CEO-CFO Personality Complementarity and Corporate Credit Risk

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ABSTRACT

We examine whether CEO-CFO personality complementarity (measured by CEO extraversion and CFO conscientiousness) affects corporate credit risk using American corporate bond market data from 2007 to 2019. We find that CEO-CFO personality complementarity is negatively related to a firm's bond yield spread, consistent with the theory of complementarity in the CEO-CFO interface (Harrison and Malhotra, 2024). In addition, the negative association is mitigated in firms with greater managerial ability, higher levels of CEO overconfidence, greater CFO co-option, and a higher ratio of independent directors. Conversely, it is exacerbated in firms facing greater financial constraints and those where subordinate executives hold more significant power. Moreover, the negative association between CEO-CFO personality complementarity and credit risk becomes stronger during the subprime crisis period. Furthermore, we also find that another CEO-CFO personality complementarity measured by CEO extraversion and CFO neuroticism exhibits a similar association with bond yield spread. Finally, our findings are robust when controlling for other CEO personality traits and considering endogeneity and sample selection bias issues.

Keywords: CEO-CFO personality complementarity; Corporate credit risk; Bond yield spread; CEO extraversion; CFO conscientiousness; CFO neuroticism

I. Introduction

Firm idiosyncratic risks are widely proven to play the important role in determining corporate credit risk among the previous credit risk-related studies. The well-known proposed firm idiosyncratic risk categories include asset value (Merton, 1974; Collin-Dufresne et al., 2001), asset volatility (or equity volatility) (Merton, 1974; Campbell and Taksler, 2003), financial leverage (Merton, 1974; Collin-Dufresne et al., 2001), and incomplete accounting information (Duffie and Lando, 2001; Yu, 2005; Lu et al., 2010). Most of the proposed firm idiosyncratic risk variables are belong to CEOs decision-making outcomes rather than decision-making motivations. Several recent studies address the issue about the determinants of firm credit risk from the perspectives of CEO/CFO physical and psychological features. The researches related to CEO/CFO physical characteristics include CEO ability (Bonsall IV et al., 2017a; Frost et al., 2023), CEO compensation (Liu and Wu, 2022), CFO gender (Francis et al., 2012), CFO facial beauty (Hrazdil et al., 2023), and CFOs' facial trustworthiness (Li et al., 2023). The studies related to CEO psychological characteristics cover CEO overconfidence (Lin et al., 2020), CEO narcissism and personality traits (Chen et al., 2022; Chen et al., 2023a), whereas those related to CFO psychological characteristics are limited in credit risk literature. However, unlike CEO/CFO individual intrinsic characteristics, CEO-CFO personality interface are rarely discussed in credit risk literature, especially for CEO-CFO personality complementarity. According to Tulimieri and Banai (2010: 240), CEO is primarily responsible for a firm's strategic direction and future growth (namely visionary leader) and CFO is mainly responsible for managing risk and encouraging a planned method to strategic pursuits (namely corporate conscience). Following five factor model (FFM) of personality (Costa and McCrae, 1985; McCrae and John, 1992), this study describes the

CEO-CFO personality complementarity by CEO extraversion and CFO conscientiousness (Harrison and Malhotra, 2024) since CEO plays the role of visionary leader and CFO plays the role of corporate conscience. In addition, Harrison and Malhotra (2024) demonstrate that extraverted CEO has the characteristics of sociability, assertiveness, ambition, and excitement-seeking (e.g. McCrae and John, 1992) while conscientious CFO is dependable, deliberate, self-disciplined, and achievement-oriented (e.g. McCrae and John, 1992). Hence, CEO-CFO personality complementarity may affect a firm's business strategies, management performance and risk, which in turn shape the firm's observed asset value distributions and contribute to the firm's idiosyncratic risks and thus its credit risk. However, CEO-CFO personality complementarity is rarely discussed in credit risk literature. Therefore, the purpose of this study is to address this important gap by investigating the effect of CEO-CFO personality complementarity on corporate credit risk (measured by bond yield spread).

CEO-CFO personality complementarity is one of the manifestations of CEO-CFO interface. Although CEO-CFO interface that is viewed as potential strategic partnership has gathered increasing attentions over the past twenty years (e.g., Canace, 2014; Corson and Miyagawa, 2012; Favaro, 2001; Howell, 2006; Tulimieri and Banai, 2010), the issues of CEO-CFO personality complementarity are few discussed in literature. Regarding the CEO-CFO personality complementarity, since CEO has the function of visionary leader and CFO has the function of corporate conscience, Harrison and Malhotra (2023) introduce five factor model (FFM) of personality (Costa and McCrae, 1985; McCrae and John, 1992) and employ CEO extraversion and CFO conscientiousness as the proxy of CEO-CFO personality complementarity and further explore its impact on financial leverage. For the CEO extraversion characteristics, McCrae and John (1992) present that an extraverted individual is active and good at interacting with others and

has an ambitious and aggressive attitude (Barrick et al., 2002), which makes extraverted CEOs more capable of utilizing resources outside the company (Nadkarni and Herrmann, 2010; Wang and Chen, 2020) and thus improves operating performance (e.g. Chen et al., 2023c). However, extraverted individuals have several negative characteristics, such as a tendency to dominate others, overestimating their own abilities (Hogan and Hogan, 2001; McCrae and John, 1992), and being less able to seek advice from their subordinates (Grant et al., 2011). The above negative characteristics may give extraverted individuals cognitive biases. In addition, extraverted individuals have a higher tendency to choose risks (De Vries et al., 2009) such as mergers and acquisitions (M&A) (Malhotra et al., 2018) and research and development (R&D) (Benischke et al., 2019). Based on the above discussions, extraverted CEOs may not only increase operating performance but also enhance the management-debtholder agency problems.

Meanwhile, a conscientious individual has the characteristics of self-discipline, prudence, responsibility, and achievement orientation, which make the conscientious individual be likely to be task-oriented rather than relationship-oriented. Hence, the conscientious individual may have a tendency to be more assertive and have high self-efficacy and expectancy motivation (Judge and Ilies, 2002; Watson and Clark, 1992), which can manifest as confidence in communicating and defending their positions (Bagherian and Mojambari, 2016; Nikel, 2020; Deniston and Ramanaiah, 1993). The above discussions suggest that conscientious CFOs may more effectively balance the tendencies of highly extraverted CEOs (Harrison and Malhotra, 2023). That is, conscientious CFOs may buffer the effects of extraverted CEOs' business strategies. For example, Harrison and Malhotra (2024) find that (1) CEO extraversion is positively related to financial leverage; (2) CFO conscientiousness weakens the positive relationship by encouraging more moderate levels of financial leverage.

Based upon the above discussions, this study summarizes that CFO conscientiousness may buffer the positive effects of CEO extraversion on risky investment and financing strategies, which thus mitigates the concerns of management-debtholder agency problems and weakens the enhancement of firm performance resulting from CEO extraversion. Therefore, CEO-CFO personality complementarity may decrease a firm's asset value volatility, financial leverage and asset value. Since asset value volatility and financial leverage (asset value) essentially and theoretically have a positive (negative) association with firm credit risk according to structural-form credit model frameworks (e.g. Merton, 1974; Duffie and Lando, 2001), this study can preliminarily conjecture that CEO-CFO personality complementarity has a negative association with corporate credit risk from the perspectives of asset value volatility and financial leverage while has a positive effect from the perspectives of asset value.

In addition to the structural form credit risk model perspectives (Merton, 1974; Duffie and Lando, 2001), this study also proposes several potential mechanisms for the relationship between CEO-CFO personality complementarity and firm credit risk, namely (1) managerial ability (e.g. Demerjian et al., 2012), (2) CEO overconfidence, (3) CFO co-option (e.g. Dikolli et al., 2021), (4) corporate governance quality, (5) financial constraint (e.g. Hadlock and Pierce, 2010), and (6) subordinate executives' power (e.g. Cheng et al., 2016). First, for the mechanisms of greater managerial ability and better corporate governance quality, the monitoring function of conscientious CFO becomes less important since bondholders have fewer concerns about extraverted CEOs' risky investment behaviors in these situations. Second, for the mechanisms of CEO overconfidence and CFO co-option, the incentives of CEOs' engaging in risky behaviors become stronger and the monitoring function of CFOs become less effective, respectively. Third,

for the mechanisms of financial constraint and subordinate executives' power[1], the monitoring function of conscientious CFO becomes stronger since the role of CFOs within a firm becomes more important in such situations.[2] Based on the above discussions, this study conjectures that (1) the mechanisms of managerial ability, CEO overconfidence, CFO co-option, and corporate governance quality have the enhancement effect for the association between CEO-CFO personality complementarity and corporate credit risk; (2) the mechanisms of financial constraint and subordinate executives' power have the reduction effect for the association.

Moreover, this study also explores whether the relation between CEO-CFO personality complementarity and firm credit risk varies with the occurrence of financial crisis. Liao et al. (2023) demonstrate that CEO extraversion is significantly and negatively related to firm performance during the financial crisis periods. This is mainly because CEO extraversion is associated with the heightened firm risk profile. Hence, the result suggests that CFO conscientiousness is more valuable during the financial crisis periods, which may lead debtholders to care more about CEO-CFO personality complementarity during the financial crisis periods. Therefore, this study hypothesizes that the relation between CEO-CFO personality complementarity and firm credit risk becomes stronger when macroeconomic conditions are fragile.

According to the above discussions, the effects of CEO-CFO personality complementarity on firm credit risk can be summarized as follows: (1) CEO-CFO personality complementarity is

[1] Since CFOs are the main members of subordinate executives, greater subordinate executives' power makes the CFOs (CEOs) have greater (smaller) importance and thus makes CEO-CFO personality complementarity becomes more apparent.

