How do investors view information disclosure quality rating?

The effect of FNFI on corporate investment efficiency

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Abstract

Purpose – Following Cheng *et al.* (2012) and Tan *et al.* (2015), this paper aims to investigate how does the forward-looking information disclosure quality affect the investors' decisions and then the investment efficiency.

Design/methodology/approach – The authors obtain the information disclosure quality rating data from the official website of the Shenzhen Stock Exchange (SZSE), and firm financial information is mainly from the China Center for Economic Research (CCER) and China Stock Market and Accounting Research Database (CSMAR). The authors choose firms that publicly traded on the SZSE during the period from 2004 to 2010, and the final sample consists of 2,415 firm-year observations for 345 unique firms.

Findings – The authors find that a firm with a high information disclosure quality rating is trusted by investors more. Forward-looking non-financial information (FNFI) disclosure alleviates financial constraints and improves investment efficiency, including alleviating underinvestment and preventing overinvestment to a larger extent for firms with high information disclosure quality rating, especially for the firms rated A (excellent) or B (good) every year since 2001, when the rating began. Moreover, this study proves that investors trust the firms rated high more but do not guard against the firms rated low enough.

Research limitations/implications – The authors only considered the quantity of FNFI disclosed by firms and ignored other characteristics of FNFI. Limited by the data of information disclosure quality rating, the research sample is just from the SZSE.

Originality/value – This paper extends the research of Cheng *et al.* (2012) and Tan *et al.* (2015) to show that one of the reasons behind the extant mix results of the relationship between FNF disclosure and investment efficiency is different information disclosure quality. High-quality FNFI disclosure can alleviate underinvestment and prevent overinvestment at same time.

Keywords Voluntary disclosure, Investment efficiency, Financing constraints, Forward-looking non-financial information (FNFI), Information disclosure quality rating

Paper type Research paper

1. Introduction

Prior studies suggest that high-quality corporate financial information disclosure should increase investment efficiency (Bushman and Smith, 2007; Healy *et al.*, 1999; Lambert *et al.*, 2007; Biddle *et al.*, 2009; Lara *et al.*, 2016). Moreover, a mechanism connecting financial information disclosure and investment efficiency is a reduction of information asymmetry that hampers efficient investment (Bushman and Smith, 2007; Biddle *et al.*, 2009). Unlike

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financial information which is mainly about the past of firms, non-financial information, especially forward-looking non-financial information (hereafter, FNFI), is about firms' future development trend which can provide more decision-making-related information for investors. Therefore, FNFI can reduce information asymmetry between firms and external suppliers of capital, but it is difficult for investors to identify their reliability. The effect of quality of the FNFI disclosure on investment efficiency is an important issue that deserves to be explored. However, most studies so far use the quantity of FNFI disclosure as the proxy of disclosure quality, whereas rarely examine the quality of FNFI disclosure directly. Information disclosure quality rating of the Shenzhen Stock Exchange (SZSE) in China gives us a good opportunity to conduct further research on this topic. In this study, we extend Cheng *et al.* (2012) and Tan *et al.*'s (2015) research on the relationship between FNFI and investment efficiency. We provide evidence for the question that whether FNFI disclosed by firms with higher information disclosure quality rating can improve investment efficiency more significantly due to its high credibility to investors.

We posit that the higher is a firm's information disclosure quality rating, the more credible is the FNFI it disclosed. Firms with high information disclosure quality rating will gain more trust of the investors, and it is easier for them to obtain the capital and alleviate the financing constraints. For firms rated high, FNFI they disclosed is of high quality, which can reduce the information asymmetry that causes economic fictions such as moral hazard and adverse selection more effectively and make the capital firms get more closer to the optimal level, eventually alleviating the underinvestment and preventing overinvestment at the same time. Meanwhile, high-quality FNFI is a supervision institution itself, which makes managers more conservative when they make investment decisions and reduces the corporate inefficient investment behavior (Zhang and Lv, 2009; Quan and Wu, 2010).

Based on this reasoning, we hypothesize that the FNFI disclosure can reduce corporate financing constraints to a larger extent and improve the corporate investment efficiency for firms with high information disclosure quality. To investigate these hypotheses, we examine the moderating role of information disclosure quality rating on the relationships of FNFI and financing constraints and corporate investment efficiency. We use the listed firms' data of the SZSE spanning 2004-2010. Given that the relationship between FNFI and financing constraints and investment efficiency could be weaker over time (Tan *et al.*, 2015), we also examine the results under the two subsamples separated by the year 2008.

We estimate the models built following Almeida *et al.* (2004) and Richardson (2006) to examine the two moderating effects, respectively. We define a firm with high information disclosure quality rating in two ways based on the rating results from the SZSE. At first, compared to firms rated C (qualified) or D (unqualified), we define firms as have higher quality rating if they were rated A (excellent) or B (good) last year; second, compared to firms rated A (excellent) or B (good) last year, we define firms as having higher quality rating if they have been rated A (excellent) or B (good) every year since 2001.

Consistent with our predictions, we document several key findings. First, we find that FNFI disclosed by firms rated A (excellent) or B (good) reduces the corporate financing constraints to a larger extent than firms rated low. Second, FNFI disclosed by firms rated high can improve the investment efficiency, specifically, alleviate the underinvestment, and meanwhile leave little opportunity for overinvestment. Third, we find that compared to firms rated A (excellent) or B (good) last year, the effects FNFI disclosure has on alleviating the financing constraints and improving the corporate investment efficiency were intensified for firms which have been rated A (excellent) or B (good) every year since 2001, but only the difference of the former is statistically significant.

Our study makes several contributions. First, our study contributes to the literature examining the relationship between information disclosure quality and investment efficiency. We extend the existing literature on FNFI disclosure quantity to quality, and provide evidence that information disclosure quality is another important moderating variable of the association of FNFI and corporate investment efficiency, besides the commercialization process and corporate governance characteristics. Second, our findings extend the literature examining the economic outcome of information disclosure quality rating. Different from series of positive economic outcome evidence of the information disclosure quality rating, we find that the information disclosure quality rating can only reward the good firms but cannot fine the bad firms effectively.

The rest of the paper is organized as follows: Section 2 provides a literature review and hypothesis development; Section 3 describes research design; Section 4 discusses sample selection and descriptive statistics; Section 5 presents empirical results; and Section 6 offers conclusions.

2. Literature review and hypothesis development

2.1 Non-financial information disclosure and investment efficiency

In the neo-classical framework, the marginal value of investment projects is the sole factor deciding whether a firm invests or not (Yoshikawa, 1980; Hayashi, 1982; Abel, 1983). Firms invest until the marginal benefit of capital investment equals the marginal costs. However, in reality, there is a lot of noise in the capital market which affects the market efficiency and makes firms' investment decisions deviate from the optimal level. Information asymmetry is one of the important factors producing the noise (Bushman and Smith, 2001). Information asymmetry between managers and investors brings moral hazard and adverse selection.

