3. Dependent variable: Real earnings management

Following prior studies, I construct the metrics of real earnings management. According to Roychowdhury (2006), real earnings management could be proxied through abnormal operating cash flows, discretionary expenses and production costs. Subsequent prior studies, such as Gunny (2005) and Zhang (2006) confirm the validity of such proxies.

4.3.1. Sales manipulation

Managers could manipulate sales temporarily by offering limited-time price discounts and lenient credit terms. Price discounts can boost sales volumes although such increased sales are likely to disappear when the price is re-established to its original status. Assuming that the sales margins are positive, total earnings normally become stronger because the positive effects brought by increased sales volumes are normally more significant than the negative effects brought by the decreased sales price. However, profit margins and cash flow per unit decrease because of the price discounts. Meanwhile, production costs relative to sales become higher due to the smaller profit margin. Lenient credit terms offered by managers in industries such as retailers or

automobile manufacturers essentially lead to lower operating cash flows (Roychowdhury, 2006). In sum, sales manipulation by price discounts and lenient terms is expected to result in lower current period operating cash flows and higher production cost per unit relative to sales.

4.3.2. Manipulation of discretionary expenses

Discretionary expenses are defined as the sum of R&D, advertising and SG&A expenses. Roychowdhury (2006) suggests that SG&A mainly consists of employee training costs, maintenance expenses and travelling fees. Discretionary expenses are negatively related with operating cash flows, and they are likely to be expensed in the financial year during which they are incurred. However, managers who are willing to present better operating results could reduce discretionary expenses, which may result in a higher operating cash flow in the current year at the risk of future lower cash flows.

4.3.3. Overproduction

Managers sometimes choose to produce more inventory than the quantity they expect to sell in order to lower the fixed cost per unit and eventually lower the per-unit cost of goods sold (COGS) given that this effect is not offset by any marginal cost brought by overproduction. Operating margin increases as the COGS per unit decreases. However, operating cash flows and production costs relative to sales are higher because the cost of overproduction could not be fully recovered by sales in the same period.

Following the methodology developed by Dechow et al. (1998) and implemented by Roychowdhury (2006), I estimate the following three cross-sectional regressions for each industry year:

$$CFO_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) + \varepsilon_t \quad (2)$$

where CFO_t (Compustat data item: OANCF) is the operating cash flow in the current period. A_{t-1} is the lagged value of total assets (Compustat data item: AT). S_t is the sales revenue in the current period (Compustat data item: SALE). ΔS_t is the change in sales.

$$PROD_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) + \beta_3(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \quad (3)$$

where $PROD_t$ is the sum of COGS (Compustat data item: COGS) and ΔINV (Compustat data item: INVT). ΔS_{t-1} is last year's change in sales.

$$DISEXP_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta(S_t/A_{t-1}) + \varepsilon_t \quad (4)$$

where $DISEXP_t$ is discretionary expenses in the current year. It consists of advertising expense (Compustat data item: XAD), R&D expense (Compustat data item: XRD) and SG&A (Compustat data item: XSGA).

The coefficients in equations (2), (3) and (4) predict the normal level of operating cash flows, production costs and discretionary expenses, respectively. The residuals from each of the models represent abnormal operating cash flows (REM_OCF), abnormal production costs (REM_PROD) and abnormal discretionary expenses (REM_DISX), respectively.

Further, to capture the total effects of real earnings management, I combine the three metrics above and compute two comprehensive measures, following Cohen and Zarowin (2010). REM_1 is computed by multiplying abnormal discretionary expenses by negative one and adding it to abnormal production costs. REM_2 is developed by multiplying both abnormal operating cash flows and discretionary expenses by negative one and then combining them into one measure.

$$REM_1 = Abnormal\ Discretionary\ Expenses * -1 + Abnormal\ Production\ Costs \quad (5)$$

$$REM_2 = Abnormal\ Operating\ Cash\ Flows * -1 + Abnormal\ Discretionary\ Expenses * -1 \quad (6)$$

Firms conducting real earnings management correspond with more negative abnormal operating cash flows and discretionary expenses based on Roychowdhury (2006). In other words, real earnings management is negatively related with these two measures numerically. Multiplying these two measures by negative one will reverse the numerical correlation and makes REM_1 and

REM_2 positively related with real earnings management. By doing this, it is easier to interpret the regression results with REM_1 and REM_2 as dependent variables.

I acknowledge that the two combined measures of real earnings management might have different explanatory power from the three individual measures (REM_OCF, REM_PROD and REM_DISX). Therefore, I include both combined measures as well as individual components of real earnings management in the regression analysis.

4.4. Independent variable: CFO age

In this study, CFO age is the main independent variable. I proxy CFO age by YOUNG_CFO, which is a dummy variable that takes a value of 1 if the CFO's age is below the median and 0 otherwise. Classifying executives into different age groups based on median age is common in corporate finance and corporate governance study (Demers and Wang, 2010; Serfling, 2014). In the sensitivity analysis, following Serfling, (2014), I use the natural logarithm of CFO age to represent CFO age in regressions.

4.5. Control variables

Following prior studies, I control for CFO-specific characteristics, CEO-specific characteristics and firm-level variables that may affect real earnings management.

4.5.1. CFO characteristics

Barua et al. (2010) relate CFO gender with earnings management and show that female CFOs are associated with higher-quality financial reporting. In addition, Byrnes et al. (1999) report that females, in general., are more risk averse. Female CFOs tend to be more cautious in evaluating acquisitions and issuing debts. Therefore, I control for CFO gender (CFO_GENDER): a dummy variable that takes a value of 1 if the CFO is male and 0 otherwise. Prior studies also suggest that CFOs have incentives to manage earnings upwards immediately before retirement, which might allow them to receive more post-retirement compensation and increase the chance to sit on other

boards (Burgstahler and Dichev, 1997; Cheng, 2004). Since senior executives retire around 65 years of age, CFOs with age between 62 and 64 years are more likely to suffer from the horizon problem (Davidson et al., 2007). I control for this effect by including the RETIREMENT variable in the regression. RETIREMENT is a dummy variable that takes a value of 1 if the CFO's age is equal or more than 62 years and 0 otherwise.

4.5.2. CEO characteristics

Demers and Wang (2010) report that older CEOs engage in more real earnings management than their younger counterparts. However, Huang et al. (2012) argue that older CEOs are more ethical because of the age influence and therefore they tend to engage in less earnings management. To control for the confounding effect of CEO age on real earnings management, I include YOUNG_CEO in the regression model, which is a dummy variable that takes a value of 1 if the CEO's age is less than the median and 0 otherwise. I control for CEO-chair duality (DUAL) because an executive who plays the role of both CEO and chair possesses strong influence in the company, which in turn may allow a powerful CEO to engage in earnings management (Krause et al., 2014; Lim, 2011). DUAL is a dummy variable that takes a value of 1 if the CEO also serves the role of chair in the company.

Agency theory argues that the separation of management and ownership creates an agency problem, which allows managers to maximize their own interest at the expense of shareholders' interests (Jensen and Meckling, 1976). However, executives' shareholding could mitigate the agency problem by aligning the interests of shareholders and that of executives. In my setting, I expect this to reduce real earnings management. Therefore, in the regression model, I control for CEO shareholding (SHARES), which is defined as the shares owned by a CEO scaled by total shares outstanding (Demers and Wang, 2010; Cohen et al., 2008). Healy (1985) suggests that a CEO's bonus is positively related to earnings management. This is because a bonus plan offers an incentive to a CEO to adopt income-increasing earnings management to meet their performance threshold (Cheng and Warfield, 2005). Therefore, in the regression model I explicitly control for

BONUS, which is calculated as the cash bonus a CEO receives in a given year divided by his or her total compensation. I include CEO gender (CEO_GENDER) as a final CEO-specific control. Prior studies suggest that female CEOs are positively related with financial reporting quality since female CEOs are less likely to be unethical than male CEOs (Barua et al., 2010; Yu et al., 2010). CEO_GENDER is a dummy variable that takes a value of 1 if the CEO is female and 0 otherwise.