[2] Regarding managers' structural power, Finkelstein (1992) demonstrate that it plays a critical role in determining whose preferences are realized at the top of the organization. Many previous studies have demonstrated that CEOs' personalities and preferences can be reflected more in firm outcomes when they have greater structural power (e.g., Chin et al., 2013; Park et al., 2018). In addition, Harrison and Malhotra (2024) extend the perspective to CFOs so that CEOs' and CFOs' structural power can make their personalities and preferences be more reflected in firm outcomes.

hypothesized to be negatively associated with firm credit risk from the theoretical perspectives of structural form credit risk models and if the effects of asset value volatility and financial leverage dominate that of asset value; (2) managerial ability and corporate governance quality are hypothesized to weaken the negative association between CEO-CFO personality complementarity and firm credit risk since the monitoring function of conscientious CFO becomes less important in such situations; (3) CEO overconfidence and CFO co-option are hypothesized to weaken the negative association between CEO-CFO personality complementarity and firm credit risk since the incentives of CEOs' engaging in risky behaviors become stronger and the monitoring function of CFOs become less effective, respectively, in such situations; (4) financial constraint and subordinate executives' power are hypothesized to enhance the negative association between CEO-CFO personality complementarity and firm credit risk since a stronger role of CFOs within the firm heightens the influence of their personalities and preferences on firm outcomes, thereby intensifying the observed effects; (5) the negative relation between CEO-CFO personality complementarity and firm credit risk is hypothesized to becomes stronger during the financial crises periods. In addition, this study also investigates whether another CEO-CFO personality complementarity, measured by CEO extraversion and CFO neuroticism, affects firm credit risk.

This study aims to explore whether CEO-CFO personality complementarity (measured by CEO extraversion and CFO conscientiousness; Harrison and Malhotra, 2024) affects corporate credit risk using American straight corporate bond data from 2007 to 2019. Regarding the estimations of CEO extraversion and CFO conscientiousness, this study follows Harrison et al. (2019) to employ the Open Language Chief Executive Personality Tool (hereafter denoted as *OLCPT*, Harrison et al., 2019) and utilize the textual data of CEOs'/ CFOs' conversation contents in earnings call transcripts to estimate the degrees of CEOs'/ CFOs' big five personality traits. In

addition, CFO co-option is defined as the appointment of a CFO after a CEO assumes office (Dikolli et al., 2021); managerial ability, financial constraint, subordinate executives' power, and CEO overconfidence are measured by managerial ability score rank (Demerjian et al., 2012), size and age index (Hadlock and Pierce, 2010), internal governance (Cheng et al., 2016), and a binary variable that equal to one if a CEO defers exercising 100% in-the-money options at least twice during their tenure, and zero otherwise (Lin et al., 2020), respectively.

Empirical results of this study show that CFO conscientiousness significantly and negatively moderates the association between CEO extraversion and corporate bond yield spread, indicating that CEO-CFO personality complementarity is negatively related to firm credit risk. This result supports the augment that the effect of CEO-CFO personality complementarity on asset value volatility and financial leverage dominate that on asset value from the theoretical perspectives of structural credit models. That is, bondholders place greater value on the benefits of CEO-CFO personality complementarity (e.g. reduced asset value volatility and lower financial leverage) compared to its drawbacks (e.g., a decline in asset value). In addition, this study also finds that managerial ability, corporate governance quality, CEO overconfidence, CEO tenure, and CFO co-option all significantly weaken the negative association between CEO-CFO personality complementarity and firm credit risk, whereas financial constraint and subordinate executives' power have the enhancement effect on the negative association between CEO-CFO personality complementarity and firm credit risk. Moreover, the negative association between CEO-CFO personality complementarity and firm credit risk becomes stronger during the subprime crisis period, indicating that bondholders place greater value on the buffering effect of CEO-CFO personality complementarity during the financial crisis periods. Furthermore, this study also finds that CFO neuroticism also significantly and negatively moderates the association between CEO

extraversion and corporate bond yield spread, providing additional evidence that bondholders care more about CEO-CFO personality complementarity.

This study also addresses the endogeneity and sample selection bias issues. To mitigate the concerns of omitted variables, reverse causality, and measurement errors, this research introduces the difference-in-difference (DID) design to provide more convincing evidence. The results of DID design are consistent with our main findings. In addition, to alleviate the sample selection bias concern, the study also employs the Heckman two-stage regression model (Heckman, 1979) to enhance the robustness of our main findings. Therefore, our findings that the negative association between CEO-CFO personality complementarity and firm credit risk is robust with respect to the issues of considering endogeneity and sample selection bias.

The main contributions of this study include: (1) exploring the determinants of firm credit risk (namely bond yield spreads) from the perspective of CEO-CFO intrinsic characteristics interface, especially CEO-CFO personality complementarity, rather than CEO/CFO individual personality traits; (2) introducing the importance and implications of CEO-CFO personality complementarity for bondholders and debtholders; (2) proposing several new potential mechanisms of managerial ability, corporate governance quality, CEO overconfidence, CEO tenure, CFO co-option, financial constraint, and subordinate executives' power for the association between CEO-CFO personality complementarity and firm credit risk in addition to those of traditional structural form credit risk models; and (3) providing the practical suggestions for bondholders that should consider CEO-CFO personality interface (e.g. complementarity) in practices, especially for the financial crisis periods. This study thus contributes to both the bond yield spread (credit risk) literature and the CEO personality traits literature. Our findings also provide practical references for creditor banks in making credit decisions.

The remainder of this paper is organized as follows. Section II demonstrates the measures of CEO-CFO personality complementarity. Section III presents hypotheses developments. Section IV summarizes other major variables used in the empirical examinations. Section V presents and analyzes empirical results. Finally, section VI provides concluding remarks.

II. Main Measures

II.1. CEO-CFO Personality Complementarity

To measure CEO-CFO personality complementarity, this study follows Harrison and Malhotra (2024) to introduce CEO extraversion/ CFO conscientiousness variables. For the estimations of CEO extraversion and CFO conscientiousness, this study employs the *OLCPT* program (Harrison et al., 2019) and the data of CEOs'/CFOs' conversation records in a firm's quarterly earnings call transcripts.[3] The estimated scores of CEO extraversion and CFO conscientiousness range from 1 to 7 points and the higher values of the CEO extraversion, CFO conscientiousness, and other big five personality traits scores represent the stronger personality traits. The data of earnings call transcripts used in this study are acquired from Capital IQ database. The variables of CEOs' (CFOs') extraversion, conscientiousness, neuroticism, agreeableness, and openness are denoted *CEO_Extra, CEO_Consc, CEO_Neuro, CEO_Agree,* and *CEO_Openn* (*CFO_Extra, CFO_Consc, CFO_Neuro, CFO_Agree,* and *CFO_Openn*), respectively.

To capture the effect of CEO-CFO personality complementarity, this study follows Harrison and Malhotra (2024) to employ the interaction term of CEO extraversion (*CEO_Extra*) and CFO conscientiousness (*CFO_Consc*), namely $CEO\_Extra \times CFO\_Consc$, as the measurement variable.

[3] The *OLCPT* program (Harrison et al., 2019) is to facilitate machine learning models (e.g. Gradient Boosting Machine) to imitate how experts in psychology evaluate the levels of CEOs' big five personality traits. In addition, the *OLCPT* program is based on the semi-supervised learning model.

As mentioned previously, conscientious CFOs may buffer the effects of extraverted CEOs' business strategies and more effectively balance the tendencies of highly extraverted CEOs.

II.2. Proxies of Corporate Credit Risk

For the measures of firm credit risk, this study employs corporate bond yield spread (YS, proxy of the cost of bond) as the main proxy. The YS variable is defined as the yield difference between the bond yield and the yield of an equivalent maturity Treasury bond in Datastream database (Yu, 2005; Lu et al., 2010). The higher value of YS variable stands for the higher firm credit risk.

II.3. Proxies of Potential Mechanisms

In addition to theoretical mechanisms of traditional structural form credit risk models (Merton, 1974; Duffie and Lando, 2001), this study proposes several new potential mechanisms for the association between CEO-CFO personality complementarity and firm credit risk, covering managerial ability, corporate governance quality, CEO overconfidence, CEO tenure, CFO co-option, financial constraint, and subordinate executives' power. The first four mechanisms are anticipated to have enhancing effects, whereas the latter two mechanisms are expected to exhibit reducing effects. The detailed definitions are demonstrated as follows:

First, in line with Demerjian et al. (2012, 2013), this study uses the managerial ability score rank (MA_R) as the primary proxy for managerial ability, with the two step procedures for MA score rank estimations, shown as Eqs. (1) and (2). The residual (ε) obtained from the estimation in Eq. (2) is defined as the managerial ability score, serving as the main proxy of managerial ability. To address the impact of extreme observations, Demerjian et al. (2012) further standardized the MA score by calculating its decile ranks (denoted as MA_R) within each year and industry,

ensuring greater comparability across time and industries.[45]

$$Max_{v} E = \frac{Sales}{v_1 COGS + v_2 SGA + v_3 PPE + v_4 OL + v_5 RD + v_6 Goodwill + v_7 OInta} \quad (1)$$

$$E = \beta_0 + \beta_1 LnTA + \beta_2 MS + \beta_3 PFCF + \beta_4 LAge + \beta_5 BSC + \beta_6 FCI + YearDummy + \varepsilon \quad (2)$$

