

# The Effect of CEO Narcissism on Corporate Financial Decisions

**Abstract:** Existing literature suggests that signature size is associated with the level of narcissism. We investigate whether and how narcissistic CEOs, measured by signature size, significantly affect corporate financial decisions. Our empirical results show that CEO narcissism is positively associated with debt financing. We also find that there is a negative association between CEO narcissism and equity financing when narcissistic CEOs have corporate control right, whereas there is a positive association between CEO narcissism and equity financing when narcissistic CEOs have no corporate control right. Further analysis shows that narcissistic CEOs with corporate control right are less likely to raise money through equity financing even experiencing financial distress. Our findings highlight the importance of CEO psychological characteristics in the domain of capital structure.

**Keywords:** CEO narcissism; signature size; debt financing; equity financing; financial distress

## 1. Introduction

Our understanding of the firm-, industry-, and market-level determinants of financing decisions is established in terms of traditional theories ([Miller, 1977](#); [Myers and Majluf, 1984](#)). Since [Hambrick and Mason \(1984\)](#) proposed *upper echelons theory*, researchers have devoted significant effort to studying whether and how executive personality traits affect firm behavior. Existing studies show that CEO personality have significant explanatory power for corporate financial policy ([Malmendier et al. 2011](#); [Bernile et al. 2017](#)). We add to the determinants of financing decisions by examining whether corporate financial decision is associated with its CEO's narcissistic personality.

Early on, narcissism was included in the area of psychosexual development and clinical psychology ([Blum,1950](#); [Krout and Tabin,1954](#); [Bader and Philipson,](#)

[1980](#)). As the concept of narcissism receive considerable attention over the years, narcissism is considered as one of interpersonal behavior descriptors ([Leary, 1956](#); [Morey et al., 1985](#)). The chief manifestations of narcissism include feelings of authority, exhibitionism, superiority, Vanity, exploitativeness, entitlement, and self-sufficiency ([Raskin and Terry,1988](#)). To seek constant recognition and attention, narcissistic CEOs pursue high-exposure investments ([Chatterjee and Hambrick,2007](#); [Ham et al. 2018](#)) and thus have strong demand for funds. When funds are not enough to support their investment policy, financing is undoubtedly an important means for narcissistic CEOs to achieve their goals. For the listed firms in China, debt financing is the main financing instrument, which is undoubtedly the first choice for corporate financing decisions. Narcissists are individuals with inflated senses of superiority that are fueled by feelings of self-esteem tendencies, thus would not be discouraged by the pressure of repayment of principal and interest and do not think they will be forced into bankruptcy. Besides, CEO narcissism has a positive effect on the likelihood that the CEO's firm engages in corporate tax shelters ([Olsen and Stekelberg,2016](#)), while debt financing has tax shield effect. Narcissistic CEOs are thus likely to favor debt financing. Moreover, narcissistic CEOs are prone to invest with creditors' money and share risk with them due to the exploitative natures of narcissists. From the view of companies, they would like to support narcissistic CEOs to debt. Since when the amount of debt financing increases, the amount of equity financing will decrease. The shares held by shareholders will not be diluted. In addition, debt could reduce the agency costs of free cash flow by reducing the cash flow available for spending at the discretion of managers ([Jensen, 1986](#)). Therefore, we predict firms lead by narcissistic CEOs are more

likely to choose debt.

However, as debt level becomes even higher, it would become extremely risky. At this point, firms need to choose other financing instruments. According to the theory of control right of capital structure, financing structure directly affects the allocation of control rights. For example, equity financing will lead to the dilution of the shares held by shareholders. Because narcissists have a need for authority and entitlement ([Emmons, 1984](#); [Raskin and Terry, 1988](#)), we shall examine the relation between CEO narcissism and equity financing splitting in the following situation: narcissistic CEOs with control right and narcissistic CEOs without control right.

When narcissistic CEOs have control, using equity financing implies dilution of their control. Thereby, to maintain absolute control, we assume that there is a negative association between CEO narcissism and equity financing. When the narcissistic CEO has no control right, it would be totally different. Narcissists pursue authority and entitlement thereby want to be the top leader and are not willing to drop to other people's knees. Narcissists always seek constant recognition and attention. Sharing the fruits of success with others will dissatisfy and displease narcissistic CEOs. Therefore, the interest of narcissistic CEOs with no control are not aligned with controlling shareholder. Narcissistic CEOs have incentive to get rid of shareholders' control by choosing financing instruments to expropriate more private benefit. Narcissistic CEOs are more likely to fight for control since they possess strong desire for power ([Emmons, 1987](#)). Because narcissists tend to exploit others in the name of individual short-term gain, narcissistic CEOs prefer to raise equity financing at the expense of benefit of controlling shareholder. Given the CFO's personality traits, we expect there will

be a positive association between CEO narcissism and equity financing when narcissistic CEOs have no corporate control right.

Narcissistic Personality Inventory (NPI) has received the most empirical attention to date ([Raskin and Hall,1979](#); [Raskin and Terry 1988](#)). However, NPI is a self-reported instrument that managers are reluctant to participate. Furthermore, executives may deliberately give biased answers when it involves some sensitive questions. By contrast, [Chatterjee and Hambrick \(2007\)](#) measure CEO's narcissism by the prominence of the CEO's photograph in annual reports, the CEO's prominence in press releases, the CEO's use of first-person singular pronouns in interviews, and compensation relative to the second-highest-paid firm executive to measure CEO's clinical level of narcissism. However, some studies start to question these measurements of narcissism. For example, [Carey et al. \(2015\)](#) argue that the relation between narcissism and the use of first-person singular pronouns (i.e., I-talk) is subjected to a strong empirical test and provide evidence that using I-talk is not associated with narcissism.

A large body of studies have demonstrated that narcissism is strongly associated with signature size. One's signature is correlate with one's status, one's self-esteem ([Zweigenhaft,1977](#)). [Zweigenhaft and Marlowe \(1973\)](#) document that signature size was shown to be significantly related to high self-esteem. [Jorgenson \(1977\)](#) find that signature size is associated positively with dominance by studying on the signatures of 245 college students. [Ham et al. \(2018\)](#) validate that the area-per-letter measure of signature size is significantly correlated with scores on the NPI-40 narcissism personality scale. Consistent with [Ham et al. \(2018\)](#), we detect and calculate the handwritten signature of CEO in the IPO prospectus by Matlab programming. After determining the coordinates of the

four corners of rectangle, wherein each side of the rectangle touches the most extreme endpoint of the handwritten signature, the program returns the number of pixels in the rectangle occupied by the signature. We divide the number of pixels by the number of letters in the CEO's name. Then the signature size is obtained.

We test the sample of firms listed in the SHSE and SZSE<sup>1</sup> between 2007 and 2016. Chinese listed firms seeking to issue new shares must go through a lengthy approval process. Existing literature provide evidence that State-owned firms are more likely to receive regulatory approval to issue new equity and access credit from bank than non-State-owned firms ([Li et al.,2012](#)). Besides, State-owned firms are often required to fulfill social objectives. Thus, to capture the effect of narcissistic CEOs on corporate financial decisions, we exclude State-owned enterprises in our sample.