4.5.3. Firm-specific controls

Firm size has been used as a control variable in various earnings management studies (Barua et al. 2010; Huang et al., 2012; Roychowdhury, 2006). Previous research suggests that an executive in a larger firm is normally pressured to present a more predictable result (Pincus and Rajgopal 2002), which may motivate him or her to adopt more real earnings management. Dechow and Dichev (2002) find that smaller firms are correlated with low earnings quality. In addition, Roychowdhury (2006) reports a negative relationship between firm size and real earnings management. Based on these studies, I control for firm size (SIZE), which is the natural logarithm of the company's market value of equity, because of its potential impact on real earnings management. Previous studies suggest that firms audited by Big 4 auditors are less likely to engage in earnings management (Defond and Jambalvo, 1994). To control for this effect, I include a dummy variable (BIG4) that takes a value of 1 if the firm is audited by a Big 4 auditor and 0 otherwise. Prior studies suggest that leverage is associated with a higher level of real earnings management (Cohen and Zarowin, 2010; Huang et al. 2020; Serfling 2014). I control for the effect of leverage (LEVERAGE), measured as the long-term debt divided by total assets.

I include DIVIDENDS, DEBT and ACQUISITION as control variables following Huang et al. (2020). DIVIDENDS is defined as common dividends divided by total assets. DEBT is defined as the difference between long-term debt issuance and long-term debt reduction, which is then divided by total assets. ACQUISITION is defined as cash flows from acquisitions divided by total assets. These three variables are financial decision factors and are predicated to be related to real earnings management (Huang et al., 2020). I include LOSS because prior studies argue that

firms that suffer losses are less likely to manage earnings up (Matsumoto, 2002; Frankel et al., 2002). However, Romanuse et al. (2008) provide evidence that well-performing firms are associated with less earnings management. LOSS is a dummy variable that takes a value of 1 if a firm reports negative net income and 0 otherwise.

In the regression model, I include INST representing institutional shareholding of the firm. Bushee (1998) finds that real earnings management (R&D reductions) are more severe among firms with lower institutional shareholding. Rajgopal et al. (1999) report that earnings quality is positively related with institutional shareholding. INST is defined as the percentage of institutional shareholding. I also control for board independence (BD_IDP). Beasley (1996) and Abbott et al. (2004) argue that outside directors monitor managers more actively to protect their reputation capital. Carcello et al. (2011) report that a board which is not independent from CEO's involvement will eliminate the benefits of an audit committee. BD_IDP is the percentage of independent directors on board. Furthermore, following prior studies, I include discretionary accruals as an additional control. For example, Cohen et al. (2008) report that discretionary accruals are likely to be the substitute of real earnings management. They suggest that in the post-SOX period, managers tend to switch from discretionary accruals to real earnings management because real earnings management is more difficult to be detected. I follow the model developed by Jones (1991) and Dechow et al. (1995) to capture discretionary accruals. DACC is defined as the absolute value of the residuals from the following model:

$$TA_t/A_{t-1} = k_1(1/A_{t-1}) + k_2(\Delta S_t/A_{t-1}) + k_3(PPE_t/A_{t-1}) + \varepsilon_t \quad (7)$$

where for the fiscal year t , TA_t represents the difference between earnings before extraordinary items (Compustat data item: IBC) and operating cash flows from continuing operations (Compustat data item: OANCF-XIDOC). PPE_t is the gross value of property, plant and equipment (Compustat data item: PPEGT). All other variables in this function are explained previously (see Section 4.3.3).

Finally, I include dummy variables to control for year and industry (2-digit SIC codes) effects in the regression model. Detailed variable definitions are provided in the Appendix.

5. Empirical results

5.1. Descriptive statistics

Table 2 presents the descriptive statistics of the variables used in the empirical analysis. Tabulated results show that the average values of REM_1 and REM_2 are -0.006 and -0.040 with a standard deviation of 0.224 and 0.281 , respectively. This result is consistent with what is reported by Cheng et al. (2016). The mean values of AB_DISX, AB_OCF and AB_PROD are -0.007 , -0.033 and 0.001 , respectively. These statistics are within the range of prior studies (Cheng et al. 2016).³ The mean of YOUNG_CFO is 0.422 with a standard deviation of 0.494 , suggesting that more CFOs in my sample are aged above the median. Similarly, 44.3% of CEOs in my sample are young (i.e., age below the sample median). I also find that 89% (96.1%) of CFOs (CEOs) in my sample are male. I also find that average firms in my sample are large, with a mean and median of 7.883 and 7.711 , respectively. This is common in research that uses ExecuComp data since ExecuComp covers relatively large firms. On average, 91.4% of the firms in my sample are audited by Big 4 audit firms. Moreover, only 13.7% of firms in my sample are subject to loss. Furthermore, average firms in my sample are relatively less leveraged ($\text{LEVERAGE} = 0.193$), pay some dividends ($\text{DIVIDENDS} = 0.017$), and spend money for acquisition ($\text{ACQUISITION} = 0.032$). Furthermore, the mean absolute value of discretionary accruals (DACC) is 0.048 . Finally, the majority of directors on the board are independent ($\text{BD_IND} = 0.793$). Overall, summary statistics of the variables are largely reasonable and consistent with previous studies (Cohen et al., 2008; Huang et al., 2012; Serfling, 2014).

³ Cheng et al. (2016) show that mean values of abnormal operating cash flows and discretionary expenses of -0.02 , while Huang et al. (2020) report that the mean value of abnormal production costs is 0.001 .

Table 2**Descriptive statistics**

This table presents the descriptive statistics of variables used in this study. Detailed variable definitions are provided in Appendix.

	N	Mean	Std. Dev.	p25	Median	p75
REM_1	8532	-0.006	0.224	-0.097	0.015	0.118
REM_2	8746	-0.040	0.281	-0.160	-0.011	0.106
AB_DISX	8746	-0.007	0.222	-0.980	-0.014	0.115
AB_OCF	8746	-0.033	0.100	-0.073	-0.022	0.019
AB_PROD	8532	0.001	0.010	-0.001	0.000	0.002
YOUNG_CFO	8746	0.422	0.494	0.000	0.000	1.000
CFO_AGE	8746	3.958	0.122	3.871	3.970	4.043
CFO_GENDER	8746	0.890	0.312	1.000	1.000	1.000
RETIREMENT	8746	0.063	0.244	0.000	0.000	0.000
YOUNG_CEO	8746	0.443	0.497	0.000	0.000	1.000
CEO_AGE	8746	4.048	0.121	3.970	4.043	4.127
DUAL	8746	0.486	0.500	0.000	0.000	1.000
SHARES	8746	2.424	4.993	0.231	0.762	2.004
BONUS	8746	0.046	0.089	0.000	0.018	0.049
CEO_GENDER	8746	0.961	0.192	1.000	1.000	1.000
SIZE	8746	7.883	1.531	6.796	7.711	8.888
BIG 4	8746	0.914	0.280	1.000	1.000	1.000
LEVERAGE	8746	0.193	0.173	0.018	0.180	0.298
DIVIDENDS	8746	0.017	0.027	0.000	0.006	0.023
DEBT	8746	0.015	0.074	-0.011	0.000	0.025
ACQUISITION	8746	0.032	0.065	0.000	0.002	0.030
LOSS	8746	0.137	0.344	0.000	0.000	0.000
INST	8746	0.047	0.018	0.035	0.043	0.054
BD_IDP	8746	0.793	0.105	0.727	0.818	0.875
DACC	8746	0.048	0.053	0.014	0.032	0.061

5.2. Correlation results

Table 3 presents the pairwise correlation between the variables used in the main regression analysis.

