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Are CFO debt-like compensation incentives associated with financial reporting quality?☆

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ABSTRACT

We investigate whether CFO debt-like compensation incentives and their alignment with CEO debt-like compensation incentives are associated with financial reporting quality. He (2015) finds that CEO debt-like compensation incentives are associated with higher financial reporting quality. Consistent with agency theory, we extend He (2015) by considering CFO debt-like compensation incentives. Overall, we find that CFO debt-like compensation incentives are associated with better financial reporting quality while controlling for CEO debt-like compensation incentives. These effects are present when the CEO and CFO compensation incentives are aligned with the same party. Further, the CFO effect dominates that of the CEO when examining discretionary accruals, and complements the CEO effect for accrual quality. However, we are unable to find any evidence of an incremental joint effect from the alignment of the CEO and CFO debt-like compensation incentives.

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1. Introduction

We investigate whether CFO debt-like compensation incentives and their alignment with that of the CEO are associated with financial reporting quality. Agency theory suggests that managers' equity (inside debt) holdings can align managers' actions with shareholders' (debtholders') interests (Jensen & Meckling, 1976). Prior literature focuses on the role of individual managers' equity-based compensation incentives and, more recently, CEO's debt-like compensation incentives on financial reporting quality (e.g., Armstrong, Jagolinzer, & Larcker, 2010; Cheng & Warfield, 2005; Feng, Ge, Luo, & Shevlin, 2011; He, 2015). These studies document a negative (positive) relationship between CEO equity-based (debt-like) compensation and financial reporting quality. However, both the CEO and CFO of U.S. public firms are responsible for financial statement quality. While prior research shows the CFO equity incentives are associated with poorer financial statement quality, we extend this research by examining whether CFO debt-like incentives affect financial reporting quality. We further examine whether there is a joint effect when the CEO and CFO debt-like compensation incentives are aligned.

Firms provide their executives incentive plans that are aligned with either shareholders or debtholders. Alignment with debtholders

provides executives incentives to reduce information asymmetry and enhance financial reporting quality. He (2015) and Dhole, Manchirai, and Suk (2016) find evidence consistent with this expectation using CEO debt-like compensation incentives. We expect a similar relationship to hold for CFO debt-like compensation incentives because the CFO has a greater opportunity to influence financial reporting quality.

Whether or not CEO and CFO debt-like compensation incentive alignment affects financial reporting quality relies on the net effect of three factors: (1) managers' individual opportunistic behavior, (2) synergy and information sharing between CEO and CFO, and (3) mutual monitoring between CEO and CFO and potential CEO pressure on the CFO. When CEO and CFO compensations incentives are aligned, their preferences for risks and accounting decisions are also aligned. Aligned compensation incentives encourage more cooperation and trust, reduce conflicts, and facilitate communication between CEO and CFO. It is then easier for CEO and CFO to reach agreement on financial reporting quality. In this case, there is less information asymmetry between CEO and CFO regarding financial information, which has a positive effect on financial reporting quality. If CEO and CFO compensation are primarily debt-like, they may face less challenges in providing high quality financial statements. However, there is less incentive for mutual monitoring between CEO and CFO. The impact of compensation alignment on financial reporting quality is therefore uncertain.

We use discretionary accruals, accrual quality, and earnings restatements to proxy for financial reporting quality. We classify CFO's individual compensation incentives as aligned with debtholders if the ratio of the relative leverage of their compensation to the firm leverage is greater than one. We also identify firms that both CEO and CFO

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compensation incentives are aligned with debtholders. Financial reporting quality is then regressed on CFO individual alignment with debtholders, the alignment between CEO and CFO debt-like compensation incentives, and control variables based on prior research including CEO individual alignment with debtholders.

We provide evidence that firms have a lower level of discretionary accruals, better accrual quality and lower propensity for earnings restatements when the CFO compensation incentive is aligned with debtholders while controlling for the CEO debt-like compensation incentive. However, we are unable to find an incremental joint effect for any of the financial reporting quality proxies when the CEO and CFO debt-like compensation incentives are both aligned with debtholders. These latter results are consistent with the notion that the positive effect of synergy and individual managers' preference for higher reporting quality is offset by the negative effect of the lack of mutual monitoring.

We make a number of contributions. First, by considering the individual effect of CFO debt-like compensation as well as the joint role of the CEO and CFO debt-like compensation incentives, we add to our understanding of the effect of compensation incentives on financial reporting quality. We provide evidence that the CFO debt-like compensation incentive helps explain financial reporting quality in addition to that of the CEO.

Second, we contribute to the literature that studies the interrelationship between CEO and CFO compensation incentives and financial reporting quality. Jiang, Petroni, and Wang (2010) find that CFO compensation incentives have an impact on financial reporting while Feng et al. (2011) argue that the CEO can pressure the CFO to commit fraud that benefits CEO. Both studies focus exclusively on the CEO and CFO equity-based compensation and overlook the debt-like components of CEO and CFO compensation. However, neither study addresses the role of mutual monitoring and synergy between CEO and CFO in financial reporting. We extend this research by considering (1) the CFO debt-like compensation incentive, (2) the alignment of CEO and CFO debt-like compensation incentives, (3) the mutual monitoring and pressure between the CFO and the CEO, and (4) the synergy and information sharing between the CEO and the CFO.

The rest of the paper is organized as follows. Prior literature is discussed in the next section. This is followed by development of our hypotheses and presentation of our research design. The sample is discussed in the following section, and empirical tests of our hypotheses are then presented. The final section offers concluding thoughts.

2. Literature review

In this section, we review literature regarding managers' influence on financial reporting quality. First, literature on the relationship between managers' compensation incentives and financial reporting quality is discussed. Next, the prior literature on the effect of CEO pressure on the CFO and mutual monitoring between them is provided.

2.1. Executive compensation incentives and financial reporting quality

According to the optimal contracting view proposed in agency theory (Jensen & Meckling, 1976), compensation plans on the one hand align managers' wealth with shareholders' benefits and on the other hand provide managers incentives to make accounting decisions that maximize their own benefits. Executive compensation plans generally consist of four components: salary, bonus, equity compensation, and debt-like compensation. Any of which can be used to incentivize efficient contracting or opportunistic behavior, as reflected in financial reporting.

Prior literature documents rich empirical evidence on the relationship between executive compensation and financial reporting. Research from the 1980s to 1990s mainly examines the bonus component of executive compensation plans and documents that earnings-based bonus schemes motivate managers to make accounting decisions that increase

their bonus (e.g., Gaver, Gaver, & Austin, 1995; Guidry, Leone, & Rock, 1999; Healy, 1985; Holthausen, Larcker, & Sloan, 1995).