Second, this study employs the proportion of independent directors on the board (IDIR, Rahman and Kabir, 2023) and the number of years the CEO has held the position (CEO_TEN) as the proxies of corporate governance quality and CEO tenure, respectively. Third, following Dikolli et al. (2021), this study defines CFO co-option (CFO_CoOpt) as the appointment of a CFO after a CEO assumes office. Dikolli et al. (2021) find that CFO co-option is linked to a CEO pay premium of approximately 10%, which is more pronounced in the early years of the co-opted CFO's tenure and in compensation components tied to achieving analyst-based earnings targets. Fourth, this study follows Lin et al. (2020) to define CEO overconfidence as a binary variable that equal to one if a CEO defers exercising 100% in-the-money options at least twice during their tenure, and zero otherwise. Finally, the variables of financial constraints and subordinate executives' power are measured by size and age index (SA, Hadlock and Pierce, 2010) and internal governance (IG, Cheng et al., 2016), respectively. It has to be noted that (1) SA index is defined as $-0.737\text{Size} + 0.043\text{Size}^2 - 0.040\text{Age}$, where firm size (Size) is measured as the natural logarithm

[4] In Eq. (1), the variable (v) represents the firm-specific vector of optimal weights assigned to the seven input factors in the optimization process. E denotes the firm efficiency measure generated by DEA, ranging from 0 to 1, which reflects the constraints applied within the optimization program. A firm's E value indicates its efficiency level, where a value less than 1 suggests that the firm needs to either increase revenues or reduce costs to achieve optimal efficiency. Additionally, Sales is defined as the firm's total output, measured by sales revenue. The seven input variables include COGS (cost of goods sold), SGA (sales, general, and administrative expenses), PPE (as property, plant, and equipment), OL (operating leases), RD (R&D expenditures), Goodwill, and OInta (other intangible assets).

[5] In Eq. (2), the variables LnTA, MS, PFCF, LAge, BSC, and FCI correspond to firm-specific characteristics, capturing firm size, market share, positive free cash flow, firm age, complex multi-segment operations, and international operations, respectively.

of a firm's total assets, while firm age (Age) is determined by the number of years since its establishment; (2) internal governance is measured by subordinate managers' relative power, defined as the sum of standardized values of *Exec_Horizon and Exec_PayRatio*, shown as Eqs. (3) and (4), respectively. In Eqs. (3) and (4), Age_SubExec represents the average age of key subordinate executives, with the assumption that the age of retirement is 65; Comp_SubExec denotes the average annual compensation of key subordinate executives, while Comp_CEO indicates the annual compensation of the CEO.

$$Exec\_Horizon = 65 - Age\_SubExec \tag{3}$$

$$Exec\_Payratio = \frac{Comp\_SubExec}{Comp\_CEO} \tag{4}$$

III. Theories and Hypotheses

This section proposes the hypotheses regarding the effects of CEO-CFO personality complementarity on corporate credit risk. The theoretical foundations of hypotheses developments are stated as follows. First, CEO has the function of visionary leader and CFO has the function of corporate conscience. These roles align with CEO extraversion and CFO conscientiousness, thereby serving as an appropriate proxy of CEO-CFO personality complementarity.

Second, extraverted CEOs are more capable of utilizing resources outside the company (Nadkarni and Herrmann, 2010; Wang and Chen, 2020) while have a higher tendency to dominate others, overestimate their own abilities (Hogan and Hogan, 2001; McCrae and John, 1992), and choose risks (De Vries et al., 2009), such as mergers and acquisitions (M&A) (Malhotra et al., 2018) and research and development (R&D) (Benischke et al., 2019). In addition, conscientious CFOs may more effectively balance the tendencies of highly extraverted CEOs (Harrison and

Malhotra, 2023) since conscientious individual have the confidence in communicating and defending their positions (Bagherian and Mojambari, 2016; Nikel, 2020; Deniston and Ramanaiah, 1993). Hence, this study can conjecture that CFO conscientiousness may buffer the positive effects of CEO extraversion on risky investment and financing strategies, which mitigates the concerns of management-debtholder agency problems and weakens the enhancement of firm performance resulting from CEO extraversion. That is, CEO-CFO personality complementarity decreases a firm's asset value, asset value volatility, and financial leverage.

Since asset value volatility, financial leverage, and incomplete accounting information (asset value) essentially and theoretically have a positive (negative) association with firm credit risk according to structural-form credit model frameworks (e.g. Merton, 1974; Duffie and Lando, 2001), this study conjectures that CEO-CFO personality complementarity is negatively associated with firm credit risk from the theoretical perspectives of asset value volatility and financial leverage while has the opposite association with firm credit risk from the theoretical perspective of asset value, shown as Hypothesis 1, 1a, and 1b.

Hypothesis 1. *A firm's CEO-CFO personality complementarity has uncertain association with corporate credit risk from the theoretical perspectives of structural form credit risk models.*

Hypothesis 1a. *A firm's CEO-CFO personality complementarity is negatively related to corporate credit risk from the theoretical perspectives of asset value volatility and financial leverage.*

Hypothesis 1b. *A firm's CEO-CFO personality complementarity is positively related to corporate credit risk from the theoretical perspective of asset value.*

Apart from considering structural form credit risk model perspectives (Merton, 1974; Duffie and Lando, 2001), this research also proposes several potential mechanisms for the association between CEO-CFO personality complementarity and firm credit risk, covering managerial ability,

corporate governance quality, CEO overconfidence, CEO tenure, CFO co-option, financial constraint, and subordinate executives' power. The first four mechanisms are anticipated to have enhancing effects for the association, whereas the latter two mechanisms are expected to exhibit reducing effects. The detailed inferences are demonstrated as follows:

First, for the mechanisms of greater managerial ability and better corporate governance quality, the monitoring function of conscientious CFO becomes less important for bondholders because the bondholders have fewer concerns about extraverted CEOs' risky investment behaviors in these situations. Second, under the mechanism of CEO overconfidence, the incentives of CEOs' engaging in risky behaviors become stronger. Third, for the mechanisms of CEO tenure and CFO co-option, the monitoring function of CFOs become less effective in these situations. Fourth, for the mechanisms of financial constraint and subordinate executives' power, the monitoring function of conscientious CFO becomes stronger and thereby CEO-CFO personality complementarity becomes more apparent since the role of CFOs within a firm becomes more important in such situations. Therefore, based on the above discussions, this study conjectures that (1) the mechanisms of managerial ability, corporate governance quality, CEO overconfidence, CEO tenure, and CFO co-option have the enhancement effect for the association between CEO-CFO personality complementarity and corporate credit risk; (2) the mechanisms of financial constraint and subordinate executives' power have the reduction effect for the association.

Hypothesis 2. *CEO/CFO characteristics moderate the association between CEO-CFO personality complementarity and firm credit risk.*

Hypothesis 2a. *Managerial ability negatively moderates (namely weakens) the association between CEO-CFO personality complementarity and firm credit risk.*

Hypothesis 2b. *CEO overconfidence negatively moderates (namely weakens) the association*

between CEO-CFO personality complementarity and firm credit risk.

Hypothesis 2c. *CEO tenure and CFO co-option negatively moderate (namely weaken) the association between CEO-CFO personality complementarity and firm credit risk.*

Hypothesis 3. *Corporate governance quality negatively moderates (namely weakens) the association between CEO-CFO personality complementarity and firm credit risk.*

Hypothesis 4. *Financial constraint and subordinate executives' power positively moderates (namely strengthen) the association between CEO-CFO personality complementarity and firm credit risk.*

In addition, this study investigates whether the relation between CEO-CFO personality complementarity and firm credit risk varies with the occurrence of financial crisis. Liao et al. (2023) demonstrate that extraverted CEOs have significant and negative impacts on firm performance during the financial crisis periods due to their risk-taking attitudes. The results indicate that CFO conscientiousness holds greater significance during financial crises. This heightened importance may prompt debtholders to place increased emphasis on CEO-CFO personality complementarity during the financial crisis periods. Based on the above discussions, this study conjectures that the association between CEO-CFO personality complementarity and firm credit risk becomes stronger during the financial crisis periods, shown as Hypothesis 5.

Hypothesis 5. *The association between CEO-CFO personality complementarity and firm credit risk becomes stronger during the financial crisis periods.*

IV. Data and Methodology

This study aims to investigate whether CEO-CFO personality complementarity affect the

firm's credit risk, measured by the yield spreads of American corporate bonds. The screening criteria for corporate bonds are outlined as follows: (1) straight corporate bond issues (Yu, 2005); (2) unsecured or unguaranteed bonds; (3) bonds with a fixed coupon rate; (4) bonds issued by non-financial or minimally regulated firms; and (5) bonds without embedded options or special clauses. Following this initial screening process, we further exclude bond samples lacking essential data on CEO/CFO personality traits, as well as other firm-, CEO-, and bond-level variables. The final sample comprises 8,820 annual bond observations collected over the period from 2007 to 2019, with approximately 81.47% classified as investment-grade bonds. Table 1 presents the distribution of these sample observations. Furthermore, the sample size shows a consistent annual increase throughout the study period.

[Insert Table 1 here]

IV.1. Data Sources and Selection

This study employs the CEO extraversion and CFO conscientiousness to describe CEO-CFO personality complementarity. For the variables of CEO extraversion and CFO conscientiousness, this study follows Harrison et al. (2019) to employ *OLCPT* to estimate the degrees of CEOs'/ CFOs' big five personality traits (namely extraversion, conscientiousness, neuroticism, agreeableness, and openness) using the textual data of CEOs'/ CFOs' conversation contents in earnings call transcripts. The textual data of earnings call transcripts are obtained from Capital IQ database. Moreover, for the employed moderating (mechanism) variables of managerial ability, corporate governance quality, CEO overconfidence, CEO tenure, CFO co-option, financial constraint, and subordinate executives' power, the detailed estimations methods are demonstrated in Section II. The needed financial data, executives' data (e.g. employee stock option, tenure), and

independent director data are gathered from COMPUSTAT, Execucomp, and BoardEx databases, respectively.