I include the two comprehensive measures of real earnings management (REM_1 and REM_2) and two proxies of CFO age (YOUNG_CFO and CFO_AGE). I find that REM_1 and REM_2 are negatively and significantly correlated with YOUNG_CFO (correlation varies from -0.04 to -0.03 , both significant at $p < 0.01$). This result provides preliminary support to my conjecture that young

CFOs are associated with less real earnings management. The correlation of REM_1 and REM_2 with CFO_AGE is positive and significant (correlation ranges from 0.03 to 0.04, significant at $p < 0.01$), suggesting that real earnings management is positively associated with older CFO. Interestingly, CFO_AGE is significantly and positively correlated with CEO_AGE (correlation = 0.13, $p < 0.01$), implying that older CEOs prefer older CFOs as their working colleagues.

I also observe a positive and highly significant correlation (correlation coefficient = 0.95, $p < 0.01$) between REM_1 and REM_2, implying that both capture the similar underlying construct. In addition, REM_1 and REM_2 are significantly and negatively correlated with DACC, indicating that more real earnings management is correlated with less accruals. This is also consistent with Cohen et al. (2008) who show that real earnings management might substitute accrual adjustments. I find that real earnings management (REM_1 and REM_2) are significantly ($p < 0.01$) and positively correlated with loss. This is consistent with the findings of Romanuse et al. (2008) that managers of companies with loss have incentives to engage in more real earnings management to secure their positions. Finally, I find that real earnings management is negatively and significantly ($p < 0.01$) correlated with CEO shareholding, firm size, and dividends. Overall, the correlation results are largely consistent with previous studies (Demers and Wang, 2010; Serfling, 2014; Roychowdhury, 2006).

Table 3**Pairwise correlations**

This table presents the Pearson correlation between the variables used in the regressions. * represents significance at 1% level. Variable definitions are presented in Appendix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) REM_1	1.00														
(2) REM_2	0.95*	1.00													
(3) YOUNG_CFO	-0.04*	-0.03*	1.00												
(4) CFO_AGE	0.04*	0.03*	-0.81*	1.00											
(5) CFO_GENDER	-0.01	-0.01	-0.04*	0.05*	1.00										
(6) RETIREMENT	-0.00	0.00	-0.14*	0.27*	0.04*	1.00									
(7) YOUNG_CEO	-0.04*	-0.03	0.07*	-0.11*	0.01	-0.04*	1.00								
(8) CEO_AGE	0.05*	0.04*	-0.09*	0.13*	-0.01	0.06*	-0.79*	1.00							
(9) DUAL	0.02	0.03	-0.02	0.03	0.02	0.00	-0.19*	0.23*	1.00						
(10) SHARES	-0.06*	-0.03*	0.00	0.01	0.00	0.04*	-0.10*	0.21*	0.23*	1.00					
(11) BONUS	0.02	0.03*	-0.02	0.02	-0.04*	-0.00	-0.02	0.03*	0.01	0.10*	1.00				
(12) SIZE	0.02	-0.07*	-0.09*	0.10*	-0.01	-0.02	-0.07*	0.05*	0.11*	-0.22*	-0.11*	1.00			
(13) BIG 4	0.04*	0.04*	0.00	-0.01	-0.03*	-0.05*	0.02	-0.03*	0.01	-0.16*	-0.02	0.25*	1.00		
(14) LEVERAGE	0.13*	0.14*	-0.01	0.00	0.05*	-0.02	-0.01	0.01	-0.00	-0.17*	-0.05*	0.20*	0.15*	1.00	
(15) DIVIDENDS	-0.05*	-0.09*	-0.02	0.04*	-0.02	0.01	-0.06*	0.07*	0.05*	0.03*	0.03*	0.25*	-0.02	0.04*	1.00
(16) DEBT	-0.02	-0.01	0.02	-0.02	0.01	0.00	0.01	-0.01	-0.01	-0.03	-0.02	0.07*	0.01	0.28*	0.04*
(17) ACQUISITION	-0.03*	-0.03*	0.01	-0.01	0.01	-0.00	0.04*	-0.03*	-0.05*	-0.04*	-0.05*	-0.01	-0.00	0.13*	-0.09*
(18) LOSS	0.03*	0.08*	0.01	-0.01	0.02	0.01	0.03	-0.02	-0.06*	-0.00	0.06*	-0.26*	-0.03*	0.09*	-0.16*
(19) INST	0.01	0.06*	0.01	-0.03*	0.01	0.01	0.03	-0.01	-0.04*	0.21*	0.08*	-0.46*	-0.15*	-0.06*	-0.03*
(20) BD_IDP	0.05*	0.03	-0.03	0.01	0.03*	-0.03*	-0.01	-0.04*	0.10*	-0.28*	-0.09*	0.21*	0.16*	0.14*	0.00
(21) DACC	-0.13*	-0.12*	0.02	-0.03*	0.05*	0.01	0.06*	-0.07*	-0.02	0.02	0.01	-0.14*	-0.06*	-0.03*	-0.08*

Variables	(16)	(17)	(18)	(19)	(20)	(21)
(16) DEBT	1.00					
(17) ACQUISITION	0.50*	1.00				
(18) LOSS	-0.03*	-0.02	1.00			
(19) INST	-0.04*	-0.04*	0.22*	1.00		
(20) BD_IDP	0.02	0.00	-0.01	-0.16*	1.00	
(21) DACC	0.02	0.03*	0.20*	0.07*	-0.03*	1.00

5.3. Univariate mean difference test

Table 4 provides the univariate mean difference test results of the variables between young CFO (i.e., CFO age < median) and older CFO (i.e., CFO age > median). I find that the mean value of both measures of real earnings management (REM_1 and REM_2) is significantly lower for the young CFO group compared to the older CFO group (t -value = 3.30, $p < 0.01$ for REM_1; t -value = 3.09, $p < 0.01$ for REM_2). This finding is consistent with my conjecture that young CFOs are

associated with less real earnings management. I also find that young CFOs are associated with significantly less abnormal discretionary expenses ($p < 0.01$) than the old CFO counterpart. Interestingly, with respect to the discretionary accruals, I find that the absolute value of discretionary accruals (DACC) is significantly higher ($p < 0.10$) for the young CFO group when compared with the older CFO counterpart. This indicates that CFOs in different age stages prefer a different method of earnings management.

In addition, I find that firms with young CFOs are significantly smaller, pay less dividends, and issue more debt. Overall, the findings from the univariate mean difference test are largely consistent with my predictions and previous studies (Cohen et al., 2008; Demers and Wang, 2010).

Table 4
Univariate test

This table summarizes the results of two sample t-test. I divide the sample in two groups based on the median age of the CFOs. Firm-year observations with smaller (greater) than median CFO age is grouped in YOUNG_CFO (OLDER_CFO) sub-sample. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Variables	YOUNG_CFO (CFO age < Median)	OLDER_CFO (CFO age > Median)	t-test of difference in mean
REM_1	-0.015	0.001	3.30***
REM_2	-0.050	-0.031	3.09***
AB_DISX	-0.015	0.001	3.21***
AB_OCF	-0.035	-0.032	1.58
AB_PROD	0.001	0.001	1.05
CFO_AGE	3.843	4.042	129.09***
CFO_GENDER	0.874	0.901	4.06***
RETIREMENT	0.000	0.109	21.57***
YOUNG_CEO	0.485	0.415	-6.65***
CEO_AGE	4.034	4.057	8.84***
DUAL	0.474	0.491	1.65*
SHARES	2.403	2.398	-0.05
BONUS	0.044	0.047	1.60
CEO_GENDER	0.957	0.963	1.36
BIG 4	0.917	0.914	-0.38
SIZE	7.733	8.011	8.49***
LEVERAGE	0.194	0.196	0.67
DIVIDENDS	0.016	0.017	1.93*
DEBT	0.017	0.014	-2.00**
ACQUISITION	0.033	0.032	-0.69
LOSS	0.145	0.137	-1.04
INST	0.048	0.048	-0.60
BD_IDP	0.791	0.796	2.38**
DACC	0.049	0.047	-1.68*

5.4. Main regression results

Table 5 presents the baseline regression results of the relationship between CFO age and real earnings management. I use two comprehensive metrics of real earnings management (REM_1 and REM_2) as dependent variables. My main independent variable is YOUNG_CFO, which is a dummy variable that takes a value of 1 if the CFO's age is less than the sample median. I estimate Equation (1) using the ordinary least squares (OLS) regressions with standard errors adjusted for heteroskedasticity and within-firm clustering⁴.