Although equity-based compensation mitigates agency conflicts by aligning managers' wealth with that of shareholders, it also encourages managers' opportunistic behavior. Beneish and Vargus (2002) document that managers benefit from their knowledge of income-increasing accruals through stock trading. Beyond the notion that managers make use of their information advantage on earnings quality to pursue higher gains in stock market, managers with higher equity-based compensation seek self-interest through accounting practices. Prior studies provide empirical evidence that CEO equity-based incentives are positively associated with meeting or beating analysts' forecast, earnings smoothing (Cheng & Warfield, 2005), discretionary accruals (Bergstresser & Philippon, 2006; Larcker, Richardson, & Tuna, 2007), accounting restatements (Burns & Kedia, 2006; O'Connor, Priem, Coombs, & Gilley, 2006), and frauds (Johnson, Harley, & Tian, 2009). LaFond and Roychowdhury (2008) document that CEOs' equity holdings are negatively associated with accounting conservatism. However, some studies find no or opposite association using different proxies for financial reporting quality and CEO equity incentives (e.g. Armstrong et al., 2010).

Agency theory predicting that managers adopt accounting methods based on self-interest is not limited to CEOs. Two studies examine whether the equity incentives of five executives with the highest pay in a firm are associated with fraud. Erickson, Hanlon, and Maydew (2006) find no consistent evidence that the probability of fraud is associated with the sensitivity of the top five managers' total equity or vested stock and stock option-based wealth to changes in stock prices. Johnson et al. (2009) employ different calculations for top five executives' equity incentives and use a conditional logistic regression to document an association opposite of Erickson et al. (2006).

Compared with the CEO and other key managers, the CFO is responsible for direct assessment and monitoring of accounting information. Although the CEO can set the tone at the top and influence the preparation of financial statements, he/she often does not have as detailed financial information or put as much effort into the financial statements as the CFO does. The CFO substantially impacts financial disclosure (Bamber, Jiang, & Wang, 2010; Ge, Matsumoto, & Zhang, 2011; Geiger & North, 2006). Graham, Harvey, and Rajgopal (2005) survey and interview over 400 financial executives and find capital market concerns to be the major reasons for the CFO to attempt to meet or beat earnings benchmark.

Two empirical papers specifically examine the impact of both CEO and CFO equity-based compensation on financial reporting outcomes. Feng et al. (2011) find that CFO pay-for-performance incentives are not significantly different between AAER firms and non-AAER firms but CEO pay-for-performance incentives are. They argue that CFOs are involved in material accounting manipulations despite the high litigation costs because they succumb to pressure from CEOs. In contrast, Jiang et al. (2010) use accrual quality and meeting or beating analysts' forecasts to proxy for reporting quality and document a positive relation between both CFO and CEO equity compensation and reporting quality. Moreover, they find that CFO equity incentives play an independent role in explaining earnings quality even after controlling for CEO compensation and that the role of CFO equity incentives is more pronounced than that of the CEO.

Although managers benefit from managing the financial disclosure, they also bear heavy costs when poor financial reporting quality is revealed. Once a restatement is announced, firms are likely to force turnover of CEOs, CFOs, and other top managers (Chakravarthy, DeHaan, & Rajgopal, 2014; Collins, Masli, Reitenga, & Sanchez, 2009; Desai, Hogan, & Wilkins, 2006). The probability of management turnover is associated with the causes, degree, consequences and other characteristics of the restatement (Agrawal & Cooper, 2016; Arthaud-Day, Certo, Dalton, & Dalton, 2006; Hennes, Leone, & Miller, 2008; Land, 2010). Moreover, the labor market serves as a disciplining mechanism for

managerial behavior (Fama, 1980). Displaced CEOs and CFOs appear to have lower employment prospects after turnover subsequent to restatements (Collins et al., 2009; Desai et al., 2006). CEO's and CFO's costs for misreporting are aligned in the sense that CEOs and CFOs both bear the risks of losing jobs, losing reputation, and poor employment opportunities.

Besides salary, bonus, and equity-based compensation, unsecured pension and deferred compensation (debt-like compensation) may also constitute a significant portion of payments to key managers (Bebchuk & Jackson, 2005). Agency theory indicates that debt-like compensation aligns managers' wealth with debtholders' interests and discourages risk-taking behavior. Consistent with this prediction, empirical studies document an association between CEO inside debt holdings and risk adverse corporate policy (Cassell, Huang, Manuel Sanchez, & Stuart, 2012; Eisdorfer, Giaccotto, & White, 2015; Liu, Mauer, & Zhang, 2014; Lu-Andrews & Yu-Thompson, 2015; Phan, 2014). It appears that, similar to equity-based incentives, excess inside debt holdings also causes deviation from optimal contracting.

With respect to financial reporting quality, He (2015) finds that CEO inside debt holdings are negatively associated with abnormal accruals, higher accruals quality, a lower likelihood of earning misstatement, and a lower incidence of earnings benchmark beating, consistent with alignment with debtholders. Dhole, Manchiraju, and Suk (2016) document that CEO inside debt holdings reduce earnings smoothing through earnings management. However, empirical evidence on the role of CFO inside debt holdings on financial reporting quality is missing.

2.2. Effects of the interrelationship between CEO and CFO

In addition to the CEO and CFO independently affecting financial reporting quality as discussed in the previous section, the interrelationship between CEO and CFO may also have a separate impact. Two such interrelationships with respect to financial reporting quality are the CEO pressuring the CFO and mutual monitoring between CEO and CFO.

Friedman (2014) develops an agency model to examine the effect of a CEO's power to pressure the CFO to bias earnings reporting and attempts to explain the mixed findings for the impact of CFO equity incentives on financial reporting. In the case that the CEO can't pressure the CFO, the reporting bias is entirely driven by the CFO's compensation incentives and the costs the CFO faces. When the CEO can pressure the CFO, the CEO faces costs derived from using this power. Specifically, the CFO now exerts less effort on financial reporting, which may consequently increase the risk level of the CEO's incentive contract at a certain incentive level. Thus, the degree of financial reporting bias largely depends on CEO compensation incentives and his ability to avoid costs associated with CFO's lack of effort.

Mutual monitoring among top managers minimizes managers' negative impacts on financial reporting quality. Fama (1980) argues that the agency conflicts derived from the separation of ownership and management is not as severe as Jensen and Meckling (1976) predict. He argues that managers are monitored by other managers, both senior and junior. Consistent with Fama (1980), Acharya, Myers, and Rajan (2011) document that self-serving actions of a CEO are limited by the potential reaction of subordinate managers. As a result, mutual monitoring between a CEO and other top managers improves firm value and mitigates the agency costs derived from CEO self-serving incentives (Li, 2014, 2017). Prior research also suggests that the monitoring role of other managers influences financial reporting quality. For example, Dyck, Morse, and Zingales (2010) document that employees, including CEOs and CFOs, play an important role in fraud detection even though they are likely to lose jobs after blowing the whistle.

While there is no research that directly examines the effect of the synergy or personal relationship between CEO and CFO on financial reporting quality, Garrett, Hoitash, and Prawitt (2014) document that employees' trust in managers is associated with better accrual quality and less restatements. They argue that "trust leads to greater availability

of accurate information across the organization and quicker identification of potential problems" (Garrett et al., 2014, 1088–1089). Using an experimental setting, Jollineau, Vance, and Webb (2012) find evidence that subordinates are more likely to bias financial reporting in accordance with the manager if they have a high quality relationship with the manager. Since CFOs are subordinates of CEOs, findings of Garrett et al. (2014) and Jollineau et al. (2012) may also apply to CFOs.

