Voluntary Non-financial Disclosure, Corporate Governance, and Investment Efficiency

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Abstract:

Different from prior studies that typically use rough proxies for accounting information quality, we construct a direct measure of voluntary disclosure of non-financial information pertaining specifically to firm's current and planned investments. We then study the effects of voluntary non-financial disclosure (NF) on investment efficiency. Based on a sample of 1029 China-listed firms during 2007-2011, we find that NF is not associated with investment efficiency for weak corporate governance firms. However, for strong corporate governance firms we find that NF can mitigate over- and under-investment. Cross-sectional analysis indicates that while the impact of NF on investment efficiency is higher for state-owned enterprises (SOEs) than non-SOEs, corporate governance has a stronger moderating effect on the association between NF and investment efficiency for non-SOEs than SOEs. The moderating role of corporate governance in the association between NF and investment efficiency is similar between firms headquartered in high-marketization regions and those in low-marketization regions. These results are robust to controls for potential endogeneity and alternative measurement of the key variables. Our evidence suggests that good corporate governance enhances the credibility of voluntary non-financial disclosure, and, by doing so, contributes to investment efficiency.

Keywords: Non-financial information; voluntary disclosure; corporate governance; investment efficiency; China.

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1. INTRODUCTION

A fundamental question in economics and finance is the optimal allocation of scarce resources. In frictionless capital markets, a firm's investment policy is solely dependent on its investment opportunities, and funds are allocated in such a way that the marginal return to investment projects is equated across every available project in the economy (Modigliani and Miller, 1958). At the firm level, this means that a firm obtains financing for all positive net present value projects at the prevailing cost of capital and continues to invest until the marginal benefit of investment equals the marginal cost (Chen et al., 2011b). However, in the real world firms deviate from this optimal investment behavior due to various frictions. Information asymmetry and agency problems are two such frictions (Stein, 2003). As an important type of firm-specific information, financial disclosure has the potential to significantly reduce information asymmetry and agency problems and consequently improve investment efficiency (Bushman and Smith, 2001; Healy and Palepu, 2001; Lambert et al., 2007; Biddle et al., 2009).

However, due to recognition and measurement problems in accounting, financial information is mainly backward-looking, and often lacks relevance and timeliness. As such, financial information contained in traditional financial statements cannot capture some important information that investors need in order to better understand firms' current situation and future prospects. In recent years researchers have increasingly recognized the value-relevance of non-financial information (e.g., Amir and Lev, 1996; Ittner and Larcker 1998; Gelb, 2002; Orens et al., 2010; Simpson, 2010; Dhaliwal et al., 2011, 2012).[1] Not only is the use of non-financial information recognized in business practices such as the balanced scorecard framework (Kaplan and Norton, 1996); it is also reommended by the Jenkins Comittee commissioned by the American Institute of Certified Public Accountants (Robb et al., 2001). Nowadays securities regulators worldwide have amended or issued various rules

[1] Financial disclosures consist of those items of information which are quantifiable in monetary amounts. Non-financial disclosures are either (1) narrative descriptions, facts, or opinions that do not readily lend themselves to quantification in monetary terms, or (2) items of information quantified in something other than money (Gernon and Meek, 2001).

and guidelines to encourage voluntary non-finacial disclosures.[2]

Unlike financial information, voluntary disclosure of non-financial information is usually unregulated. As a result, managers have great discretion regarding what information to disclose, and how such information is presented. While such discretion allows managers to convey relevant information to outsiders in a more timely and flexible manner, it also gives rise to opportunistic disclosure which limits its usefulness and which may even mislead investors (Lang and Lundholm, 2000; García Osma and Guillamón-Saorín, 2011).[3] Depsite some evidence that non-financial disclosure may reduce cost of capital (Orens et al., 2010) and improve the quality of analysts' earnings forecasts (Vanstraelen et al., 2003), much of the evidence is limited to the developed markets (Continental Europe and North America), where strong institutions enhance the credibility of the non-financial disclosures, thereby making them potentially useful to investors.[4] To the best of our knowledge, there is little empirical evidence, either in the developed or the emerging markets, on whether the investment efficiency of listed firms is affected by the quantity and/or quality of voluntary non-financial disclosure, and whether this relationship depends on the effectiveness of firm-level corporate governance. We aim to fill this literature gap by studying the association between firm-level investment efficiency and voluntary non-financial disclosure pertaining to ongoing and planned investment projects in China's market setting. The focus on China is motivated both by the lack of relevant studies in this largest emerging economy, and because the institutional features of China (e.g., state ownership of the majority of the listed firms, and weak investor protection) make it an interesting research setting. The evidence from our study contributes to the general accounting literature on the real effects of voluntry non-financial disclosure, and

[2] The SEC recently amended the "Safe Harbor Rules" and Private Securities Litigation Reform Act (PSLRA) to encourage the disclosure of forward-looking non-financial information and limit frivolous securities lawsuits. Securities regulators in the UK and Canada also encourage the disclosure of forward-looking information in the financial statements. In China, regulators and other stakeholders increasingly encourage non-financial information disclosure; see Zhong et al. (2011).

[3] Even when they are not opportunistic, increased quantity and timeliness of voluntary disclosures are not without concerns. Timely voluntary disclosure of information by companies sometimes results in erroneous disclosure that must later be retracted and/or corrected. Tan & Koonce (2011) present experimental evidence on the adverse consequences of retractions and corrections of management earnings forecasts.

[4] Oren et al. (2010) argue and show that since institutional differences affect the quality of mandatory financial information, the association between voluntary non-financial disclosure and a firm's cost of capital also differs across countries.

offers policy implications useful to other emerging as well as developed economies.

The China Securities and Regulatory Commission (CSRC) requires listed companies to disclose non-financial information about current and new investment projects. However, the companies are given much discretion as to how much information to provide, and how detailed such disclosures should be. As such, disclosure of non-financial information about ongoing and planned investments largely falls into the realm of voluntary disclosure (Chen et al., 2014). Regarding the motives for and consequences of voluntary disclosure, two schools of thought emerge from the extant literature (Healy and Palepu, 2001), based primarily on the Anglo-Saxon markets. In one view (the "information perspective"), firms proactively disclose high-quality information so as to mitigate information asymmetry and financing constraints and consequently lower the cost of capital (Grossman and Hart, 1980； Grossman, 1981； Milgrom, 1981; Hughes, 1986; Botoson, 1997; Bozzolan et al., 2009). Another view (the "opportunistic perspective" or "impression management") holds that managers attempt to influence investor perceptions for their private benefit by voluntarily disclosing misleading information (Lang and Lundholm, 2000; Jo and Kim, 2007; Merkl-Davies and Brennan, 2007; Kothari et al., 2009; Li, 2008, 2010). Although there is evidence that the potential for voluntary non-financial disclosure to mislead investors is constrained by strong investor protection and sophisticated investors/intermediaries in the Anglo-Saxon markets, such counteracting forces are considerably weaker in emerging markets, such as China, due to weaker institutional and market environments. Therefore, we expect that the opportunistic perspective is likely to prevail in emerging markets owning to their generally lax legal and regulatory frameworks, under-developed market intermediaries, and unsophisticated (retail) investors.

Existing research provides evidence on the monitoring and disciplining role of governance mechanisms, in particular highlighting the role of boards of directors, in facilitating and improving the control exerted over senior managers and ensuring that management acts in the interest of investors (Dechow et al., 1996; Ajinkya et al., 2005; Karamanou and Vafeas, 2005; Ahmed and Duellman, 2007; García Osma and Guillamón-Saorín, 2011). In China's market setting, there is some evidence that strong corporate governance is effective in constraining managerial opportunism and protecting

investors (Liu and Lu, 2007; Lo et al., 2010; Firth et al., 2011; Chen and Zhang, 2014). However, most of the existing evidence concerns the relationship between corporate governance and quality of financial information, which, other than being regulated, is generally verifiable and thus relatively more difficult or costly to manipulate. By contrast, non-financial disclosure is unregulated, and allows greater discretion and flexibility. To the extent that strong corporate governance limits managerial opportunism and enhances the credibility of voluntary non-financial disclosure about ongoing and planned investment projects, we expect that such disclosure may contribute positively to investment efficiency by aiding project selection and monitoring of managers/insiders.

Using a sample of 1029 A-share firms listed in the Shanghai and Shenzhen Stock Exchanges during 2007-2011, we find that the extent of voluntary disclosure of non-financial information about ongoing and planned investment projects is on average not associated with investment efficiency for weak corporate governance firms. However, voluntary non-financial disclosure is associated with significantly higher investment efficiency for strong corporate governance firms. Since we control for corporate governance in all the regressions, and since corporate governance and non-financial disclosure are only weakly correlated (their correlation coefficient ranges from 0.03 to 0.05), the strong evidence on the interaction effect cannot be attributed to non-financial disclosure acting as a proxy for corporate governance. Instead, the interaction effect indicates that non-financial disclosure has an incremental effect on investment efficiency, but the effect is significant only when a firm has strong corporate governance. We argue that this occurs because strong corporate governance enhances the credibility and thus value-relevance of non-financial disclosure (García Osma and Guillamón-Saorín, 2011; Wang and Hussainey, 2013).

Cross-sectional analysis indicates that while the impact of non-financial disclosure on investment efficiency is higher for state-owned enterprises (SOEs) than non-SOEs, the moderating effect of good governance on the relation between investment efficiency and voluntary non-financial disclosure is stronger for non-SOEs than SOEs. This finding is explained by the fact that, compared with SOEs which are often given preferential treatment by the government, non-SOEs in general face greater financial constraints, and thus have stronger incentives to engage in opportunistic disclosure in order to access market resources.