To investigate the relation between CEO narcissism and financing decision, we first examine the effect of narcissistic CEOs on debt financing. We run Tobit regressions of debt financing (*Loan* and *Bond*) on the CEO's level of narcissism (*SignatureSize*) and a set of control variables, where *Bond* is cash received from issuing bonds divided by total assets in a given fiscal year and *Loan* is loans amount from bank and other financial institution divided by total assets in a given fiscal year. Consistent with our conjecture, we find that firms lead by narcissistic CEOs are positively associated with debt financing.

We next demonstrate the link between CEO narcissism and equity financing. We run logistic regressions of equity issuances (*Equity*) on the CEO's level of narcissism (*SignatureSize*) and Tobit regressions of the amount of equity

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<sup>1</sup> Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) in China is somewhat akin to the NYSE and NASDAQ in the US.

*(Equityasset)* on the CEO's level of narcissism (*SignatureSize*). *Equity* is an indicator variable equal to 1 if the firm issues equity and 0 otherwise. *Equityasset* is cash received from issuing equity divided by total assets in a given fiscal year. The results show that there is a negative association between CEO narcissism and equity financing when narcissistic CEOs have corporate control right whereas a positive association between CEO narcissism and equity financing when narcissistic CEOs have no corporate control right.

To further explore how reluctant is the firms lead by narcissistic CEOs who have corporate control right to choose equity financing, we investigate the equity(financing) decision of firms in financial distress led by CEO narcissism. We use Altman's Z-score to measure corporate financial health ([Altman,1968](#)), and find that narcissistic CEOs with corporate control right would not like to raise money through equity financing even experiencing financial distress.

Our study contributes to the literature in three ways. First, Prior studies provide evidence that narcissistic managers will affect firm strategies, takeover process, corporate tax shelters, financial reporting quality, and investment decision ([Chatterjee and Hambrick, 2007](#); [Aktas et al., 2016](#); [Olsen and Stekelberg,2016](#); [Ham et al.,2017](#); [Ham et al., 2018](#)). Few studies focus on the relationship of narcissistic leaders and corporate financial policies. Our results fill a critical gap in the narcissism literature by directly linking CEO narcissism to financing choices. Second, Previous research has focused on the firm-, industry-, and market-level determinants of financing decisions ([Brennan and Franks,1997](#); [Miller 1977](#); [Myers 1984](#); [Cronqvist and Nilsson, 2002](#)). We provide evidence that CEO narcissism is one of significant influences of financial decisions. Third, narcissistic CEOs covet corporate control right who

are characterized by an exaggerated sense of authority and entitlement, which creates conflict between narcissistic CEOs and controlling shareholders. Based on agency theory, this paper explores how narcissistic CEOs use financial instruments to get rid of the control of controlling shareholders.

The remainder of this study is organized as follows. The second section develops the hypothesis. The third section describes the research design, including sample selection, variable measurement, and regression models. The fourth section reports the empirical results. The fifth section conducts further analysis. The sixth section present results of robustness tests. Finally, the seventh section concludes.

## **2. Hypothesis Development**

Prior literature document that CEO personality is significantly relate to corporate financial policy. For example, [Malmendier et al. \(2011\)](#) find that overconfident CEOs choose more debt financing and issue less equity. They document that CEOs who experienced the Great Depression are averse to debt and lean excessively on internal finance. CEOs with a military background maintain higher leverage than other CEOs. [Bernile et al. \(2017\)](#) find that CEOs' early-life exposure to fatal disasters is associated with leverage ratio. Based on in *upper echelons theory*, we believe that a narcissistic CEO's behavioral tendencies can affect the likelihood that the individual's firm participates in financial decisions. We will discuss the relation between CEO narcissism and corporate financial decisions from debt financing and equity financing separately.

### ***2.1 CEO narcissism and debt financing***

We analyze the relation between CEO narcissism and debt financing from two

aspect. One is CEO personality, and the other one is the intention of the company lead by a narcissistic CEO.

With respect to CEO personality. First, [Ham et al. \(2018\)](#) document that CEO narcissism is associated with overinvestment, because narcissistic CEOs always seek constant recognition and attention while investments can generate higher levels of exposure and the opportunity for self-enhancement. To achieve their empire building dreams, internal financing cannot completely meet their needs, then external financing is a necessary choice. Debt financing is the main financing instrument for Chinese listed companies, which would be the first choice if narcissistic CEOs have financing needs. Second, debt financing becomes costly when debt levels are large ([Jensen and Meckling, 1976](#)). However, narcissists possess grandiose senses of superiority ([Raskin and Terry 1988](#)) and thus would not be discouraged by the pressure of repayment of principal and interest and do not think they will be forced into bankruptcy. They overestimate the future cash flow brought by investment projects, and underestimate the risk of repayment of loans on schedule, thereby boosting their confidence in debt management. Moreover, one of the benefits of debt is tax shields. [Olsen and Stekelberg \(2016\)](#) document statistically and economically significant effects of CEO narcissism on the likelihood that the CEO's firm engages in corporate tax shelters. Therefore, narcissistic CEOs are likely to prefer debt financing. Third, debt financing is risky since there is a chance that it won't be repaid. If the risky projects that narcissistic CEOs invest succeed, the beneficiaries are not only the enterprises and creditors but also the narcissistic CEOs themselves, because this could offer "narcissistic supply" ([Kernberg, 1975](#)) and the fuel for a reinforced self-image. Whereas if the projects fail, the enterprises cannot make profits, and



the losers are the creditors. Based on the psychology literature, narcissists are interpersonally exploitative and lacking in empathy ([APA,1994](#)). They like to take advantage of others because they do not experience the feelings of guilt ([Campbell and Foster, 2007](#)). Therefore, Narcissistic CEOs are more willing to raise capital to expand the firm with the lower cost.

Many people questions about the difference between narcissism and overconfidence. Indeed, some prior work has illustrated a positive correlation between narcissism and overconfidence ([Campbell et al. 2004](#)). The traits of narcissism include superiority and self-sufficiency that are related to overconfidence. Hence, we do not intend to separate the two personality characteristics, whereas emphasize the difference between these two personality traits when detecting the relation between CEO narcissism and corporate financial decision. For instance, narcissists tend to make unethical decisions. They would like to pursue their own interests at the expense of others and are more likely to seek constant recognition and attention, etc., distinct from overconfidence.

With respect to the intention of the company lead by a narcissistic CEO, not only do narcissistic CEOs prefer debt financing, companies are also pleased about it. On the one hand, creditors do not have the right to choose the board of directors or to take decisions in the firm directly. On the contrary, equity-holders collectively have the right to choose the board of directors who have right to make key decisions in the firm. Thus, while the amount of debt financing increases, the amount of equity financing will decrease. The shares held by shareholders will not be diluted. On the other hand, the conflict of interest between manager and shareholder creates an agency problem. Debt financing has

control function that debt can reduce the agency costs of free cash flow by reducing the cash flow available for spending at the discretion of managers ([Jensen,1986](#)). Narcissistic CEOs have less money to spend due to debt repayment pressure thereby cannot do just about whatever they please.

Even so, narcissistic CEOs are likely to prefer debt financing. There are two reasons why this might be. One is the difference in institutional background. The development of Chinese public debt markets is slow, where banks are the main credit vehicle. For the companies, debt could mean more than a reduction in disposable free cash flow, which somewhat reflects firms' strong external financing capacity. The narcissistic CEOs will insist on recognition and attention, both as an exercise of vanity and out of a desire to showcase their authority ([Raskin and Terry, 1988](#)), and hence they are more likely to regard the amount of debt as a way to exhibit his financing capacity. Second, tangible benefits are not the only motive for narcissistic CEOs. Compared with non-narcissistic CEOs, gaining recognition and attention, improving the status, enhancing prestige are more attractive to narcissistic CEOs. Therefore, even if debt financing forms the restriction on managers, the narcissistic CEOs will insist on increasing the amount of debt to achieve self-pursuit.