Managers tend to maximize their personal welfares when there is divergence in principal–agent incentives (Jensen and Meckling, 1976). On the one hand, managers are likely to invest in the projects with negative net present value (NPV) when they can benefit from them. On the other hand, managers tend to overinvest to grow their firms or consume perquisites when there is enough capital available (Jensen, 1986; Blanchard *et al.*, 1994).

Managers will overprice securities taking advantage of non-public information they have but investors do not (Akerlof, 1970). If they are successful, they will obtain excess capital than the firm really needs and overinvest these proceeds (Banker *et al.*, 2003; Biddle *et al.*, 2009). However, investors may realize that and will give a discount price for projects they are not informed enough about. Therefore, it is wise for firms to disclose more information to separate themselves from the bad ones, and then avoid being undervalued in the capital market (Grossman and Hart, 1980; Grossman, 1981; Milgrom, 1981).

However, one of the assumptions for the literature above is that the information firms disclose is real and of high quality. Actually, it is not the truth. Much research studies show that firms would try to arrive at their expected market reaction by adjusting information disclosure strategies. Firms tend to disclose more good news and heal the bad news (Lang and Lundholm, 2000), keep high disclosure frequency (Jo and Kim, 2007) before their equity offers and behave adversely after that. Firms mislead the investors by reducing report readability (Li, 2008, 2010) and disclosure tone management (Huang *et al.*, 2013). Further, researchers found that firms mislead investors and manipulate capital market by disclosing false information, especially in countries with a weak institutional environment like China. Compared to developed countries, China's legal system relatively lags behind and the legal power protecting the interest of investors and punishing firms' opportunistic behavior is weaker (Zhang and Zhu, 2007; Liu *et al.*, 2007). It is difficult to detect the disclosure misbehavior and apply appropriate penalties in a timely manner, which reduces the cost of

false statements to a large certain extent. Cheng *et al.* (2012) suggest that there is a negatively significant relationship between corporate value and voluntary disclosure in China which is characterized by the Guanxi-based economic and uneven market. Cheng *et al.* (2012) find that FNFI could not alleviate, but instead aggravated, information asymmetry between managers and investors by directly testing the relationship between FNFI and information asymmetry.

To conclude, the extant literature obviously has shown mixed results. The two streams of literature mentioned above correspond to the two hypotheses about information quality based on different disclosure motivations, respectively. On the one hand, the accounting transparency hypothesis argues that the information firms disclose reflects their real financial and operation situation and is helpful to investors' decision-making. On the other hand, the opportunism hypothesis, also known as impression management hypothesis, claims that firms' voluntary disclosure is not necessarily informative. Instead, it can be used as a tool, allowing managers to manipulate information for their personal benefit.

The mixed results suggested that the relationships between FNFI and financing constraints and investment efficiency may be contextual. The key of the mixed results rests in two points: first is the quality of the information disclosure; second is whether information disclosure is or to what extent trusted by investors. Information disclosure quality rating was implemented in the SZSE as the only official appraisal system of the quality of listed firms' information disclosure, which connected the information quality with investors' trust. Hence, it is important and meaningful to examine the moderating role of the information disclosure quality on the relationships.

2.2 Information disclosure quality rating as a moderating variable

2.2.1 FNFI, information quality rating and financing constraints. To improve the quality of information disclosure and promote the construction of the market-oriented operation mechanism which rewards the good and fines the bad, the SZSE issued the Appraisal Measures for Information Disclosure of Listed Firms on May 10, 2001. The listed firm information disclosure quality rating is divided into four grades of A (excellent), B (good), C (qualified) and D (unqualified). The rating reflects firms' information disclosure performance in timeliness, accuracy, integrity and legitimacy of listed firm information disclosure, and notice of punishment listed firms received and so on. Since July 30, 2004, the SZSE discloses the appraisal results every year on its website (www.szse.cn).

A large number of academic literature use the information disclosure quality ratings of the SZSE as the proxy of disclosure quality. For instance, Zeng and Lu (2006) prove that there is a negative relationship between disclosure quality measured by the information disclosure quality rating results and marginal cost of equity in the Chinese stock market. Yu and Zhang (2007) find that the higher the information disclosure quality, the lower the debt cost. Zhang *et al.* (2007) examine the influence of the information disclosure quality on the corporate performance; the result shows that the quality of information disclosure has a significantly positive effect on the performance of a firm. Quan and Wu (2010) study that more powerful CEOs appear to have a greater impact on corporate decision-making, and information disclosure quality of the listed firms weakens the effect of CEO power on corporate performance variability. Also, there are researchers exploring the economic consequence of information disclosure appraisal with respect to agent cost. For instance, Han (2007) finds that high-quality information disclosure can help decrease the shareholder expropriation and help investors detect the earning management of the high-risk project. Du and Zhou (2009) take listed firms in the SZSE from 2001 to 2006 as a sample, and find that higher

disclosure quality can reduce agency cost significantly, applying multivariate regression and Heckman's "two-stage" model.

All studies above suggest that information disclosure quality rating has a positive economic consequence, which is a good signal for different market participants, including investors.

Information disclosure quality rating is an effective proxy of FNFI disclosure quality for reasons mentioned below. At first, information disclosure appraisal can influence the quality of FNFI directly. One of the important contents of information disclosure appraisal is the authenticity and validity of the corporate voluntary disclosure, besides the mandatory disclosure. The higher the quality of voluntary disclosure, the higher the quality rating. To obtain a good rating, firms will choose to improve the voluntary disclosure which contains FNFI. Also, information disclosure quality rating can influence the quality of FNFI in an indirect way. The quality of mandatory disclosure information is an important part of the appraisal: the higher the quality of mandatory disclosure information, the better the information disclosure quality rating. Large amount of research studies suggests that mandatory disclosure provide guarantees for voluntary disclosure (Healy *et al.*, 1999). Gigler and Hemmer (1998) claim that providing indirect assurance for the authenticity of the voluntary disclosure information is one of the reasons why mandatory disclosure with low timeliness exists. Sansing (1992) uses a single-stage game model showing that mandatory disclosure can ensure the managers disclose some real information voluntarily. Therefore, the managers' opportunistic behavior can be deterred because they were afraid of being exposed by the corporate mandatory disclosure afterwards.