Regarding the dependent variables, bond yield spread (YS) data are sourced from the Datastream database. In the dataset containing bond yield spreads, this research adheres to the criteria outlined by Yu (2005) and Chen and Tseng (2021) for filtering corporate bond issues. The criteria include: (1) fixed-rate coupons; (2) being unsecured or unguaranteed; and (3) having no embedded options or special clauses (e.g., non-convertible or non-callable bonds). The observation periods for corporate bonds span from 2007 to 2019. Additionally, observations lacking CEO-CFO personality complementarity variables, firm characteristics (as control variables), and bond features (as control variables) are excluded from the sample.

IV.2. Control Variables

For the control variables of corporate bond yield spreads, this study follows Yu (2005), Lu et al. (2010), and Chen and Tseng (2021) to incorporate several firm characteristics, CEO characteristics, and bond issue features. The firm characteristics variables cover: (1) leverage ratio (LEV), defined as the ratio of debt book value to the sum of debt book value and equity market value; (2) equity volatility (VOL), defined as the annualized standard deviation of daily stock returns over the past 250 trading days; (3) return on assets (ROA), defined as the ratio of earnings before interest and tax (EBIT) to total assets; (4) ROA volatility (ROAV), measured by the standard deviation of ROA estimated by the past five-year ROA annual data; (5) firm age (Fage), defined as the number of years since the firm appeared in COMPUSTAT; (6) firm asset size (SIZE), defined as the natural logarithm of the market value of a firm's assets; (7) R&D intensity (RD, defined as the ratio of R&D expenses to sales); (8) capital expenditure ratio (CAPX, defined as the

ratio of capital expenditures to total assets). The needed financial and equity market data are from COMPUSTAT and CRSP, respectively. The CEO characteristics variables include CEO tenure (CEO_TEN; unit: in years), CEO gender (CEO_GEN; 1: female; 0: male), CEO age (CEO_Age; unit: in years), and CEO overconfidence (CEO_OC; 1: overconfidence; 0: non-overconfidence). The needed managers' data are from Execucomp database.

In the context of bond features variables, this study incorporates coupon rate (Coupon), bond maturity (LFFL), amount issued (Lnamt), bond age (Bage), and Moody's bond credit rating (RAT) as control variables. These bond features are sourced from the Datastream database. The Coupon variable represents the annualized coupon rate of the bond, while LFFL denotes the remaining years from time t to the bond maturity date. Lnamt and Bage serve as proxies for bond liquidity, indicating the logarithm of the originally issued dollar amount and the time interval from the issuing date to the settlement date, respectively. The RAT variable corresponds to the numerical score assigned to each rating group, with values such as 1 for Aaa, 2 for Aa1, 3 for Aa2, 4 for Aa3, 5 for A1, and so forth.

The summarized descriptive statistics of the above variables using the sample bond observations with CEO/CFO personality traits variables and control variables are shown in Table 2. The average bond yield spread (YS) is 214.4295 bps. In addition, the average of CEO agreeableness (CEO_Agree), CEO conscientiousness (CEO_Consc), CEO extraversion (CEO_Extra), CEO neuroticism (CEO_Neuro), and CEO openness (CEO_Openn) are 4.1111, 5.1807, 4.6503, 3.3073, and 4.6211, respectively. In addition, the average of CFO agreeableness (CFO_Agree), CFO conscientiousness (CFO_Consc), CFO extraversion (CFO_Extra), CFO neuroticism (CFO_Neuro), and CFO openness (CFO_Openn) are 4.0090, 5.0864, 4.6345, 3.3267, and 4.6324, respectively. These results show that on average bond sample observations are issued

by firms with relatively lower CEO/CFO neuroticism. Table 2 also presents that the average the average financial leverage (LEV) is 29.07%, the average equity volatility (VOL) is 24.41%, and the average bond credit rating (RAT) is 8.8561 (between Baa1 and Baa2 in Moody's rating system).

[Insert Table 2 here]

V. Empirical Analyses

V.1. Examining the relation between CEO-CFO personality complementarity and bond yield spread

We examine the above hypotheses by using panel data regressions with fixed effect (bond- and year-fixed effects) model. In addition, we also consider the bond-level clustered standard errors (Petersen, 2009) in evaluating the effectiveness of the regression coefficient estimates. The model specification to examine Hypothesis 1 is shown as Eq. (5). *Bond* and *Year* denote firm dummy variables and year dummy variables, respectively. It has to be noted that CEO_Extra_H (CFO_Consc_H) is a dummy variable that equals 1 if the value of CEO_Extra (CFO_Consc) is larger than its median, respectively.

$$YS_{it} = \alpha + \beta_1 CEO\_Extra_{it} + \beta_2 CFO\_Consc_{it} + \beta_3 CEO\_Extra_{it} \times CFO\_Consc_{it} + \sum_{j=1} \beta_{j+3} CV\_Bond_{j,it} + Bond_k + Year_t + \varepsilon_{it} \quad (5)$$

$$YS_{it} = \alpha + \beta_1 CEO\_Extra\_H_{it} + \beta_2 CFO\_Consc\_H_{it} + \beta_3 CEO\_Extra\_H_{it} \times CFO\_Consc\_H_{it} + \sum_{j=1} \beta_{j+3} CV\_Bond_{j,it} + Bond_k + Year_t + \varepsilon_{it} \quad (6)$$

Where CV_Bond= LEV, VOL, ROA, ROAV, Fage, SIZE, RD, CAPX, CEO_TEN, CEO_GEN, CEO_Age, CEO_OC, Coupon, LFFL, Lnamt, Bage, RAT, and CEOs'/CFOs' personality traits

The results of column (1) to (4) in Table 3 demonstrate that CEO extraversion (CEO_Extra) is significantly and positively related to the bond yield spread while the interaction term of CEO extraversion and CFO conscientiousness (CEO_Extra*CFO_Consc) has the significant and negative effect, indicating that CEO-CFO personality complementarity is significantly and negatively related to bond yield spread. The result of column (2) show that the coefficients of CEO_Extra and CEO_Extra*CFO_Consc are 109.9127 and -22.5955, indicating that the firm's bond yield spread increases 56.2423 bps (109.9127×0.5117) and decreases 3.4825 bps (-22.5955 ×0.5117×0.3012) per standard deviation increase in the firm's CEO_Extra and CEO_Extra* CFO_Consc, respectively. The results reveal that the benefits resulting from the decrease effect on asset volatility and financial leverage of CEO-CFO personality complementarity perceived by bondholders are greater than the damages resulting from the decrease effect on asset value of CEO-CFO personality complementarity. That is, the results support the argument that bondholders care more about the impacts of CEO-CFO personality complementarity on asset volatility and financial leverage than those on asset value. Hence, Hypothesis 1a is empirically supported.

[Insert Table 3 here]

V.2. The relation between CEO-CFO personality complementarity and bond yield spread: Potential mechanisms of CEOs'/CFOs' characteristics, financial constraints, and corporate governance

To scrutinize the potential mechanisms involving CEOs'/CFOs' characteristics, financial constraints, as well as corporate governance in the impact of CEO-CFO personality complementarity on firm credit risk (specifically addressing Hypotheses 2, 3, and 4), this study utilizes the following model specifications, presented as Eq. (7), to examine Hypotheses 2, 3, and

4. The definitions of CEO-CFO personality complementarity and control variables remain consistent with those outlined in Eq. (5).

$$\begin{aligned} YS_{it} = {} & \alpha + \beta_1 CEO\_Extra_{it} + \beta_2 CFO\_Consc_{it} + \beta_3 CEO\_Extra_{it} \times CFO\_Consc_{it} \\ & + \beta_4 MED_{it} + \beta_5 CEO\_Extra_{it} \times MED_{it} + \beta_6 CFO\_Consc_{it} \times MED_{it} \\ & + \beta_7 CEO\_Extra_{it} \times CFO\_Consc_{it} \times MED_{it} + \sum_{j=1} \beta_{j+7} CV\_Bond_{j,it} \\ & + Bond_k + Year_t + \varepsilon_{it} \end{aligned} \tag{7}$$

Where *MED=SA, IG, MA_R, CEO_OC, CEO_TEN, CFO_CoOpt, IDIR*

CV_Bond= LEV, VOL, ROA, ROAV, Fage, SIZE, RD, CAPX, CEO_TEN, CEO_GEN, CEO_Age, CEO_OC, Coupon, LFFL, Lnamt, Bage, RAT, and CEOs'/CFOs' other personality traits

The results of columns (1) to (5) in Table 4 show that the coefficient of the interaction term of *MA_R* and *CEO_Extra*CFO_Consc*, that of the interaction term of *CEO_OC* and *CEO_Extra*CFO_Consc*, that of the interaction term of *CEO_TEN* and *CEO_Extra* CFO_Consc*, that of the interaction term of *CEO_CoOpt* and *CEO_Extra*CFO_Consc*, and that of the interaction term of *IDIR* and *CEO_Extra*CFO_Consc* are all significant and positive. These results support the following augments: (1) greater managerial ability and better corporate governance quality both make bondholders have fewer concerns about extraverted CEOs' risky investment behaviors, which leads the monitoring function of conscientious CFO to become less important for bondholders. This weakening of oversight diminishes the impact of CEO-CFO personality complementarity, rendering its effects less noticeable; (2) higher CEO overconfidence increases the incentives of CEOs' engaging in risky behavior, weakening the impact of CEO-CFO personality complementarity; (3) higher CEO tenure and CFO co-option indicate the CEO may have greater power and the CFO is easily constrained by the CEO, making the monitoring function of the CFO become less effective. Based on the above discussions, Hypotheses 2a, 2b, 2c, and 3

are empirically supported.