Overall, we expect the sense of superiority, willingness to exploit others, need for recognition of narcissistic CEOs to be reflected in higher levels of debt financing. Hence, our hypothesis is as follows:

**H1:** CEO narcissism is positively associated with debt financing.

## ***2.2 CEO narcissism and equity financing***

Although debt financing is the main financing instruments in China, as debt level becomes even higher, it would become risky, since there is a chance that it won't

be repaid. Then firms need to choose other financing instruments.

The separation of ownership right from operation right leads to the principal agent problem ([Jensen and Meckling,1976](#)). The corporate governance structure in the United States is based on America-British law system, its principal characteristics are high level of ownership structure dispersion. On the contrary, the shareholding concentration ratio of Chinese listed companies is rather high hence there are many ultimate controlling shareholders in Chinese listed companies ([Shleifer and Vishny, 1997](#)). Because narcissists possess grandiose senses of authority and entitlement ([Emmons, 1984](#); [Raskin and Terry,1988](#)), whether the controlling shareholders are able to control the narcissistic CEOs well and bring narcissistic CEOs to their knees are a question worth exploring.

The essence of control (decision) right is the right to control the allocation of resources. It includes personal satisfaction and reputational enhancement that is over and above any cash flows received ([Hart, 2001](#)), which can provide “narcissism supply” and thereby is appealing to narcissistic CEOs.

According to the theory of control right of capital structure, financing structure directly affects the allocation of control rights. Managers will choose different financing instruments to expropriate more private benefit. Thereby, the financing preferences of narcissistic CEOs depend on whether they have control. We would better investigate the relation between CEO narcissism and equity financing splitting into the following situation: narcissistic CEOs with control right and narcissistic CEOs without control right.

When narcissistic CEOs have control, using equity financing implies dilution of control of narcissistic CEOs. If the shares of new shareholders are large enough, it will threaten the controlling status of controlling shareholders. In

extreme cases, existing controlling shareholder may lose all private benefit of control. Hence, it is crucial to pay attention to capital structure changes and financial policies for controlling shareholders to maintain Private benefits of control. Therefore, to maintain absolute control, narcissistic CEOs are less likely to issue equity.

When the narcissistic CEO has no control right, it will be completely different. Imagine if narcissistic CEO develops an idea for a project, he or she will not satisfy with implementing this idea with interference from anyone else. Narcissists pursue authority and entitlement thereby want to be the top leader and would not like to bow down before others. Narcissists have a need for constant recognition and attention. If someone else controls the project, narcissistic CEO will have to get permission from this other person and may have to share the fruits of his idea with them; this cannot offer “narcissistic supply” for them and will make them discontented. These different interests create a potential conflict between the narcissistic CEO with no control right and controlling shareholder. The control contest of GOME Ltd. provides a real-world case ([Zhu and Wang, 2012](#)) for the theoretical inference of our hypothesis:

*Agency conflicts of GOME<sup>2</sup> is agency conflicts of controlling shareholders and managers' actual control rights. Mr. Wong, the founder of GOME, had been arrested for illegal business practices and insider trading on 17 November 2008. Then, Chen Xiao, the chief executive officer of GOME, was appointed the chairman of GOME on 16 January 2009. After Mr. Chen was appointed the chairman, he granted share options to the management of GOME, introduced Bain Capital to convert bond into stock, which falling the proportion of equity held by Mr. Wong. GOME signed protective provisions with Bain Capital in the issuance of convertible bonds. The protective provisions include that the term of the chairman of Chen Xiao is at least 3 years, etc.,*

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<sup>2</sup> GOME Electrical Appliances Holding Limited has changed its name to GOME Retail Holdings Limited. GOME is an integrated home solution provider (stock code:00493).

*which provides guarantee for Mr. Chen's control right and pose a serious threat to Mr. Wong 's controlling status. Further, in July 2009, Mr. Chen granted share options and implemented equity compensation to the management of GOME to get support of the management team, which further dilute the shares held by Huang family.*

Before Mr. Chen was appointed as the chairman of GOME, Mr. Wong was the chairman and the rest of executive directors were elevated by Mr. Wong. That is, Mr. Wong not only was GOME's controlling shareholders but also controlled the board. After Mr. Chen was appointed as the chairman of board, he carried out a placement to spread the ownership structure of GOME. It is clear that a series of financing policies implemented under Mr. Chen's leadership are intended to fall the proportion of equity held by Mr. Wong and master company's actual control rights. That is, when the interests of shareholders and management are inconsistent, shareholders will encourage and supervise managers to make them act on behalf of current shareholder. In turn, managers have incentive to get rid of shareholders' control using various means and methods, forming managerial entrenchment. As the case of GOME's control contest, that managers choose financing instruments based on private benefit and personal preferences is a kind of managerial entrenchment.

Narcissists fantasize about fame and power and will focus on their own interests to the exclusion of others' interests when given the opportunity to do so ([Raskin and Novacek, 1991](#); [Campbell et al., 2005](#)). Thus, narcissistic CEOs are more likely to fight for control. On the other hand, narcissists are more interested in their own status and success than their emotional closeness to others and tend to exploit others in the name of individual short-term gain ([Campbell et al., 2005](#)). Even if the narcissistic CEO does not directly compete with the controlling shareholder for control right, the narcissistic CEO is willing to raise

equity financing at the expense of benefit of controlling shareholder. Based on the discussion above, we expect that CEO narcissism has a negative effect on the likelihood that the CEO's firm issue equity when the narcissistic CEO has corporate control right, and a positive effect on the likelihood that the CEO's firm issue equity when the narcissistic CEO has no corporate control right. Hence, we offer the following hypotheses:

**H2a:** There is a negative association between CEO narcissism and equity financing when narcissistic CEOs have corporate control right.

**H2b:** There is a positive association between CEO narcissism and equity financing when narcissistic CEOs have no corporate control right.

### **3. Research Design**

#### ***3.1. Sample and Data***

The new accounting standards are in force on January 1, 2007. To reduce the impact of institutional factors on our examination, we start with a sample from 2007 to 2016. China has a long history of government intervention in economic affairs. [Li et al. \(2012\)](#) find that State-owned firms are more likely to obtain government approval to conduct seasoned equity offerings than non-State-owned firms. [Brandt and Li \(2003\)](#) provide evidence that private firms in China face difficulty in accessing credit from bank. State-owned firms generally have duties of social objectives such as supporting employment, investing in public projects and maintaining social stability. Therefore, to detect the relation between CEO narcissism and corporate financial decisions, we decide to exclude state-owned enterprises in our sample. We exclude financial enterprise and require each firm to have data on all control variables included in the regressions. These additional

restrictions yield a sample of 4,104 firm-year observations. We winsorize all continuous variables at the 1st and 99th percentiles of their respective distributions. We construct our sample from several sources. We start with the list of CEOs from the IPO prospectus, which provides handwritten signature of CEOs. Other data are gathered from the China Stock Market and the Accounting Research Database (CSMAR).