Most existing literature shows three channels through which voluntary information disclosure can reduce the financing cost and alleviate the financing constraints (Grossman and Hart, 1980; Grossman, 1981; Milgrom, 1981; Welker, 1995; Healy *et al.*, 1999; Botosan and Harris, 2000; Dhaliwal *et al.*, 2012, 2012; Muslu *et al.*, 2010). At first, more information disclosure can improve the stock liquidity and then reduce the exchange cost (Glosten and Milgrom, 1985; Diamond and Verrecchia, 1991); second, more information disclosure can greatly decrease the prediction risk, and then reduce the risk premium (Klein and Bawa, 1976; Clarkson *et al.*, 1996); third, more information disclosure is conducive to establishing a favorable corporate image in the market and maintaining a good reputation (Lunawat, 2009; Dhaliwal *et al.*, 2012; He *et al.*, 2012). Botosan (1997) finds that firms which gained less attention from analysts tend to have a low equity cost if they disclosed more information. Wang and Jiang (2004) examine the association between the cost of equity capital and voluntary-disclosure level, and the results suggested that greater disclosure is associated with a lower cost of equity capital after controlling for firm size and financial risk. He *et al.* (2012) find that firms that disclose social responsibility reports have less financing constraints than the ones that do not disclose social responsibility reports.

A firm with a high rating means that it is more likely a firm having good corporate governance mechanism and low agent cost, emphasizing investor protection; meanwhile, it is honest to the market. Therefore, investors will more likely invest in the firms with high ratings, and the relationship between FNFI disclosure and financial constraints will be more significant for those firms. So, we put forward *H1*:

H1. *Ceteris paribus*, the FNFI can alleviate corporate financing constraints to a larger extent for firms with high information disclosure quality rating.

2.2.2 FNFI, information quality rating and investment efficiency. Cheng *et al.* (2012) find that external financing is an intervening variable between FNFI and the investment efficiency. Prior studies (Cheng *et al.*, 2012; Tan *et al.*, 2015) show that disclosing more FNFI is helpful

to alleviating corporate financial constraints. However, more capital available does not definitely improve the investment efficiency, which depends on the quality of the information attracting the investors.

Low-quality information disclosure and even false statements can bring positive market effect as high-quality information do when investors cannot identify them successfully. Then, low-quality information disclosure also can help firms ease the financing constraints and get excess market resources than they need. With ample resources in hand, they tend to expand their investment scale and even implement ineffective investment to satisfy the personal interest or comply with the regulations of the government, which would avoid the underinvestment but induce overinvestment at the same time. Chen *et al.* (2014), whose result also supported the opportunism hypothesis, investigate whether the good firms would disclose more forward-looking non-financial disclosure information after the China Securities Regulatory Commission changed the future investment disclosure rules. Besides, there turned up a large number of cases about the fraudulent financial statements in China's capital markets in recent years, such as the case of Hangxiao Co. Ltd., in which the managers disclosed the future investment amounting to 34.4 billion Yuan but hid the information of great potential risk. The trust of the investors has generally been erased by such scandals. Cheng *et al.* (2012) find that disclosing more FNFI helps firms attract more capital from investors, but part of the capital results in over-investment eventually due to low-quality information disclosure. Tan *et al.* (2015) claim that the influences of FNFI on corporate investment efficiency become weaker over time due to the decrease in the investors' trust on the information disclosure.

For firms with high information disclosure quality rating, the FNFI they disclosed probably has high quality, which can reduce the information asymmetry between the manager and investors effectively. The FNFI firms disclosed can be used by shareholders to monitor managers and provide more private information for investors. On the other hand, higher-quality information disclosure can reduce the likelihood that firms obtain excess capital through securities mispricing. Therefore, the higher-quality information disclosure can improve the resource allocation efficiency in the capital market, make the amount of market resources the firms acquire get closer to the optimal level and then make the project with high NPV be invested, although insufficient cash in hand, eventually alleviating the underinvestment and preventing overinvestment. Bushman and Smith (2007) suggest that high-quality financial information disclosure can improve investment efficiency through reducing the moral hazard, alleviating adverse selection and enhancing the capital market effectiveness, which is supported by a lot of empirical research studies afterwards (Verdi, 2009; Biddle and Hilary, 2006; McNichols and Stubben, 2008; Biddle *et al.*, 2009; Lara *et al.*, 2016; Kedia and Philippon, 2009; Bushman *et al.*, 2011; Balakrishnan *et al.*, 2011; Li, 2009; Zhou, 2009). Meanwhile, FNFI disclosed by firms such as future investment with high quality exposed the corporate operation decision and the investment projects' progress to the supervision of the public, which makes managers more conservative when they make investment decisions and reduces the corporate inefficient investment behaviors (Zhang and Lv, 2009; Quan and Wu, 2010). Then, we have *H2*:

H2. *Ceteris paribus*, to firms with high information disclosure quality rating, FNFI can improve the corporate investment efficiency.

3. Research design

3.1 Variable measures

3.1.1 FNFI. Following Cheng *et al.* (2012) and Tan *et al.* (2015), we built a scoring system combining the FNFI disclosure guidance of American Institute of Certified Public

Accountant (AICPA) (1994), Canadian Institute of Chartered Accountants (CICA) (2001), Institute of Chartered Accountants in England and Wales (ICAEW) (2003) and the work of China Academy of Corporate Governance in Nankai University. The scoring system included six parts (new product or new services, investment projects, future development strategy, innovation activities, competitive advantage/disadvantage analysis and industry development trend) which are all composed of many detailed disclosure items. We gave the score 1 if the firm disclosed the information items and 0 otherwise, and then obtained the average score to proxy firms' disclosure of FNFI:

$$\text{FNFI} = \frac{\sum (\text{Scores of every disclosure item})}{\text{Total number of disclosure items}}$$

3.1.2 The FNFI disclosure quality. We used two dummy variables to identify firms with high information disclosure quality based on information disclosure rating results. First, DEGREE_1, which is equal to 1 if a firm's information disclosure quality rating is A or B, and 0 if the information disclosure quality rating is C or D. The SZSE generally discloses the information disclosure quality rating results in the next year, so the information disclosure quality rating investors use in their decision-making is the rating results of past or prior years. Further, we find a firm will be rated A or B with a high possibility of 82 per cent if it was rated A or B in the past year; there is a strong correlation between the rating results of current year and past year. To mitigate the endogeneity problem, we used the lagged rating results in the regression. Second, considering investors may rely more on previous rating results in the past, we used another dummy variable DEGREE_2, which is equal to 1 if a firm's rating results were always A or B since 2001, and 0 otherwise. So, we have two variables measuring the firms' information disclosure quality, DEGREE 1 is built on the information disclosure quality rating of the past year and DEGREE 2 is built on the information disclosure quality rating of all the years since 2001, when the information disclosure quality rating began.