2.3. Summary

In summary, prior research predominantly argues that CEO and CFO equity-based compensation are each negatively associated with financial reporting quality while CEO debt-like compensation is positively associated with financial reporting quality. Further, the interrelationship between the CEO and CFO also impacts on accounting decisions. For instance, CEO can pressure CFO to bias financial reporting at the cost of increasing the risk level of his or her incentive contract and mutual monitoring mitigates the agency problems associated with managers' self-serving incentives. Despite the need that the CEO and CFO must reach an agreement on financial statements and the importance of the CFO with respect to financial reporting process, empirical research on the individual CFO debt-like compensation incentive as well as the joint effect of CEO and CFO debt-like compensation incentives is limited.

3. Hypotheses development

Utility theory suggests managers take actions to maximize their own utilities even if it is detrimental to the firm. Firms therefore adopt incentive contracts to reduce agency costs by aligning managers' self-serving behavior with the interests of stakeholders (Jensen & Meckling, 1976). Equity-based compensation aligns managers' behavior with shareholders and motivates managers to make decisions that are in the best interest of shareholders. However, equity-based compensation also provides managers incentives to adopt accounting decisions that maximize the market value of their equity holdings. Prior research shows that managers' equity incentives are negatively associated with financial reporting quality (e.g., Bergstresser & Philippon, 2006; Cheng & Warfield, 2005; Larcker et al., 2007).

Unlike equity-based compensation, debt-like compensation aligns managers' behavior with debtholders' interest. Managers with high inside debt holdings therefore benefit from accounting decisions that reduce the information asymmetry between firms and debtholders and therefore enhance financial reporting quality. Prior research finds that CEO debt-like compensations are associated with improved financial reporting quality (Dhole et al., 2016; He, 2015). However, the CEO is not the only manager that influences financial reporting quality.

Like the CEO, the CFO certifies the financial statements as to their quality. Unlike the CEO, the CFO's expertise is generally financial reporting. The CFO oversees the preparation of financial statements and thus has the opportunity to influence the financial reporting quality. The inside debt holdings may therefore provide the CFO incentive to improve financial reporting quality separate from the CEO.

The first hypothesis is stated as follows.

H1. *Ceteris paribus, the financial reporting quality of firms is greater when the CFO compensation incentives are aligned with debtholders.*

The Securities and Exchange Commission (SEC) requires both the CEO and CFO of U.S. public firms to review the financial reporting process and certify the quality of the financial statements. Thus, financial reporting quality, to some degree, is a joint decision of the CEO and CFO. Because firms may grant the CEO and CFO similar or different incentive plans, the alignment between the CEO and CFO compensation incentives can potentially enhance or mitigate the effect of the CEO and CFO individual incentives on financial reporting quality. Our focus

is whether the CEO and CFO compensation incentives are both aligned with debtholders.

When CEO and CFO compensation incentives are similarly aligned, the net benefits, which are the differences between expected financial benefits and costs, for biasing financial reporting are consistent and it is easier for them to reach agreement on potentially improving financial reporting quality. The CEO and CFO are less concerned that their personal interests may be harmed by the compensation incentives of the other through financial reporting. Similarly aligned compensation incentives reduce conflicts and mistrust between CEO and CFO.

When both CEO and CFO compensation incentives are aligned with debtholders, both managers are motivated to reduce bias in financial reporting for their own benefits. There is less incentive for the CEO to pressure the CFO and/or the CEO and CFO may share more private information with each other, which are important inputs to judgments necessary in preparing financial statements (Garrett et al., 2014). Enhanced cooperation and information sharing between CEO and CFO, as well as this shared preference for lower reporting bias when both compensation incentives are debt-like, enhance financial reporting quality.

However, having both the CEO and CFO compensation incentives aligned with debtholders can reduce financial reporting quality. Mutual monitoring between the CEO and CFO is limited because of both parties are more likely to agree on the level of financial reporting quality. As a result, this potential corporate governance mechanism is limited (Li, 2014).

The net of (1) increased synergy between CEO and CFO and (2) shared preference for better financial reporting quality suggests that when CEO and CFO interests are both aligned with debtholders, financial reporting quality will be higher than other firms. However, governance is weakened with the lack of mutual monitoring, and the alignment potentially impacts financial reporting quality negatively.

Because of the competing arguments, we state the second hypothesis in the alternative without a prediction as follows.

H2. *Ceteris paribus, financial reporting quality of firms is affected when CEO and CFO compensation incentives are both aligned with debtholders.*

4. Research design

In this section, we first introduce the measurements for the financial reporting quality, the debt-like compensation incentives of individual managers and the alignment of CEO and CFO debt-like compensation incentives. We then present the empirical model used to test our hypotheses.

4.1. Financial reporting quality

Following prior literature, we employ multiple financial reporting quality proxies. Our first financial reporting quality proxy is abnormal accruals using the modified Jones Model (Dechow, Sloan, & Sweeney, 1995; Jones, 1991). This model considers accruals associated with changes in working capital and depreciation. Abnormal accruals measure the managerial discretion in the choice of accounting decisions.

Eq. (1) is estimated annually for each Fama-French 48 industry classification. The estimated coefficients are then used to calculate discretionary accruals (DA) using Eq. (2). Following Dechow et al. (1995), the growth of accounts receivable is included in Eq. (2) to capture the sales growth attributable to credit sales and exclude it from normal accruals (subscripts for firm and current time period are excluded here and elsewhere for brevity).

$$TA = \alpha_1 1/Assets_{t-1} + \alpha_2 \Delta Sales + \alpha_3 PPE + \varepsilon \quad (1)$$

$$DA = TA - \hat{\alpha}_1 1/Assets_{t-1} - \hat{\alpha}_2 (\Delta Sales - \Delta AR) - \hat{\alpha}_3 PPE \quad (2)$$

where variables in Eqs. (1) and (2) are defined in Appendix A. The

absolute value of the discretionary accruals is then used to capture the magnitude of abnormal accruals (Abs_DA) and represents the degree of accruals management.

The second measure follows the model developed by Dechow and Dichev (2002) as modified by McNichols (2002) and captures the extent to which accruals map into cash flow. Unlike the modified Jones Model, this measure focuses on short-term working accruals and views the working capital change as a function of past, present, and future cash flow, sales growth, and the balance of fixed assets. The residuals from annual cross-sectional estimations of Eq. (3) for each industry represent accrual estimation errors. Our accrual quality measure is the standard deviation of these residuals over the previous four years (DD). Lower standard deviation is associated with higher accruals quality.

$$WC_Change = \gamma_0 + \gamma_1 CFO_{t-1} + \gamma_2 CFO + \gamma_3 CFO_{t+1} + \gamma_4 \Delta Sales + \gamma_5 PPE + \varepsilon \quad (3)$$

where variables in Eq. (3) are defined in Appendix A.

The third measure, earnings restatements, is an external indicator of earnings quality. Compared with abnormal accruals and accruals quality, restatements provide more direct evidence of poor financial reporting quality. After a misstatement is revealed, firms need to restate earnings of prior years, indicating poor financial reporting quality. Therefore, our restatement measure (Restatement) is an indicator variable equal to one if the earnings are subsequently restated.