### 3.2. Measurement and Regression Models

We explore a regression model to investigate the effect of narcissistic CEO on corporate financing decision. The base regression specification is:

$$FinanceDecision_{i,t} = \beta_1 SignatureSize_i + Controls + \varepsilon \quad (1)$$

The dependent variable, *FinanceDecision*, is *Loan*, *Bond*, *Equity*, and *Equityassets* respectively, depending on the specification. We test H1 using Tobit regression models where the dependent variables are *Loan* and *Bond*. We test H2 using Logit regression models where the dependent variable is *Equity* and using Tobit regression models where the dependent variable is *Equityassets*. *Loan* is loans amount from bank and other financial institution divided by total assets in a given fiscal year. *Bond* is cash received from issuing bonds divided by total assets in a given fiscal year. *Equity* is an indicator variable equal to 1 if the firm issues equity and 0 otherwise. *Equityasset* is cash received from issuing equity divided by total assets in a given fiscal year.

*SignatureSize* is a proxy for the CEO's level of narcissism that measured as the natural logarithm of the area-per-letter handwritten signature size metric on the consent form for each CEO. Specifically, we detect and calculate the handwritten signature of CEO in the IPO prospectus by Matlab programming. After determining the coordinates of the four corners of rectangle, wherein each

side of the rectangle touches the most extreme endpoint of the handwritten signature, the program returns the number of pixels in the rectangle occupied by the signature. We divide the number of pixels by the number of letters in the CEO's name. Then the signature size is obtained.

We construct several control variables including firm size (*SIZE*), firm leverage (*Leverage*), firm age (*Firmage*), sales growth (*Growth*), cash holdings (*CFO*), return on assets (*ROA*), the fraction of shares held by the largest shareholder (*Largest*), the number of shares held by shareholders from the second-largest through the fifth-largest shareholder divided by the number of shares held by the largest shareholder (*Balance*), age of CEO (*Age*), and gender of CEO (*Male*). All models include industry-year fixed effects. Variable definitions are provided in the notes at the bottom of Table 1.

We run logistic regressions of equity issuances (*Equity*) on the CEO's level of narcissism (*SignatureSize*) and a set of control variables. We estimate Tobit models where the dependent variables are *Loan*, *Bond*, and *Equityassets*. Similar to prior tests, standard errors are clustered at the firm level.

## **4. Results**

### ***4.1. Descriptive statistics***

Table 1 reports summary statistics for all variables used in the study. The final sample consists of 4,104 CEO firm-year observations on 1,092 CEOs during 2007-2016 sample periods. There are two reasons why the observations are small during 10 years sample period. First, the handwritten signatures of CEOs can only be obtained from the IPO prospectus, resulting in the proxy of narcissism not changing with time. Hence, we lose the observations for that firm if the



firm's CEO changed. Secondly, the time of IPO is different. For example, some firms listed in 2007 while some firms listed in 2016, thus the CEO signature does not necessarily correspond to 10 firm-year observations during 2007-2016 sample periods. These two reasons can also explain why our sample companies are relatively young (the mean of the variable *Firmage* is 3.71). As shown in Table 1, the minimum value of *SignatureSize* is 9.53; mean value is 10.66; maximum value is 12.14, implying that the mean value of area-per-letter signature size of CEOs is 49,461.15 pixels; the minimum value is 13,817.45 pixels; maximum value is 186,408 pixels. Hence, there is large difference in signature size. With regards to personal characteristic, we find that more than 90% of CEOs are male, few females serve as CEOs. Additionally, it should be emphasized that the average age of CEOs is 50.4 years old, which indicates the personality characteristics of the CEOs in our sample are formed. Relatively stable individual psychological characteristics lay a foundation for the examination of this paper.

#### ***4.2. Empirical results***

Table 2 reports estimates from Tobit regressions where the dependent variables are *Loan* (Column 1) and *Bond* (Column 2) of the firms in the sample. The coefficient of *SignatureSize* in column (1) is significantly positive at the level of 10%, indicating that narcissistic CEOs are more likely to raise capital through bank loans, consistent with the prediction of H1. Since debt financing includes bank loans, it can be expected that the coefficient of leverage is significantly positive.

The coefficients of *Firmage* and *Growth* are significantly positive, suggesting that the longer the company is listed and the better the growth is, the

more narcissistic CEOs tend to raise loans.

The evidence in Column (2) shows that the coefficient of *SignatureSize* is significantly positive at the 5% level, which indicates that the narcissistic CEO tends to debt financing, consistent with H1. The coefficient of *CEOage* is negative and significant, indicating that the firms led by younger CEOs tend to issue more bonds. In addition, we can find that the coefficient of *Size* and *ROA* are significantly positive. The results may result from the requirement to issue bonds. Section 16 of *Securities Act* requires that the accumulated bond balance constituting should be no more than 40 % of the net asset of a company. Thus, the larger the company, the higher the amount of bond issuance that can be applied for. Section 16 of *Securities Act* also requires that the average distributable profits over the latest 3 years should be sufficient to pay the 1-year interests of corporate bonds. Hence, the better-performing companies are more likely to qualified to issue bonds.

Table 3 reports estimates for the relation between CEO narcissism, company control right, and equity financing. Column (1) and (2) of Table 3 report estimates from logistic regressions where the dependent variables are *Equity*, split based on either whether the CEO has control right of enterprises or not.

The coefficient of *SignatureSize* in Column (1) is not significant, suggesting that firms led by narcissistic CEOs who have corporate control right would not like to issue equity, consistent with H2a. In contrast, the coefficient of *SignatureSize* in Column (2) is significantly positive at 1% level, indicating firms led by narcissistic CEOs who do not have control tend to issue more equity, consistent with H2b. The difference in the coefficients of *SignatureSize* between in Column (1) and (2) is statistically significant ( $p < 0.1$ ). Therefore, whether the

narcissistic CEOs have corporate control right has significant impact on corporate equity financing decisions.

Column (3) and (4) of Table 3 report estimates from Tobit regressions where the dependent variables are *Equityassets*, split based on either whether the CEO has corporate control right or not. The coefficient of *SignatureSize* in column (3) is significantly negative at 10% level, indicating that firms lead by narcissistic CEOs tend to reduce the amount of equity financing when the narcissistic CEOs have control of enterprises. The coefficient of *SignatureSize* in Column (4), by contrast, is positive and significant at 5% level, which indicates that firms lead by narcissistic CEOs are more likely to increase the amount of equity financing when the narcissistic CEOs do not have control of companies. The difference in the coefficients of *SignatureSize* between in Column (3) and (4) is statistically significant ( $p < 0.01$ ). Taken together, the results support our hypotheses.

Moreover, the coefficients of *Size* are all significantly negative in Table 3, which indicates that larger firms are less likely to issue equity and the amount of their equity financing are smaller. The coefficients of *Leverage* in Table 3 are all significantly positive, indicating that companies with higher leverage ratios are more likely to issue equity and the amount of their equity financing is larger. The coefficients of *ROA* as shown in Table 3 are all significantly positive, which may be caused by institutional background. For example, one of the requirements of public placement in China is that the weighted average return on net assets of the main board and small and medium board listed companies in the last three fiscal years should not be less than 6% on average. Thereby, better-performance firms may be more likely to issue equity. The coefficients of *CEOage* in Table 3 are all significant and negative, suggesting younger CEOs are more likely to issue

equity.

The coefficients of *Growth* in Column (2)- (4) of Table 3 are significantly positive, indicating that high growth companies are more likely to issue equity and their amount of equity financing are larger than low growth companies.