3.1.3 Financing constraints. Many studies measure financing constraints with "Investment-Cash Flow" sensitivity following Fazzari *et al.* (1998). However, some researchers such as Kaplan and Zingales (1997, 2000) and Gomes (2001) questioned this approach based on several points as follows: First, Tobin's Q may not be a perfect proxy for firms' future investment opportunity, and there would be great noise and adaptive bias especially in an emerging market like China, whose capital market is far from efficient. Second, "Investment-Cash Flow" sensitivity did not necessarily result from financing constraints; for instance, high agency cost can also improve the sensitivity between investment and cash flows (Jensen, 1986). Hence, it is difficult for us to separate the two effects effectively when using the "Investment-Cash Flow" sensitivity model. Moreover, consistent with Kaplan and Zingales (1997), Lian and Cheng (2007) find that investment is still sensitive to the cash flow even when they controlled the measurement error of Tobin's Q, and that firms which are less financially constrained exhibit greater investment-cash flow sensitivity. Then, for reasons mentioned above, Almeida *et al.* (2004) created "Cash-Cash flow" sensitivity to measure financing constraints. The basic principle is that firm's financing constraints will affect the cash-holding policy; the more severe the financing constraints are, firms will hold more cash to maintain high cash holdings and liquidity for future investment, then the "Cash-Cash flow" sensitivity is higher. In other words, the more severe the financing constraints are, the higher the sensitivity of "Cash-Cash flow" is. This model is followed by many researchers in China (Yu *et al.*, 2012; Jin *et al.*, 2012; He *et al.*, 2012).

We gauged the financing constraints with "Cash-Cash flow" sensitivity following Almeida *et al.* (2004).

3.1.4 Investment efficiency. We defined investment efficiency following Richardson's (2006) model. In particular, we divided firms' investment into two parts: one part is used to maintain the firm's operating expense and planned investment and is closely related to firm's growth opportunities, financing constraints and industry factors; the other part is unexpected investment and is believed to be overinvestment when it is positive, and underinvestment when negative.

3.1.5 Control variables. We controlled financial characteristics variables including firm size, revenue, free cash flow, profitability, Tobin's Q, growth and asset turnover following prior studies (Yang and Hu, 2007; Wei and Liu, 2007; Jiang *et al.*, 2009; Cheng *et al.*, 2012; Tan *et al.*, 2015). The definitions of all variables are reported in Table I.

3.2 Empirical models

To test whether FNFI can help alleviate the corporate financing constraints and whether high information disclosure quality rating can enhance investors' trust on FNFI and then intensify the relationship between FNFI and corporate financing constraints (*H1*), we built Model (1) based on Almeida *et al.*'s (2004) "Cash-Cash flow" sensitivity model as follows:

$$\begin{aligned}\Delta Cash = {} & \beta_0 + \beta_1 Cfo + \beta_2 \mathrm{FNFI} + \beta_3 \mathrm{FNFI} \times Cfo + \beta_4 \mathrm{FNFI} \times DEGREE_i \\ & + \beta_5 DEGREE_i \times Cfo + \beta_6 \mathrm{FNFI} \times DEGREE_i \times Cfo + \beta_7 DEGREE_i \\ & + \beta_8 Size + \beta_9 TobinQ + \beta_{10} \Delta STD + \beta_{11} \Delta NWC \\ & + \beta_{12} Expenditure + \sum Industry + \sum Year + \omega\end{aligned} \tag{1}$$

where $\Delta Cash$ is the change of corporate cash holdings, equals the net increase of cash and cash equivalents scaled by the total asset at the beginning of the year for the firm i in the year t. *Cfo* is the net cash flow of corporate operation activities divided by the total asset at the beginning of the year for the firm i in the year t. *DEGREE* is one of the proxies of the quality of FNFI disclosure. β_3 measures the effects of FNFI on the "Cash-Cash Flow" sensitivity which measures financing constraints. β_6 represents the incremental effects information disclosure quality rating has on the relationship between the FNFI and financing constraints. We expect β_3 andβ_6 to be significantly negative, implying that disclosing more FNFI can alleviate corporate financing constraints, and high quality of FNFI disclosure can intensify this relationship.

To examine whether FNFI can improve the corporate investment efficiency and whether the relationship in the firms with high information disclosure quality rating is stronger (*H2*), we have Model (2) based on Richardson's (2006) model:

$$\begin{aligned}\mathrm{INEF} = {} & \alpha_0 + \alpha_1 \mathrm{FNFI} + \alpha_2 \mathrm{DEGREE}_i + \alpha_3 \mathrm{FNFI} \times \mathrm{DEGREE}_i + \alpha_4 \mathrm{SIZE} \\ & + \alpha_5 \mathrm{REVENUE} + \alpha_6 \mathrm{FCF} + \alpha_7 \mathrm{ROA} + \alpha_8 \mathrm{TobinQ} + \alpha_9 \mathrm{GOA} + \alpha_{10} \mathrm{AT} \\ & + \alpha_{11} \mathrm{LEVERGE} + \sum Industry + \sum \mathrm{Year} + \varepsilon\end{aligned} \tag{2}$$

Where INEF denotes investment efficiency, including overinvestment (OVER) and underinvestment (UNDER). *DEGREE* is one of the proxies of the quality of FNFI disclosure. α_1 represents the effects of FNFI on the investment efficiency. We expect α_1 to be

Type	Name	Abbreviation	Definition
Dependent variable	Overinvestment	OVER	The positive residual obtained by using Richardson's (2006) method
	Underinvestment	UNDER	The negative residual obtained by using Richardson's (2006) method
	The change of cash	ΔCash	The net increase of cash and cash equivalents scaled by total asset at the beginning of the year
	Investment scale	INV	The sum of Cash paid to acquire fixed assets, intangible assets and other long-term assets, Cash paid to acquire investments and other cash payments relating to investing activities scaled by total asset at the beginning of the year
Independent variable	Forward-looking non-financial information	FNFI	Following Cheng *et al.*'s (2012) measurement of FNFI disclosure, we build a score system that contains six elements to obtain an average score as the proxy for the disclosure of FNFI
	Information disclosure quality rating	$DEGREE_1$	Dummy variable. Equals 1 if a firm rated A (excellent) or B (good) last year, 0 otherwise
	Information disclosure quality rating	$DEGREE_2$	Dummy variable. Equals 1 if a firm has been rated A (excellent) or B (good) every year since 2001, 0 otherwise
	Financial characteristics	SIZE	Calculated from the logarithm of total assets
		REVENUE	Calculated from revenue scaled by net asset at the beginning of the year
		FCF	Calculated from free cash flow divided by total asset at the beginning of this year, where free cash flow is from CSMAR database and equals the sum of net income, interest expense and non-cash expenses, then minus working capital increase and capital expenditure
		ROA	Calculated from net income divided by total assets
		Tobin's Q	Calculated from the sum of equity market value and liabilities market value, divided by total asset, where the value of non-tradable shares is proxy by net asset value
		GOA	The growth rate of total assets
		AT	The turnover of total assets
		LEVERGE	Calculated from a company's debt ratio, equals liabilities scaled by total assets at the beginning

Table I.
Variables definition

Source: Based on authors' analysis; CSMAR = China Stock Market and Accounting Research Database

significantly negative when INEF denotes overinvestment, and positive when INEF denotes underinvestment. α_3 represents the incremental effects information disclosure quality rating has on the relationship between the FNFI and investment efficiency. We expect α_3 to have the same sign as α_1 , implying that disclosing high-quality FNFI can alleviate underinvestment and prevent overinvestment at the same time.