As a result, in non-SOEs strong corporate governance plays a more important role in constraining opportunistic disclosure and enhancing the credibility and usefulness of voluntary non-financial disclosure. In contrast, we find the moderating role of corporate governance in the non-financial disclosure-investment efficiency relation to be equally strong for firms headquartered in high-marketization regions, and for those headquartered in low-marketization regions. This suggests that internal corporate governance positively impacts investment efficiency irrespective of the stage of regional economic development. The results are robust to controls for endogeneity in the voluntary disclosure and investment decisions, and to alternative measurement of the key variables. Taken together, the evidence suggests that in China's emerging stock market, strong corporate governance enhances the credibility of voluntary non-financial disclosure, and, by doing so, improves investment efficiency.

We contribute to the literature in several ways. Firstly, our results for China, based on a content analysis of voluntary non-financial disclosure pertaining to ongoing and planned investment projects, complements and supplemens prior studies (mainly in developed markets) which suggest that non-financial disclosure is value-relevant and useful (Amir and Lev, 1996; Vanstraelen et al., 2003; Orens et al., 2010; Dhaliwal et al., 2011). Secondly, we extend that strand of accounting literature by showing that voluntary non-financial disclosure has the potential to mitigate over- and under-investment, but such potential depends on whether firm-level corporate governance is able to constrain information manipulation and enhance the credibility of such disclosure (García Osma and Guillamón-Saorín, 2011; Wang and Hussainey, 2013). In situations where voluntary non-financial disclosure is not constrained by strong corporate governance and thus is more likely to be opportunistic, such disclosure does not help improve investment efficiency. Although the importance of the credibility of voluntary disclosure in resource allocation has been well recognized in the litertaure (e.g., Healy and Palepu, 2001), we are among the first to examine this issue in the specific context of firm-level investment efficiency. In addition, while prior studies (e.g., Hope and Thomas, 2008; Biddle et al., 2009; Shroff et al., 2014) have examined the usefulness of financial disclosure (e.g., the role of financial disclosures in monitoring managers; the effect of aggregate financial reporting quality on investment

efficiency) using rough proxies for the information environment or financial reporting quality, our study focuses on voluntary non-financial disclosure pertaining specifically to investment projects, which represent one major source of value creation (McConnell and Muscarella, 1985; Chung et al., 1998). Doing so has the advantage of illuminating the likely mechanisms through which such disclosure may affect investment efficiency.[5] Lastly, we contribute to the corporate governance literature by providing evidence that strong firm-level corporate governance to some extent can substitute for weak country-level investor protection in terms of promoting transparency and truth-telling, and improving investment efficiency. The positive effect of strong corporate governance on investment efficiency we document for China corroborates, and extends the findings in prior studies which suggest that corporate governance, broadly construed, impacts firms' information disclosure quality (García Osma and Guillamón-Saorín, 2011; Wang and Hussainey, 2013), and affects stock price efficiency and capital allocation (Morck et al., 2000; Wurgler, 2000; Durnev et al., 2004). The evidence has implications for regulators, managers and investors alike.

Section 2 reviews the literature on corporate information disclosures, introduces China's institutional background, and presents the predictions. Section 3 describes the sample selection, variable measurement and testing method. Section 4 presents and discusses the empirical results. The final section provides a summary and concludes.

2. BACKGROUND AND RESEARCH QUESTION

(i) Value-relevance of corporate information disclosure

[5] Firms' investment decision-making process cannot be directly observed, and thus it is difficult, if not impossible, to say definitively whether and how more and better information actually mitigates investment efficiency. Most previous studies measure accounting or financial reporting quality using rough proxies. For example, Shroff et al. (2014) derive proxies for the transparency of the external information environment based on analyst coverage, press coverage, and earnings transparency. They show that this measure of information quality improves firm-level investment efficiency (which they proxy using measures similar to ours in nature), based on the assumption that a better information environment reduces information asymmetries and improves the investment decision-making processes. Like previous studies, we must base our inference on the presumed channel/mechanism of influence that high quality information reduces information asymmetry and enhances monitoring. However, compared to past studies, our measure of non-financial disclosure is based on information pertaining specifically to firms' current and planned future investments, and thus the likely impact of such disclosures on investment efficiency appear to be more direct.

Studies of the relationship between information disclosure and investment efficiency start from examining the role of financial disclosure. Bushman and Smith (2001) and Healy and Palepu (2001) amongst others argue that high-quality financial information potentially contributes to investment efficiency in at least three ways. First, financial accounting information of firms and their competitors helps managers and investors identify and distinguish between good and bad investment opportunities (project identification). This leads directly to the more accurate allocation of capital by investors and managers to their highest valued uses. In addition, the lower estimation risk perceived by investors will likely reduce the cost of capital, which may further contribute to investment efficiency (Botosan, 1997; Francis et al., 2008; Cheynel, 2013). Second, financial accounting information is a direct input to corporate control mechanisms designed to discipline (via monitoring) managers to guide resources towards good projects and away from bad projects, and to prevent managers from expropriating the wealth of investors. Finally, firms' pre-commitment to the timely disclosure of high-quality financial information reduces investors' risk of loss from trading with more informed investors, thereby attracting more funds in the capital markets, which, in turn, lowers investors' liquidity and risk and improves firms' operating decisions (Fama and Laffer, 1971; Diamond and Verrecchia, 1991; Baiman and Verrecchia, 1996; Verrecchia, 2001). These theoretical arguments are supported by substantial empirical evidence (e.g., Verdi, 2006; Biddle and Hilary, 2006; McNichols and Stubben, 2008; Kedia and Philippon, 2009; Biddle et al., 2009; Bushman et al., 2011).

In addition to financial information, investors are also concerned about non-financial information. Although non-financial information, such as intangible assets, is important in the value creation processes of firms, financial reporting standards largely fail to recognize such information in the financial statements (Gu and Wang, 2005). Consequently, investors, financial analysts and other stakeholders need to rely on non-financial information in order to assess a firm's future cash flows and value creation (Orens et al., 2010). Indeed, a plethora of studies find that non-financial information plays an important role in the capital markets, in particular in relation to valuation, similar to the role of financial information. Amir and Lev (1996) examine the value relevance of non-financial information of independent cellular companies in the US. They find that non-financial indicators, such as

POPS (a growth proxy) and Market Penetration (an operating performance measure), are highly value-relevant. Focusing on US-listed firms, Brazel et al. (2009) examine whether auditors can effectively use non-financial measures (NFMs, such as the number of retail outlets, warehouse space, or employee head counts) to assess the reasonableness of financial performance and, thereby, help detect financial statement fraud. Their results suggest that NFMs can be effectively used to assess fraud risk. Dhaliwal et al. (2012) examine the relationship between disclosure of non-financial information and analyst forecast accuracy in 31 countries. Using the issuance of stand-alone corporate social responsibility (CSR) reports to proxy for disclosure of non-financial information, they find that the issuance of stand-alone CSR reports is associated with lower analyst forecast error. Focusing on three European countries, Vanstraelen et al. (2003) find that higher levels of forward-looking non-financial disclosures are associated with lower dispersion and higher accuracy in financial analysts' earnings forecasts. Using a large-scale sample of UK FTSE All-Share companies, Wang and Hussain (2013) find that forward-looking statements of well-governed firms improve the stock market's ability to anticipate future earnings.

One important type of non-financial disclosure is information about firms' investment projects, including current and planned investments. As discussed previously, such disclosure falls into the realm of voluntary disclosure, at least in China, and the usefulness of voluntary non-financial disclosure, and hence its potential impact on investment efficiency, hinges critically on the credibility as well as the amount and content of the disclosure. We next discuss this within China's specific market setting.

(ii) China's institutional, regulatory and market environments

China's capital markets have developed rapidly since the 1990s, marked by the establishment of two stock exchanges and the (partial) privatization of SOEs through public listing. However, compared with the developed economies, China's capital markets are still immature, due to incomplete legislation and an inefficient regulatory framework. Allen et al. (2005) compare China's legal system with the 49 countries studied in La Porta et al. (1999) and find that, in the code of law on paper, China falls between the English-origin countries and French-origin countries in terms of investor protection. However, in terms of actual law

enforcement, China's measures are significantly below all average measures of the LLS sample countries, regardless of their legal origins. China's weak institutions and information environment make it difficult to detect disclosure violations by listed firms, punish management opportunistic behavior, such as false or misleading financial disclosures, and protect minority shareholders' interest (Piotroski and Wong, 2011; Cheng et al., 2011).

In terms of the regulatory framework, China's property rights system and institutional reality make "regulatory capture" more likely (Shleifer, 2005). The majority of China's listed firms are SOEs, and the government plays the dual role of being the controlling shareholder and the regulator (Clarke, 2003; Firth et al., 2006; Firth et al., 2013). The government wants the firms it owns to be run efficiently, but not solely for the purpose of wealth maximization (Liu and Lu, 2007). In fact, the government also has other objectives, such as the maintenance of employment levels, direct control over sensitive industries, or politically motivated appointments (Clarke, 2003; Liu and Lu, 2007). As a result, many SOEs are charged with many social functions. To prop up failing SOEs, the government often has to protect and bail them out (Lin and Li, 2004). Due to government intervention and political influences, SOEs often suffer from investment inefficiency (Cheng et al., 2011) and suboptimal financial performance (Sun and Tong, 2003; Fan et al., 2007). However, the extent to which investment efficiency is enhanced by the quantity and/or quality of voluntary non-financial disclosure, and whether the relationship varies between SOEs and non-SOEs has not been systematically examined.