[Insert Table 4 here]

The results of columns (6) to (7) in Table 4 show that the coefficient of the interaction term of *SA* and *CEO_Extra*CFO_Consc* and that of the interaction term of *IG* and *CEO_Extra*CFO_Consc* are both significant and negative. These results suggest that financial constraint and subordinate executives' power both enhance the effect of CEO-CFO personality complementarity on firm credit risk. The results thus support the contention that the role of CFOs within a firm has grown increasingly significant, enhancing the monitoring function of conscientious CFOs. This strengthened oversight amplifies the impact of CEO-CFO personality complementarity, making its effects more pronounced. Hence, Hypothesis 4 is empirically supported.

V.3. Endogeneity issue for the relationship between CEO-CFO personality complementarity and bond yield spread

This section demonstrates the endogeneity discussions for the association between a firm's CEO-CFO personality complementarity and bond yield spread. To mitigate the endogeneity concerns of omitted variables, reverse causality, and measurement errors, we employ difference-in-difference model design to implement the robustness analyses.

It is noted that (1) individuals are less inclined to possess identical levels of personality traits; and (2) concurrently, CEOs/CFOs wield discretionary power in shaping the configuration of CEO-CFO personality complementarity, suggesting that the characteristics of CEO-CFO personality complementarity could undergo exogenous changes in response to occurrences of CEO/CFO turnovers. Therefore, this study utilizes *the event of unexpected CEO/CFO turnover* as a *quasi-*

exogenous shock for the changes of CEO-CFO personality complementarity and then form an experimental framework for discussing the impacts of CEO-CFO personality complementarity on firm credit risk.[6]

This study adheres to the methodology introduced by Lin et al. (2020) to screen the sample by the following criteria: (1) inclusion of the firm in the sample; (2) occurrence of CEO/CFO turnover during the sample period; and (3) the presence of a low level of CEO-CFO personality complementarity before the CEO/CFO turnover.[7] Subsequently, this study utilizes this screened sample to conduct the difference-in-difference (DID) analysis.

Accordingly, this study defines the treatment group as the firms with CEO/CFO turnover that change from a low level of CEO-CFO personality complementarity to a high level. The control group is defined as the firms with CEO/CFO turnover event that change from a low level of CEO-CFO personality complementarity to another low level. Besides, this research defines a dummy variable, *Treat_D*, that equals 1 if a firm moves from a low level of CEO-CFO personality complementarity to a high level and 0 otherwise due to the joining of the new CEO/CFO. *Post* is a dummy variable that equals 1 if the year of observation is after the occurrence of CEO/CFO turnover and 0 otherwise. We employ *TREAT_D×Post* to capture the treatment effect of a firm from a low level of CEO-CFO personality complementarity to a high level n bond yield spread.

To strengthen the robustness of the evidence supporting Hypothesis 1, this study employs

[6] It has to be noted that this study focus on CEO/CFO unexpected turnover as the event to capture the exogenous change in CEO-CFO personality complementarity on firm credit risk because the CEO/CFO expected turnover may not be an appropriate exogenous variable.

[7] "High levels of CEO-CFO personality complementarity" are characterized by the values of CEO extraversion and CFO conscientiousness variables that are both above their respective 50th percentiles. Conversely, "low levels of CEO-CFO personality complementarity" are defined as the following three situations: (1) the value of the CEO extraversion is above the 50th percentile while the value of the CFO conscientiousness is below the 50th percentile; (2) the value of the CEO extraversion is below the 50th percentile while the value of the CFO conscientiousness is above the 50th percentile; and (3) the value of the CEO extraversion is below the 50th percentile and the value of the CFO conscientiousness is also below the 50th percentile.

Treat_D ×*Post* to capture the treatment effect of a firm from a low level of CEO-CFO personality complementarity to a high level on firm credit risk, shown as Eq. (8). The definitions of control variables (CV_Bond) are same as those outlined in Eq. (5).

$$YS_{it} = \alpha + \beta_1 Treat\_D_{it} + \beta_2 Post_{it} + \beta_3 Treat\_D_{it} \times Post_{it} + \sum_{j=1} \beta_{j+3} CV\_Bond_{j,it} + Bond_k + Year_t + \varepsilon_{it} \quad (8)$$

Columns (1) to (2) of Table 5 show that the coefficient of *Treat_D*×*Post* is negative and significant (-28.3035, -26.5617), indicating that firms that change from a low level of CEO-CFO personality complementarity to a high level have lower bond yield spreads than those that change from a low level of CEO-CFO personality complementarity to another low level. This result is consistent with our main findings in Table 3. Therefore, our finding that the negative association between CEO-CFO personality complementarity and bond yield spread is robust to endogeneity issues.

[Insert Table 5 here]

V.4. Sample selection bias issue for the relationship between CEO-CFO personality complementarity and bond yield spread

Since the sample in this study requires earnings call transcripts to estimate the personality traits of CEOs and CFOs, there may be sample selection bias. Following Heckman (1979)'s two-stage correction model, the first stage employs a probit model to establish the "selection equation", identifying which firms release earnings call transcripts (and thus have CEO/CFO personality trait variables), and subsequently calculating the Inverse Mills Ratio (IMR). In the first stage model, (1) ECT_D is a dummy variable that equals one if earnings call transcript is provided, and zero otherwise; (2) ECT_D is regressed against CEO characteristic variables (CEO_TEN, CEO_GEN,

CEO_Age, CEO_OC) and firm characteristics variables. The second stage involves correcting the "outcome equation" by including the IMR as an additional control variable in the main models, namely Eqs. (5) and (6). If the coefficient of the IMR is significant, it indicates the presence of sample selection bias, and the correction method has partially addressed this issue.

Empirical results of columns (1) to (3) in Table 6 show that the CEO-CFO personality complementarity variable (CEO_Extra*CFO_Consc) is still significant and negative when additionally controlling for the IMR variable. The results are consistent with those in Table 3. Hence, we can conclude that the negative association between CEO-CFO personality complementarity and bond yield spread is robust to sample selection bias issues.

[Insert Table 6 here]

V.5. Additional findings: Using another proxy of CEO-CFO personality complementarity

Moreover, this study also introduces other personality traits complementarity in the CEO-CFO interface and further discusses their impacts on a firm's bond yield spreads. Based on the functions of CEOs and CFOs in the firm, this study employs "CEO extraversion (CEO_Extra) and CFO neuroticism (CFO_Neuro)" as another measure of the complementarity in the CEO-CFO interface. In addition, CEO_Extra_H (CFO_Neuro_H) is a dummy variable that equals 1 if the value of CEO_Extra (CFO_Neuro) is larger than its median, respectively.

Empirical results of columns (1) to (4) in Table 7 show that the CEO-CFO personality complementarity variables (CEO_Extra*CFO_Neuro; CEO_Extra_H*CFO_Neuro_H) are significant and negative when controlling for other CEOs'/CFOs' personality traits variables. That is, CFO neuroticism also significantly weakens the positive effect of CEO extraversion on bond yield spreads. The results are similar with the role of CFO conscientiousness for the positive effect

of CEO extraversion on bond yield spreads.

[Insert Table 7 here]

V.6. The relation between CEO-CFO personality complementarity and bond yield spread: Financial crisis period

To examine the Hypothesis 5, this study adds the interaction term of subprime crisis period (SC) and CEO-CFO personality complementarity and SC variable into Eq. (5). The SC variable is a dummy variable of subprime crisis period that equals 1 if the bond observation is at the period from 2007 to 2008 and 0 if elsewise. The CEO-CFO personality complementarity variables cover CEO_Extra*CFO_Consc and CEO_Extra*CFO_Neuro.

Empirical results of columns (1) to (2) in Table 8 show that the interaction terms of subprime crisis period (SC) and CEO-CFO personality complementarity (CEO_Extra* CFO_Consc*SC; CEO_Extra*CFO_Neuro*SC) are significant and negative when controlling for other CEOs'/CFOs' personality traits variables. That is, CFO conscientiousness and neuroticism both have greater impacts on weakening the positive effect of CEO extraversion on bond yield spreads during the financial crisis period. This is because CFO conscientiousness holds greater significance during financial crises and the heightened importance may prompt debtholders to place increased emphasis on CEO-CFO personality complementarity during the financial crisis periods.

[Insert Table 8 here]

VI. Concluding Remarks

This study is the first to investigate the effects of CEO-CFO personality complementarity on firm credit risk (measured by bond yield spread). The main results demonstrate: (1) CEO-CFO

personality complementarity is negatively related to firm credit risk, supporting the augment that the effect of CEO-CFO personality complementarity on asset value volatility and financial leverage dominate that on asset value from the theoretical perspectives of structural credit models; (2) managerial ability, corporate governance quality, CEO overconfidence, CEO tenure, and CFO co-option all significantly weaken the negative association between CEO-CFO personality complementarity and firm credit risk; (3) financial constraint and subordinate executives' power have the enhancement effect on the negative association between CEO-CFO personality complementarity and firm credit risk; (4) the negative association between CEO-CFO personality complementarity and firm credit risk becomes stronger during the financial crisis period, indicating that bondholders place greater value on the buffering effect of CEO-CFO personality complementarity during the financial crisis periods; (5) CFO neuroticism also significantly weakens the association between CEO extraversion and corporate bond yield spread, providing additional evidence that bondholders care more about CEO-CFO personality complementarity.

In sum, we conclude that CEO-CFO personality complementarity plays an important role in influencing firm credit risk and bondholders' wealth. Our findings are helpful for traditional structural form credit risk models to explain firm credit risk (and bond yield spreads). This work thus not only provides new insights for the credit risk literature but also practical guidance for creditor banks in conducting credit decisions based on a new understanding of the economic consequences of the firm's CEO-CFO personality complementarity. Therefore, this study contributes to both the bond yield spread (credit risk) literature and the CEO personality traits literature. Our findings also provide practical references for creditor banks in making credit decisions.