To mitigate the endogeneity problem, we used the lagged value of variable FNFI, then the variable FNFI spans from 2004 to 2010 and the variable INEF spans from 2005 to 2011. Because of the high correlation between the interaction item FNFI × $DEGREE_i$ and FNFI (or $DEGREE_i$), the multi-collinearity may result in a biased estimator. To mitigate this problem, we used the residual centering method.

Cheng *et al.* (2012) found that firms can obtain sufficient financing even more necessary by disclosing low-quality non-financial information in the year 2005-2009, because investors could not distinguish the quality of non-financial information in early years. Consist with Cheng *et al.* (2012), Tan *et al.* (2015) found that every year from 2005 to 2009, the FNFI was positively and significantly related to either overinvestment or underinvestment. However, the variable FNFI was insignificantly related to overinvestment or underinvestment in the year 2009-2010 by annual regressions. The result means that investors do not trust all non-information firms disclosed over time, as a large number of fraudulent financial statements have been revealed in China's capital markets, and FNFI's influence on decreasing investment efficiency becomes weaker. So, following Tan *et al.* (2015) and considering the lagged value of variable FNFI used in this study, we divide our sample into two groups: subsample of year 2004-2008 and subsample of year 2009-2010.

4. Sample selection and descriptive statistics

4.1 Sample and data

We chose firms publicly traded on the SZSE during the period from 2004 to 2010, excluding firms of the financial industry, and without the continuous five years' presence and the missing data, each year, we had 345 firms and a total of 3,449 samples. The data of investment efficiency span from 2005 to 2011. Information disclosure quality rating spans from 2001 to 2010, which is collected from the official website of the SZSE (www.szse.cn/). The rest of the data are mainly extracted from China Center for Economic Research (CCER) and CSMAR.

4.2 Descriptive statistics

Table II presents the description of the information disclosure quality rating data spanning from 2001 to 2010. Table III presents the description of the firms that were always rated A or B since 2001 ($DEGREE_2 = 1$).

Table II shows that the number of firms rated B is the most of four ratings, and the next is the number of firms rated C, and the number of firms rated A or D is less. The total number

		A		B		C		D	
Year	No.	No. of firms	(%)	No. of firms	(%)	No. of firms	(%)	No. of firms	(%)
2001	344	26	7.558	136	39.535	170	49.419	12	3.488
2002	345	35	10.145	181	52.464	113	32.754	16	4.638
2003	345	34	9.855	191	55.362	107	31.014	13	3.768
2004	345	23	6.667	226	65.507	89	25.797	7	2.029
2005	345	35	10.145	210	60.870	88	25.507	12	3.478
2006	345	33	9.565	193	55.942	109	31.594	10	2.899
2007	345	33	9.565	169	48.986	130	37.681	13	3.768
2008	345	37	10.725	200	57.971	99	28.696	9	2.609
2009	345	40	11.594	225	65.217	72	20.870	8	2.319
2010	345	42	12.174	236	68.406	60	17.391	7	2.029
Total	3,449	338	9.800	1,967	57.031	1,037	30.067	107	3.102

Table II.
Descriptive statistics

of firms rated A or B is more than the number of firms rated C or D, and the difference is larger over time. Moreover, the number of firms rated A or B increased gradually from 2001 to 2010, while the number of firms rated C or D decreased over time. This reflects that the information disclosure quality rating of the SZSE has made a positive market consequence, guiding listed firms to improve the quality of their information disclosure. However, almost 20 per cent of listed firms were rated C or D at 2010 after 10 years of the quality rating. This is consistent with the conclusions of prior studies that there still exist many firms obtaining the market resources through false statements and misleading investors in China's capital market.

Table III presents the number and percentage of firms rated A or B since 2001 by year. The number of firms rated A or B since 2001 was 100, 87, 77, 66, 46, 40 and 36 from 2004 to 2010, respectively, and account for 28.986, 25.217, 22.319, 19.130, 13.333, 11.594 and 10.435 per cent, respectively. This implies that 100 firms were rated A or B for the first three years, but only 36 firms were rated A or B for 10 years since the quality rating began.

We can conclude from Tables II and III that the information disclosure quality of more than half of the listed firms in the SZSE is more than good, but only a small part of the firms can keep a good information disclosure quality consistently. In total, the information disclosure quality of listed firms in the SZSE needs to be further strengthened.

5. Results

*5.1 FNFI, information disclosure quality rating and financing constraints (*H1*)*

Model (1) examines the difference in the effects of FNFI on the financing constraints across firms whose information disclosure quality rating is high (A or B) and low (C or D) for the overall sample, using $DEGREE_1$ and $DEGREE_2$ as the measures of the information disclosure quality. The estimated results are presented in Panel A of Table IV. And, Panels B and C of Table IV present the regression results of subsample from 2004-2008 and 2009-2010, respectively. For six regressions except the regression for subsample of 2009-2010 using $DEGREE_1$, the coefficients on the interaction of FNFI and CFO are significantly negative ($\beta_3 = -0.368, -0.308, -0.323, -0.313, -0.339$ and -0.551; $p = 0.001$, 0.002, 0.019, 0.008, 0.278 and 0.019, respectively). This implies that disclosing more FNFI can help enhance the investors' trust and alleviate corporate financing constraints, which is consistent with the findings of Cheng *et al.* (2012).

Further, for all six regressions, the coefficients on the interaction of FNFI × CFO and $DEGREE_1$ or $DEGREE_2$ are significantly negative ($\beta_3 = -0.178, -0.432, -0.202, -0.446, -0.633$ and -0.785; $p = 0.016$, 0.000, 0.061, 0.000, 0.090 and 0.050, respectively). Also, the absolute coefficients of FNFI × CFO × $DEGREE_2$ are bigger and more significant than the coefficients of FNFI × CFO × $DEGREE_1$. This indicates that the relationship of FNFI and corporate financing constraints is stronger for firms with high information disclosure quality rating, especially for those which were rated A or B every year since 2001.