4.2. Managerial debt-like compensation incentives

Sundaram and Yermack (2007) and Edmans and Liu (2011) document that managers' compensation incentives are more aligned with shareholders (debtholders) if managers' personal debt-to-equity ratios are lower (higher) than firm leverage. This finding is widely used to proxy managers' alignment with shareholders and debtholders in the inside debt literature (e.g., Cassell, Huang, Sanchez, & Stuart, 2012; He, 2015; Sundaram & Yermack, 2007; Wei & Yermack, 2011). Consistent with this literature, we employ relative leverage to proxy the alignment of managerial compensation incentives with shareholders and debtholders. Managers' relative leverage is calculated as follows.

$$Relative_Leverage = Individual_Leverage / Lev \quad (4)$$

where variables in Eq. (4) are defined in Appendix A. We assign two indicator variables to capture the alignment of individual managers with debtholders. When the CEO's (CFO's) relative leverage ratio exceeds one, the CEO (CFO) compensation incentives are more aligned with debtholders and we set CEO_ID (CFO_ID) equal to one. Otherwise CEO_ID (CFO_ID) is equal to zero.

Our study also concerns the alignment of CEO and CFO debt-like compensation incentives. We therefore compare the CEO and CFO alignments to derive an alignment variable. We create CEO_CFO_ID, an indicator variable equal to one if both the CEO and CFO compensation incentives are aligned with debtholders (both CEO and CFO relative leverage are more than one).

4.3. Empirical model

To test our hypotheses, we regress financial reporting quality (FRQ) proxies on the CFO's individual debt-like compensation incentives (CFO_ID), the alignment of CEO and CFO's debt-like compensation incentives (CEO_CFO_ID) and a set of control variables. We draw on prior research, as discussed below, for our control variables. Our

primary regression model is Eq. (5).

$$\begin{aligned} \text{FRQ} = & \beta_0 + \beta_1 \text{CEO_ID} + \beta_2 \text{CFO_ID} + \beta_3 \text{CEO_CFO_ID} + \beta_4 \text{CEO_VEGA} \\ & + \beta_5 \text{CFO_VEGA} + \beta_6 \text{CEO_OWNS} + \beta_7 \text{CFO_OWNS} + \beta_8 \text{Size} + \beta_9 \text{MB} \\ & + \beta_{10} \text{ROA} + \beta_{11} \text{Sale_Growth} + \beta_{12} \text{Lev} + \beta_{13} \text{StdCash} + \beta_{14} \text{StdSale} \quad (5) \\ & + \beta_{15} \text{Return} + \beta_{16} \text{Big4} + \beta_{17} \text{MA_Score} + \beta_{18} \text{Ln_Coverage} \\ & + \beta_{19} \text{Ln_CEOTenure} + \varepsilon \end{aligned}$$

where variables are defined in Appendix A. Industry and year fixed effects are included in the estimation of Eq. (5).

Our hypotheses focus on the effect of CFO debt-like compensation incentives. First, we follow He (2015) and include CEO_ID where we expect a negative coefficient indicating improved financial reporting quality. In H1, our focus is CFO_ID. We also expect a negative relationship between CFO inside debt holding and financial reporting ($\beta_2 < 0$). For H2, we do not make predictions for the signs of CEO_CFO_ID. If CEO_CFO_ID is negatively associated with financial reporting quality ($\beta_3 < 0$), then the positive impact of mutual monitoring outweighs the negative impact of the lack of information sharing. A positive coefficient ($\beta_3 > 0$) suggests the opposite.

CEO's risk taking incentives are associated with various corporate policy and firm risks, which could potentially impact financial reporting outcomes (Coles, Daniel, & Naveen, 2006). We control for CEO's risk taking incentives derived from their equity compensation (CEO_VEGA), but do not make a prediction. Likewise, we control for the CFO's risk taking incentives (CFO_VEGA). We also include the CEO's and CFO's percentage equity ownership (CEO_OWNS and CFO_OWNS) to control for the effect of equity incentives on financial reporting quality.

Dechow, Ge, and Schrand (2010) conclude that financial reporting quality is associated with firm size, performance, debt, growth, and investment. Accordingly, we use the natural log of total assets (Size) to control firm size, return on assets (ROA) to control for firm performance, and leverage (Lev) to control for debt holdings. We use the market to book ratio (MB), sales growth (Sale_Growth), sales volatility (StdSale), and cash flow volatility (StdCash) to control for firm growth and investment. We anticipate financial reporting quality to be higher for firms with better performance, lower debt holdings, slower growth, and more stable sales growth and cash holdings. We do not make a prediction for firm size.

We consider two external monitoring sources related to financial reporting. Both auditors and financial analysts help detect financial misreporting. Specifically, we use auditor size (Big4) and the number of following analysts (Ln_Coverage) to control for auditors and analysts' effect on financial reporting quality (DeAngelo, 1981; Healy & Palepu, 2001; Yu, 2008). We also use shareholder returns (Return) to control for incentives provided by the capital market. We expect that financial reporting quality is higher for firms with Big 4 auditors, more following analysts, and less pressure from capital market.

Managerial ability is a determinant of the compensation structure of managers and has substantial impact on financial reporting quality (Demerjian, Lev, Lewis, & McVay, 2013). Consequently, the effect of compensation on financial reporting quality may be, to a certain degree, driven by the association between compensation structure and

Table 1
Sample determination.

Cross-section of Compustat, Execucomp, and CRSP databases for 2006 to 2014	16027
Less firm-year observations:	
In the utility and financial service industries (SIC 4800-4999, 6000-6999)	(6408)
Missing required financial statement data from Compustat	(558)
Missing required return data from CRSP	(237)
Missing required compensation data from Execucomp	(2202)
Final sample	6622

Table 2
Descriptive statistics.

Variables ^a (N = 6622)	Mean	Std. Dev.	25 th percentile	Median	75 th percentile
Abs_DA	0.0430	0.0407	0.0140	0.0312	0.0578
DD	0.0949	0.0755	0.0455	0.0739	0.1173
Restatement	0.0667	0.2496	0.0000	0.0000	0.0000
CEO_ID	0.3031	0.4596	0.0000	0.0000	1.0000
CFO_ID	0.3245	0.4682	0.0000	0.0000	1.0000
CFO_CFO_ID	0.2182	0.4131	0.0000	0.0000	0.0000
CEO_VEGA	146.0727	214.2204	14.1419	60.9971	181.3539
CFO_VEGA	35.3616	51.7510	3.4223	15.4046	43.0971
CEO_OWNS	1.9460	3.8290	0.2656	0.7680	1.8200
CFO_OWNS	0.2529	0.3484	0.0450	0.1290	0.3120
Size	7.7116	1.6269	6.5867	7.6097	8.8303
MB	2.9719	4.0523	1.3567	2.1380	3.4142
ROA	0.0400	0.1129	0.0199	0.0531	0.0867
Sale_Growth	0.0753	0.2017	-0.0160	0.0623	0.1438
Lev	0.2226	0.1650	0.0963	0.2058	0.3155
StdCash	0.0452	0.0380	0.0221	0.0348	0.0552
StdSale	0.1475	0.1253	0.0652	0.1099	0.1833
Return	0.1535	0.5251	-0.1370	0.1139	0.3501
Big4	0.9311	0.2532	1.0000	1.0000	1.0000
MA_Score	0.0151	0.1448	-0.0693	-0.0239	0.0506
Ln_Coverage	1.8168	1.3138	0.0000	2.1972	2.9444
Ln_CEOtenure	1.7699	0.8397	1.0986	1.7918	2.3979

^a Variables are defined in Appendix A.

managerial ability. Consistent with the notion that managers with higher ability tend to make better decisions and forecasts, Demerjian et al. (2013) document that higher managerial ability is associated with lower propensity of earnings restatement. However, they also document a positive association between accrual quality and managerial ability, which is counter-intuitive. Irrespective of the results in Demerjian et al. (2013), we control for managerial ability using MA_Score.