## **5. CEO Narcissism, financial distress, and equity financing**

Based on the preceding analysis, we find that there is a negative association between CEO narcissism and equity financing when narcissistic CEOs have corporate control right. But how reluctant is the firms lead by narcissistic CEOs who have corporate control right to choose equity financing? When companies are experiencing financial distress, will their narcissistic CEOs with control would like to choose equity financing to get out of financial trouble? In order to further investigate the relation between CEO narcissism and equity financing, we examine this relation in a specific setting.

Financial distress, which is sometimes called financial crisis. It is a condition that describes corporate financial condition is not good and experiencing difficulties. If companies that are experiencing financial distress are not immediately dealt with correct policies will lead to bankruptcy finally. Thereby, when the company experiences financial distress, as early as possible it must make various efforts to maintain its survival (going concern).

Company experiencing financial distress has insufficient cash flows to meet the payments on its debt and has to rely on external funds to going concern. However, it is quite difficult to raising funds for loss-making companies. For instant, taking risks into account, banks are generally unwilling to lend to financially distressed companies. According to *the Subject to the Requirements of China Securities Regulatory Commission (CSRC)*, the enterprises financing via

public placement and right issue are limited by high factors. In this case, private placement has become an important source of external financing for loss-making companies to escape financial distress.

Altman's Z-score has been proven to be a reliable tool. Thus, we calculate the Z-scores to measure corporate financial health (Altman,1968). Specifically,  $Z=1.2\times\text{Networking capital to total assets ratio}+1.4\times\text{Retained Earnings to total assets ratio}+3.3\times\text{Profit Before Interest \& Tax (PBIT) to total assets ratio}+0.6\times\text{Capital funds to total liabilities ratio}+1\times\text{net sales to total assets ratio}$ . If the Z- score is less than 1.81 then it indicates bad financial performance which may lead to bankruptcy. It indicates a poor financial performance if the Z-Score is  $\geq 1.81$  and  $Z \leq 2.675$ . If the Z score value is greater than 2.675 then it indicates good financial performance. To examine the relation between CEO narcissism and equity financing when companies experience financial distress, we estimate the following regression:

$$Equity_{i,t} / Equityassets_{i,t} = \beta_1 SignatureSize + \beta_2 DZ + \beta_3 SignatureSize \times DZ + \beta_4 Size_{i,t-1} + Controls + \varepsilon \quad (2)$$

Where  $DZ$  is an indicator variable equal to 1 if  $Z$  value of firm is less than 1.81, and 0 otherwise. Other variable definitions are provided in the notes at the bottom of Table 1.

We conduct a cross-sectional analysis to examine the relation between CEO narcissism and equity financing when firms suffer financial distress. To reduce the influences of the regulations, for example, the requests for public placement required by CSRC is that the weighted average return on net assets of the companies in the last three fiscal years should not be less than 6% on average, we just focus on private equity placements in this section.

We are interested in the interaction item  $SignatureSize \times DZ$ . If the

coefficient of the interaction item is significantly negative when the narcissistic CEOs possess control right, it suggests that the narcissistic CEO with control right is still reluctant to adopt equity financing even suffering financial distress. If the coefficient of the interaction item is not significant, it indicates that when the company suffers financial distress, the narcissistic CEO with control right are no longer reject equity financing in order to keep the company out of trouble.

Columns (1) and (2) of Table 4 reports estimates from Logistic regressions where the dependent variables are *Equity*, split based on either whether the CEO has corporate control right or not. Columns (3) and (4) of Table 4 reports estimates from Tobit regressions where the dependent variables are *Equityassets*, split based on either whether the CEO has corporate control right or not. As shown in Table 4, the coefficients of the interaction item *SignatureSize*×*DZ* in Columns (2) and (4) are not significant. Hence, we do not find that narcissistic CEOs without corporate control right are reluctant to issue equity. While the coefficients of the interaction item *SignatureSize*×*DZ* in Columns (1) and (3) are negative and significant, suggesting that narcissistic CEOs with corporate control right would not like to raise money through equity financing even experiencing financial distress. The findings further prove evident H2a.

## **6. Robustness Checks**

### ***6.2.1 Control for overconfidence***

Although narcissism is associated with overconfidence (Campbell, Goodie, and Foster, 2004), but they are distinct traits. Overconfident people have biased perceptions of reality and are more optimistic about the future. While narcissists possess authority, exhibitionism, exploitativeness, vanity, and entitlement, in

addition to self-sufficiency and superiority. Nevertheless, we control for CEO overconfidence and re-examine the impact of narcissistic CEO on corporate financing decisions to make sure the robustness of our conclusions. Although there have been many papers study on overconfidence, the accuracy of overconfidence measurement is still up for discussion. Because executive incentive system in China is imperfect and executive option exercise behavior is unobservable, the common measurement of overconfident based on executive's willingness to postpone the exercise of vested options that are at least 67 percent in the money does not apply in this study. Thereby, we borrow from [Rao and Wang \(2010\)](#) and define a CEO as overconfident if she still holds corporate stock even the corporate stock return rate is lower than the return rate of stock market in the current year. Specifically, we set the CEO overconfidence indicator variable (*OC*) equal to 1 when she is identified as overconfident, and 0 otherwise.

We re-estimate Equation (1) after controlling for CEO overconfidence variable. Our results as shown in Table 5 suggest that our findings are robust to the inclusion of the CEO overconfidence variable. It is worth noting that the coefficients of overconfidence (*OC*) in columns (3) -(6) are negative, or rather, the coefficients of *OC* in columns (4) and (5) are significantly negative. Therefore, we can crudely infer that overconfident CEO does not like to engage in equity financing, consist with the findings of [Malmendier et al. \(2011\)](#).

### ***6.2.2 Consider Chinese character stroke***

Chinese characters are composed of strokes. The number of strokes of each Chinese character is not the same. In order to rule out the influence of the number of Chinese strokes on the signature size and ensure the robustness of our

conclusions, this paper standardize the signature size using the number of strokes; that is, *SignatureSize* is equal to the number of pixels in the rectangle occupied by the signature divided by the number of strokes in the name. In our sample, the minimum number of strokes is 8 and the maximum is 41. Data on the stroke are taken from Unihan Database.

We re-estimate Equation (1) and the results are reported in Table 5, which consistent with our predictions. Therefore, the conclusions are robust after considering the impact of Chinese strokes.

### ***6.2.3 Signature design***

People may argue that some of Chinese CEO may ask professionals to design their signature. Although we hold that this behavior is a form of narcissism, we delete designed signature to ensure that our results are not affected by designed signature. Specifically, we ask two students who study calligraphy for more than two years to decide whether it is a designed signature. It is defined as a designed signature if both the students consider that the signature is designed. Designed signatures account for 5% of the total signature sample. We re-estimate equation (1) by excluding the designed signatures as shown in Table 7. As expected, our conclusions remain unchanged.

### ***6.2.4 Shortening of sample period***

We obtain CEO handwritten signatures from IPO prospectus, thus it is a constant value that not vary with the time. Although narcissism is a kind of stable individual character, we are not able to ensure that our proxy of narcissism is capable to measure the level of narcissism after many years later. To ensure the robustness of the conclusions, we limit the sample period to 5 years and



re-estimate Equation (1) and the results are reported in Table 8. Consistent with our expectations, *SignatureSize* is positively associated with debt financing in Column (1) and (2). *SignatureSize* is not significant in Column (3) and (5) while positively associated with equity financing in Column (4) and (6). Our conclusions are robust to replace sample period.