In Column (1), I use REM_1 as the dependent variable. Recall that REM_1 is computed by multiplying abnormal discretionary expenses by negative one and adding it to abnormal production costs. By construction, a higher value of REM_1 indicates more real earnings management. I find that the coefficient on YOUNG_CFO is negative and significant (coefficient = -0.016 , $p < 0.05$), suggesting that younger CFOs are related to less real earnings management. My finding is also economically nontrivial. For example, the coefficient in Column (1) suggests that firms with young CFOs are related to 2.7 times less real earnings management compared to their old CFO counterpart (calculated as $-0.016/-0.006$).

In Column (2), I report regression results using the second comprehensive measure of real earnings management (REM_2). REM_2 is constructed by multiplying both abnormal operating cash flows and discretionary expenses by negative one and then combining them into one measure. By construction, a higher value of REM_2 indicates more real earnings management. My regression estimates show a negative and significant coefficient on YOUNG_CFO (coefficient = -0.024 , $p < 0.05$), signifying that young CFOs are associated with less real earnings management. In terms of economic significance, I find that firms with young CFOs are related to 60% less real earnings management when compared to their old CFO counterpart (calculated as $-0.024/-0.04$).

⁴ To alleviate the concern with potential collinearity problem, I conduct variance inflation factor (VIF) test. Untabulated results show that multicollinearity problem isn't a concern since the highest VIF is 1.90 related to SIZE, followed by 1.51 for DEBT. The rest of the VIFs related to other variables are below 1.48.

The above negative and significant relationship between young CFO and real earnings management is consistent with my hypothesis that CFO age could be positively and significantly related with real earnings management. This is also consistent with previous studies showing that older executives are more motivated to participate in real earnings management than their younger counterparts because of the horizon problem or career concerns (Chevalier and Ellison, 1999; Davidson et al., 2007; Demers and Wang 2010).

I also note that the sign and significance of the controls are largely consistent with previous studies. For example, the duality of CEO and chairperson's role is significantly positively related to both metrics of real earnings management (coefficient = 0.018, $p < 0.10$ for REM_1; coefficient = 0.033, $p < 0.01$ for REM_2), suggesting that CEO entrenchment corresponds to more earnings management. As expected, SIZE is negatively related with REM_2 (coefficient = -0.019, $p < 0.01$), suggesting that larger firms are less likely to get involved in real earnings management. Moreover, coefficients on LEVERAGE are negative and significant (coefficient = 0.225, $p < 0.01$ for REM_1; coefficient = 0.281, $p < 0.01$ for REM_2), implying that firms with leverage have more pressure to adopt real earnings management for future potential finance opportunities. This result is consistent with my expectations and previous studies (Huang et al., 2020). Furthermore, DACC exhibits a significant negative relationship with real earnings management (coefficient = -0.539, $p < 0.01$ for REM_1; coefficient = -0.599, $p < 0.01$ for REM_2), suggesting that discretionary accruals might be used by managers as the substitute rather than the complement of real earnings management, consistent with Cohen et al. (2008). The coefficients on other controls such as LOSS, DIVIDENDS, and ACQUISITIONS have predicted the sign and significance. Finally, the Adj. R-squared shows that regressions in Column (1) and (2) capture 8% and 9% of the model, which is within the range of prior studies (Cohen and Zarowin, 2010).

Table 5**Main regression results**

This table presents regression results of the relationship between the CFO age (YOUNG_CFO) and real earnings management (REM_1 and REM_2). Robust t-statistics are reported in parentheses. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Dep. Var. =	(1) REM_1	(2) REM_2
YOUNG_CFO	-0.016** [-1.99]	-0.024** [-2.47]
CFO_GENDER	-0.011 [-0.85]	-0.008 [-0.55]
RETIREMENT	0.003 [0.17]	0.005 [0.31]
YOUNG_CEO	-0.013 [-1.52]	-0.014 [-1.31]
DUAL	0.018* [1.92]	0.033*** [2.92]
SHARES	-0.002 [-1.57]	-0.002* [-1.69]
BONUS	0.061 [1.45]	0.070 [1.51]
CEO_GENDER	0.006 [0.22]	0.001 [0.04]
SIZE	-0.004 [-0.82]	-0.019*** [-3.12]
BIG 4	0.014 [0.55]	0.036 [1.22]
LEVERAGE	0.225*** [6.58]	0.281*** [7.00]
DIVIDENDS	-0.606* [-1.84]	-1.037*** [-2.78]
DEBT	-0.152*** [-3.59]	-0.087* [-1.69]
ACQUISITION	-0.144** [-2.52]	-0.197*** [-2.88]
LOSS	0.013 [1.22]	0.041*** [3.38]
INST	0.312 [1.16]	0.538* [1.75]
BD_IDP	0.018 [0.35]	0.014 [0.24]
DACC	-0.539*** [-5.21]	-0.599*** [-4.96]
Constant	-0.086 [-1.21]	-0.020 [-0.230]
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	8,532	8,746
Adj. R-squared	0.08	0.09

5.5. Sensitivity analysis

5.5.1. Alternative measures of real earnings management

To show the robustness of my results, in this subsection I use alternative measures of real earnings management. In particular, while in my main regression analysis I use two composite measures of real earnings management, here I use three individual components of real earnings management (AB_DISX, AB_OCF and AB_PROD). Prior studies suggest that individual components of real earnings management should be retained and regressed as dependent variables because they possess different explanatory power from the comprehensive measures (Cohen and Zarowin, 2010). I report results from this analysis in Table 6.

The dependent variables in Columns (1), (2) and (3) are abnormal discretionary expenses (AB_DISX), abnormal operating cash flows (AB_OCF) and abnormal production costs (AB_PROD), respectively. Column (1) shows that the coefficient on YOUNG_CFO is negative and significant when AB_DISX is used as the dependent variable (coefficient = -0.015 , $p < 0.10$). This result suggests that firms with young CFO engage in less abnormal discretionary expenses. Similarly, in Column (2), I find that the coefficient on YOUNG_CFO is also negative and significant when AB_OCF is used as the dependent variable (coefficient = -0.009 , $p < 0.01$), implying that firms with young CFO engage in less abnormal operating cash flows. However, in Column (3) the coefficient on YOUNG_CFO is insignificant when AB_PROD is used as the dependent variable. Overall, findings from this analysis are consistent with my baseline regression that young CFOs are related to less real earnings management. Importantly, results from individual components of real earnings management in Table 6 suggest that abnormal discretionary expenses and abnormal operating cash flows are the components that drive the main regression results (Table 5).

The sign and significance on control variables are consistent with the main regression results. For example, leveraged and loss-making firms pursue more real earnings management, whereas dividend payers pursue less real earnings management.