Two competing arguments suggest the inclusion of CEO tenure. First, long-tenured CEOs accumulate power during his/her services, which can be used to influence corporate governance and business decisions (Shen, 2003; Walters, Kroll, & Wright, 2007; Westphal & Zajac, 1995). Consequently, it is also easier for a long-tenured CEO to pressure the CFO. Second, the CEO is more likely to overstate earnings during the earlier years of his/her service to favorably influence markets' perception (Ali & Zhang, 2015). We therefore include the natural log of CEO tenure (Ln_CEOtenure) to minimize the influence of extreme values; however, we don't make predictions for its sign.

5. Sample

Our sample selection process starts with the 16,027 firm-year observations included in Execucomp (our source for CEO and CFO compensation information) for the years 2006 to 2014 that have matching observations on Compustat and CRSP. We first exclude 6408 firm-year observations in utility and financial service industry (SIC 4800-4999, 6000-6999) as these industries are regulated, which may affect our financial reporting quality and incentive variables. We then eliminate firm-year observations without sufficient information for calculating the CEO and CFO compensation incentives and eliminate firm-year observations with missing values for variables in the main regression based on Compustat and CRSP data.¹ Our final sample consists of 6622 firm-year observations (Table 1).

Table 2 presents the descriptive statistics for variables in the main analyses.² Approximately 32% of firm-years have the CFO

¹ Included in this are firm-year observations from industries with less than twenty firms in a year necessary to compute discretionary accruals and accrual quality measures. Our MA_Score data is acquired from Demerjian's website: <http://faculty.washington.edu/pdemerj/data.html>

² All continuous variables are winsorized at the top and bottom 1% to reduce the effect of outliers.

Table 3
Pearson correlation matrix.

Panel A – Variables 1 to 11.											
Variables ¹ (N = 6622)	1	2	3	4	5	6	7	8	9	10	11
1. Abs_DA	1										
2. DD	0.2387*	1									
3. Restatement	0.0175	0.0285*	1								
4. CEO_ID	-0.0972*	-0.1355*	-0.0477*	1							
5. CFO_ID	-0.1121*	-0.1461*	-0.0484*	0.5581*	1						
6. CEO_CFO_ID	-0.0910*	-0.1225*	-0.0469*	0.8036*	0.7608*	1					
7. CEO_VEGA	-0.1369*	-0.1503*	-0.0482*	0.1535*	0.1861*	0.1718*	1				
8. CFO_VEGA	-0.1337*	-0.1424*	-0.0592*	0.1437*	0.1687*	0.1653*	0.7725*	1			
9. CEO_OWNS	0.0471*	-0.0083	0.0134	-0.1638*	-0.0828*	-0.1298*	-0.0449*	-0.0968*	1		
10. CFO_OWNS	0.0747*	0.0885*	-0.0103	-0.0970*	-0.1182*	-0.0763*	-0.1868*	-0.0665*	0.1873*	1	
11. Size	-0.2360*	-0.2707*	-0.0544*	0.2379*	0.2724*	0.2438*	0.5943*	0.5642*	-0.2099*	-0.4187*	1
12. MB	-0.0205	-0.0004	0.0191	0.0304*	0.0550*	0.0483*	0.1379*	0.1075*	-0.0198	-0.0574*	0.2124*
13. ROA	-0.2512*	-0.1860*	-0.0420*	0.0984*	0.1108*	0.0983*	0.1197*	0.1123*	-0.0018	-0.1108*	0.2804*
14. Sale_Growth	0.0339*	0.0203	-0.0197	-0.0635*	-0.0607*	-0.0497*	-0.0098	-0.0009	0.0096	-0.0053	0.0853*
15. Lev	-0.0135	0.0419*	0.0457*	-0.1760*	-0.1805*	-0.1683*	0.015	0.0027	-0.0802*	-0.0552*	0.0167
16. StdCash	0.2214*	0.4625*	0.0069	-0.1232*	-0.1193*	-0.0996*	-0.1784*	-0.1732*	0.0629*	0.1088*	-0.2868*
17. StdSale	0.1043*	0.2828*	0.0302*	-0.0756*	-0.0723*	-0.0701*	-0.1471*	-0.1261*	0.0350*	0.0793*	-0.2164*
18. Return	-0.0836*	0.0333*	0.0049	-0.0182	-0.0035	-0.0093	0.0046	0.0107	-0.0157	-0.0387*	0.1314*
19. Big4	-0.0540*	-0.1231*	0.0273*	0.0865*	0.1104*	0.0812*	0.1535*	0.1462*	-0.1708*	-0.1454*	0.2787*
20. MA_Score	0.0639*	0.0521*	-0.0229	0.0445*	0.0373*	0.0431*	0.2071*	0.1845*	-0.0334*	-0.0779*	0.2591*
21. Ln_Coverage	-0.1317*	-0.1348*	-0.0407*	0.1181*	0.1403*	0.1094*	0.2023*	0.1821*	-0.0982*	-0.1213*	0.3524*
22. Ln_CEOTenure	-0.0193	-0.0265*	0.0105	-0.0013	-0.0294*	-0.0121	0.1209*	0.011	0.3443*	0.1250*	0.002

Panel B – Variables 12 to 22.											
Variables ^a (N = 6622)	12	13	14	15	16	17	18	19	20	21	22
12. MB	1										
13. ROA	0.1051*	1									
14. Sale_Growth	0.0722*	0.1620*	1								
15. Lev	0.0439*	-0.0863*	-0.0615*	1							
16. StdCash	0.0364*	-0.1630*	0.0885*	-0.0157	1						
17. StdSale	-0.0152	-0.0531*	0.0239*	0.0091	0.3365*	1					
18. Return	0.1196*	0.1636*	0.0252*	0.0638*	0.005	0.0235	1				
19. Big4	0.0257*	0.1019*	-0.0229	0.1134*	-0.1465*	-0.0453*	-0.0093	1			
20. MA_Score	0.0914*	0.1802*	0.1328*	-0.1045*	0.1017*	0.0795*	0.0427*	0.0376*	1		
21. Ln_Coverage	0.0663*	0.1202*	0.001	-0.0138	-0.1210*	-0.1062*	-0.0038	0.1168*	0.0603*	1	
22. Ln_CEOTenure	0.0138	0.014	0.0805*	-0.0018	0.0009	-0.0318*	0.0012	-0.0417*	0.0005	0.0688*	1

^a Variables are defined in Appendix A.