Currently, regulatory sanctions for misleading/false information disclosure are governed primarily by *Notice on Accepting Civil Tort Cases Involving False Information Disclosure in the Securities Market (*hereafter, *Notice)*, issued by the High Court in 2002, and by *Stipulations Regarding the Acceptance of Civil Litigation Cases Arising from False Information Disclosure in the Securities Market (*hereafter, *Stipulations)*, issued by the High Court in 2003. To further improve the quality of information disclosure and to be consistent with the new *Company Law* and *Securities Law*, the CSRC released in 2007 the *Regulations on Information Disclosure of Listed Companies*, which clearly specifies the disclosure contents in periodical reports, set particular rules for the disclosure of incidents in *ad hoc*

reports, and stipulates the punishments on the violation of disclosure rules.[6] Although these regulations provide a legal basis and judicial guidance for the acceptance and handling of cases involving misleading or false information disclosures in the securities market, there exist many practical problems in the actual implementation.

First, it is very difficult to establish causation between false disclosures and the losses sustained. In practice, many listed companies have managed to lower or be exonerated from legal liability on the ground of systemic risk or factors beyond their control.

Second, there is uncertainty about how to establish the discovery date for false disclosure. According to Article 20.2 of the *Stipulations*, "The discovery date of false disclosure shall be the date on which the false disclosure was first publicized on national newspapers, periodicals, radio, or television etc." However, because many media are likely to be involved, it would be difficult for investors to decide whether and when the false disclosure was first exposed to the public. In actual practice, the listed firms being accused often managed to limit their damages paid by citing a large number of media reports and arguing that the false disclosure had already been publicized before the announcement of investigation by CSRC.

Third, the burden of proof imposed on the plaintiff has the effect of increasing the costs of protecting minority shareholder right owning to their information disadvantage. Even if successful, minority shareholders only get compensated for the actual damages suffered, and the listed firm does not suffer punitive damages.[7] Furthermore, due to historical and other reasons, regulatory bodies in China often recruit from brokerage firms and fund houses. The cooperative relationship between regulators and industry practitioners has the effect of hindering the achievement of the regulatory objectives (Yue and Wang, 2006).

It is thus apparent that China's existing legal framework has only a limited deterrence effect on misleading or false disclosures, with the result that managers are faced with relatively low risks (both *ex ante* and *ex post*) of being punished for opportunistic or false

[6] For details on the evolution and current status of China's corporate governance system and disclosure practices, see Standard & Poor's (2009a, b), Zhong et al. (2011), Chen and Gong (2012), Leung and Cheng (2013), and Lan et al. (2013).

[7] In the famous ST Jiabao case, six shareholders only received a total compensation of 6.1973 million yuan, which represents a mere 32.28% of the losses suffered.

disclosures, a problem that may be particularly severe among poorly governed firms, especially financially constrained non-SOEs that need external financing for new investments.

China embarked on corporate governance reforms at the beginning of the 2000s with the aim of enhancing minority shareholders' protection against expropriation by controlling shareholders. The *Guidance on Establishing Independent Directors for Listed Companies* was issued in 2001. This was followed by implementation of the *Code of Corporate Governance for Listed Companies* in China in 2002, and of the new *Company Law* in 2006 (Chen and Gong, 2012). Over the past decade China has established a corporate governance system centered on the board of directors. The continuous improvement in China's corporate governance system and investor protection was recognized by Standard & Poor's (2009a) *Country Governance Study–Corporate Governance in China*. Empirical studies suggest that improvement in China's corporate governance system has played a positive role in constraining managerial opportunism and protecting investors' rights. For example, Chen et al. (2006) find that among the sample of 169 firms sanctioned by CSRC for financial frauds during 1999-2003, firms with a large proportion of outside directors commit less fraud. This is attributed to outside directors monitoring a firm's actions and helping deter fraud. Lo et al. (2010) find that strong corporate governance firms (e.g., those with a board that has a higher percentage of independent directors, or those without CEO duality) are less likely to engage in transfer pricing manipulations. Using data from 447 firms representing 3129 firm-year observations during 2000-2006, Chen and Zhang (2014) find that earnings management is curbed through the introduction of independent non-executive directors on the board and the audit committee and accounting/financial experts sitting on the audit committee.

(iii) Voluntary non-financial disclosure, corporate governance and investment efficiency

The discussions above suggest that the ability of corporate voluntary disclosures to mitigate the adverse effects of information asymmetries between managers/insiders and outsider investors depends critically on the credibility and value-relevance of the disclosure. Voluntary non-financial disclosure pertaining to ongoing and planned investment projects potentially overcomes the backward-looking nature of financial disclosures, and thus may

contribute positively to investment efficiency by aiding project selection and monitoring of managers/insiders. However, a plethora of studies show that managers/insiders may mislead outside investors by intentionally disclosing false information (Healy and Palepu, 2001; Lang and Lundholm, 2000; Jo and Kim, 2007; Li, 2008, 2010). Such a problem can become even more serious in developing countries, such as China, where lax regulation and ineffective law enforcement make it difficult to deter, detect and punish misleading or false information disclosures (Piotroski and Wong, 2011). It is not uncommon in China for companies to be quick to release good news, and slow to release bad news. Some even intentionally release unreliable or misleading information in the hopes of pumping up selective publicity (He, 2003).[8] Tang et al. (2008) find that in China, managers extract private benefits of control by packaging and making their information disclosures appear more reliable and timely. Thus, there is at least anecdotal evidence in China that voluntary disclosures are likely opportunistic, and hence are of low credibility/quality.

Low-quality (i.e. self-serving and misleading) non-financial disclosure may lead to adverse economic consequences. For example, unsophisticated credulous investors may not properly discount the reliability of such disclosures.[9] Reliance on positive publicity or false disclosures may lead to under-estimation of firm's risk, and over-estimation of project future cash flows and firm value. The result may be lower cost of capital and capital misallocation, such that high productivity firms are denied scarce resources while low productivity firms obtain financing for low-quality projects. These tend to distort investment efficiency.

As an important investor protection mechanism, corporate governance can limit managerial misbehavior, influence corporate information quality, and improve investment efficiency, by providing an architecture of accountability. Corporate governance encompasses all of the provisions and mechanisms aimed at ensuring that the assets of the firm are managed efficiently and in the interests of the providers of finance (Shleifer and Vishny, 1997). A growing body of literature examines whether various internal

[8] The lack of an independent press in China makes it difficult for investors and other stakeholders to detect and punish misleading information disclosures (Gong et al., 2012, 2013; Jin et al., 2014).

[9] In the well-publicized case involving Hangxiaoganggou in 2007, the firm disclosed only favorable information about its housing projects in Angola amounting to 34 billion yuan, but was silent about the possible risks involved.

governance mechanisms are effective in controlling opportunistic managerial behaviour (Beasley, 1996; Xie et al., 2003). The results from this literature highlight the importance of corporate boards in ensuring that managers act in the interest of investors. Another body of recent work views corporate governance in a broader light, as encompassing a number of internal and external mechanisms that, jointly, lessen managerial ability to extract rents or bias information (e.g., Bertrand and Mullainathan, 2003; Davila and Penalva, 2006; Gompers et al., 2003).

There is broad empirical support, both within China (e.g., Bai et al. 2004; Liu and Lu, 2007; Chen and Zhang, 2014) and in other countries, for the proposition that strong corporate governance plays a positive role in affecting economic and corporate outcomes. In a recent study using Spain data, García Osma and Guillamón-Saorín (2011) find that strong governance limits impression management, consistent with governance monitoring effectively reducing self-serving disclosures by management. However, to date there is no direct empirical evidence on the issue of whether and how corporate governance impacts the quality of voluntary non-financial disclosure and consequently investment efficiency. We predict that strong corporate governance mechanisms reduce information manipulation and increase the reliability and relevance of the information voluntarily disclosed. This is achieved by strong corporate governance monitoring firm communication strategy to reduce biases in the preparation, presentation and dissemination of information, and thus reducing the potential for erroneous decision making by outsiders (García Osma and Guillamón-Saorín, 2011). As a result of higher quality (i.e., more reliable/relevant/credible) non-financial disclosures pertaining to ongoing and planned investment projects, we predict that outside investors will be able to more accurately estimate the firm's future revenues, performance and hence value creation, such that capital will be channeled into higher quality (more efficient) firms/projects, and away from lower quality firms/projects. We test the following hypothesis:

H1: Strong corporate governance is associated with more credible voluntary non-financial disclosure and hence higher investment efficiency.

It is now well established that ownership type/control, through its impact on corporate governance, is associated with firm value and performance in China. Xu and Wang (1997) using 1993, 1994 and 1995 data finds that there is a relationship between ownership structure

and corporate performance, confirming the positive role of institutional investors and the negative role of state shareholding. Using a sample of 434 manufacturing firms listed on the Chinese stock exchange in 1997, Chen (2001) find a strong relation between ownership concentration and corporate performance, measured by Tobin's Q. A further classification of owners reveals that while shares held by state play a negative role in corporate governance, domestic institutional and managerial shareholdings improve the firms' performance. A study by the Shanghai Stock Exchange (2006) found that the corporate governance mechanisms of central SOEs are better than those of local SOEs, because the largest shareholders of the former do not have strong incentives to expropriate profits and the central government, as the ultimate shareholder, has implemented restrictions on the activities of the largest shareholders. In contrast, the largest shareholders of local SOEs usually engage in tunnelling and other forms of expropriation. Chen et al. (2009) argue that because different types of owners in China's listed firms have different objectives and motivations, this will affect how they exercise their control rights over the firms they invest in, and in turn the relative efficiency of these firms. Their empirical results indicate that the operating efficiency (measured by return on assets, cash flow return on assets, return on sales, productivity, and Tobin's Q) of Chinese listed companies varies across the type of controlling shareholder: SOEs controlled by the central government perform best, firms controlled by State Asset Management Bureaus and private firms perform worst, and SOEs controlled by local governments are in the middle. Some previous studies (e.g. Cheung et al. 2010) find a positive association between the level of corporate governance (as opposed to ownership type, though the two are likely to be strongly correlated) and firm value. More recently, Cheng et al. (2011) and Chen et al. (2011b) find that SOEs have weaker investment efficiency than non-SOEs.