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Table 1. Sample Distribution

The sample period is yearly between 2007 and 2019. Table 1 shows the sample distribution. There are totally 8,020 annual bond observations with available data of CEO extraversion and CFO conscientiousness variables, other CEO/CFO characteristics, firm characteristics, and bond features. Table 1 reports the numbers of pooled observations for firms in the given years and credit ratings. The rating subsamples are sorted by Moody's credit ratings.

Year/ Rating	Above Aa3	A	Baa	Below Ba1	Total
2007	0	0	0	2	2
2008	0	12	3	17	32
2009	4	61	77	70	212
2010	8	129	134	96	367
2011	9	107	151	92	359
2012	9	109	178	97	393
2013	9	124	184	112	429
2014	11	147	308	119	585
2015	15	259	373	123	770
2016	34	305	497	146	982
2017	41	336	615	189	1,181
2018	17	327	776	213	1,333
2019	16	339	810	210	1,375
Total	173	2,255	4,106	1,486	8,020

Table 2. Summary Statistics of Major Variables

This table presents the mean, median, standard deviation (Std. dev.), minimum, and maximum of major variables used in empirical analyses. Panel A, B, C, D, and E present the summary statistics of CEO personality traits characteristics variables, CFO personality traits characteristics variables, firm characteristics variables, CEO characteristics variables, and bond features variables, respectively. Panel A and B show summary statistics of CEO personality traits variables (CEO_Agree, CEO_Consc, CEO_Extra, CEO_Neuro, CEO_Openn) and CFO personality traits characteristics variables (CFO_Agree, CFO_Consc, CFO_Extra, CFO_Neuro, CFO_Openn), respectively. Agree, Consc, Extra, Neuro, and Openn represent agreeableness, conscientiousness, extraversion, neuroticism, and openness, respectively. Panel C, D, and E shows firm characteristic variables, CEO level variables, and bond feature variables, respectively. The variables of firm characteristics include financial leverage (LEV), equity volatility (VOL), return on assets (ROA, defined as the ratio of net income to total assets), ROA volatility (ROAV, defined as the standard deviation of previous five-year ROA data), firm size (SIZE, the natural log of a firm's asset value at the end of a fiscal year), firm age (Fage, defined as the number of years a firm has appeared on Compustat), R&D intensity (RD, defined as the ratio of R&D expenses to sales), and capital expenditure ratio (CAPX, defined as the ratio of capital expenditures to total assets). The variables of CEO characteristics include CEO tenure (CEO_TEN; unit: in years), CEO gender (CEO_GEN; 1: female; 0: male), CEO age (CEO_Age; unit: in years), and CEO overconfidence (CEO_OC; 1: overconfidence; 0: non-overconfidence). The bond feature variables cover bond yield spreads (YS), annual coupon rate (Coupon), bond age (Bage, defined as the difference between the settlement date and the issuing date), natural log of amount issued (Lnamt), the time to maturity (LFFL), and bond rating (RAT, defined as the numerical scores of bond rating, where Aaa is 1, Aa1 is 2, Aa2 is 3, etc.).

Variable	Mean	Median	Std. dev.	Min	Max
Panel A. CEO personality traits variables					
CEO_Agree	4.1111	4.1204	0.5212	2.3374	6.3524
CEO_Consc	5.1807	5.1795	0.3319	3.9736	6.9193
CEO_Extra	4.6503	4.6627	0.5117	2.8116	6.4831
CEO_Neuro	3.3073	3.3480	0.3766	1.7567	4.4162
CEO_Openn	4.6211	4.6269	0.3537	2.5515	5.8219
Panel B. CFO personality traits variables					
CFO_Agree	4.0090	4.0129	0.4979	1.1824	5.6941
CFO_Consc	5.0864	5.0896	0.3012	3.8363	6.0076
CFO_Extra	4.6345	4.6494	0.5317	2.1301	7.0000
CFO_Neuro	3.3267	3.3316	0.3590	1.8390	4.4399
CFO_Openn	4.6324	4.6507	0.3413	2.2958	6.0150
Panel C. Firm characteristics variables (Firm controls)					
LEV	0.2907	0.2384	0.1722	0.0077	0.9978
VOL	0.2441	0.2081	0.1425	0.0708	2.2185
ROA	0.0554	0.0553	0.0714	-0.5618	1.0250
ROAV	0.0344	0.0219	0.0432	0.0006	1.0701
SIZE	10.0406	10.0570	1.3185	6.3108	13.2207
Fage	48.3013	55.0384	18.4748	4.0027	69.5507
RD	0.0135	0.0000	0.0250	0.0000	0.1865
CAPX	0.0490	0.0400	0.0442	0.0000	0.4401
Panel D. CEO characteristics variables (CEO controls)					
CEO_TEN	6.5268	5.4192	5.2174	0.0000	44.0274
CEO_GEN	0.0757	0.0000	0.2645	0.0000	1.0000
CEO_Age	57.5616	57.0000	5.3219	39.0000	81.0000
CEO_OC	0.6168	1.0000	0.4862	0.0000	1.0000
Panel E. Bond features variables (Bond controls)					
YS	214.4295	152.0000	250.6778	-108.4000	2430.8000
Coupon	0.0533	0.0520	0.0185	0.0135	0.1188
Bage	7.2861	4.9877	6.7360	0.0110	29.5452
Lnamt	12.9178	13.1224	1.2106	6.9078	16.0127
LFFL	11.1705	7.1972	19.1273	0.0250	999.0000
RAT	8.8561	9.0000	2.8697	3.0000	21.0000

Table 3. The Relationship between CEO-CFO Personality Complementarity and Bond Yield Spreads

This table shows the results regarding the relationship between CEO-CFO personality complementarity and bond yield spread (YS) controlling for other big five personality traits. Following Harrison and Malhotra (2024), CEO-CFO personality complementarity is measured by CEO extraversion (CEO_Extra) and CFO conscientiousness (CFO_Consc). CEO_Extra_H (CFO_Consc_H) is a dummy variable that equals 1 if the value of CEO_Extra (CFO_Consc) is larger than its median, respectively. Agree, Consc, Extra, Neuro, and Openn represent agreeableness, conscientiousness, extraversion, neuroticism, and openness, respectively. For the estimations of these five personality traits, this study follows Harrison et al. (2019) to facilitate the Open Language Chief Executive Personality Tool (*OLCPT*) developed by Harrison et al. (2019) to analyzes the dialogue records of the CEO in the firm's quarterly earnings call transcripts and then calculates the CEO's five personality traits scores, which ranges from 1 to 7 points. The detailed definitions of control variables (e.g. firm characteristic variables, CEO level variables, and bond feature variables) are same as those in Table 2. The bond- and year-fixed effects and cluster issues are considered in these results. This table presents the regression coefficients. The t-statistics calculated by bond-level clustered standard errors (Petersen, 2009) for each coefficient appears immediately underneath. The signs of "*, **, ***" represent the significance of 10%, 5%, and 1%, respectively.

	(1) YS	(2) YS	(3) YS	(4) YS
CEO_Extra	124.1523**	109.9127**		0.6472
	(2.52)	(2.25)		(0.09)
CFO_Consc	92.7587**	108.6215**		9.1325
	(2.17)	(2.44)		(0.92)
CEO_Extra* CFO_Consc	**-25.3964*** **	**-22.5955** **		
	(-2.62)	**(-2.36)**		
CEO_Extra_H			14.6136**	14.4144**
			(2.44)	(2.08)
CFO_Consc_H			6.6577	11.9872
			(0.90)	(1.33)
CEO_Extra_H* CFO_Consc_H			**-37.5858*** **	**-35.0475*** **
			(-4.37)	**(-4.11)**
CEO_Agree		32.8971***		31.8883***
		(4.39)		(4.35)
CEO_Consc		-15.6919**		-14.7365**
		(-2.20)		(-2.12)
CEO_Neuro		-27.7753***		-27.9251***
		(-4.04)		(-3.86)
CEO_Openn		-25.2620**		-27.0058**
		(-2.21)		(-2.53)
CFO_Agree		-44.3936***		-42.7642***
		(-5.69)		(-5.70)
CFO_Extra		4.8624		2.4553
		(1.14)		(0.55)
CFO_Neuro		-12.3544*		-10.1496
		(-1.87)		(-1.57)
CFO_Openn		-0.9973		3.0911
		(-0.12)		(0.36)
Constant	YES	YES	YES	YES
Firm & CEO controls	YES	YES	YES	YES
Bond controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Bond FE	YES	YES	YES	YES
Observations	8020	8020	8020	8020
Adjusted R^2	0.2278	0.2392	0.2411	0.2519

Table 4. The Relationship between CEO-CFO Personality Complementarity and Bond Yield Spreads: The Potential Mechanisms of Reduction Effects and Enhancement Effects

This table shows the results of the potential mechanisms of reduction effects and enhancement effects for the relation between CEO-CFO personality complementarity and bond yield spread (YS). The CEO-CFO personality complementarity is measured by CEO extraversion (CEO_Extra) and CFO conscientiousness (CFO_Consc). The potential mechanisms of reduction effects discussed in this study include managerial ability score rank (MA_R; Demerjian et al., 2012), CEO overconfidence (CEO_OC), CEO tenure (CEO_TEN), CFO co-option (CFO_CoOpt, Dikolli et al., 2021), and independent director ratio (IDIR). These five variables decrease the importance of the CFOs' monitoring role within a firm, thereby making the CFOs' conscientiousness and CEO-CFO personality complementarity less evident. The potential mechanisms of enhancement effects discussed in this study include financial constraint (SA; size and age index, Hadlock and Pierce, 2010) and subordinate executives' power (namely internal governance; IG, Cheng et al., 2016). These two variables increase the importance of the CFOs' role within a firm, thereby making the CFOs' conscientiousness and CEO-CFO personality complementarity more evident. The detailed definitions of CEOs'/CFOs' personality traits variables, firm characteristic variables, CEO level variables, and bond feature variables are same as those in Table 2. The bond- and year-fixed effects and cluster issues are considered in these results. This table presents the regression coefficients and adjusted R-squared. The t-statistics calculated by bond-level clustered standard errors (Petersen, 2009) for each coefficient appears immediately underneath. The signs of "*, **, ***" represent the significance of 10%, 5%, and 1%, respectively.