## **7. Conclusion**

This study provides evidence that CEO narcissism significantly and positively affect corporate financial decisions, above and beyond traditional market-, industry-, and firm-level determinants of capital structure. We find strong evidence that, CEO narcissism is associated with debt financing. Unlike prior studies that focus on the link between CEO traits and one financial instruments (equity financing), we investigate the relation between CEO narcissism and equity financing splitting in the two situation: narcissistic CEOs with control right and narcissistic CEOs without control right. We find that there is a negative association between CEO narcissism and equity financing when narcissistic CEOs have corporate control right, while there is a positive association between CEO narcissism and equity financing when narcissistic CEOs have no corporate control right. Furthermore, to detect how reluctant is the firms lead by more narcissistic CEOs who have corporate control right to choose equity financing, we demonstrate the effect of narcissistic CEOs on equity(financing) decision when firms suffer financial distress. We find that narcissistic CEOs with corporate control right are less likely to raise money through equity financing even experiencing financial distress, which once again attest our assumptions.

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**Table 1. Descriptive statistics**

Variable	N	Mean	Min	Median	Max	Std.Dev
Loan	4104	0.15	0	0.11	0.69	0.16
Bond	4104	0.01	0	0	0.17	0.03
Equity	4104	0.19	0	0	1	0.39
Equityassets	4104	0.03	0	0	0.38	0.08
SignatureSize	4104	10.66	9.53	10.65	12.14	0.53
Size	4104	21.52	19.90	21.38	25.79	1.00
Leverage	4104	0.62	0.03	0.42	4.07	0.64
Firmage	4104	3.71	1.02	3.48	9.02	1.87
Growth	4104	0.21	-0.42	0.15	1.70	0.34
CFO	4104	0.04	-0.15	0.04	0.21	0.06
ROA	4104	0.05	-0.12	0.05	0.19	0.05
Largest	4104	34.86	9.63	33.10	72.96	14.19
Balance	4104	0.84	0.06	0.69	2.83	0.61
CEOage	4104	50.40	34	50	69	6.66
Male	4104	0.93	0	1	1	0.26

Notes: Variables are as defined below.

Loan= loans from bank and other financial institution divided by total assets in a given fiscal year;

Bond= cash received from issuing bonds divided by total assets in a given fiscal year;

Equity= an indicator variable equal to 1 if the firm issues equity and 0 otherwise;

Equityassets= cash received from issuing equity divided by total assets in a given fiscal year;

SignatureSize= signature size of CEO, calculated as the natural logarithm of the number of pixels scaled by the number of letters in the signed name;

Size= natural logarithm of total assets;

Leverage= total liabilities deflated by total assets;

Firmage= end of this year minus listing date divided by 365;

Growth=growth rate of sales;

CFO=net cash flow from operating divided by total assets;

ROA=earnings before interest and tax divided by total assets;

Largest= the fraction of shares held by the largest shareholder;

Balance= the number of shares held by shareholders from the second-largest through the fifth-largest shareholder divided by the number of shares held by the largest shareholder;

CEOage= age of CEO;

Male= indicator variable equal to 1 if board CEO is male, and 0 otherwise;

**Table 2** **CEO narcissism and debt financing**

	(1) Loan	(2) Bond
<b>SignatureSize</b>	<b>0.0165*</b> <b>(1.7052)</b>	<b>0.0350***</b> <b>(3.4084)</b>
Size	0.0003 (0.0577)	0.0758*** (10.0319)
Leverage	0.1336*** (10.9806)	0.0000 (0.0007)
Firmage	0.0065** (2.2525)	-0.0033 (-0.7727)
Growth	0.0420*** (4.6724)	0.0074 (0.4757)
CFO	-0.3522*** (-7.0978)	-0.1894* (-1.9384)
ROA	-0.2695*** (-3.7185)	0.3435** (2.5105)
Largest	-0.0006 (-1.2606)	-0.0021*** (-3.0203)
Balance	-0.0096 (-0.9413)	-0.0260* (-1.8070)
CEOage	0.0000 (-0.0439)	-0.0021** (-2.1891)
Male	0.0073 (-0.435)	0.0297 (1.2304)
Observations	4104	4104
Chi <sup>2</sup>	1636.52***	462.04***

Notes: This table reports Tobit regression estimates where the dependent variable is indicated in the column title. t-Statistics based on heteroskedasticity-robust standard errors clustered by firms are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 3 CEO narcissism, corporate control right, and equity financing**

	Equity		Equityassets	
	(1)	(2)	(3)	(4)
	Leader=1	Leader=0	Leader=1	Leader=0
<b>SignatureSize</b>	<b>-0.0717</b>	<b>0.2349***</b>	<b>-0.0145*</b>	<b>0.0109**</b>
	<b>(-0.4610)</b>	<b>(2.6034)</b>	<b>(-1.9026)</b>	<b>(2.4734)</b>
Size	-0.5740***	-0.3292***	-0.0222***	-0.0065*
	(-4.1231)	(-4.9632)	(-3.5536)	(-1.8902)
Leverage	1.2233***	0.6140***	0.0510***	0.0319***
	(6.5046)	(4.9111)	(5.1991)	(4.8011)
Firmage	0.0554	0.0215	0.0045	-0.0004
	(0.9493)	(0.6470)	(1.5584)	(-0.2535)
Growth	0.0644	0.6193***	0.0220**	0.0313***
	(0.2998)	(4.0110)	(2.0561)	(4.2165)
CFO	-1.9685	-0.1412	-0.0943	0.0199
	(-1.4046)	(-0.1585)	(-1.3648)	(0.4603)
ROA	8.4083***	2.4939*	0.3270***	0.3431***
	(3.7316)	(1.9539)	(2.8776)	(5.2759)
Largest	-0.0167*	0.0034	0.0001	-0.0003
	(-1.6956)	(0.5568)	(0.2022)	(-1.1560)
Balance	-0.3534	0.1992	0.0021	0.0011
	(-1.3080)	(1.6044)	(0.1649)	(0.1723)
CEOage	-0.0237*	-0.0124*	-0.0013*	-0.0010***
	(-1.6634)	(-1.6832)	(-1.8458)	(-2.8357)
Male	0.1694	-0.3469**	-0.0044	-0.0056
	(0.4801)	(-2.0769)	(-0.1970)	(-0.6093)
Observations	1094	2982	1114	2990
Pseudo R <sup>2</sup> / Chi <sup>2</sup>	0.1437	0.0939	174.92***	327.00***

Notes: This table reports Logit regression estimates where the dependent variable is Equity and Tobit regression estimates where the dependent variable is Equity assets. t-Statistics based on heteroskedasticity-robust standard errors clustered by firms are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 4 CEO narcissism, financial distress, and equity financing**