* Indicates correlation is significant at the 0.05 level.

compensation incentives aligned with debt-holders; while, approximately 30% of firm-year observations have CEO compensation incentives similarly aligned. Further, approximately 22% of firm-years have both CEO and CFO compensation incentives aligned with debtholders. We compare the industry distributions partitioned on CFO_ID. The distributions are similar indicating that there is not a differential industry concentration influencing the reported results.

The magnitude of abnormal accruals (Abs_DA) has a mean of 0.0430 and a median of 0.0312. The accrual quality (DD) has a mean of 0.0949 and a median of 0.0739. The mean of Restatement indicates that earnings for 6.67% of our sample are subsequently restated. Our proxies for financial reporting quality are slightly skewed, but are consistent with prior research (Dhole et al., 2016; He, 2015).

The firms in our sample are larger consistent with the sources for some of our data (Execucomp). On average, the firms are profitable (mean ROA of 4.00%), growing (mean sales growth of 7.53%), growth potential (mean MB of 2.97), and low leverage (mean leverage of 22.26%). The mean CEO tenure is approximately 5 years, while approximately 5 analysts follow each firm on average.

Table 3 presents the Pearson correlation coefficients. CEO and CFO individual inside debt incentives have significant negative association with all three financial reporting proxies. Firms with CEO and CFO compensation incentives both aligned with debtholders also have a negative association with the three financial reporting proxies. A review of the significant correlations among the control variables doesn't indicate any collinearity issues that may affect the interpretation of our results. We do not observe any

significant correlations above 0.50 other than firm size with CEO_VEGA (0.59) and CFO_VEGA (0.56).³

6. Empirical results

We estimate Eq. (5) for each of the three financial reporting quality measures to test our hypotheses and report the results in Tables 4–6.⁴ We first estimate Eq. (5) without the debt-like compensation alignment variable to provide evidence on the CFO's inside debt incentives. Next, we include both CEO and CFO individual inside debt incentives as well as their alignment. We estimate Eq. (5) where FRQ is defined as either Abs_DA or DD using OLS and report standard errors based on clustering at the firm level (Peterson, 2009). The Restatement models are estimated using a logistic regression. Year and industry fixed effects are included in each estimation.

The estimated coefficients for the control variables are generally consistent with our predictions.⁵ Larger firms, lower growth potential

³ We also examine the variance inflation factors (VIFs) in an estimation of Eq. (5). None of the control variables have a VIF > 4 (Hair et al., 2010); multi-collinearity should not be an issue. We also consider the VIFs for the test variables where only the VIFs for alignment variable in each model exceed 4. Hair et al. (2010) suggest this warrants further discussion; we discuss this as part of our empirical results.

⁴ In untabulated analyses, we first replicate He (2015) using our data F and find greater financial reporting quality using all three measures when CEO compensation incentives are aligned with debtholders.

⁵ Lower values for the dependent variables represent better financial reporting quality. Therefore, when interpreting our results in terms of financial reporting quality, we focus on the opposite effect of the estimate coefficient for ease of discussion.

Table 4

Effect of CFO Inside Debt on Absolute Value of Abnormal Accruals.

$$\text{Abs_DA} = \beta_0 + \beta_1 \text{CEO_ID} + \beta_2 \text{CFO_ID} + \beta_3 \text{CEO_CFO_ID} + \beta_4 \text{CEO_VEGA} + \beta_5 \text{CFO_VEGA} + \beta_6 \text{CEO_OWNS} + \beta_7 \text{CFO_OWNS} + \beta_8 \text{Size} + \beta_9 \text{MB} + \beta_{10} \text{ROA} + \beta_{11} \text{Sale_Growth} + \beta_{12} \text{Lev} + \beta_{13} \text{StdCash} + \beta_{14} \text{StdSale} + \beta_{15} \text{Return} + \beta_{16} \text{Big4} + \beta_{17} \text{MA_Score} + \beta_{18} \text{Ln_Coverage} + \beta_{19} \text{Ln_CEOTenure} + \varepsilon$$

Variables ^a (N = 6622)	Pred.	Estimated coefficient	Estimated coefficient
Intercept	?	0.0471***	0.0472***
CEO_ID	—	-0.0001	-0.0014
CFO_ID	H1 -	-0.0016*	-0.0026**
CEO_CFO_ID	H2 +/-		0.0026
CEO_VEGA	?	-0.0000	-0.0000
CFO_VEGA	?	-0.0000	-0.0000
CEO_OWNS	?	0.0002*	0.0002*
CFO_OWNS	?	-0.0018	-0.0019
Size	?	-0.0015***	-0.0015***
MB	+	0.0005***	0.0005***
ROA	-	-0.1162***	-0.1162***
Sale_Growth	+	0.0173***	0.0173***
Lev	+	-0.0090***	-0.0091***
StdCash	+	0.1282***	0.1277***
StdSale	+	0.0027	0.0027
Return	+	0.0011	0.0011
Big4	-	0.0043**	0.0044**
MA_Score	+/-	0.0324***	0.0324***
Ln_Coverage	-	-0.0010***	-0.0010***
Ln_CEOTenure	-	-0.0000	-0.0000
Year and Industry Fixed Effects		Yes	Yes
Adjusted R ²		0.2163	0.2164

***, **, * denote significance at 1%, 5%, and 10% levels for two-tail tests (one-tail tests for directional predictions). P-values are based on standard errors clustered at the firm level (Petersen, 2009).

^a Variables are defined in Appendix A.

(lower MB), better performance (higher ROA), lower growth (lower Sale_Growth), lower volatility in cash and sales (lower StdCash and lower StdSale), less pressure from stock market (lower return), and more analysts following (higher Ln_Coverage), are associated with better financial reporting quality. The estimated coefficients for firm leverage and Big 4 auditor depend on the FRQ measure. Results for firm leverage are consistent with our expectations for DD and Restatement, but opposite when explaining Abs_DA, and the expected Big 4 coefficients is consistent in the DD model, but not the other two models.

Table 4 presents regression results with Abs_DA as the dependent variable. We find that CFO_ID is negatively associated with Abs_DA ($\beta_2 = -0.0016$, p-value <.10), suggesting firms with CFO compensation incentives aligned with debtholders are likely to have lower discretionary accruals and thus better financial reporting quality. Thus, we find support for H1 when financial accounting quality is defined as the absolute value of discretionary accruals. However, the estimated coefficient for CEO_ID is negative, but not significant ($\beta_1 = -0.0002$, p-value = .46) consistent with the notion that the CFO has greater influence on financial reporting quality than the CEO.