Table 6**CFO age and individual component of real earnings management**

This table presents regression results of the relationship between the CFO age (YOUNG_CFO) and individual component of real earnings management (REM_DISX, REM_OCF and REM_PROD). Robust t-statistics are reported in parentheses. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Dep. Var. =	(1) AB_DISX	(2) AB_OCF	(3) AB_PROD
YOUNG_CFO	-0.015*	-0.009***	0.000
	[-1.89]	[-3.05]	[-0.24]
CFO_GENDER	-0.008	-0.000	-0.000
	[-0.63]	[-0.03]	[-0.34]
RETIREMENT	0.005	0.000	-0.001
	[0.36]	[0.01]	[-1.17]
YOUNG_CEO	-0.014*	0.001	0.000
	[-1.66]	[0.21]	[0.69]
DUAL	0.017*	0.015***	-0.000
	[1.90]	[4.50]	[-0.99]
SHARES	-0.002	-0.001*	-0.000
	[-1.38]	[-1.70]	[-0.10]
BONUS	0.063	0.007	0.002
	[1.52]	[0.44]	[1.55]
CEO_GENDER	0.006	-0.004	0.000
	[0.21]	[-0.55]	[0.31]
SIZE	-0.005	-0.014***	0.001***
	[-1.01]	[-8.05]	[6.29]
BIG 4	-0.018	0.018***	0.001
	[0.71]	[2.65]	[0.85]
LEVERAGE	0.216***	0.064***	0.004***
	[6.47]	[5.37]	[4.27]
DIVIDENDS	-0.583*	-0.455***	-0.020***
	[-1.79]	[-5.02]	[-3.06]
DEBT	-0.157***	0.070***	-0.004**
	[-3.78]	[3.13]	[-2.10]
ACQUISITION	-0.130**	-0.067***	-0.003
	[-2.34]	[-2.70]	[-1.02]
LOSS	0.012	0.029***	0.002***
	[1.13]	[7.17]	[4.64]
INST	0.287	0.252**	0.009
	[1.09]	[2.56]	[0.73]
BD_IDP	0.015	-0.001	0.004**
	[0.31]	[-0.06]	[2.52]
DACC	-0.532***	-0.067*	-0.008*
	[-5.28]	[-1.85]	[-1.74]
Constant	0.085	-0.066***	-0.010***
	[1.20]	[-2.59]	[-3.89]
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	8,746	8,746	8,532
Adj. R-squared	0.08	0.19	0.07

5.5.2. Alternative measure of CFO age

In the main regression analysis, I use YOUNG_CFO, a dummy variable that takes a value of one if the CFO's age is less than the sample median. In this section, I replace YOUNG_CFO with the natural logarithm of the CFO's age (CFO_AGE) to test the sensitivity of my finding. Regression results in Table 7 show that CFO_AGE is positively and significantly related to REM_2 only (coefficient = 0.108, $p < 0.05$). Recall that REM_1 is the comprehensive measure representing abnormal production costs and discretionary expenses, while REM_2 represents the combined effects of abnormal discretionary expenses and cash flows from operations. This regression result is consistent with my findings in Table 6, which reports that younger (older) CFOs mainly engage in less (more) real earnings management by manipulating less (more) operating cash flows and discretionary expenses. To be consistent with the specification of the main variable, I replace YOUNG_CEO with CEO_AGE which is the natural logarithm of the CEO's age. I find that the coefficient on CEO_AGE is significant and positive for both measures of real earnings management (coefficient = 0.085, $p < 0.05$ for REM_1; coefficient = 0.083, $p < 0.1$ for REM_2). The coefficients on other control variables in Table 7 are consistent with that reported in Table 5.

Overall, results from this analysis show the robustness of my findings and suggest that the specific definition of CFO age does not drive the findings of this study.

Table 7**CFO age and real earnings management: Use of alternative measure of CFO age**

This table presents regression results of the relationship between the CFO age and real earnings management (REM_1 and REM_2), where CFO age is measured as the natural log of 1 plus CFO age. Robust t-statistics are reported in parentheses. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Dep. Var. =	(1) REM_1	(2) REM_2
CFO_AGE	0.069	0.108**
	[1.59]	[2.16]
CFO_GENDER	-0.011	-0.008
	[-0.83]	[-0.54]
RETIREMENT	-0.008	-0.010
	[-0.47]	[-0.54]
CEO_AGE	0.085**	0.083*
	[1.97]	[1.67]
DUAL	0.016*	0.031***
	[1.67]	[2.71]
SHARES	-0.002*	-0.003*
	[-1.80]	[-1.91]
BONUS	0.059	0.068
	[1.38]	[1.46]
CEO_GENDER	0.005	0.000
	[0.19]	[0.01]
SIZE	-0.004	-0.019***
	[-0.85]	[-3.17]
BIG 4	0.014	0.035
	[0.54]	[1.20]
LEVERAGE	0.225***	0.280***
	[6.56]	[6.98]
DIVIDENDS	-0.612*	-1.045***
	[-1.85]	[-2.79]
DEBT	-0.150***	-0.084
	[-3.53]	[-1.63]
ACQUISITION	-0.145**	-0.199***
	[-2.55]	[-2.91]
LOSS	0.012	0.040***
	[1.15]	[3.32]
INST	0.337	0.566*
	[1.26]	[1.84]
BD_IDP	0.024	0.020
	[0.47]	[0.34]
DACC	-0.531***	-0.590***
	[-5.20]	[-4.95]
Constant	-0.718***	-0.800***
	[-2.65]	[-2.58]
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	8,532	8,746
Adj. R-squared	0.08	0.09

5.6. Endogeneity concerns

So far, I provide robust evidence that young CFO is negatively and significantly related to real earnings management. However, one may argue that a time-variant omitted variable could drive this finding. In addition, there may be a concern that firms engaging in less real earnings management prefer hiring younger CFOs rather than older CFOs, giving rise to the reverse causality problem. I use an instrumental variable approach to mitigate this endogeneity concern. A valid instrumental variable should present significant correlation with the endogenous variable and no correlation with dependent variables. In purely economic terms, finding a variable meeting such restrictions is quite challenging.

Following Serfling (2014), I use the natural logarithm of the consumer price index (CPI) in the years when the CFO was born as my instrumental variable. In econometric sense, CPI is likely to be highly correlated with CFO age. This is because the values of CPI generally increase over the years (i.e., with the increase of CFO age). Accordingly, CPI in the year when a CFO was born should be negatively and significantly correlated with the CFO's current age. In addition, there are no theoretical arguments to predict that CPI is correlated with real earnings management (Serfling, 2014).

Table 8 presents the results of two-stage least squares (2SLS) regression. In the first stage, I regress the endogenous variable (YOUNG_CFO) or natural logarithm of CFO age (CFO_AGE) on the previously used control variables and CPI. I then use the predicted values of the endogenous variable from the first-stage regression in the second-stage regressions.

Columns (1) to (4) use YOUNG_CFO as the proxy for CFO age while columns (5) to (8) use CFO_AGE as the metric for CFO age. Columns (1), (3), (5) and (7) present the first-stage regression results, whereas columns (2), (4), (6) and (8) show the results of second-stage regressions. Column (2) and (4) show that the coefficients on YOUNG_CFO remain negative and significant (coefficient = -0.038 , $p < 0.05$ for YOUNG_CFO in Column (2); coefficient = -0.052 , $p < 0.01$ for YOUNG_CFO in Column (4)). Columns (6) and (8) report that coefficients on

CFO_AGE remain positive and significant (coefficient = 0.107, $p < 0.05$ for CFO_AGE in Column (6); coefficient = 0.146, $p < 0.01$ for CFO_AGE in Column (8)). In addition, the Wald F -statistics in the first-stage regressions are all significant ($p < 0.01$) and large enough, justifying that my instrumental variable is strong. Overall, the results from the two-stage instrumental variable regression provide consistent evidence that young (older) CFOs are negatively (positively) and significantly related to real earnings management, confirming that this result is not driven by the endogeneity problem.