	Equity		Equityassets	
	(1) Leader=1	(2) Leader=0	(3) Leader=1	(4) Leader=0
<b>SignatureSize</b>	0.0138 (0.0886)	0.2376** (2.5201)	-0.0114 (-1.5108)	0.0116** (2.4823)
DZ	23.6238** (2.0312)	3.6646 (0.7687)	1.0323** (2.2841)	0.2061 (1.2285)
<b>SignatureSize×DZ</b>	<b>-2.2049**</b> <b>(-2.0731)</b>	<b>-0.3246</b> <b>(-0.7381)</b>	<b>-0.0943**</b> <b>(-2.2949)</b>	<b>-0.0195</b> <b>(-1.2465)</b>
Size	-0.4863*** (-3.5761)	-0.3335*** (-4.8276)	-0.0201*** (-3.2955)	-0.0067* (-1.8974)
Leverage	1.3156*** (6.2239)	0.6170*** (4.6277)	0.0556*** (5.0083)	0.0337*** (4.6102)
Firmage	0.0373 (0.6462)	0.0217 (0.6359)	0.0039 (1.3630)	-0.0004 (-0.2460)
Growth	0.0213 (0.0957)	0.6401*** (4.0749)	0.0200* (1.8817)	0.0303*** (4.0337)
CFO	-1.9300 (-1.3218)	0.0344 (0.0391)	-0.0794 (-1.1815)	0.0252 (0.5734)
ROA	8.6464*** (3.7852)	2.5931** (1.9935)	0.3394*** (3.1189)	0.3375*** (5.0857)
Largest	-0.0149 (-1.5199)	0.0030 (0.4769)	0.0001 (0.2200)	-0.0003 (-1.0279)
Balance	-0.3429 (-1.3054)	0.1965 (1.5674)	-0.0013 (-0.1110)	0.0017 (0.2694)
CEOage	-0.0225 (-1.6194)	-0.0113 (-1.5067)	-0.0013** (-2.0786)	-0.0009*** (-2.6970)
Male	0.3014 (0.8136)	-0.3473** (-2.0706)	-0.0001 (-0.0030)	-0.0044 (-0.4720)
Observations	1092	2954	1112	2962
Pseudo R <sup>2</sup> / Chi <sup>2</sup>	0.1509	0.1032	182.38***	328.78***

Notes: This table reports Logit regression estimates where the dependent variable is Equity and Tobit regression estimates where the dependent variable is Equity assets. t-Statistics based on heteroskedasticity-robust standard errors clustered by firms are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 5****Control for overconfidence**

	(1) Loan	(2) Bond	(3) Equity Leader=1	(4) Equity Leader=0	(5) Equityassets Leader=1	(6) Equityassets Leader=0
<b>SignatureSize</b>	<b>0.0166*</b>	<b>0.0352***</b>	<b>-0.0669</b>	<b>0.2405***</b>	<b>-0.0143*</b>	<b>0.0109**</b>
	<b>(1.7141)</b>	<b>(3.4233)</b>	<b>(-0.4286)</b>	<b>(2.6659)</b>	<b>(-1.8702)</b>	<b>(2.4798)</b>
<b>OC</b>	<b>-0.0033</b>	<b>-0.0089</b>	<b>-0.2347</b>	<b>-0.2159*</b>	<b>-0.0132*</b>	<b>-0.0017</b>
	<b>(-0.5291)</b>	<b>(-0.7827)</b>	<b>(-1.1992)</b>	<b>(-1.6783)</b>	<b>(-1.7533)</b>	<b>(-0.3171)</b>
Size	0.0003	0.0758***	-0.5600***	-0.3309***	-0.0213***	-0.0066*
	(0.0557)	(10.0473)	(-3.9936)	(-5.0144)	(-3.4200)	(-1.8954)
Leverage	0.1336***	-0.0003	1.2025***	0.6163***	0.0493***	0.0320***
	(10.9756)	(-0.0333)	(6.3444)	(4.9704)	(5.0436)	(4.8060)
Firmage	0.0066**	-0.0030	0.0637	0.0249	0.0050*	-0.0004
	(2.2664)	(-0.7168)	(1.0856)	(0.7468)	(1.7346)	(-0.2376)
Growth	0.0417***	0.0067	0.0601	0.5977***	0.0216**	0.0310***
	(4.6250)	(0.4273)	(0.2776)	(3.8735)	(1.9995)	(4.1770)
CFO	-0.3528***	-0.1919**	-1.9828	-0.1364	-0.0932	0.0198
	(-7.0893)	(-1.9685)	(-1.4120)	(-0.1528)	(-1.3428)	(0.4581)
ROA	-0.2707***	0.3390**	8.1351***	2.4653*	0.3062***	0.3426***
	(-3.7221)	(2.4718)	(3.5674)	(1.9352)	(2.6991)	(5.2673)
Largest	-0.0006	-0.0021***	-0.0178*	0.0024	0.0001	-0.0003
	(-1.2975)	(-3.0487)	(-1.7754)	(0.3926)	(0.1174)	(-1.1768)
Balance	-0.0098	-0.0260*	-0.3700	0.1948	0.0017	0.0010
	(-0.9555)	(-1.8055)	(-1.3534)	(1.5653)	(0.1315)	(0.1694)
CEOage	0.0000	-0.0021**	-0.0240*	-0.0129*	-0.0013*	-0.0010***
	(0.0390)	(-2.1839)	(-1.6839)	(-1.7273)	(-1.8434)	(-2.8401)
Male	0.0074	0.0298	0.1240	-0.3433**	-0.0064	-0.0056
	(0.4394)	(1.2352)	(0.3507)	(-2.0659)	(-0.2821)	(-0.6042)
Observations	4104	4104	1094	2982	1114	2990
Pseudo R <sup>2</sup> / Chi <sup>2</sup>	1636.85***	462.64***	0.1437	0.0939	177.71***	327.1***

Notes: The dependent variable is indicated in the column title. t-Statistics based on heteroskedasticity-robust standard errors clustered by firms are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.



**Table 6** **Consider Chinese character stroke**

	(1) Loan	(2) Bond	(3) Equity Leader =1	(4) Equity Leader =0	(5) Equityassets Leader =1	(6) Equityassets Leader =0
<b>SignatureSize</b>	<b>2.4163*</b>	<b>2.9338**</b>	<b>-9.7350</b>	<b>30.6361***</b>	<b>-1.7901*</b>	<b>1.4854***</b>
	<b>(1.6804)</b>	<b>(2.4280)</b>	<b>(-0.6336)</b>	<b>(2.7030)</b>	<b>(-1.9370)</b>	<b>(2.7973)</b>
Size	-0.0001	0.0768***	-0.5699***	-0.3327***	-0.0217***	-0.0067*
	(-0.0155)	(10.1135)	(-4.0907)	(-4.9752)	(-3.4698)	(-1.9262)
Leverage	0.1340***	0.0001	1.2240***	0.6187***	0.0509***	0.0321***
	(11.0587)	(0.0114)	(6.5283)	(4.9515)	(5.2048)	(4.8602)
Firmage	0.0064**	-0.0036	0.0552	0.0183	0.0045	-0.0006
	(2.2059)	(-0.8457)	(0.9477)	(0.5489)	(1.5401)	(-0.3621)
Growth	0.0422***	0.0072	0.0632	0.6272***	0.0224**	0.0317***
	(4.7009)	(0.4701)	(0.2972)	(4.0450)	(2.1025)	(4.2448)
CFO	-0.3491***	-0.1896*	-1.9937	-0.1043	-0.0966	0.0225
	(-7.0154)	(-1.9503)	(-1.4145)	(-0.1170)	(-1.3908)	(0.5218)
ROA	-0.2739***	0.3317**	8.4763***	2.4103*	0.3350***	0.3390***
	(-3.7632)	(2.4436)	(3.7333)	(1.8949)	(2.9502)	(5.2266)
Largest	-0.0006	-0.0021***	-0.0167*	0.0036	0.0001	-0.0003
	(-1.2503)	(-3.0288)	(-1.6965)	(0.5778)	(0.2136)	(-1.1551)
Balance	-0.0100	-0.0268*	-0.3560	0.1940	0.0018	0.0007
	(-0.9742)	(-1.8725)	(-1.3177)	(1.5603)	(0.1429)	(0.1137)
CEOage	-0.0000	-0.0021**	-0.0231	-0.0129*	-0.0012*	-0.0010***
	(-0.0132)	(-2.2205)	(-1.6333)	(-1.7363)	(-1.7172)	(-2.8608)
Male	0.0078	0.0305	0.1522	-0.3510**	-0.0057	-0.0058
	(0.4699)	(1.2043)	(0.4256)	(-2.0896)	(-0.2510)	(-0.6196)
Observations	4104	4104	1094	2982	1114	2990
Pseudo R <sup>2</sup> / Chi <sup>2</sup>	1638.86***	453.27***	0.1438	0.0936	174.70***	327.04***