	Potential mechanisms of reduction effects					Potential mechanisms of enhancement effects	
	(1) YS	(2) YS	(3) YS	(4) YS	(5) YS	(6) YS	(7) YS
CEO_Extra	419.9630***	335.0438***	105.4426**	232.6362**	1363.8402**	938.4295***	98.9684*
	(2.73)	(3.35)	(2.12)	(2.32)	(2.11)	(2.99)	(1.84)
CFO_Consc	346.2160**	276.2593***	63.8941	208.3338**	1154.5033**	678.5474***	73.1628
	(2.52)	(3.04)	(1.46)	(2.05)	(2.17)	(2.68)	(1.61)
CEO_Extra*CFO_Consc	**-84.1010*** **	**-67.0962*** **	**-20.9772** **	**-49.7856** **	**-279.8521** **	**-164.0662*** **	**-18.5777* **
	(-2.76)	**(-3.43)**	**(-2.16)**	**(-2.38)**	**(-2.21)**	**(-2.74)**	**(-1.78)**
MA_R	1851.7476**						
	(2.43)						
CEO_Extra*MA_R	-470.1285***						
	(-2.78)						
CFO_Consc*MA_R	-360.8429**						
	(-2.36)						
CEO_Extra*CFO_Consc*MA_R	**93.0102*** **						
	(2.76)						
CEO_Extra*CEO_OC		-410.2013***					
		(-3.90)					
CFO_Consc*CEO_OC		-310.6678***					
		(-3.26)					
CEO_Extra*CFO_Consc*CEO_OC		**81.5284*** **					
		(3.90)					
CEO_Extra*CEO_TEN			-5.0421***				
			(-3.51)				
CFO_Consc*CEO_TEN			0.7276				
			(0.46)				
CEO_Extra*CFO_Consc*CEO_TEN			**0.9475*** **				
			(2.64)				
CEO_Extra*CFO_CoOpt				-195.8216*			
				(-1.69)			
CFO_Consc*CFO_CoOpt				-156.1778			
				(-1.31)			
CEO_Extra*CFO_Consc*CFO_CoOpt				**42.8494* **			
				(1.78)			

CFO_CoOpt				719.7716			
				(1.26)			
CEO_Extra*IDIR					-1347.1242**		
					(-2.02)		
CFO_Consc*IDIR					-1127.6927**		
					(-2.05)		
CEO_Extra*CFO_Consc*IDIR					**276.8218****		
					(2.11)		
IDIR					5568.9301**		
					(1.99)		
CEO_Extra*SA						208.2745***	
						(2.86)	
CFO_Consc*SA						148.3005**	
						(2.49)	
CEO_Extra*CFO_Consc*SA						**-36.1020*****	
						(-2.59)	
SA						365.9996	
						(0.92)	
CEO_Extra*IG							135.3713**
							(2.21)
CFO_Consc*IG							91.9382*
							(1.73)
CEO_Extra*CFO_Consc*IG							**-25.0540****
							(-2.03)
IG							-513.9166*
							(-1.96)
CEO_Agree	22.8347***	31.9361***	30.6098***	31.5394***	34.2426***	29.6711***	33.2571***
	(2.89)	(4.33)	(4.13)	(4.25)	(4.75)	(4.57)	(4.98)
CEO_Consc	-6.9878	-16.2993**	-10.7923	-14.4935*	-17.3165**	-9.2307	-11.8831*
	(-0.81)	(-2.24)	(-1.55)	(-1.96)	(-2.48)	(-1.37)	(-1.75)
CEO_Neuro	-35.7034***	-31.6333***	-28.6856***	-30.0671***	-25.8086***	-26.9356***	-33.4647***
	(-4.15)	(-4.37)	(-3.91)	(-4.30)	(-3.66)	(-3.67)	(-4.40)
CEO_Openn	-20.6151	-26.8201**	-23.3349**	-22.7356**	-34.9700***	-31.6676***	-29.9950***
	(-1.48)	(-2.36)	(-2.26)	(-1.97)	(-3.49)	(-3.14)	(-2.98)
CFO_Agree	-34.5370***	-42.3438***	-41.9703***	-42.6661***	-46.1653***	-44.1277***	-42.1350***
	(-4.24)	(-5.59)	(-5.63)	(-5.67)	(-6.18)	(-6.36)	(-6.18)
CFO_Extra	8.2015	2.3428	3.2707	4.5728	2.1341	2.9079	4.5330
	(1.48)	(0.54)	(0.73)	(1.09)	(0.49)	(0.68)	(1.02)
CFO_Neuro	-11.1893	-9.3246	-8.8185	-8.8485	-11.9774*	-8.2697	-4.3283
	(-1.56)	(-1.45)	(-1.38)	(-1.39)	(-1.84)	(-1.30)	(-0.66)
CFO_Openn	-20.1500**	-0.4177	-2.5154	-0.7133	6.3670	2.6717	-2.0145
	(-2.08)	(-0.05)	(-0.29)	(-0.08)	(0.78)	(0.33)	(-0.25)
Constant	YES	YES	YES	YES	YES	YES	YES
Firm & CEO controls	YES	YES	YES	YES	YES	YES	YES
Bond controls	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Bond FE	YES	YES	YES	YES	YES	YES	YES
Observations	6774	8020	8020	8003	7956	7770	7763
Adjusted R^2	0.2596	0.2527	0.2513	0.2411	0.2544	0.2825	0.2732

Table 5. Endogeneity Discussions on the Relation between CEO-CFO Personality Complementarity and Corporate Bond Yield Spread: Difference-in-Difference Design

This table shows the results of difference-indifference model design for the effect of CEO-CFO personality complementarity on bond yield spread (YS; the proxy of firm credit risk). The CEO-CFO personality complementarity is measured by CEO extraversion (CEO_Extra) and CFO conscientiousness (CFO_Consc). This study employs unexpected CEO/CFO turnovers as an event to form a quasi-natural experiment and then discusses the impacts of CEO-CFO personality complementarity on bond yield spread. This study defines the treatment group as the firms with CEO/CFO turnovers that change from a low level of CEO-CFO personality complementarity to a high level. The control group is defined as the firms with CEO turnover event that change from a low level of CEO-CFO personality complementarity to another low level. Besides, this research defines a dummy variable, *Treat_D*, that equals 1 if the joining of the new CEO/CFO moves from a low level of CEO-CFO personality complementarity to a high level and 0 otherwise. *Post* is a dummy variable that equals 1 if the year of observation is after the occurrence of unexpected CEO/CFO turnovers and 0 otherwise. We employ *Treat_D×Post* to capture the treatment effect of a firm from a low level of CEO-CFO personality complementarity to a high level on bond yield spread. Control variables include CEOs'/CFOs' big five personality traits (conscientiousness, extraversion, neuroticism, agreeableness, openness), firm characteristic variables, CEO level variables, and bond feature variables. The detailed definitions of the above control variables are same as those in Table 2. The bond- and year-fixed effects and cluster issues are considered in these results. This table presents the regression coefficients and adjusted R-squared. The t-statistics calculated by bond-level clustered standard errors (Petersen, 2009) for each coefficient appears immediately underneath. The signs of "*, **, ***" represent the significance of 10%, 5%, and 1%, respectively.

	(1) YS	(2) YS
Treat_D	1.9284	0.0767
	(0.18)	(0.01)
Post	164.3838***	154.3592***
	(3.01)	(2.85)
Treat_D*Post	**-28.3035****	**-26.5617****
	(-2.26)	**(-2.14)**
CEO_Agree		31.7318***
		(4.38)
CEO_Consc		-10.7616
		(-1.57)
CEO_Extra		8.4799
		(1.26)
CEO_Neuro		-25.3630***
		(-3.71)
CEO_Openn		-31.3484***
		(-2.72)
CFO_Agree		-40.6739***
		(-5.42)
CFO_Consc		15.0109*
		(1.65)
CFO_Extra		3.3365
		(0.74)
CFO_Neuro		-8.4169
		(-1.30)
CFO_Openn		4.0558
		(0.46)
Constant	YES	YES
Firm & CEO controls	YES	YES
Bond controls	YES	YES
Year FE	YES	YES
Bond FE	YES	YES
Observations	8020	8020
Adjusted R^2	0.2498	0.2595

Table 6. Sample Selection Biases Issue on the Relation between CEO-CFO Personality Complementarity and Corporate Bond Yield Spread: Heckman Correction Model

This table shows the results of Heckman two-stage regression model (correction model) design for the effect of CEO-CFO personality complementarity on bond yield spread (YS; the proxy of firm credit risk). The CEO-CFO personality complementarity is measured by CEO extraversion (CEO_Extra) and CFO conscientiousness (CFO_Consc). To mitigate the sample selection bias concern, the study employs the Heckman two-stage regression model (Heckman, 1979) to enhance the robustness of our main findings. ECT_D is a dummy variable that equals one if earnings call transcript is provided, and zero otherwise. In the first stage, ECT_D is regressed against CEO characteristic variables (CEO_TEN, CEO_GEN, CEO_Age, CEO_OC) and firm characteristics variables. IMR is the inverse mill ratio, calculated based on the first-stage regression. In the second stage, IMR variable is also included as additional explanatory variable to conduct the regression analysis. Control variables include CEOs'/CFOs' big five personality traits (conscientiousness, extraversion, neuroticism, agreeableness, openness), firm characteristic variables, CEO level variables, and bond feature variables. The detailed definitions of the above control variables are same as those in Table 2. The bond- and year-fixed effects and cluster issues are considered in these results. This table presents the regression coefficients and adjusted R-squared. The t-statistics calculated by bond-level clustered standard errors (Petersen, 2009) for each coefficient appears immediately underneath. The signs of "*, **, ***" represent the significance of 10%, 5%, and 1%, respectively.