	No. of firms	(%)	No. of firms	(%)	No. of firms	(%)
Year	2004		2005		2006	
$DEGREE_2 = 1$	100	28.986	87	25.217	77	22.319
Year	2007		2008		2009	
$DEGREE_2 = 1$	66	19.130	46	13.333	40	11.594
Year	2010		Sum			
$DEGREE_2 = 1$	36	10.435	452		18.716	

Table III.
Descriptive statistics ($DEGREE_2 = 1$)

Variables	Coef.	t	$P>t$	Coef.	t	$P>t$
Panel A: overall sample						
CFO	0.292***	20.82	0.000	0.291***	20.90	0.000
FNFI	−0.033***	−2.84	0.005	−0.029**	−2.51	0.012
FNFI × CFO	−0.368***	−3.33	0.001	−0.308***	−3.10	0.002
$DEGREE_1$	−0.001	−0.28	0.778			
$DEGREE_1 \times FNFI \times$ CFO	−0.178**	−2.42	0.016			
$DEGREE_1 \times FNFI$	−0.016	−0.88	0.378			
$DEGREE_1 \times CFO$	−0.052*	−1.84	0.066			
$DEGREE_2$				−0.006**	−2.25	0.025
$DEGREE_2 \times FNFI \times$ CFO				−0.432***	−4.31	0.000
$DEGREE_2 \times FNFI$				0.007	0.38	0.700
$DEGREE_2 \times CFO$				−0.152***	−4.59	0.000
SIZE	−0.002	−1.22	0.222	−0.001	−1.19	0.234
Tobin's Q	0.002	1.06	0.289	0.001	0.92	0.356
STD	0.247***	25.46	0.000	0.246***	25.61	0.000
NWC	0.338***	29.35	0.000	0.337***	29.44	0.000
EXPENDIT	−0.106***	−7.90	0.000	−0.108***	−8.13	0.000
Industry	Control			Control		
Year	Control			Control		
F	63.10***			64.50***		
Adjusted R^2	0.419			0.424		
Number	2,415			2,415		
Panel B: subsample of 2004-2008						
CFO	0.268***	15.75	0.000	0.269***	15.90	0.000
FNFI	−0.026*	−1.89	0.059	−0.026*	−1.83	0.067
FNFI × CFO	−0.323**	−2.35	0.019	−0.313***	−2.67	0.008
$DEGREE_1$	0.001	0.20	0.842			
$DEGREE_1 \times FNFI \times$ CFO	−0.202*	−1.87	0.061			
$DEGREE_1 \times FNFI$	−0.017	−0.81	0.417			
$DEGREE_1 \times CFO$	−0.091***	−2.61	0.009			
$DEGREE_2$				−0.006*	−1.74	0.082
$DEGREE_2 \times FNFI \times$ CFO				−0.446***	−3.50	0.000
$DEGREE_2 \times FNFI$				0.012	0.56	0.577
$DEGREE_2 \times CFO$				−0.144***	−3.68	0.000
SIZE	0.000	−0.28	0.779	0.000	−0.21	0.832
Tobin's Q	0.005**	2.31	0.021	0.005**	2.02	0.044
STD	0.238***	20.95	0.000	0.238***	21.18	0.000
NWC	0.319***	23.41	0.000	0.320***	23.58	0.000
EXPENDIT	−0.119***	−7.33	0.000	−0.121***	−7.47	0.000
Industry	Control			Control		
Year	Control			Control		
F	42.91***			43.73***		
Adjusted R^2	0.387			0.392		
Number	1,725			1,725		

(*continued*)

Table IV. Regressions examining the relationship between FNFI and financing constraints with information disclosure quality rating as moderating variable

	Coef.	t	$P>t$	Coef.	t	$P>t$
Panel C: subsample of 2009-2010						
CFO	0.345***	11.93	0.000	0.334***	11.53	0.000
FNFI	−0.042*	−1.90	0.058	−0.038*	−1.72	0.086
FNFI × CFO	−0.339	−1.08	0.278	−0.551**	−2.36	0.019
$DEGREE_1$	−0.006	−1.10	0.273			
$DEGREE_1 \times FNFI \times CFO$	−0.633*	−1.70	0.090			
$DEGREE_1 \times CFO$	−0.243*	−1.79	0.073			
$DEGREE_1 \times FNFI$	0.027	0.58	0.560			
$DEGREE_2$				−0.007	−1.09	0.277
$DEGREE_2 \times FNFI \times CFO$				−0.785**	−1.96	0.050
$DEGREE_2 \times CFO$				−0.089	−0.65	0.517
$DEGREE_2 \times FNFI$				−0.013	−0.28	0.776
SIZE	−0.004	−1.64	0.101	−0.004*	−1.65	0.099
Tobin's Q	−0.001	−0.67	0.500	−0.001	−0.45	0.650
STD	0.274***	14.17	0.000	0.268***	13.98	0.000
NWC	0.372***	16.71	0.000	0.367***	16.64	0.000
EXPENDIT	−0.071***	−2.87	0.004	−0.080***	−3.29	0.001
Industry		Control			Control	
Year		Control			Control	
F		25.26***			25.97***	
Adjusted R^2		0.458			0.465	
Number		690			690	

Table IV.

Notes: *Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level

*5.2 FNFI, information disclosure quality rating and investment efficiency (*H2*)*

To examine the moderating role of information disclosure quality on the relationship between FNFI and investment efficiency (*H2*), we regress the Model (2). To mitigate the endogeneity problem between FNFI and INEF, we use the lagged value of variable FNFI. The results from estimating Model (2) using $DEGREE_1$ as the measure of the information disclosure quality rating in the overall sample are presented in Panel A of Table V. And, Panels B and C of Table V present the regression results of subsample from 2004-2008 and 2009-2010, respectively. The results from estimating Model (2) using $DEGREE_2$ as the measure of the information disclosure quality rating in the overall sample and two subsamples are presented in Panels A, B and C of Table VI, respectively.