We next include both CEO and CFO individual inside debt incentives (CEO_ID and CFO_ID) and introduce the alignment of CEO and CFO inside debt incentives (CEO_CFO_ID). Consistent with the first estimation, only CEO_ID has a significant and negative association with Abs_DA ($\beta_2 = -0.0026$, p-value <.05). The estimated coefficient for CEO_CFO_ID is not significant and we do not find evidence supporting an incremental joint effect expected in H2. However, CEO_CFO_ID is highly correlated with both CEO_ID and CFO_ID, and as mentioned earlier, the VIF for this interaction term is >4. Hair, Black, Babin, and Anderson (2010) suggest that further investigation is therefore necessary.⁶ We partition the sample based on (1) CEO_ID and (2) whether the CEO and CFO compensation incentives are aligned and

⁶ VIFs >10 indicate serious multicollinearity problems requiring correction, while those >4 but less 10 warrant further investigation (Hair et al., 2010).

Table 5

Effect of CFO Inside Debt on Absolute Value of Accrual Quality.

$$\text{DD} = \beta_0 + \beta_1 \text{CEO_ID} + \beta_2 \text{CFO_ID} + \beta_3 \text{CEO_CFO_ID} + \beta_4 \text{CEO_VEGA} + \beta_5 \text{CFO_VEGA} + \beta_6 \text{CEO_OWNS} + \beta_7 \text{CFO_OWNS} + \beta_8 \text{Size} + \beta_9 \text{MB} + \beta_{10} \text{ROA} + \beta_{11} \text{Sale_Growth} + \beta_{12} \text{Lev} + \beta_{13} \text{StdCash} + \beta_{14} \text{StdSale} + \beta_{15} \text{Return} + \beta_{16} \text{Big4} + \beta_{17} \text{MA_Score} + \beta_{18} \text{Ln_Coverage} + \beta_{19} \text{Ln_CEOTenure} + \varepsilon$$

Variables ^a (N = 6622)	Pred.	Estimated coefficient	Estimated coefficient
Intercept	?	0.0853***	0.0855***
CEO_ID	—	-0.0035**	-0.0051**
CFO_ID	H1 -	-0.0027	-0.0039*
CEO_CFO_ID	H2 +/-		0.0031
CEO_VEGA	?	0.0000	0.0000
CFO_VEGA	?	0.0000	0.0000
CEO_OWNS	?	-0.0011***	-0.0011***
CFO_OWNS	?	-0.0045*	-0.0046*
Size	?	-0.0065***	-0.0065***
MB	+	0.0004*	0.0004*
ROA	-	-0.0693***	-0.0693***
Sale_Growth	+	-0.0011	-0.0012
Lev	+	0.0158***	0.0156***
StdCash	+	0.6861***	0.6856***
StdSale	+	0.0868***	0.0868***
Return	+	0.0092***	0.0092***
Big4	-	-0.0065**	-0.0064*
MA_Score	+/-	0.0307***	0.0307***
Ln_Coverage	-	-0.0005	-0.0004
Ln_CEOTenure	-	0.0006	0.0006
Year and Industry Fixed Effects		Yes	Yes
Adjusted R ²		0.2983	0.2983

***, **, * denote significance at 1%, 5%, and 10% levels for two-tail tests (one-tail tests for directional predictions). P-values are based on standard errors clustered at the firm level (Petersen, 2009).

^a Variables are defined in Appendix A.

estimate our model (untabulated). These results suggest that for firms with CEO compensation aligned with equity holders (CEO_ID = 0), CFO_ID is significantly associated with improved accounting quality. Further, for firms where the CEO and CFO compensation incentives are aligned with the same party, the reporting quality is better if the CFO compensation incentive is aligned with debtholders. Therefore, the CFO_ID main effect explains Abs_DA independent of whether the CEO and CFO debt compensation incentives are aligned and there is no joint effect.

Table 5 reports regression results using DD as the dependent variable. Consistent with He (2015), we observe a significant and negative coefficient for CEO_ID ($\beta_1 = -0.0035$, p-value <.05) in the first model, suggesting that firms with CEO compensation incentives aligned with debtholders tend to have better accrual quality. However, we do not observe similar findings for the CFO ($\beta_2 = -0.0027$, p-value = .11).

The interaction of CEO_ID and CFO_ID is included in the second estimation. In addition to significant and negative coefficient for CEO_ID ($\beta_1 = -0.0051$, p-value <.05) the estimated coefficient for CFO_ID is now significant and negative ($\beta_2 = -0.0039$, p-value <.10), consistent with H1. However, the alignment variable is not significant and H2 is not supported. To address the potential multicollinearity problem among the test variables, we again partition the sample based on (1) CEO_ID and (2) whether the CEO and CFO compensation incentives are aligned (untabulated). Similar to our earlier discretionary accrual results, we find that for firms where the CEO and CFO compensation incentives are aligned with the same party, the reporting quality is better if the CFO compensation incentive is aligned with debtholders. Therefore, the CFO_ID main effect only explains DD when the CEO and CFO debt compensation incentives are aligned and there is no evidence of a joint effect.

Table 6 presents the logistic regression results using Restatement as the dependent variable. Neither CEO_ID nor CFO_ID are significant in the first estimation. When CEO_ID, CFO_ID, and CEO_CFO_ID are all included in the regression, none of the coefficients are significant, H1 and H2 are not supported when financial reporting equality is measured as restatements. As discussed above, the test

Table 6
Effect of CFO Inside Debt on Restatements.
Prob (Restatement = 1) = F ($\beta_0 + \beta_1$ CEO_ID + β_2 CFO_ID + β_3 CEO_CFO_ID + β_4 CEO_VEGA + β_5 CFO_VEGA + β_6 CEO_OWNS + β_7 CFO_OWNS + β_8 Size + β_9 MB + β_{10} ROA + β_{11} Sale_Growth + β_{12} Lev + β_{13} StdCash + β_{14} StdSale + β_{15} Return + β_{16} Big4 + β_{17} MA_Score + β_{18} Ln_Coverage + β_{19} Ln_CEOTenure + κ)

Variables ^a (N = 6622)	Pred.	Estimated coefficient	Estimated coefficient
Intercept	?	-2.8211***	-2.8210***
CEO_ID	-	-0.1153	-0.1156
CFO_ID	H1 -	-0.1265	-0.1267
CEO_CFO_ID	H2 +/-		0.0007
CEO_VEGA	?	-0.0000	-0.0000
CFO_VEGA	?	-0.0035*	-0.0035*
CEO_OWNS	?	0.0068	0.0068
CFO_OWNS	?	-0.3733**	-0.3733**
Size	?	-0.1209**	-0.1209**
MB	+	0.0194**	0.0194**
ROA	-	-1.3806***	-1.3806***
Sale_Growth	+	0.0770	0.0770
Lev	+	0.7252**	0.7252**
StdCash	+	-1.6353	-1.6354
StdSale	+	0.6935*	0.6935*
Return	+	-0.0068	-0.0068
Big4	-	0.8690***	0.8691***
MA_Score	+/-	-0.1610	-0.1610
Ln_Coverage	-	-0.0703*	-0.0703*
Ln_CEOTenure	-	0.0919	0.0919
Year and Industry Fixed Effects		Yes	Yes
Pseudo R ²		0.0546	0.0546

***, **, * denote significance at 1%, 5%, and 10% levels for two-tail tests (one-tail tests for directional predictions) using a Logit estimation.
^a Variables are defined in Appendix A.

variables may introduce multicollinearity into the estimation. To address this issue, we again partition the sample based on (1) CEO_ID and (2) whether the CEO and CFO compensation incentives are aligned and estimate our model (untabulated). We find marginal evidence in that when CEO and CFO compensation incentives are aligned with the same party, the reporting quality is better (lower restatements) if the CFO compensation incentive are aligned with debtholders. H1 is partially supported.