None of the aforesaid prior studies have examined the role of corporate governance in moderating the association between non-financial disclosure and investment efficiency, and how this varies between SOEs and non-SOEs. Because most prior research suggests a negative effect of state ownership on firm performance in China, and given prior findings of a negative association between ownership type/concentration and corporate governance quality, we expect ownership type and, relatedly, corporate governance to impact the role of voluntary non-financial disclosure in affecting investment efficiency.

Specifically, regarding the impact of state ownership on the motives for and effects of voluntary disclosure, the literature suggests two possibilities. On the one hand, the institutional environment in China favors SOEs over non-SOEs (Berkman et al., 2010), with large SOEs often given preferential treatment in terms of access to bank loans, tax cuts, award of contracts, direct government subsidies, and even bias in the judicial process (e.g., Sun and Tong, 2003; China Securities and Regulatory Commission, 2009; Firth et al., 2011). Given such special treatment, especially easy access to capital, SOEs tend to have lower incentives to engage in manipulation of non-financial disclosure. In contrast, non-SOEs (firms owned/controlled by non-state entities or individuals) have relatively limited resources (Yiu et al., 2005). For example, non-SOEs in China are often discriminated against by the state-owned banks (Li et al., 2012). Allen et al. (2005) suggest that, while non-SOEs account for a larger share of production than SOEs in China, the amount of bank credit extended to the former is much lower than that extended to the latter. Also, the banks' lending decisions to non-SOEs are made on a competitive basis, and the banks place more restrictions on information reflecting profitability. Non-SOEs' financial constraints and reliance on external capital jointly create stronger incentives for them to manipulate voluntary non-financial disclosure. This leads to the prediction that non-financial disclosure by non-SOEs is of lower credibility/quality, and thus has a lower impact on investment efficiency on average. Among such firms, however, strong corporate governance is expected to have a larger marginal moderating effect on the role of non-financial information in mitigating investment inefficiency.

On the other hand, it may be argued that the disclosure quality of SOEs is poorer than that of non-SOEs. This belief is advanced on the following grounds: First, agency problem is more serious in SOEs than in non-SOEs due to multiple interest conflicts, which, in turn, increase information asymmetry and limit monitoring efficiency. Second, as Shleifer and Vishny (1989) suggest, concentrated ownership can promote managerial self-dealing and magnifies private control benefits. Thus, managers of SOEs are more likely to limit information disclosure for the benefit of the controlling parties. This line of argument implies that voluntary non-financial disclosure by SOEs is of lower quality and hence has a relatively low impact on investment efficiency on average, and that corporate governance has a larger

marginal effect on the relation between non-financial disclosure and investment efficiency within SOEs. Given these divergent predictions, we tentatively formulate our second hypothesis as follows:

H2: The moderating role of corporate governance in the non-financial disclosure-investment efficiency relation is stronger among non-SOEs than among SOEs.

One of the major contributions of this paper is to shed light on how variations in firm-level corporate governance, both between SOEs and non-SOEs, and within each ownership type, affect the role of non-financial disclosure pertaining specifically to firm-level investments, in improving investment efficiency.

3. RESEARCH DESIGN AND SAMPLE DATA

(i) Sample selection

Our sample comprises all listed A-share companies in China during 2007-2011. We choose this time period because China introduced a new accounting standard in 2007. The change in accounting standard affects the comparability of the accounting data after 2007 with the accounting data in the earlier years.

The data sources include the China Centre for Economics Research (CCER) database, the Nankai Corporate Governance Index for Chinese Listed Companies, and the China Stock Market and Accounting Research (CSMAR) database. Following prior studies (e.g., Chen et al., 2011b), we use non-financial Chinese firms listed on the Shanghai and Shenzhen stock exchanges during 2007-2011 to construct our sample. We remove firms with missing data and/or with abnormal observations. This gives us a total of 1029 firms per year, and a total of 5145 firm-year observations. We winsorize the continuous variables at the top 1% and bottom 1% levels to mitigate the effects of outliers (all results are qualitatively similar without winsorization).

(ii) Variable definition and measurement

Investment efficiency

The two key constructs in the analysis are investment efficiency and voluntary disclosure

of non-financial information (NF) in corporate reports (including annual reports and other corporate disclosures) pertaining to planned and on-going investment projects. In a first attempt to control for the interdependencies between firms' disclosure and investment decisions (Beyer and Guttman, 2012), we investigate how NF in the *current* year affects *next* year's investment efficiency.

Following prior research (e.g., Richardson, 2006; Biddle et al., 2009; Chen et al., 2011b), we measure investment efficiency as deviations from expected investment using a model that predicts investment as a function of growth opportunities. Thus, both under-investment (negative deviations from expected investment) and over-investment (positive deviations from expected investment) are considered inefficient investments. Specifically, we estimate a parsimonious model for expected investment as a function of revenue growth (e.g., Modigliani and Miller, 1958; Hubbard, 1998; Chen et al., 2011b), and allow for differential predictability for revenue increases and revenue decreases (McNichols and Stubben, 2008). Operationally, we estimate the following piecewise linear regression model:

$$Invest_{i,t} = \alpha_0 + \alpha_1 NEG_{i,t-1} + \alpha_2 \%REVGrowth_{i,t-1} + \alpha_3 NEG * \%REVGrowth_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

$Invest_{i,t}$ is defined as the sum of new investment in machinery, equipment, vehicles, land, buildings, and research and development expenditures, less the sale of fixed assets, and scaled by lagged total assets for firm *i* in year *t*; $\%REVGrowth_{t-1}$ is the annual revenue growth rate for firm *i* in year *t-1*; and the indicator variable $NEG_{i,t-1}$ takes the value of 1 for negative revenue growth, and 0 otherwise.

We estimate the investment model cross-sectionally with at least ten observations in each CSRC level-one industry, based on the residuals of Equation (1), i.e., the deviations from the predicted investment levels. As explained later, we use both the raw value and the absolute value of the residuals to classify firms into over- and under-investment firms. Furthermore, to mitigate measurement errors arising from possible misclassification of firm types based on residuals, for robustness we also use decile ranks in place of residuals, and obtain qualitatively similar results.

Voluntary disclosure of non-financial information (NF)

We focus on voluntarily disclosed non-financial information pertaining to planned and on-going investment projects. Specifically, we start with the Nankai Corporate Governance Index for Chinese Listed Companies database which contains detailed information disclosures made by the listed firms. We compile a NF score based on the following criteria/items.[10] First, we count disclosures regarding the sources and cost of financing, and use of the funds. Such information helps investors understand the firms' investment projects and their financing. Second, we count disclosures regarding the impact of the planned and on-going investment projects on current and future performance. Such information helps investors understand the expected returns on the investments. Third, we count disclosures regarding investment risks and risk management strategy. Such information informs investors about the risk profiles of the firms' investments and the risk-return tradeoff faced by investors. Appendix 1 lists the 18 indicators and describes the scoring method in greater detail.

Operationally, we compute NF as follows:

$$NF = \frac{\sum \textit{Nonfinancial disclosure score}}{\textit{Total number of nonfinancial disclosures}}$$

Corporate governance index

Well-governed firms tend to disclose more information, and are likely to be more efficient. To gauge the incremental effect of non-financial disclosure and the interaction effect of non-financial disclosure and corporate governance on investment efficiency, it is necessary to control for corporate governance as well as other determinants of investment efficiency. Our measure of corporate governance follows Bai et al. (2004) and Chen et al. (2014) among others which take into account China's institutional setting. Specifically, we include the

[10] We consider these disclosures to be voluntary disclosure for the following reasons. First, although CSRC requires timely disclosure of information about major investment projects (e.g., risks, revenues and progress), up till 2011 CSRC did not stipulate what constitutes major investment projects, effectively leaving this to be determined by management. Second, while CSRC mandates the disclosure of project risks and expected return, no detailed guidelines have been issued regarding actual implementation. Third, as a practical matter, we observe wide variations in firms' non-financial disclosures pertaining to investment projects. Such variations are not to be expected if the disclosures are mandatory. Our non-financial disclosure items, whilst less comprehensive than those in Robb et al. (2001) or Orens et al. (2010), are deemed to be suitable for our research question in that they allow investors and other stakeholders to assess a firm's future cash flows and value creation pertaining to investment projects.

following variables in constructing a corporate governance index.[11] The first is the stake of the largest shareholder, which measures both the largest shareholder's interest in a company and also the largest shareholder's power on the board. Prior research (e.g., Bai et al., 2004; Ding et al., 2007) finds evidence of a U-shaped relationship between ownership concentration and firm performance in China. Thus we include the square of the largest shareholder's percentage ownership. We also include a dummy variable coded 1 if a firm has a parent company, and 0 otherwise. This is because if the largest shareholder of a listed company is a firm, the scope for tunneling is large because a company has more channels available than does an individual, such as through related party transactions (Cheung et al., 2006; Jian and Wong, 2010) or transfer pricing manipulation (Lo et al., 2010).

With respect to the board of directors, we include a dummy variable that equals 1 if CEO duality exists and 0 if otherwise. The monitoring role of board of directors is compromised when a CEO controls fully or partially the board. To measure the degree of outside control of the board, we include the ratio of the number of directors who are not members of the management team. If the board is dominated by members of the management team, we do not expect it to play an effective monitoring role.