As is presented in Table V, for the underinvestment group, the coefficients of $FNFI \times DEGREE_1$ in the overall sample, 2004-2008 subsample and 2009-2010 subsample are 0.047 ($p = 0.001$), 0.032 ($p = 0.060$) and 0.087 ($p = 0.008$), respectively, which are all significantly positive. And in Table VI, the coefficients of $FNFI \times DEGREE_2$ in the overall sample, 2004-2008 subsample and 2009-2010 subsample are 0.078 ($p = 0.000$), 0.057 ($p = 0.002$) and 0.153 ($p = 0.000$), respectively, which are also significantly positive. The result indicates that firms rated A (excellent) or B (good) were trusted by investors more, and then obtained more market resources, which reduced the corporate underinvestment and improved the investment efficiency. Further, for firms rated A (excellent) or B (good) every year since 2001, the coefficients of interaction are bigger than that of the interaction in the regression in firms rated A (excellent) or B (good) in the past year, and the differences passed the one-tailed test at least at the 10 per cent level. A good information disclosure quality

Variables	UNDER Coef.	t	$P > t$	OVER Coef.	t	$P > t$
Panel A: overall sample from SZSE						
FNFI	0.036***	3.82	0.000	0.073**	2.08	0.038
$DEGREE_1$	0.010***	5.02	0.000	−0.040***	−5.23	0.000
FNFI × $DEGREE_1$	0.047***	3.27	0.001	−0.191***	−3.68	0.000
SIZE	−0.005***	−4.31	0.000	−0.005	−1.25	0.212
REVENUE	−0.002	−1.39	0.163	−0.001	−0.26	0.797
FCF	−0.015	−1.25	0.211	0.003	0.06	0.954
ROA	0.040**	2.15	0.032	0.081	1.09	0.276
Tobin's Q	−0.008***	−7.04	0.000	−0.001	−0.26	0.792
GOA	−0.013**	−2.34	0.020	0.141***	10.16	0.000
AT	0.006*	1.68	0.093	−0.007	−0.57	0.567
LEVERGE	0.066***	9.31	0.000	−0.122***	−4.85	0.000
Industry		Control			Control	
Year		Control			Control	
F		14.91***			9.66***	
Adjusted R^2		0.195			0.228	
Number		1,609			806	
Panel B: subsample of 2004-2008 from SZSE						
FNFI	0.034***	2.99	0.003	0.097**	2.30	0.022
$DEGREE_1$	0.008***	3.31	0.001	−0.034***	−3.79	0.000
FNFI × $DEGREE_1$	0.032*	1.88	0.060	−0.152**	−2.50	0.013
SIZE	−0.004***	−2.78	0.006	−0.006	−1.19	0.236
REVENUE	−0.001	−0.81	0.418	−0.003	−0.68	0.497
FCF	−0.011	−0.75	0.453	0.035	0.62	0.533
ROA	0.058***	2.61	0.009	0.094	1.06	0.291
Tobin's Q	−0.010***	−5.28	0.000	0.001	0.17	0.863
GOA	−0.013**	−2.09	0.037	0.141***	8.60	0.000
AT	0.002	0.46	0.646	−0.008	−0.49	0.625
LEVERGE	0.058***	6.97	0.000	−0.066**	−2.09	0.037
Industry		Control			Control	
Year		Control			Control	
F		9.96***			7.64***	
Adjusted R^2		0.170			0.220	
Number		1,141			584	
Panel C: subsample of 2009-2010 from SZSE						
FNFI	0.017	1.02	0.306	0.024	0.36	0.722
$DEGREE_1$	0.011**	2.45	0.015	−0.053***	−2.61	0.010
FNFI × $DEGREE_1$	0.087***	2.67	0.008	−0.241*	−1.75	0.081
SIZE	−0.007***	−3.34	0.001	−0.001	−0.11	0.916
REVENUE	−0.003	−1.49	0.136	0.002	0.38	0.706
FCF	−0.019	−0.90	0.371	−0.065	−0.73	0.466
ROA	0.003	0.07	0.942	0.050	0.34	0.731
Tobin's Q	−0.007***	−4.50	0.000	−0.010	−1.29	0.198
GOA	−0.010	−0.93	0.352	0.104***	3.70	0.000
AT	0.013**	2.22	0.027	−0.005	−0.24	0.811
LEVERGE	0.082***	5.94	0.000	−0.235***	−5.25	0.000
Industry		Control			Control	
Year		Control			Control	
F		8.11***			4.32***	
Adjusted R^2		0.259			0.249	
Number		468			222	

Notes: *Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level

Table V. Regressions examining the relationship between FNFI and corporate investment efficiency with information disclosure quality rating ($DEGREE_1$) as moderating variable

Variables	UNDER Coef.	t	$P > t$	OVER Coef.	t	$P > t$
Panel A: overall sample from SZSE						
FNFI	0.034***	3.66	0.000	0.119***	3.41	0.001
$DEGREE_2$	0.010***	4.49	0.000	−0.051***	−6.47	0.000
FNFI × $DEGREE_2$	0.078***	5.16	0.000	−0.270***	−5.13	0.000
SIZE	−0.005***	−4.13	0.000	−0.006	−1.48	0.139
REVENUE	−0.001	−1.25	0.211	0.000	0.02	0.982
FCF	−0.015	−1.25	0.212	0.007	0.14	0.886
ROA	0.040**	2.14	0.032	0.061	0.83	0.405
Tobin's Q	−0.008***	−7.05	0.000	0.003	0.64	0.523
GOA	−0.010*	−1.91	0.056	0.133***	9.74	0.000
AT	0.007*	1.95	0.052	−0.014	−1.17	0.243
LEVERGE	0.063***	8.98	0.000	−0.118***	−4.78	0.000
Industry	Control			Control		
Year	Control			Control		
F	15.35***			11.12***		
Adjusted R^2	0.200			0.257		
Number	1,609			806		
Panel B: subsample of 2004-2008 from SZSE						
FNFI	0.034***	3.00	0.003	0.109***	2.64	0.009
$DEGREE_2$	0.009***	3.32	0.001	−0.051***	−5.54	0.000
FNFI × $DEGREE_2$	0.057***	3.18	0.002	−0.277***	−4.32	0.000
SIZE	−0.004***	−2.77	0.006	−0.006	−1.22	0.222
REVENUE	−0.001	−0.80	0.425	−0.002	−0.45	0.651
FCF	−0.010	−0.68	0.499	0.030	0.54	0.589
ROA	0.057***	2.59	0.010	0.076	0.86	0.387
Tobin's Q	−0.009***	−4.93	0.000	0.007	0.86	0.389
GOA	−0.011*	−1.78	0.075	0.135***	8.41	0.000
AT	0.003	0.67	0.505	−0.014	−0.91	0.363
LEVERGE	0.057***	6.86	0.000	−0.071**	−2.30	0.022
Industry	Control			Control		
Year	Control			Control		
F	10.21***			8.88***		
Adjusted R^2	0.174			0.251		
Number	1,141			584		
Panel C: subsample of 2009-2010 from SZSE						
FNFI	0.028	1.61	0.109	0.095	1.37	0.172
$DEGREE_2$	0.007	1.54	0.124	−0.053**	−2.14	0.033
FNFI × $DEGREE_2$	0.153***	4.66	0.000	−0.263*	−1.69	0.092
SIZE	−0.006***	−2.98	0.003	−0.003	−0.34	0.737
REVENUE	−0.002	−1.25	0.212	0.003	0.53	0.596
FCF	−0.028	−1.29	0.196	−0.048	−0.54	0.592
ROA	0.000	0.01	0.991	0.019	0.13	0.897
Tobin's Q	−0.008***	−4.71	0.000	−0.004	−0.49	0.622
GOA	−0.007	−0.72	0.473	0.097***	3.45	0.001
AT	0.015**	2.45	0.015	−0.013	−0.67	0.505
LEVERGE	0.075***	5.56	0.000	−0.219***	−4.93	0.000
Industry	Control			Control		
Year	Control			Control		
F	8.66***			4.45***		
Adjusted R^2	0.274			0.256		
Number	468			222		

Table VI. Regressions examining the relationship between FNFI and corporate investment efficiency with information disclosure quality rating ($DEGREE_2$) as moderating variable

Notes: *Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level

rating can help firms earn the trust of investors and absorb more resources, and then reduce the underinvestment and improve the corporate investment efficiency.