Table 8

Two-Stage least squares regressions

This table presents the two-stage least squares regression results of the relationship between CFO age (YOUNG_CFO) and real earnings management (REM_1 and REM_2). I use the natural logarithm of consumer price index (CPI) in the years when the CFO was born as the instrumental variable. Robust t-statistics are reported in parentheses. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Dep. Var. =	(1) 1 st Stage YOUNG_CFO	(2) 2 nd Stage REM_1	(3) 1 st Stage YOUNG_CFO	(4) 2 nd Stage REM_2	(5) 1 st Stage CFO_AGE	(6) 2 nd Stage REM_1	(7) 1 st Stage CFO_AGE	(8) 2 nd Stage REM_2
YOUNG_CFO		-0.038** [-2.44]		-0.052*** [-2.74]				
CFO_AGE						0.107** [2.44]		0.146*** [2.74]
CFO_GENDER	0.001 [0.06]	-0.004 [-0.36]	0.004 [0.23]	0.000 [0.01]	-0.006*** [-3.03]	-0.003 [-0.33]	-0.006*** [-3.14]	0.001 [0.05]
RETIREMENT	- -	- -	- -	- -	- -	- -	- -	- -
YOUNG_CEO	0.020* [1.88]	-0.015** [-2.16]	0.025** [2.30]	-0.014* [-1.66]	-0.005*** [-4.12]	-0.016** [-2.22]	-0.005*** [-4.29]	-0.015* [-1.73]
DUAL	0.015 [1.36]	0.030*** [4.10]	0.019* [1.64]	0.048*** [5.47]	-0.002 [-1.51]	0.029*** [4.05]	-0.002* [-1.86]	0.047*** [5.40]
SHARES	-0.003* [-1.82]	-0.002* [-1.94]	-0.002* [-1.65]	-0.002** [-2.17]	0.000 [0.01]	-0.002* [-1.84]	0.000 [0.85]	-0.002** [-2.08]
BONUS	0.028* [0.45]	0.011 [0.27]	0.042 [0.64]	0.023 [0.47]	-0.005 [-0.66]	0.010 [0.25]	-0.006 [-0.77]	0.022 [0.44]
CEO_GENDER	-0.021 [-0.77]	0.023 [1.31]	-0.028 [-1.03]	0.023 [1.07]	0.012*** [3.69]	0.023 [1.32]	0.012*** [3.72]	0.023 [1.07]
SIZE	0.006 [1.48]	-0.009*** [-3.02]	0.002 [0.50]	-0.025*** [-7.35]	0.001* [1.90]	-0.009*** [-3.09]	0.001** [2.32]	-0.025*** [-7.41]
BIG 4	-0.007 [-0.35]	0.015 [1.16]	-0.007 [-0.33]	0.037** [2.34]	0.000 [-0.10]	0.016 [1.20]	-0.001 [-0.26]	0.038** [2.37]
LEVERAGE	-0.009 [-0.25]	0.219*** [9.82]	-0.019 [-0.55]	0.266*** [9.84]	0.005 [1.19]	0.219*** [9.83]	0.006 [1.43]	0.266*** [9.85]
DIVIDENDS	-0.005 [-0.02]	-0.973*** [-7.28]	0.029 [0.14]	-1.443*** [-8.89]	-0.032 [-1.33]	-0.971*** [-7.27]	-0.036 [-1.51]	-1.439*** [-8.87]

DEBT	0.064	-0.189***	0.067	-0.152**	-0.014	-0.191***	-0.014	-0.154**
	[0.81]	[-3.64]	[0.820]	[-2.43]	[-1.50]	[-3.68]	[1.52]	[-2.45]
ACQUISITION	0.036	-0.131**	0.049	-0.141**	0.002	-0.132**	0.001	-0.144**
	[0.40]	[-2.21]	[0.530]	[-1.97]	[0.19]	[-2.24]	[0.07]	[-2.00]
LOSS	0.016	0.019*	0.012	0.047***	0.000	0.019*	0.000	0.046***
	[0.97]	[1.84]	[0.740]	[3.69]	[-0.16]	[1.80]	[-0.21]	[3.64]
INST	-0.508***	0.150	-0.531***	0.201	0.054***	0.165	0.058***	0.221
	[-2.92]	[1.31]	[-3.04]	[1.49]	[2.63]	[1.45]	[2.93]	[1.64]
BD_IDP	-0.099*	0.027	-0.118**	0.030	0.004	0.031	0.007	0.035
	[-1.78]	[0.73]	[-2.07]	[0.67]	[0.68]	[0.85]	[1.03]	[0.80]
DACC	-0.120	-0.528***	-0.118	-0.609***	-0.014	-0.523***	-0.011	-0.601***
	[-1.13]	[-7.64]	[-1.08]	[-7.23]	[-1.14]	[-7.56]	[-0.92]	[-7.14]
CPI	1.540***		1.527***		-0.549***		-0.547***	
	[41.57]		[42.02]		[-168.01]		[-169.96]	
Constant	-0.301	-0.117	-2.980	-0.049	5.223	-0.564	5.213	-0.654
	[-16.30]	[-1.16]	[-16.25]	[-0.39]	[320.78]	[-2.98]	[321.42]	[-2.85]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4599	4,599	4,721	4,721	4,599	4,599	4,721	4,721
Adj. R-squared		0.09		0.11		0.09		0.11
<u>Weak Identification Test</u>								
Cragg-Donald Wald F								
statistics	1712.95***		1765.53***		28225.80***		28886.10***	

5.7. Cross-sectional analysis

In this section, I conduct cross-sectional analyses to understand how the relationship between young CFO and real earnings management varies depending on the contextual factors.

5.7.1. CFO age and real earnings management: The role of CEO age

Prior studies provide inconclusive evidence in relation to CEO age and earnings management. For example, Huang et al. (2012) show that older CEOs are associated with better financial reporting. On the other hand, Demers and Wang (2010) report that young CEOs are negatively and significantly related to real earnings management. Given that CEOs have considerable influence on the activities of CFOs, I expect young CFOs to demonstrate more conservative behaviour in terms of real earnings management if they serve in firms that employ young CEOs. Therefore, the negative relationship between young CFO and real earnings management should be stronger if a young CEO serves the supervisory role. I report results from this analysis in Table 9.

In Columns (1) and (2), I use REM_1 to measure real earnings management. I divide the sample into young (old) CEO group if CEO_AGE is less (more) than the sample median. I find that the negative relationship between YOUNG_CFO and REM_1 is negative and significant only for subsample of firms with young CEOs. In Columns (3) and (4), I use REM_2 to proxy for real earnings management. I find that coefficients for YOUNG_CFO are negative and significant for both subsamples. However, the coefficient is relatively stronger for the YOUNG_CEO subsample. Taken together, these results suggest that young CEOs moderate the relationship between CFO age and real earnings management.

Table 9

CFO age and real earnings management: Moderating role of CEO age

This table presents regression results of the moderating role of CEO age on relationship between the CFO age and real earnings management (REM_1 and REM_2). Robust t-statistics are reported in parentheses. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Dep. Var. =	(1) REM_1 Young CEO	(2) REM_1 Old CEO	(3) REM_2 Young CEO	(4) REM_2 Old CEO
YOUNG_CFO	-0.020* [-1.65]	-0.012 [-1.27]	-0.024* [-1.66]	-0.022* [-1.87]
CFO_GENDER	-0.030 [-1.39]	-0.003 [-0.23]	-0.038 [-1.51]	0.007 [0.42]
RETIREMENT	0.003 [0.10]	0.000 [0.02]	-0.001 [-0.02]	0.006 [0.34]
DUAL	0.017 [1.21]	0.023* [1.95]	0.024 [1.40]	0.045*** [3.17]
SHARES	-0.003* [-1.65]	-0.002 [-1.31]	-0.003 [-1.51]	-0.002* [-1.66]
BONUS	0.017 [0.23]	0.076 [1.52]	0.034 [0.41]	0.080 [1.50]
CEO_GENDER	0.008 [0.27]	-0.002 [-0.07]	-0.003 [-0.08]	-0.001 [-0.02]
SIZE	-0.004 [-0.58]	-0.006 [-1.02]	-0.020** [-2.40]	-0.020*** [-2.91]
BIG 4	-0.009 [-0.26]	0.024 [0.89]	0.006 [0.15]	0.049 [1.59]
LEVERAGE	0.210*** [4.09]	0.235*** [6.46]	0.280*** [4.72]	0.277*** [6.35]
DIVIDENDS	-1.047** [-2.00]	-0.141 [-0.55]	-1.477** [-2.49]	-0.541* [-1.84]
DEBT	-0.137** [-2.12]	-0.141** [-2.56]	-0.054 [-0.70]	-0.089 [-1.31]
ACQUISITION	-0.143* [-1.78]	-0.143** [-2.02]	-0.190* [-1.96]	-0.202** [-2.40]
LOSS	0.015 [0.97]	0.008 [0.65]	0.042** [2.33]	0.037** [2.54]
INST	0.519 [1.43]	0.086 [0.28]	0.724* [1.67]	0.360 [1.03]
BD_IDP	0.090 [1.25]	-0.024 [-0.41]	0.071 [0.82]	-0.015 [-0.22]
DACC	-0.665*** [-4.70]	-0.401*** [-3.38]	-0.747*** [-4.51]	-0.441*** [-3.14]
Constant	-0.065 [-0.65]	-0.096 [-1.14]	0.070 [0.57]	-0.085 [-0.84]
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	3,776	4,756	3,878	4,868
Adj. R-squared	0.10	0.09	0.10	0.10