Regarding executive compensation, stock options are rare in China. Furthermore, the information on executive pay is not complete and is often inaccessible. Hence, following Bai et al. (2004) we define the top executives of the firm to be its CEO, the executive vice presidents, the chairperson and the vice chairpersons of the board of directors. We take the percentage of shares held by these top executives as a measure of their economic interests in a company. The interests of the top managers are better aligned with the interests of shareholders if they have a larger stake in the firm.

Turning to the external mechanisms, we measure the market for corporate control by the concentration of shares in the hands of the second to the tenth largest shareholders. We take

[11] García Osma and Guillamón-Saorín (2011) amongst others point out that multiple elements of corporate governance jointly contribute to the strength of the overall governance system and limit managerial self-serving disclosures. By computing a comprehensive corporate governance index, our paper differs from many prior China studies which categorize firms based on type of ownership/control (e.g. SOE versus non-SOE, local SOE versus central SOE).

the natural logarithm of the sum of squares of the percentage shareholding by the 2nd to the 10th largest shareholders. This variable is expected to have a positive effect on corporate governance and firm value.

While most Chinese listed companies issue only A-shares and are regulated uniformly by Chinese jurisprudences, some companies have also issued H shares (traded on the Hong Kong Stock Exchange) or B shares (foreign shares traded in the Shanghai or Shenzhen stock exchange). Dual-listed companies are subject to stricter legal/disclosure rules. We follow Bai et al. (2004) amongst others and include in our corporate governance index a dummy variable that equals 1 if a company has H/B shares and 0 otherwise. In addition to the above seven measures of corporate governance derived from conventional economic theory, we also include a variable to indicate whether the controlling shareholder is the central or local government. Prior studies find that a controlling government stakeholder can use the listed company as a vehicle to achieve policy goals although they may conflict with shareholders' interests, and may even expropriate minority shareholders (Bai et al., 2000; Cheung et al., 2010; Berkman et al., 2010).

In addition to the above corporate governance variables, we also include several other variables in our construction of corporate governance index that affect firms' information environment, including percentage of institutional ownership and the number of analysts following the firm. To reduce the dimensionality of the individual corporate governance mechanisms, we follow prior studies and construct a corporate governance index using the principal component method.

Following prior studies (e.g., Verdi, 2006; Biddle and Hilary, 2006; Chen et al., 2011b), we include additional firm-level variables to control for firm characteristics. We include a cash flow variable (CFO_{t-1}), defined as cash flow of the firm divided by its total asset at the end of year *t*, to control the effect of firm's cash flow. In order to control the effect of firm's size on over-investment behaviour, we include $LN\ (ASSET)_{t-1}$, defined as the natural logarithm of the book value of total assets at the end of year *t-1*. We also include firm's revenue (REV_{t-1}),

leverage (LEV_{t-1}), earnings (ROE_{t-1}) to control their effect on investment behaviour. Table 1 contains the variable definitions.

[Insert Table 1 here]

(iii) Baseline empirical model

To test our first hypothesis (H1), we first divide the sample firms into strong corporate governance and weak corporate governance firms based on the median value of the corporate governance index for each industry and year. We then estimate the following regression model and test if the regression coefficient on NF is statistically different between the strong governance and the weak governance groups:

$$INEF_t = \alpha_0 + \alpha_1 NF_{t-1} + \alpha_2 LN\ (ASSET)_{t-1} + \alpha_3 LEV_{t-1} + \alpha_4 REV_{t-1} + \alpha_5 ROE_{t-1} + \alpha_6 CFO_{t-1} + \varepsilon_t \quad (2)$$

$INEF_t$ denotes investment efficiency (over-investment, OVER, or under-investment, UNDER), and NF_{t-1} denotes extent of voluntary non-financial disclosure. INEFt is alternately measured as the raw value, and the absolute value of the residual, of the residual from Equation (1).

Since corporate governance index is a continuous variable, we also test H1 by examining the regression coefficient on the interaction term between corporate governance index and NF:

$$INEF_t = \beta_0 + \beta_1 NF_{t-1} + \beta_2 CG_{t-1} + \beta_3 NF_{t-1} * CG_{t-1} + \beta_4 LN\ (ASSET)_{t-1} + \beta_5 LEV_{t-1} + \beta_6 REV_{t-1} + \beta_7 ROE_{t-1} + \beta_8 CFO_{t-1} + \varpi_t \quad (3)$$

$INEF_t$ denotes investment efficiency, CG_{t-1} denotes corporate governance index, and $NF_{t-1}*CG_{t-1}$ denotes the interaction of CG and NF. A statistically significant coefficient on *NF*CG* indicates that the effect of non-financial disclosure on investment efficiency depends on the level of corporate governance, after controlling for other determinants of investment efficiency (including corporate governance). Specifically, when the dependent variable is the raw value of UNDER (OVER), a positive (negative) coefficient on $NF_{t-1}*CG_{t-1}$ indicates that

strong corporate governance mitigates under-investment (over-investment).[12] Note that in Equation (3), the partial effect of non-financial disclosure on investment efficiency is captured by β1+β3.

4. EMPIRICAL RESULTS

(i) Descriptive statistics

Panel A of Table 2 reports the time variation of voluntary non-financial disclosure (NF) and new external financing (increase in total external financing, scaled by total asset at end of the prior year) for the whole sample. There is no apparent time trend in either variable. At the firm level, the first-order autocorrelation of NF is 0.2362 (untabulated), which is significant at the 1% level. In the robustness check, we find a positive and statistically significant association between voluntary non-financial disclosure and contemporaneous as well as next year's external financing. Together, these suggest that non-financial disclosure exhibits some degree of 'stickiness', but increases when firms need to raise external financing.

Panel B and Panel C present the descriptive statistics of the key variables for the over-investment and under-investment firms, respectively. A total of 3305 firm-observations exhibit under-investment, compared with 1855 that exhibit over-investment. The mean (median) of NF is 0.3399 (0.3125) for the under-investment group, whereas for the over-investment group, the mean (median) is 0.3474 (0.3750). Thus, overall Chinese listed firms seem to voluntarily disclose only a limited amount of non-financial information. However, there is considerable variation in the amount of non-financial disclosures, as reflected in the minimum, maximum and standard deviation of NF.

Panel D and Panel E of Table 2 present the correlation coefficients among the key variables for the over-investment and under-investment firms separately. Of special interest to this study, under-investment is positively correlated with both voluntary non-financial disclosure and corporate governance, while over-investment is negatively correlated with corporate governance. Note also that the correlation coefficient between NF and CG is low (ranging from 0.03 to 0.05), so any impact of NF on investment efficiency is unlikely to be

[12] Unless otherwise noted, UNDER (OVER) is defined as the raw value of the residual from Equation (1).

attributed to NF being a function (or surrogate) of CG, especially when both are included in the same regression.

[Insert Table 2 here]

(ii) Baseline regression results

[Insert Table 3 here]

Panel A of Table 3 shows that for the whole sample, the coefficient on non-financial disclosure is 0.0045 (-0.0060) for the under-investment (over-investment) firms, and is statistically indistinguishable from zero. Thus, the extent of non-financial disclosure is on average not statistically associated with investment efficiency in the subsequent year. A possible reason for this is that voluntary non-financial disclosure in general is perceived as subject to manipulation and thus is of low credibility.

Panel B and Panel C of Table 3 report the results for strong corporate governance and weak corporate governance firms within the under-investment and over-investment sub-samples, respectively.[13] For the strong corporate governance firms within the under-investment (over-investment) sub-sample, the coefficient on non-financial disclosure is positive (negative) and statistically significant at the 5% level. By contrast, for the weak corporate governance firms within both the under- and over-investment sub-samples, the coefficients on non-financial disclosure are much smaller in magnitude, and are statistically indistinguishable from zero. The evidence indicates that non-financial disclosure by strong corporate governance firms is useful in mitigating investment inefficiency (i.e., increasing investment among the under-investment firms, and decreasing investment among the over-investment firms). We argue that this is because such disclosure is rendered credible by the strong corporate governance in place which constrains managerial opportunism.

Our interpretation is consistent with prior research arguing for a credibility-enhancing role of corporate governance in financial reporting. For instance, Mercer (2004) posits that investors may feel more confidence in the veracity of a firm's disclosures when the firm has a high-quality board of directors. Healy and Palepu (2001) suggest that the board plays an

[13] We run the regressions separately for the OVER and UNDER groups (using the signed residuals) because the effect of NF on INEF may not be symmetric between the two groups/types of firms.

important role in enhancing the quality of voluntary disclosure and hence its credibility. By including multiple indicators of corporate governance quality in our corporate governance index, and by relating corporate governance to non-financial disclosure and investment efficiency, our study extends prior research and reaffirms the credibility-enhancing role of corporate governance in a new and important context (i.e., investment efficiency in China).

To further investigate the moderating role of corporate governance on the relation between non-financial disclosure and investment efficiency, we next estimate Equation (3) after adding the interaction term NF*CG. Other than the regression coefficient on the interaction term, we are also interested in the sum of the coefficients on NF and NF*CG, which captures the overall effect of NF on investment efficiency. The results are reported in Panel A of Table 4.

[Insert Table 4 here]

For the under-investment sub-sample, higher voluntary non-financial disclosure *per se* is not associated with higher investment efficiency (the coefficient on NF is statistically insignificant). For the over-investment sub-sample, the coefficient on NF is negative and only marginally significant. For both sub-samples, higher corporate governance is associated with higher investment efficiency, as indicated by a positive (negative) and statistically significant coefficient on CG for the under-investment (over-investment) sub-sample. More importantly for this study, the coefficient on NF*CG is positive and statistically significant for the under-investment sub-sample, and negative and statistically significant for the over-investment sub-sample. This is consistent with the by-group regression results in Table 3, and reaffirms the earlier finding that effect of voluntary non-financial disclosure on investment efficiency is contingent on the level of corporate governance. For both the under-investment and over-investment cases, the sum of the coefficients on NF and NF*CG is statistically different from zero, which indicates that non-financial disclosure has a positive effect on investment efficiency, with the effect increasing as the level of corporate governance increases.