For the overinvestment group, the results are presented in Tables V and VI; the coefficients of FNFI × $DEGREE_1$ in the overall sample, 2004-2008 subsample and 2009-2010 subsample are −0.191 (p = 0.000), −0.152 (p = 0.013), −0.241 (p = 0.081), respectively, which are all significantly negative. And in Table V, the coefficients of FNFI×$DEGREE_2$ in the overall sample, 2004-2008 subsample and 2009-2010 subsample are −0.270 (p = 0.000), −0.277 (p = 0.000) and −0.263 (p = 0.092), respectively, which are also significantly negative. For firms rated A (excellent) or B (good), on the one hand, good information disclosure quality helps reduce the information asymmetry between investors and firms, improve the market resource allocation efficiency and make the money firms can absorb from the market to get more closer to the optimal level, and then make it possible to prevent the overinvestment result from excess resources available; on the other hand, even the firms rated A (excellent) or B (good) acquire excess resources due to prediction error; the high-quality information disclosure is itself a effective monitoring institution for the allocation and use of investors' money, which can deter managers' misbehavior, such as tunnel private interest through empire building, and then eventually improve the corporate investment efficiency. Meanwhile, we find that the coefficients of the interaction between FNFI and $DEGREE_2$ are generally bigger than the coefficients of the interaction between FNFI and $DEGREE_1$. We examined whether the difference is significantly different from 0 following Clogg *et al.* (1995) and Chen *et al.* (2011), but the difference is not significant. This indicates that disclosing FNFI can prevent the overinvestment effectively for firms rated A (excellent) or B (good), and the moderating role of which is more significant for firms rated A (excellent) or B (good) every year since 2001 than firms rated A (excellent) or B (good) only in the past year. However, the difference is not statistically significant.

5.3 Robust test

We carried out the following robustness check: First, considering the dominant single-large shareholder phenomenon is common in firms of China. Previous studies show that non-control large shareholders could enhance a firm's value by monitoring its controlling shareholder's expropriation of private benefits (Volpin, 2002; Laeven and Levine, 2008; Attig *et al.*, 2009; Cheng *et al.*, 2011). Cheng *et al.* (2011) suggest that firms with non-controlling shareholders tend to disclose more information. To further mitigate the endogeneity problem, we re-estimated investment efficiency model using the sum of share proportion of top 5-10 shareholders as instrumental variables following Cheng *et al.* (2011). The moderate effect of information disclosure quality rating in the relationship between FNFI and investment efficiency is similar.

Second, there are many ways through which managers can tunnel private interest after they acquire the excess resources from investors, such as managerial perks, diverting the money directly and so on. Expanding the scale of investment is only one of them. Therefore, it is necessary to further examine whether firms with low information disclosure quality will make more investments using the excess resources acquired through misleading investors by disclosing more FNFI with low quality. Hence, we also examined the moderating role of information disclosure quality rating on the relationship between FNFI and investment expanding. We got the same results as the estimations examining the relationship between FNFI and financing constraints and corporate investment efficiency. For firms rated A (excellent) or B (good), FNFI can help enhance the investors' trust and make it easier for firms to acquire the scarce market resources, and tend to make more investments. And, the

relationship of FNFI and investment scale is stronger for firms with high information disclosure quality rating, especially for those which were rated A or B every year since 2001.

Third, to test the robustness of our measures of investment efficiency, we estimate the Model (2) using alternative financial measures such as the growth rate of total assets, the growth rate of sales and so on. The results were similar to those obtained using Tobin's Q. We also regressed using the model of Biddle *et al.* (2009). Again, the results were similar to those obtained earlier. At last, we use the number of phrases used in firms' FNFI disclosure as a measure of FNFI instead of the average score of the disclosure items following the research method of Muslu *et al.* (2010) and Bozzolan *et al.* (2009). The results were similar to those obtained earlier.

6. Concluding remarks

Prior studies (Cheng *et al.*'s, 2012; Tan *et al.*, 2015) show that FNFI can reduce the financing constraints and alleviate the underinvestment but exaggerate overinvestment in China's emerging market. There are studies that found that FNFI is helpful to improve corporate investment efficiency. One of the reasons behind the mixed results is the different information disclosure quality. Information disclosure quality rating of the SZSE is the listed firms' public information disclosure evaluation system issued by the authority in China. We explored the relationship between FNFI and financing constraints and corporate investment efficiency across firms rated high and low.

We find that the opportunism hypothesis was depressed and the information hypothesis was intensified in the firms with high ratings, including A (excellent) and B (good), that is to say these firms tend to disclose information with high quality to earn the trust of investors and distinguish themselves from firms in bad situations. Hence, on the one hand, for firms rated high, FNFI is more easily trusted by investors and makes it easier for firms to acquire investment from investors, which reduces the corporate financing constraints to a larger extent than firms rated low. On the other hand, we found that, for firms rated high, FNFI can reduce the information asymmetry between the firms and investors effectively and make the resources acquired get close to the optimal level, and then alleviate the underinvestment effectively and meanwhile leave little opportunity for overinvestment. Also, the high-quality FNFI disclosure is a supervision institution of the allocation of use of the resources acquired itself, which can deter the managers' misbehavior, such as inefficient investment, and then improve the investment efficiency. Moreover, we found that compared to firms rated A (excellent) or B (good) in the past year, the effects FNFI disclosure has on alleviating the financing constraints and improving the corporate investment efficiency were intensified more for firms rated A (excellent) or B (good) every year since 2001, but only the difference of the former is statistically significant.

The result also reveals that investors trust the information disclosed by firms rated high more but do not guard against the information disclosed by the firms rated low. The information disclosure quality rating can only reward the good firms which disclose high-quality information but cannot fine the bad firms which disclose low-quality information effectively, because disclosing more FNFI can help obtain more investment for both the good and bad firms, and then will aggravate the overinvestment in bad firms.

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