Notes: The dependent variable is indicated in the column title. t-Statistics based on heteroskedasticity-robust standard errors clustered by firms are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 7****Consider designed signatures**

	(1) Loan	(2) Bond	(3) Equity Leader=1	(4) Equity Leader=0	(5) Equityassets Leader=1	(6) Equityassets Leader=0
<b>SignatureSize</b>	<b>0.0183*</b>	<b>0.0280**</b>	<b>-0.2431</b>	<b>0.2368**</b>	<b>-0.0207**</b>	<b>0.0125***</b>
	<b>(1.7385)</b>	<b>(2.4893)</b>	<b>(-1.2623)</b>	<b>(2.2187)</b>	<b>(-2.4144)</b>	<b>(2.6553)</b>
Size	-0.0050	0.0711***	-0.5365***	-0.3188***	-0.0196**	-0.0060
	(-0.7523)	(8.2017)	(-2.7956)	(-4.1763)	(-2.0883)	(-1.5978)
Leverage	0.1338***	-0.0012	1.2420***	0.4893***	0.0438***	0.0257***
	(10.1306)	(-0.1124)	(5.0576)	(3.7197)	(3.1479)	(3.3981)
Firmage	0.0042	-0.0080	0.0786	0.0226	0.0090*	0.0001
	(1.3638)	(-1.6278)	(0.8592)	(0.5735)	(1.8896)	(0.0475)
Growth	0.0383***	0.0083	-0.0118	0.7411***	0.0267*	0.0323***
	(4.0633)	(0.5449)	(-0.0355)	(4.4832)	(1.8247)	(3.8956)
CFO	-0.3666***	-0.2587**	-2.7091	0.1079	-0.0871	0.0469
	(-5.9445)	(-2.3932)	(-1.4849)	(0.1076)	(-0.9394)	(1.0054)
ROA	-0.2428**	0.3984***	9.6279***	1.2612	0.2123	0.3058***
	(-2.3673)	(2.5926)	(3.0135)	(0.8392)	(1.1240)	(4.2064)
Largest	-0.0005	-0.0020***	-0.0245**	0.0035	-0.0003	-0.0005
	(-0.9977)	(-2.6842)	(-2.0168)	(0.5170)	(-0.4177)	(-1.4110)
Balance	-0.0094	-0.0188	-0.1725	0.2663*	0.0008	-0.0015
	(-0.8861)	(-1.1636)	(-0.5313)	(1.9025)	(0.0514)	(-0.2307)
CEOage	0.0003	-0.0023**	-0.0454**	-0.0120	-0.0019**	-0.0009**
	(0.3769)	(-2.2298)	(-2.2636)	(-1.4881)	(-2.2221)	(-2.3948)
Male	0.0125	0.0296	-0.3126	-0.1988	-0.0314	-0.0036
	(0.7382)	(1.0608)	(-0.7049)	(-1.0360)	(-1.1328)	(-0.3804)
Observations	2879	2879	546	2300	558	2321
Pseudo R <sup>2</sup> / Chi <sup>2</sup>	1143.64 ***	361.95 ***	0.1503	0.0992	94.03 ***	244.24 ***

Notes: The dependent variable is indicated in the column title. t-Statistics based on heteroskedasticity-robust standard errors clustered by firms are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

**Table 8****Replace sample period**

	(1) Loan	(2) Bond	(3) Equity Leader=1	(4) Equity Leader=0	(5) Equityassets Leader=1	(6) Equityassets Leader=0
<b>SignatureSize</b>	<b>0.0203*</b>	<b>0.0247*</b>	<b>-0.0445</b>	<b>0.2720**</b>	<b>-0.0106</b>	<b>0.0136***</b>
	<b>(1.8636)</b>	<b>(1.9127)</b>	<b>(-0.1861)</b>	<b>(2.2650)</b>	<b>(-1.0327)</b>	<b>(2.6361)</b>
Size	0.0162*	0.0846***	-0.7603***	-0.3746***	-0.0270***	-0.0087**
	(1.7299)	(8.7173)	(-2.8903)	(-4.1798)	(-2.5985)	(-2.2299)
Leverage	0.0724***	-0.0069	1.4720***	0.5761***	0.0525***	0.0312***
	(3.2475)	(-0.5371)	(4.7377)	(3.5396)	(3.3385)	(4.0974)
Firmage	0.0060	-0.0064	0.0813	0.1338**	0.0116*	0.0025
	(1.5495)	(-1.0007)	(0.6762)	(2.3516)	(1.9364)	(1.0341)
Growth	0.0464***	0.0218	0.5127	0.7523***	0.0367**	0.0333***
	(4.2530)	(1.2318)	(1.3358)	(4.0867)	(2.1663)	(3.6267)
CFO	-0.4093***	-0.2005	-2.3775	-0.3088	-0.0685	0.0362
	(-5.7321)	(-1.6412)	(-1.2272)	(-0.2709)	(-0.6838)	(0.6966)
ROA	-0.4675***	0.3658**	8.3882**	2.7586	0.1855	0.3346***
	(-3.1725)	(2.0569)	(2.3727)	(1.5375)	(0.9275)	(4.1133)
Largest	-0.0006	-0.0018**	-0.0219	0.0054	-0.0003	-0.0005
	(-1.0665)	(-2.1187)	(-1.5906)	(0.7036)	(-0.4596)	(-1.3753)
Balance	-0.0126	-0.0166	-0.0889	0.3177**	-0.0018	-0.0017
	(-1.0686)	(-0.9069)	(-0.2728)	(2.0222)	(-0.1178)	(-0.2447)
CEOage	-0.0000	-0.0019*	-0.0385*	-0.0158*	-0.0015*	-0.0012***
	(-0.0110)	(-1.7441)	(-1.7570)	(-1.8031)	(-1.8185)	(-3.1093)
Male	0.0119	0.0350	-0.4120	-0.2195	-0.0315	-0.0073
	(0.6464)	(1.1983)	(-0.8726)	(-1.0864)	(-1.1417)	(-0.7910)
Observations	2515	2515	468	2014	480	2035
Pseudo R <sup>2</sup> / Chi <sup>2</sup>	855.52***	327.03***	0.1698	0.1179	92.99***	245.15***

Notes: The dependent variable is indicated in the column title. t-Statistics based on heteroskedasticity-robust standard errors clustered by firms are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.