To facilitate interpretation, and assess whether the results are sensitive to how we classify over- and under-investment firms, we next re-run the regressions using the absolute value of

the residual from Equation (1). Consistent with Chen et al. (2011a), higher (absolute) residual values indicate higher levels of investment inefficiency. The results are reported in Panel B of Table 4.

For the whole sample, NF is not associated with investment efficiency. Better corporate governance mitigates investment inefficiency (a negative and statistically significant coefficient on CG). And as corporate governance improves, NF mitigates investment inefficiency (a negative and statistically significant coefficient on CG*NF).

For the strong corporate governance group, higher levels of NF mitigate investment inefficiency (a negative and statistically significant coefficient on NF). However, for the weak corporate governance group, the coefficient on NF is statistically indistinguishable from zero, so there is no evidence to suggest that non-financial disclosure mitigates investment inefficiency among weak corporate governance firms. The results in Panel B are therefore consistent with those in Panel A, suggesting that they are not sensitive to whether investment inefficiency is defined using the raw value of the residuals, or the absolute value of the residuals, from Equation (1). In the remainder of the paper we will only report the results based on the raw value of the residuals.

The analyses thus far indicate that the effect of voluntary non-financial disclosure on investment efficiency depends on corporate governance—strong governance enhances the effectiveness of voluntary non-financial disclosure in mitigating over- and under-investment. To see if this conclusion depends critically on firm characteristics such as ownership type (H2) and the external market environment, we next conduct cross-sectional analysis to gauge the reliability of the baseline results.

(iii) Cross-sectional analysis

State-own enterprises (SOEs) versus non-state-owned enterprises (NSOEs)

A distinct characteristic of Chinese listed firms is that many of them are SOEs, in which the state is the ultimate controlling shareholder. As discussed in the literature review section, prior China studies document a strong effect of ownership type on firm performance. We further extend this literature by testing whether the effects of non-financial disclosure on investment efficiency are different between SOEs and NSOEs, and, within each ownership

type, whether the association is moderated by the level of corporate governance.

[Insert Table 5 here]

As seen in Table 5, for both the over- and under-investment sub-samples, voluntary non-financial disclosure has a statistically significant effect on investment efficiency (reducing over-investment and increasing under-investment) among the SOEs, but not among non-SOEs. These results are consistent with the view that SOEs in China have lower incentives to opportunistically manipulate their non-financial disclosures, making them more credible such that increases in non-financial disclosure contribute to improvement in investment efficiency. In contrast, because non-SOEs have relatively strong incentives to engage in opportunistic manipulation, their non-financial disclosures are associated with low credibility and hence are on average ineffective in mitigating investment inefficiency.

To the extent that good corporate governance can constrain opportunism and enhance the credibility of voluntary non-financial disclosure, the above argument also suggests that the marginal effect of corporate governance on the ability of non-financial disclosures to improve investment efficiency is stronger for non-SOEs than for SOEs. In other words, given that non-SOEs have stronger incentives to engage in opportunistic disclosure, strong corporate governance is expected to play a more important role in constraining such opportunism in non-SOEs relative to SOEs. To test this conjecture (H2), Table 6 reports the results of the baseline regression after adding corporate governance and the interaction term between corporate governance and voluntary non-financial disclosure.

[Insert Table 6 here]

Firstly focusing on SOEs, the coefficient on NF is positive (negative) and statistically significant for the under-investment (over-investment) sub-sample. This reaffirms our earlier finding that non-financial disclosure mitigates investment efficiency. Importantly, the coefficient on NF*CG is positive and statistically significant for the under-investment sub-sample (Panel A), and is positive though statistically insignificant for the over-investment sub-sample (Panel B). Thus there is some evidence that, among SOEs, the effect of voluntary non-financial disclosure on investment efficiency increases as the value of corporate governance increases, i.e., there is an interaction effect between corporate governance and voluntary non-financial disclosure.

Next moving on to non-SOEs, the coefficient on NF is statistically insignificant for both the under- and over-investment sub-samples. In contrast, the coefficient on the interaction term NF*CG is positive (negative) and statistically significant for the under-investment (over-investment) sub-sample. The results show that, among non-SOEs, better corporate governance enhances the credibility and thus quality of non-financial disclosure, which in turn improves investment efficiency.

Lastly, a Wald test of equality of the coefficient on NF*CG indicates that the moderating role of corporate governance in the non-financial disclosure-investment efficiency relation is stronger for non-SOEs than SOEs in the case of over-investment, but there is no statistically significant difference in the case of under-investment. Taken together, the evidence is supportive of H2 that the marginal effect of corporate governance on the ability of non-financial disclosures to improve investment efficiency is stronger for non-SOEs than for SOEs.[14]

Firms from high-marketization regions versus firms from low-marketization regions

Prior research (e.g., Fan et al., 2007; Jian and Wong, 2010) finds that Chinese listed firms headquartered in regions with better developed market institutions (such as Guangdong, Shanghai, Zhejiang and Jiangsu) are subject to greater market discipline, have better corporate governance, and perform better. Chen et al. (2014) also find that relation between firm value and voluntary disclosure varies between firms located in high- and low-marketization regions. We next test for differences in the credibility-enhancing role of corporate governance between high-marketization firms and low-marketization firms.

[Insert Table 7 here]

Table 7 reports the baseline regression results by stage of regional economic development. In both high- and low-marketization regions, non-financial disclosure *per se* is not significantly related to investment efficiency. There is also no statistically significant

[14] In untabulated analysis, we find that SOEs on average have significantly better corporate governance than non-SOEs, although their investment efficiency is not much different. Given that non-SOEs generally have weaker corporate governance, it is expected that their voluntary disclosure is on average less credible. To the extent that strong corporate governance constrains managerial opportunism (García Osma and Guillamón-Saorín, 2011), improvements in corporate governance should have a stronger marginal effect on the ability of voluntary non-financial disclosure to impact investment efficiency. This is what we found.

difference between high- and low-marketization firms in the association between non-financial disclosure and investment efficiency.

[Insert Table 8 here]

To investigate the role of corporate governance in moderating the effect of non-financial disclosure on investment efficiency, we next estimate Equation (3) by stage of regional economic development. The results are reported in Table 8. For the high-marketization firms, corporate governance *per se* mitigates over-investment (a negative and statistically significant coefficient on CG) but not under-investment. The coefficient on NF*CG is positive but statistically insignificant for the under-investment sub-sample, and is negative and statistically significant for the over-investment sub-sample. Thus, corporate governance enhances the role of non-financial disclosure in reducing over-investment, but not in increasing under-investment. In contrast, for the low-marketization firms, corporate governance *per se* mitigates both under- and over-investment. The coefficient on the interaction term NF*CF is positive (negative) and statistically significant for the under-investment (over-investment) firms, suggesting that the ability of non-financial disclosure to mitigate investment inefficiency grows with improvement in the internal corporate governance of firms headquartered in the less-developed regions. The test of equality in the coefficient on the interaction term between the high-marketization and low-marketization firms, however, is not statistically significant, so there is no evidence that the role of corporate governance in moderating the non-financial disclosure-investment efficiency relation differs between the high- and low-marketization regions.

(iv) Robustness tests

The cross-sectional regression results are largely consistent with the results in the baseline analysis, and indicate that firm-level corporate governance can positively affect the role of non-financial disclosure in improving investment efficiency. We next conduct robustness tests to gauge the sensitivity of our results to controls for endogeneity and financial information quality, as well as alternative measurements of the key variables.

Addressing potential endogeneity

Our main hypothesis is that voluntary non-financial disclosure that is made credible by good corporate governance improves investment efficiency. While it is challenging to establish causality in this line of research (Chen et al., 2011a), our research design has at least partially alleviated such concerns. First, our hypothesis is grounded in economic theory and builds on prior empirical research. Second, we test the effect of NF in the current period on investment efficiency in the next period. Third, we include control variables that prior research suggests are relevant. Fourth, our focus on interaction effects makes it hard to argue for reverse causality (e.g., Rajan and Zingales, 1998; Chen et al., 2011a).

As a further control for endogeneity in the investment and voluntary disclosure decisions (Beyer and Guttman, 2012), we follow the logic of Dhaliwal et al. (2011) to explicitly model the voluntary disclosure decision.[15] Specifically, we use the residual value of voluntary non-financial disclosure in place of the raw disclosure score, with the predicted value of voluntary non-financial disclosure determined from the following model estimated using pooled cross-sectional regression:

$$\begin{aligned}\mathrm{NF}_t = {} & \beta_0 + \beta_1 \mathrm{LN\ (ASSET)}_{t-1} + \beta_2 \mathrm{FINANCING}_{t-1} + \beta_3 \mathrm{FINANCING}_t + \beta_4 \mathrm{FINANCING}_{t+1} + \\ & \beta_5 \mathrm{TOBINQ}_{t-1} + \beta_6 \mathrm{TOBINQ}_t + \beta_7 \mathrm{TOBINQ}_{t+1} + \beta_8 \mathrm{LEV}_{t-1} + \beta_9 \mathrm{ROA}_{t-1} + \beta_{10} \mathrm{ROA}_t + \\ & \beta_{11} \mathrm{ROA}_{t+1} + \beta_{12} \mathrm{SOE}_{t-1} + \beta_{13} \mathrm{POLITICALCONNECTION}_{t-1} + \\ & \beta_{14} \mathrm{HIGHMARKETIZATION}_{t-1} + \mathrm{INDUSTRY/YEAR\ fixedeffect} + \varepsilon_t \qquad (4)\end{aligned}$$

We control for firm size in the preceding year ($\mathrm{LN(ASSET)}_{t-1}$) because it captures demand for and supply of information (Lang and Lundholm, 1993).[16] We measure firm size

[15] For example, firms with more new investments, or more profitable investments, may engage in more voluntary disclosure. At the other extreme, firms with no new investments will have no related information to disclose, and those with low-profit investments may choose to disclose less information. One difference between our model of voluntary disclosure and that of Dhaliwal et al. (2011) is that theirs is a logistic regression model that captures factors influencing a firm's decision to commit to corporate social responsibility disclosure, whereas our model captures factors that more generally influence a firm's voluntary non-financial disclosure pertaining to investments. By including a corporate governance index and voluntary non-financial disclosure in all the regressions, we also address the concern that corporate governance and the propensity of voluntary disclosure may be jointly determined (Wang and Hussainey, 2013).