We perform a number of robustness tests. We first consider a number of potential correlated omitted variables. While we control for CEO tenure in Eq. (5), CEO age, CFO age and CFO tenure may also be important since these factors may impact the level of individual managers' preference for higher or lower financial reporting quality. Our main test variable is an indicator variable that capture compensation alignment with debtholders. As an alternative, we control for the log of CEO Relative_Leverage and the log of CFO Relative_Leverage. The results (untabulated) in each case are consistent with those reported.⁷

As an alternative to CEO_CFO_ID, we use the similarity between CEO and CFO debt-like compensation incentives. For example, a CEO and a CFO with 0.9 and 1.1 relative leverage, respectively, have more similar compensation incentives than those with 1.1 and 3 relative leverage, respectively, even though both managers' compensation incentives are aligned with debtholders in the latter case. We measure the degree of the similarity between CEO and CFO compensation incentives by taking the lesser of the ratio of CEO relative leverage to CFO relative leverage or its reciprocal. After controlling for the degree of the similarity, the results (untabulated) continue to indicate that CFO debt-like compensation incentives are positively associated with financial reporting quality. However, we do not observe a consistent significant impact of the degree of CEO and CFO compensation similarity on financial reporting.

⁷ Similar to He (2015), we also consider meeting or just beating analyst forecast as another measure of financial reporting quality. However, our results are consistently not significant.

We also conduct a propensity score matching approach (untabulated). In the first stage, we regress CFO_ID on a vector of explanatory variables.⁸ The estimated R² for this regression is 15.8%. Using these results, we form a sample of firms with CFO_ID equal to one and a control group where CFO_ID is equal to zero. In forming the control group, we perform the matching procedure without replacement of observations and use a caliper distance of 0.10. The difference between the residual of the control and treatment group is not significant suggesting the propensity score matching process largely reduces the bias. We then re-estimate Eq. (5) using the propensity score match sample for each of our financial reporting proxy and find similar result for the Abs_DA and DD proxy and weak results for the restatement proxy.

7. Conclusion

We investigate whether the CFO debt-like compensation incentive as well as the alignment of CEO and CFO debt-like compensation incentives impacts financial reporting quality. We find that firms with CFO compensation incentives aligned with debtholders have better financial reporting quality. Further analysis indicates that this effect is incremental to or in place of that of the CEO. These results are consistent with agency theory arguments and alignment with debtholders. However, we are unable to find any evidence that firms with alignment of CEO and CFO debt-like compensation incentives have incrementally better financial reporting quality. This result is consistent with the positive effect that synergy and individual managers' preference for higher reporting quality from aligning CEO and CFO debt-like compensation offsetting the negative effect of the lack of mutual monitoring.

There are several limitations in our research. First, there are not a sufficient number of efficient instrument variables to assess the feedback relation between financial reporting quality and the alignment of CEO and CFO compensation. Second, we examine one aspect of incentive alignment - whether CEO and CFO are aligned with the same party - debtholders. In fact, the compensation structure is much more complex. Future research can extend the definition and scope for the alignment of compensation incentives. Third, our argument on the synergy between CEO and CFO can be threatened if we account for potential conflicts between the CEO and CFO outside the scope of the financial reporting. For example, they may have competition within the firm as managers or outside the firm for external directorship. Finally, CEOs and CFOs vary across firms. While we include some controls for this variation, it is hard to identify super "powerful" CEOs or CFOs based on their compensation structure or firm-specific characteristics.

Data availability

Data is obtained from the publicly-available sources listed in the paper.

Appendix A. Variable definitions

TA	Total accruals, which is calculated as the income before extraordinary income minus operating cash flow adjusted for extraordinary items and discontinued operations, scaled by total assets at the beginning of fiscal year
Assets	Total assets
PPE	Gross value of property, plants, and equipment, scaled by total assets at the beginning of fiscal year
Delta_Sales	Change in sales, scaled by total assets at the beginning of

⁸ In the first stage logistic regression, we regress CFO_ID on the state income tax rate, the indicator variable that capture whether a firm that has negative operating cash flow, the industry means of CEO_ID and CFO_ID as suggested by Cassell et al. (2012). We also include all the control variables from the main regression in the first stage estimation.

	fiscal year
Delta_AR	Change in accounts receivable, scaled by total assets at the beginning of fiscal year
Abs_DA	Absolute value of discretionary accruals based on modified Jones Model (Dechow et al., 1995; Jones, 1991)
WC_Change	Sum of the increase in accounts receivable, the increase in the inventory, the decrease in accounts payable, the decrease in accrued tax, the increase in other assets, and decrease in other liabilities, all scaled by average total assets
CFO	Cash flow from operating activities
DD	Accrual quality based the model developed by Dechow and Dichev (2002) and modified by McNichols (2002)
Restatement	Indicator variable equal to 1 if earnings are subsequently restated, and 0 otherwise
Individual_Leverage	Sum of the present value of accumulated pension benefits and total deferred compensation divided by the value of manager's equity holding using the Core and Guay (2002) method
Relative_Leverage	Manager's Individual_Leverage divided by firm leverage
CEO_ID (CFO_ID)	Indicator variable equal to 1 if Relative_Leverage for the CEO (CFO) is >1, and 0 otherwise
CEO_CFO_ID	Indicator variable equal to 1 if CEO and CFO Relative_Leverage are both >1, and 0 otherwise
FRQ	Financial reporting quality which takes the value of Abs_DA, DD, Restatement, or Target_Beating as the dependent variable in the regression models
CEO_Vega (CFO_Vega)	Dollar change in CEO's (CFO's) wealth associated with a 0.01 change in the standard deviation of the firm's returns.
CEO_Owns (CFO_Owns)	CEO (CFO) percentage ownership in the firm's common equity
Size	Natural log of the market value of a firm's common shareholder's equity
MB	Market value of common shareholder's equity divided by book value of common shareholders' equity
ROA	Income before extraordinary items divided by total assets at the beginning of fiscal year
Sale_Growth	Percentage change in sales for a fiscal year
Lev	Total debt divided by the book value of total equity
StdCash	Standard deviation of cash flow scaled by total assets for the previous five years
StdSale	Standard deviation of sales scaled by total assets for the previous five years
Return	Annual compounded shareholder return
Big4	Indicator variables equal to 1 if the firm is audited by Big 4 auditors and 0 otherwise
MA_Score	Managerial ability score developed by Demerjian, Lev, and McVay (2012)
Ln_Coverage	Natural log of one plus the number of analysts following a firm in a fiscal year
Ln_CEOtenure	Natural log of one plus the number of years that a CEO has been serving in the position

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