5.7.2. CFO age and real earnings management: The role of CEO duality

Prior studies suggest that separation of the roles of chair and CEO positively contributes to the board independence and corporate governance environment (Lim, 2011). In contrast, CEOs who are also appointed as chairpersons are entrenched and become more powerful, which adversely affects board monitoring and governance (Krause et al., 2014). Extant studies provide evidence that CEO-chair duality allows the CEOs to commit opportunistic behaviours, such as adopting real earnings management. Under this circumstance, CFOs might have less opportunity to demonstrate due diligence to secure their positions. Therefore, I expect the negative relationship between young CFOs and real earnings management to be weaker (stronger) for firms with CEO-chair duality (separation). I report results from this analysis in Table 10.

In Columns (1) and (2), I use REM_1 as the dependent variable. I classify firms into two different groups based on whether the CEO also holds the chair position. In particular, firm-year observations with CEO-chair duality (separation) are grouped as Dual (Separate). Results in Columns (1) and (2) show that the coefficient on YOUNG_CFO is negative, significant, and more pronounced only for the subsample of firms with a separation in the CEO-chair position (i.e., duality = 0). In Columns (3) and (4), I use REM_2 as the dependent variable and re-run the analysis. Again, I continue to find that the coefficient on YOUNG_CFO is negative, significant, and more pronounced only for the subsample of firms with a separation in the CEO-chair position (i.e., duality = 0). On the other hand, the coefficient on YOUNG_CFO is insignificant for the subsample of firms with CEO-chair duality (duality = 1). Taken together, results from this analysis suggest that young CFO is associated with less real earnings management when the CEO is less powerful.

Table 10**CFO age and real earnings management: Moderating role of CEO-Chair Separation**

This table presents regression results of the moderating role of CEO-Chair duality on relationship between the CFO age and real earnings management (REM_1 and REM_2). Robust t-statistics are reported in parentheses. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Dep. Var. =	(1) <u>REM_1</u> Duality = 1	(2) <u>REM_1</u> Duality = 0	(3) <u>REM_2</u> Duality = 1	(4) <u>REM_2</u> Duality = 0
YOUNG_CFO	-0.001 [-0.07]	-0.028** [-2.51]	-0.003 [-0.26]	-0.039*** [-2.90]
CFO_GENDER	-0.006 [-0.31]	-0.021 [-1.34]	-0.001 [-0.03]	-0.021 [-1.10]
RETIREMENT	0.011 [0.55]	0.001 [0.03]	0.014 [0.59]	0.003 [0.11]
YOUNG_CEO	-0.017 [-1.35]	-0.010 [-0.85]	-0.024 [-1.61]	-0.006 [-0.42]
SHARES	-0.002 [-1.55]	0.000 [0.08]	-0.003* [-1.66]	-0.001 [-0.30]
BONUS	0.083 [1.52]	0.016 [0.27]	0.095 [1.58]	0.018 [0.28]
CEO_GENDER	-0.019 [-0.45]	0.026 [0.81]	-0.021 [-0.39]	0.020 [0.55]
SIZE	-0.001 [-0.22]	-0.010 [-1.55]	-0.015** [-2.12]	-0.027*** [-3.38]
BIG 4	0.014 [0.43]	0.020 [0.69]	0.025 [0.68]	0.050 [1.46]
LEVERAGE	0.208*** [4.85]	0.247*** [5.33]	0.227*** [4.51]	0.333*** [6.11]
DIVIDENDS	-0.513 [-1.55]	-0.615 [-1.43]	-0.791** [-2.00]	-1.145** [-2.44]
DEBT	-0.188*** [-2.85]	-0.121** [-2.05]	-0.153* [-1.89]	-0.033 [-0.47]
ACQUISITION	-0.120 [-1.49]	-0.160** [-2.22]	-0.157 [-1.59]	-0.225*** [-2.63]
LOSS	0.013 [0.96]	0.012 [0.85]	0.039** [2.42]	0.040** [2.48]
INST	0.403 [1.19]	0.193 [0.53]	0.589 [1.49]	0.462 [1.11]
BD_IDP	0.053 [0.70]	-0.021 [-0.36]	0.050 [0.57]	-0.033 [-0.45]
DACC	-0.504*** [-3.84]	-0.563*** [-4.50]	-0.530*** [-3.35]	-0.653*** [-4.43]
Constant	-0.110 [-1.07]	0.040 [0.40]	-0.030 [-0.24]	0.130 [1.07]
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	4,162	4,370	4,252	4,494
Adj. R-squared	0.08	0.09	0.08	0.11

5.7.3. CFO age and real earnings management: The role of institutional ownership

Finally, I investigate whether institutional ownership moderates the relationship between CFO age and real earnings management. Prior studies suggest that the monitoring role of institutional ownership curbs managerial opportunity for earnings management (Bushee, 1998). Further, Rajgopal et al. (1999) report that earnings quality is improved in the presence of institutional investors. I predict that the negative relationship between young CFOs and real earnings management will be stronger (weaker) if there is more (less) institutional shareholding. I report the results from this analysis in Table 11.

I classify firms into high (low) ownership subsamples based on whether institutional shareholding is more (less) than the sample median. In Columns (1) and (2), I use REM_1 as the dependent variable. I find that the coefficient on YOUNG_CFO is negative, significant, and more pronounced only for the subsample of firms with high institutional ownership. In Columns (3) and (4), I use REM_2 as the dependent variable and re-run the analysis. Again, I continue to find that the coefficient on YOUNG_CFO is negative, significant, and more pronounced only for the subsample of firms with high institutional ownership. On the other hand, the coefficient on YOUNG_CFO is insignificant for the subsample of firms with less institutional ownership.

Table 11**CFO age and real earnings management: Moderating role of institutional ownership**

This table presents regression results of the moderating role of institutional ownership on relationship between the CFO age and real earnings management (REM_1 and REM_2). Robust t-statistics are reported in parentheses. *, **, *** represent 10%, 5% and 1% levels of significance, respectively. Variable definitions are presented in Appendix.

Dep. Var. =	(1) REM_1 Inst>median	(2) REM_1 Inst<median	(3) REM_2 Inst>median	(4) REM_2 Inst<median
YOUNG_CFO	-0.019* [-1.88]	-0.009 [-0.77]	-0.023* [-1.90]	-0.021 [-1.57]
CFO_GENDER	-0.013 [-0.87]	-0.009 [-0.49]	-0.021 [-1.17]	0.009 [0.43]
RETIREMENT	-0.021 [-1.02]	0.022 [1.21]	-0.024 [-1.06]	0.030 [1.37]
YOUNG_CEO	-0.016 [-1.50]	-0.009 [-0.82]	-0.017 [-1.31]	-0.009 [-0.63]
DUAL	0.019* [1.65]	0.025* [1.96]	0.033** [2.39]	0.041*** [2.66]
SHARES	-0.002 [-1.05]	-0.003** [-2.02]	-0.002 [-0.68]	-0.004** [-2.40]
BONUS	0.068 [1.20]	0.044 [0.75]	0.083 [1.23]	0.042 [0.72]
CEO_GENDER	0.015 [0.42]	-0.006 [-0.18]	0.019 [0.43]	-0.016 [-0.42]
SIZE	-0.019** [-2.53]	0.001 [0.26]	-0.039*** [-4.32]	-0.013* [-1.93]
BIG 4	0.003 [0.10]	0.029 [0.77]	0.014 [0.41]	0.062 [1.49]
LEVERAGE	0.251*** [5.88]	0.196*** [4.45]	0.304*** [6.01]	0.263*** [5.12]
DIVIDENDS	-0.994* [-1.77]	-0.384 [-1.47]	-1.541** [-2.40]	-0.745** [-2.51]
DEBT	-0.194*** [-3.80]	-0.048 [-0.69]	-0.135** [-2.10]	0.038 [0.46]
ACQUISITION	-0.123* [-1.77]	-0.187** [-2.28]	-0.151* [-1.76]	-0.282*** [-2.90]
LOSS	0.012 [0.98]	0.010 [0.65]	0.044*** [3.08]	0.031 [1.62]
INST	-0.625 [-1.50]	0.798** [2.56]	-0.657 [-1.38]	1.114*** [3.14]
BD_IDP	0.093 [1.35]	-0.061 [-0.98]	0.093 [1.14]	-0.075 [-1.01]
DACC	-0.579*** [-4.81]	-0.510*** [-3.05]	-0.614*** [-4.24]	-0.611*** [-3.19]
Constant	0.087 [0.86]	-0.165* [-1.84]	0.238* [1.96]	-0.149 [-1.38]
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	4,726	3,806	4,843	3,903
Adj. R-squared	0.11	0.08	0.12	0.10