[16] Recall that in the baseline regression, we already lag voluntary non-financial disclosure relative to investment efficiency (we investigate how NF in the current year affects next year's investment efficiency). Thus, by modeling NF as a function of firm size in the prior year, we allow two years between the measurement of investment efficiency and firm size (and similarly for some other variables). This should further mitigate potential endogeneity between the (contemporaneous)

as the natural logarithm of the market value of common equity at the beginning of each year. We control for new external financing in the preceding year, current year and subsequent year because firms may increase their voluntary disclosures after raising new financing, or in anticipation of new financing.[17] To account for the possibility that firms' voluntary disclosure is influenced by past, current or expected project profitability, we control for profitability (which we proxy using ROA) in the preceding year, current year and subsequent year. We also control for growth opportunity (which we proxy using TOBINQ), although its effect on voluntary disclosure may be unclear *ex ante* (Dhaliwal et al., 2011). Leverage, ownership type, political connection, regional economic development and industry/year fixed effects are included as additional controls.

[Insert Table 9 here]

Panel A of Table 9 reports the results of regressing determinants of voluntary disclosure against firm-level raw NF scores. Consistent with expectation, larger firms, firms that raise new external financing in the current or subsequent year, and more profitable firms are associated with higher voluntary non-financial disclosure, whereas high growth firms and politically connected firms disclosed less non-financial information. The model has reasonable explanatory power (adjusted R-squared=0.115).

We next use the abnormal value of NF (ANF, being the difference between the predicted value of NF from the first-stage regression, and the raw NF) and re-do the baseline regression analyses. The results are reported in Panel B of Table 9. While non-financial disclosure *per se* is not statistically significantly associated with higher investment efficiency in the next year, better corporate government mitigates under-investment (i.e., a positive and statistically significant coefficient on CG for the under-investment sub-sample) and reduces over-investment (i.e., a negative and statistically significant coefficient on CG for the over-investment sub-sample). And as corporate governance improves, voluntary non-financial disclosure plays a more significant role in improving investment efficiency for both under- and over-investment firms. These results are qualitatively similar to those

investment and disclosure decisions.

[17] We also tried using increase in capital expenditures in place of new external financing and obtained qualitatively similar results. We do not include both as they are highly correlated.

obtained using raw values of non-financial disclosure.

Controlling for quality of financial information[18]

To account for the effect of quality of financial information, we further control for several measures of financial information quality following prior literature, including discretionary accruals (Dechow et al., 1995). Table 10 reports the results of re-running the baseline regression after including these additional control variables. The results are qualitatively the same.

[Insert Table 10 here]

Using number of sentences to measure non-financial information

Following Muslu et al. (2014), Bozzolan et al. (2009) and Li (2010) amongst others, we use sentence (defined as a set of words that is complete in itself, typically containing a subject and predicate, conveying a statement, and consisting of a main clause and sometimes one or more subordinate clauses) as the unit of analysis because it is the smallest integral unit of text that conveys an idea or message (Ivers, 1991), and because it is generally considered more reliable than pages or paragraphs (Hackston and Milne, 1996). Operationally, we trained a dozen MSc students to locate and manually read through the corporate reports and count the number of sentences pertaining to firms' new investment projects (see Appendix 1 for a list of voluntary disclosure items related to new investments). The baseline regression results using this alternative measure of NF are reported in Table 11.

[Insert Table 11 here]

While the coefficients of NF are statistically insignificant, the coefficients of CG and the interaction term NF*CG are positive (negative) and statistically significant for the under-investment (the over-investment) sub-sample. This reaffirms the earlier findings that corporate governance enhances the role of voluntary non-financial disclosure in improving investment efficiency.

Differentiating between firms with new investments and those without

The above tests do not distinguish between firms that made new investments during the

[18] From this point on we only tabulate the results for the baseline model. The results for the cross-sectional analysis (omitted for brevity but available on request) are qualitatively the same.

year, and those that did not. In studying the relation between firm value and voluntary disclosure of information in China, Chen et al. (2014) restrict their sample to firms that have new investment projects, as these are the firms that are likely to need to attract new investors. To see if the conclusions depend critically on whether the firms made any new investments, we repeat all the above tests for the sub-sample of firms that indeed had new investments during the year (about 60% of the overall sample).[19] The results (untabulated) are qualitatively similar.

5. SUMMARY AND CONCLUSIONS

A hotly debated issue in accounting and finance is the effect of information asymmetries on investment efficiency. Adverse selection resulting from information asymmetries between insiders and outside investors may lead to inefficient allocation of resources, such that negative NPV projects may be taken up due to excess financing, and positive NPV projects may be rejected due to financing constraints. Moral hazard resulting from information asymmetries may similarly lead to inefficient investments as managers engage in empire building (Hope and Thomas, 2008) or expropriation of shareholders. Past studies find that financial information alleviates information asymmetries and is value-relevant. In comparison with backward-looking financial information in traditional financial statements, non-financial information is not subject to GAAP, and has the advantages of being more flexible, relevant and timely. As an offsetting disadvantage, non-financial information is more easily manipulated, and thus may be of lower reliability and quality than financial information. So far, there has been limited research on whether voluntary non-financial disclosure affects investment efficiency, and whether the association is moderated by firm-level corporate governance.

We investigate this important issue using 5145 firm-year observations involving 1029 Chinese A-share companies listed on the Shanghai and Shenzhen Stock Exchanges during 2007-2011. Different from previous studies that typically use raw proxies for information quality, we compose a direct measure of non-financial disclosure pertaining specifically to

[19] Note that the overall sample includes firms with planned new investments but these may not have embarked upon during the year.

firm's ongoing and planned future investments, which has the advantage of illuminating the underlying mechanism through which investment efficiency may be affected by voluntary non-financial disclosure. Due to China's under-developed institutional and market environments, managers/insiders are more likely to pursue private gains by voluntarily disclosing misleading or difficult-to-verify non-financial information. Outside investors may not trust such disclosures, unless their credibility is enhanced by investor protection mechanisms. Empirically, we find that voluntary non-financial disclosure on average is not associated with higher investment efficiency for weak corporate governance firms. However, for companies with strong corporate governance, voluntary non-financial disclosure is significantly associated with higher investment efficiency. Furthermore, we find that as the level of corporate governance increases, the relation between voluntary non-financial disclosure and investment efficiency becomes stronger. We argue that this occurs because good corporate governance constrains managerial opportunism, and thus enhances the credibility of voluntary non-financial disclosure, such that outside investors utilize such disclosures for effective monitoring of managers and project identification. The net result is higher investment efficiency.

The positive effect of strong corporate governance on investment efficiency we document for China corroborates and extends findings in prior studies elsewhere (mostly in developed markets) which suggest that corporate governance impacts firms' information disclosure (García Osma and Guillamón-Saorín, 2011; Wang and Hussainey, 2013) and affects stock price efficiency and capital allocation (Morck et al., 2000; Durnev et al., 2004). Our research complements these studies by focusing on the world's largest emerging market (China), and by examining an identifiable and important source of firm-specific information (non-financial disclosure regarding current or planned investments) that likely impacts firm-level investment efficiency (as opposed to stock market- or analyst-based mesaures).

Our paper is not without limitations. Although our focus on disclosure of information about ongoing and planned investments provides more direct evidence on the relations among non-financial disclosure, corporate governance and investment efficiency, we do not directly observe the investment decision-making process, and thus (like previous studies) must base our inference on the presumed channel/mechanism of influence that high quality information

reduces information asymmetry and enhances monitoring. Furthermore, there are different ways to measure/model investment efficiency. We are currently conducting sensitivity tests by using different models of investment efficiency and by including a more comprehensive set of control variables.

Nevertheless, our results are interesting from the viewpoint of both academic and policy research. An important implication of our study is that firm-level corporate governance can substitute for country-level institutions, and that voluntary non-financial disclosures can be value-relevant. By improving internal corporate governance, which, in turn, enhances the credibility of voluntary disclosure and enables outside investors to more effectively monitor managers, firms in emerging markets may overcome the deficiencies in their institutional environments and improve their investment efficiency. We call for more research in other markets to corroborate our findings.