	(1) ECT_D	(2) YS	(3) YS
CEO_Extra		120.6070**	102.2558**
		(2.40)	(1.98)
CFO_Consc		90.6099**	102.6180**
		(2.12)	(2.26)
CEO_Extra*CFO_Consc		**-24.7397****	**-21.2788****
		(-2.52)	**(-2.14)**
CEO_Agree			33.4582***
			(4.55)
CEO_Consc			-14.8151**
			(-2.04)
CEO_Neuro			-27.2034***
			(-4.00)
CEO_Openn			-24.5198**
			(-2.07)
CFO_Agree			-44.1444***
			(-5.58)
CFO_Extra			5.5980
			(1.32)
CFO_Neuro			-13.6905*
			(-1.92)
CFO_Openn			-2.3392
			(-0.27)
CEO_TEN	-0.0075***	2.6535	2.4371
	(-4.01)	(1.29)	(1.19)
CEO_GEN	0.3545***	-182.2063***	-165.6698**
	(8.73)	(-2.60)	(-2.41)
CEO_Age	0.0064***	-5.1824	-4.6898
	(3.20)	(-1.61)	(-1.48)
CEO_OC	0.1877***	-39.1340	-42.5286
	(8.78)	(-1.35)	(-1.47)
LEV	-0.3746***	674.8773***	671.1445***
	(-4.80)	(9.24)	(9.16)
SIZE	-0.1056***	-11.8089	-20.0732
	(-11.89)	(-0.46)	(-0.79)
ROA	0.1845	-36.3003	-41.0718
	(1.26)	(-0.41)	(-0.46)
ROAV	-1.2411***	289.8130*	245.1875
	(-6.09)	(1.81)	(1.50)
Fage	0.0035***	-5939.1053	737.3934
	(5.97)	(-0.26)	(0.03)
CAPX	-2.3734***	91.6976	97.0458
	(-7.54)	(0.44)	(0.46)
OCF	0.9541***		
	(4.17)		
VOL		60.3038	48.7696
		(0.71)	(0.57)
RD		1157.4862***	1196.9932***
		(5.48)	(5.11)
IMR		95.9790	107.9383
		(0.64)	(0.70)
Constant	YES	YES	YES
Bond controls	NO	YES	YES
Industry FE &Year FE	YES	NO	NO
Bond FE & Year FE	NO	YES	YES
Observations	25513	8014	8014
Wald chi^2	4361.58		
Pseudo R^2	0.1963		
Adjusted R^2		0.2282	0.2397

Table 7. The Relationship between CEO-CFO Personality Complementarity and Bond Yield Spreads: Another Personality Complementarity Definition

This table shows the results regarding the relationship between CEO-CFO personality complementarity and bond yield spread (YS) using another personality complementarity definition. The CEO-CFO personality complementarity used in this table is measured by CEO extraversion (CEO_Extra) and CFO neuroticism (CFO_Neuro). CEO_Extra_H (CFO_Neuro_H) is a dummy variable that equals 1 if the value of CEO_Extra (CFO_Neuro) is larger than its median, respectively. Agree, Consc, Extra, Neuro, and Openn represent agreeableness, conscientiousness, extraversion, neuroticism, and openness, respectively. For the estimations of these five personality traits, this study follows Harrison et al. (2019) to facilitate the Open Language Chief Executive Personality Tool (*OLCPT*) developed by Harrison et al. (2019) to analyzes the dialogue records of the CEO in the firm's quarterly earnings call transcripts and then calculates the CEO's five personality traits scores, which ranges from 1 to 7 points. Control variables include CEOs'/CFOs' big five personality traits (conscientiousness, extraversion, neuroticism, agreeableness, openness), firm characteristic variables, CEO level variables, and bond feature variables. The detailed definitions of the above control variables are same as those in Table 2. The bond- and year-fixed effects and cluster issues are considered in these results. This table presents the regression coefficients. The t-statistics calculated by bond-level clustered standard errors (Petersen, 2009) for each coefficient appears immediately underneath. The signs of "*, **, ***" represent the significance of 10%, 5%, and 1%, respectively.

	(1) YS	(2) YS	(3) YS	(4) YS
CEO_Extra	108.2167***	100.2692***		-3.0202
	(4.19)	(3.51)		(-0.43)
CFO_Neuro	144.2453***	133.1709***		-11.8294
	(4.03)	(3.80)		(-1.36)
CEO_Extra*CFO_Neuro	**-35.8807*** **	**-31.7363*** **		
	(-4.82)	**(-4.15)**		
CEO_Extra_H			5.2666	8.6504
			(0.86)	(1.36)
CFO_Neuro_H			2.7990	8.9977
			(0.50)	(1.43)
CEO_Extra_H* CFO_Neuro_H			**-28.1638*** **	**-23.1010*** **
			(-3.66)	**(-3.07)**
CEO_Agree		33.8874***		33.3971***
		(4.49)		(4.50)
CEO_Consc		-9.9311		-11.7028*
		(-1.41)		(-1.67)
CEO_Neuro		-26.7349***		-25.0887***
		(-3.87)		(-3.56)
CEO_Openn		-25.6106**		-26.2575**
		(-2.23)		(-2.28)
CFO_Agree		-42.4442***		-42.6893***
		(-5.57)		(-5.67)
CFO_Consc		1.0411		3.0713
		(0.12)		(0.35)
CFO_Extra		3.7521		4.0437
		(0.87)		(0.94)
CFO_Openn		-3.1062		-2.9195
		(-0.37)		(-0.35)
Constant	YES	YES	YES	YES
Firm & CEO controls	YES	YES	YES	YES
Bond controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Bond FE	YES	YES	YES	YES
Observations	8020	8020	8020	8020
Adjusted R^2	0.2296	0.2402	0.2286	0.2399

Table 8. The Relationship between CEO-CFO Personality Complementarity and Bond Yield Spreads: The Moderating Role of Subprime Crisis Period

This table shows the results of the moderating role of subprime crisis for the relation between CEO-CFO personality complementarity and bond yield spread (YS). The CEO-CFO personality complementarity in this table is measured by (1) CEO extraversion (CEO_Extra) and CFO conscientiousness (CFO_Consc); and (2) CEO extraversion (CEO_Extra) and CFO neuroticism (CFO_Neuro). The proxy of subprime crisis period is a dummy variable (SC) that equals 1 if the bond observation is at the period from 2007 to 2008 and 0 if elsewise. Agree, Consc, Extra, Neuro, and Openn represent agreeableness, conscientiousness, extraversion, neuroticism, and openness, respectively. For the estimations of these five personality traits, this study follows Harrison et al. (2019) to facilitate the Open Language Chief Executive Personality Tool (*OLCPT*) developed by Harrison et al. (2019) to analyzes the dialogue records of the CEO in the firm's quarterly earnings call transcripts and then calculates the CEO's five personality traits scores, which ranges from 1 to 7 points. Control variables include CEOs'/CFOs' big five personality traits (conscientiousness, extraversion, neuroticism, agreeableness, openness), firm characteristic variables, CEO level variables, and bond feature variables. The detailed definitions of the above control variables are same as those in Table 2. The bond- and year-fixed effects and cluster issues are considered in these results. This table presents the regression coefficients. The t-statistics calculated by bond-level clustered standard errors (Petersen, 2009) for each coefficient appears immediately underneath. The signs of "*, **, ***" represent the significance of 10%, 5%, and 1%, respectively.

	(1) YS	(2) YS
CEO_Extra	141.9086***	98.3688***
	(3.03)	(3.43)
CFO_Consc	135.5662***	0.3428
	(3.16)	(0.04)
CEO_Extra*CFO_Consc	**-28.2210*** **	
	(-3.05)	
CEO_Extra*CFO_Consc*SC	**-66.2128*** **	
	(-4.16)	
CEO_Extra*CFO_Neuro		**-30.3685*** **
		(-3.95)
CEO_Extra*CFO_Neuro*SC		**-143.0133*** **
		(-3.08)
CEO_Agree	29.0614***	30.5428***
	(3.92)	(4.12)
CEO_Consc	-16.8889**	-10.0657
	(-2.35)	(-1.41)
CEO_Neuro	-29.0074***	-26.7513***
	(-4.18)	(-3.85)
CEO_Openn	-25.6780**	-25.4083**
	(-2.24)	(-2.21)
CFO_Agree	-40.7856***	-40.3476***
	(-5.27)	(-5.37)
CFO_Extra	3.7775	3.3725
	(0.90)	(0.79)
CFO_Neuro	-9.4155	128.8600***
	(-1.44)	(3.66)
CFO_Openn	1.5247	-1.5217
	(0.18)	(-0.19)
Constant	YES	YES
Firm & CEO controls	YES	YES
SC	YES	YES
Bond controls	YES	YES
Year FE	YES	YES
Bond FE	YES	YES
Observations	8020	8020
Adjusted R^2	0.2464	0.2461