6. Conclusion

In this paper, I investigate the relationship between CFO age and real earnings management. Based on extant prior literature (e.g., Cohen and Zarowin, 2010; Demers and Wang, 2010; Huang et al., 2012), I develop two competing hypotheses in relation to CFO age and real earnings management. Empirical results present a positive relationship between CFO age and real earnings management, indicating that young CFOs engage less in real earnings management. In addition, a series robust tests are conducted, in which alternative measures of CFO age and real earnings management are employed, confirming the validity of the findings from the study. Moreover, I conduct a two-stage instrumental variable regression to mitigate the potential endogeneity concerns. Additional analysis shows that the documented negative relationship between young CFO and real earnings management is more pronounced in the presence of young CEO, CEO-chair separation and higher level of institutional ownership.

Findings from this study contribute to the corporate governance literature by shifting attention from CEOs to CFOs when investigating executives' influence on corporate outcome. Prior studies (Demers and Wang, 2010; Huang et al. 2012; Ali and Zhang, 2005) focus on CEOs in investigating how the characteristics of executives impact the financial reporting quality. Although the CFO is the head of the accounting department and holds direct control of financial reports, there has been much less attention on the role of the CFO in influencing financial reporting quality. This study also contributes to earnings management literature. Previous studies tend to proxy earnings management through accruals rather than real earnings management although real earnings management is preferred by executives in the post-SOX period because it is hard to be detected (Cohen et al. 2008; Hutton et al. 2009). In addition, prior research examining the role of the CFO ignores the influence of age in affecting real earnings management although it has a significant role in explaining human behavioural differences (Geiger and North, 2006; Ham et al. 2017; Yu et al. 2010; Habib and Hossain, 2013; Khan, 2019; Aier et al. 2005; Dowdell and

Krishnan, 2004). My findings fill these voids by studying the influence of CFO age on real earnings management.

Findings from my study has important policy implications. For example, my findings suggest that regulators should pay more attention on the financial reports prepared by older CFOs when dealing with financial reporting frauds and irregularities. In addition, regulators and policy makers might consider enforcing new policies to improve supervision of older CFOs as they are more likely to adopt real earnings management.

My study is subject to some limitations. First, the sample used in this study mainly covers only large companies that are covered by S&P 1500 for the indicated fiscal year. Use of large companies as sample may generates large company bias. Second, the accrual models adopted in my thesis may be subject to some measurement errors (Barua et al., 2010). Third, although I have included most control variables which might potentially influence real earnings management in regressions, it is possible that there are some other underlying factors correlated with both CFO age and real earnings management which are omitted from regression estimates.

This study suggests several directions for future studies. First, it seems that proxying financial reporting quality through different metrics (restatement, accruals, meeting or beating targets and real earnings management) may cause different conclusions about the effects of executives' characteristics. I encourage future research to verify findings from this study by using other metrics of earnings management. Second, I find that older managers are correlated with more real earnings management but less accruals. It is worthwhile to investigate the rationales behind shifting from accruals to real earnings management with the increase of executives' age. Finally, future research may also examine if young CFOs have any incentive to hide bad news and whether it leads to future stock price crash risk.

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Appendix

Variables	Definition and measure
<u>Dependent Variables</u>	
AB_OCF	Abnormal operating cash flows, measured as deviations from the predicted values from the corresponding industry-year regression: $CFO_{it}/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_{it}/A_{t-1}) + \beta_2(\Delta S_{it}/A_{t-1}) + \varepsilon_{it}$. I multiply AB_OCF by negative one for the ease of interpretation.
AB_DISX	Abnormal discretionary expenses, measured as deviations from the predicted values from the corresponding industry-year regression: $DISEXP_{it}/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta(S_{it}/A_{t-1}) + \varepsilon_{it}$. I multiply AB_DISX by negative one for the ease of interpretation.
AB_PROD	Abnormal production costs, measured as deviations from the predicted values from the corresponding industry-year regression: $PROD_{it}/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_{it}/A_{t-1}) + \beta_2(\Delta S_{it}/A_{t-1}) + \beta_3(\Delta S_{t-1}/A_{t-1}) + \varepsilon_{it}$.
REM_1	Composite proxy for real earnings management, measured as the sum of abnormal discretionary expenses (AB_DISX) and abnormal production costs (AB_PROD).
REM_2	Composite proxy for real earnings management, measured as the sum of abnormal operating cash flows (AB_OCF) and abnormal discretionary expenses (AB_DISX).
<u>Main Explanatory Variables</u>	
YOUNG_CFO	Dummy variable that takes a value of 1 if the CFO's age is less than the sample median, 0 otherwise.
CFO_AGE	CFO age, measured as age in terms of years. For the regression analysis, I measure CFO_AGE as the natural log of (1+ CFO age).
<u>Control Variables</u>	
CFO_GENDER	Dummy variable that takes a value of 1 if the CFO is male, 0 otherwise.
RETIREMENT	Dummy variable that takes a value of 1 if the CFO's age is more than 61, 0 otherwise.
YOUNG_CEO	Dummy variable that takes a value of 1 if the CEO's age is less than the median, 0 otherwise.
CEO_AGE	CEO age is measured as age in terms of years. For the regression analysis, I measure CEO_AGE as the natural log of (1+ CEO age).
DUAL	Dummy variable that takes a value of 1 if the CEO also holds a chair position, 0 otherwise.
SHARES	Percentage of total shares owned by the CEO.
BONUS	Bonus received by the CEO divided by the CEO's total compensation (TDC1).
CEO_GENDER	Dummy variable that takes a value of 1 if the CEO is a female, 0 otherwise.
SIZE	Natural logarithm of market value of equity of the firm (PRCC_F*CSHO).
BIG4	Dummy variable that takes a value of 1 if respective companies are audited by Big 4 audit firms, 0 otherwise.
LEVERAGE	Financial leverage, measured as long-term debt (DLTT) divided by total assets (AT).

DIVIDENDS	Dividends paid to ordinary shareholders (DVC) divided by total assets (AT).
DEBT	Long-term debt issuance (DLTIS) minus long-term debt reduction (DLTR), divided by total assets (AT).
ACQUISITION	Acquisition expenses measured as acquisitions (AQC) divided by total assets (AT).
LOSS	Dummy variable that takes a value of 1 if net income is negative, 0 otherwise.
INST	Institutional shareholders' concentration.
BD_IDP	Percentage of independent directors on the board.
DACC	Absolute value of discretionary accruals, measured as deviations from the predicted values from the corresponding industry-year regression: $TA_{i,t}/Assets_{t-1} = k_1(1/Assets_{i,t-1}) + k_2(\Delta REV_{i,t}/Assets_{i,t-1}) + k_3(PPE_{i,t}/Assets_{i,t-1}) + \varepsilon_{i,t}.$