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Table 1: Definition of Variables

Variables	Definition
OVER	Positive residuals from Equation (1)
UNDER	Negative residuals from Equation (1)
NF	Voluntary non-financial disclosure regarding ongoing and planned investment projects
CG	Corporate governance index
REV	Revenue, defined as revenue divided by total asset at year end
LEV	Total debt over its total asset at year end
CFO	Operating cash flow divided by its total asset at year end
LN (ASSET)	The natural logarithm of average total assets
ROE	Net income divided by end-of-period net assets
NEW EXTERNAL FINANCINEG	Increase in total external financing, scaled by total asset at the end of the prior year
TOBINQ	Market value of tradable shares plus the net asset value of non-tradable shares divided by the book value of total assets
ROA	Return on assets (scaled by end-of-period total assets)
SOE	A dummy variable set to 1 if the firm's controlling shareholder is the government or a government agency, otherwise 0
POLITICALCONNECTION	A dummy variable set to 1 if a senior executive (e.g., General Manager or Chairman) ever served in the government or government agencies, otherwise 0
MARKETIZATION	A dummy variable coded 1 if the firm is headquartered in a high-marketization region (Guangdong, Shanghai, Zhejiang and Jiangsu), otherwise 0

Table 2: Summary and Descriptive Statistics

Panel A. Time variation of voluntary non-financial disclosure and new external financing

Year	Mean value of NF (standard deviation of NF)	Mean value of New External Financing (standard deviation of New External Financing)
2007	0.571 (0.103)	0.271 (0.197)
2008	0.570 (0.135)	0.283 (0.210)
2009	0.580 (0.118)	0.285 (0.212)
2010	0.488 (0.144)	0.260 (0.209)
2011	0.502 (0.124)	0.264 (0.216)

Panel B. Summary statistics for the under-investment sub-sample

Variable	Minimum	Maximum	Mean	Median	St. deviation
UNDER	-0.11	0.00	-0.03	-0.02	0.02
NF	0.06	0.63	0.36	0.31	0.09
CG	-0.03	0.04	0.00	-0.00	0.02
LN (ASSET)	16.52	26.41	21.74	21.68	1.23
CFO	-0.20	0.27	0.02	0.01	0.07
ROE	-1.11	0.51	0.05	0.06	0.19
LEV	0.08	1.03	0.53	0.53	0.20
REV	0.05	2.98	0.73	0.61	0.54
N	3262				

Panel C. Summary statistics for the over-investment sub-sample

Variable	Minimum	Maximum	Mean	Median	St. deviation
OVER	0.00	0.23	0.05	0.04	0.05
NF	0.06	0.63	0.37	0.38	0.08
CG	-0.15	0.18	0.00	−0.00	0.02
LN (ASSET)	-9.21	26.85	21.88	21.81	1.38
CFO	-0.20	0.27	0.012	0.01	0.07
ROE	-1.11	0.51	0.06	0.07	0.16
LEV	0.08	1.03	0.53	0.54	0.18
REV	0.05	2.98	0.71	0.60	0.52
N	1883				

Panel D. Pearson correlation coefficients for the under-investment sub-sample

	UNDER	NF	CG	LN (ASSET)	CFO	ROE	LEV	REV
UNDER	1							
NF	0.04**	1						
CG	0.11***	0.03*	1					
LN (ASSET)	0.17***	0.12***	0.24***	1				
CFO	0.02	0.03*	0.01	0.06***	1			
ROE	0.05***	0.02	0.06***	0.19***	0.15***	1		
LEV	0.08***	0.02	0.03	0.21***	-0.04**	-0.15***	1	
REV	0.09***	0.04**	0.048**	0.07***	0.04**	0.10***	0.11***	1

Panel E. Pearson correlation coefficients for the over-investment sub-sample

	OVER	NF	CG	LN (ASSET)	CFO	ROE	LEV	REV
OVER	1							
NF	0.01	1						
CG	-0.10***	0.05**	1					
LN (ASSET)	0.01	0.07***	0.19***	1				
CFO	0.05**	0.02	-0.01	0.08***	1			
ROE	0.05**	0.02	0.07***	0.21***	0.10***	1		
LEV	0.01	0.03	0.05**	0.22***	-0.01	-0.17***	1	
REV	-0.10***	0.01	0.05**	-0.01	-0.03	0.13***	0.02	1

***, **, * significant at the 0.01, 0.05 and 0.10 levels, respectively (two-tailed test). Please see Table 1 for definition of the other variables.

Table 3: Investment Efficiency and Voluntary Non-financial Disclosure

Panel A. Whole sample

	Dependent Variable: UNDER		Dependent Variable: OVER	
	Coef.	t	Coef.	t
NF	0.0045	1.45	-0.0060	-0.43
LN (ASSET)	0.0025***	9.88	-0.0003	-0.37
LEV	-0.0043***	-3.07	0.0190***	2.77
REV	0.0023***	4.26	-0.0176***	-7.24
ROE	0.0009	0.64	0.0137	1.63
CFO	-0.0039	-1.08	-0.0347**	-2.31
_cons	-0.0814***	-14.93	0.0540***	2.85
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	44.52		6.82	
Adjusted R^2	0.2189		0.0609	
N	3262		1883	

Panel B. Under-investment sub-sample

	Dependent Variable: UNDER			
	Strong corporate governance firms		Weak corporate governance firms	
	Coef.	t	Coef.	t
NF	0.0106**	2.22	0.0007	0.17
t-statistic for test of equality in coefficient:[2.26][b]				
LN (ASSET)	0.0022***	5.80	0.0026***	7.59
LEV	-0.0042*	-1.95	-0.0038**	-2.13
REV	0.0023***	2.94	0.0016**	2.17
ROE	0.0000	-0.01	0.0015	0.82
CFO	0.0035	-0.66	0.0038	-0.78
_cons	-0.0805***	-9.63	-0.0811***	-10.91
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	29.25***		18.71***	
Adjusted R^2	0.2668		0.1857	
N	1631		1631	

Panel C. Over-investment sub-sample

	Dependent Variable: OVER			
	Strong corporate governance firms		Weak corporate governance firms	
	Coef.	t	Coef.	t
NF	-0.0397**	-2.26	0.0303	1.42
t-statistic for test of equality in coefficient: [3.35][a]				
LN (ASSET)	0.0021*	1.78	-0.0006	-0.52
LEV	0.0224***	2.66	0.0159	1.52
REV	-0.0183***	-6.19	-0.0153***	-3.95
ROE	0.0154	1.36	0.0171	1.41
CFO	0.0441**	-2.38	0.0358	-1.56
_cons	0.0040	0.15	0.0492*	1.79
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	3.64***		4.94***	
Adjusted R^2	0.0556		0.0810	
N	942		941	

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). a, b, c Significant at the 1%, 5%, 10% levels (one-tailed). Strong (weak) corporate governance firms are those with above (below) median corporate governance index value. T-statistic for test of equality in coefficient refers to t-statistic for test of equality in the coefficient on NF between the strong corporate governance and the weak corporate governance firms. Please see Table 1 for definition of variables.

Table 4: The Moderating Role of Corporate Governance in the Relation between Non-financial Disclosure and Investment Efficiency

Panel A. Investment inefficiency is measured using raw value of residuals from Equation 1

	Dependent Variable: UNDER; OVER			
	Under-investment sub-sample		Over-investment sub-sample	
	Coef.	T	Coef.	T
NF	0.0048	1.55	-0.0077	-0.56
CG	0.0660***	2.76	-0.2948***	-3.32
NF*CG	0.1556**	2.30	-0.6853***	-2.66
LN (ASSET)	0.0021***	8.25	0.0009	1.07
LEV	-0.0040***	-2.93	0.0192***	2.85
REV	0.0021***	3.91	-0.0161***	-6.73
ROE	0.0008	0.59	0.0157*	1.90
CFO	0.0038	1.05	0.0352**	2.38
_cons	-0.0729***	-13.17	0.0220	1.16
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	43.56***		9.59***	
Adjusted R^2	0.2309		0.0950	
t-statistic for: β1+β3=0	18.23***		24.06***	
N	3262		1883	

Panel B. Investment inefficiency is measured using absolute value of residuals from Equation 1

	Strong corporate governance firms	Weak corporate governance firms	Whole sample
NF	-0.020***	0.012	-0.003
	(-2.782)	(1.494)	(-0.541)
CG			-0.192***
			(-4.868)
NF*CG			-0.381***
			(-3.387)
LN (ASSET)	0.000	0.001	0.001**
	(0.568)	(1.259)	(2.459)
LEV	0.011***	0.005	0.008***
	(3.195)	(1.271)	(3.060)
REV	-0.008***	-0.008***	-0.008***
	(-7.048)	(-5.133)	(-8.353)
ROE	0.006*	0.007*	0.007***
	(1.726)	(1.876)	(2.670)
CFO	-0.020**	-0.017*	-0.018***

	(-2.552)	(-1.827)	(-2.968)
_cons	0.030***	0.015	0.012
	(2.620)	(1.200)	(1.386)
N	2571	2574	5145
Adjusted R^2	0.084	0.071	0.098

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). Please see Table 1 for definition of variables.

Table 5: Relation between Voluntary Non-financial Disclosure and Investment Efficiency by Ownership Type

Panel A. Under-investment sub-sample

	SOEs		NSOEs	
	Coef.	t	Coef.	t
NF	0.0085**	2.03	-0.0006	-0.12
t-statistic for test of equality in coefficient: [1.58][c]				
LN (ASSET)	0.0024***	7.10	0.0026***	6.55
LEV	-0.0032*	-1.71	-0.0061***	-2.89
REV	0.0026***	3.78	0.0020**	2.28
ROE	0.0018	0.97	-0.0002	-0.10
CFO	0.0025	0.51	0.0053	1.02
_cons	-0.0843***	-11.28	-0.0789***	-9.28
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	27.10***		20.31***	
Adjusted R^2	0.2061		0.2516	
N	2112		1150	

Panel B. Over-investment sub-sample

	SOEs		NSOEs	
	Coef.	t	Coef.	t
NF	-0.0339**	-2.02	0.0369	1.45
t-statistic for test of equality in coefficient: [-1.71][b]				
LN (ASSET)	-0.0010	-1.06	0.0007	0.41
LEV	0.0182**	2.11	0.0216*	1.91
REV	-0.0202***	-6.86	-0.0124***	-2.74
ROE	0.0162	1.56	0.0077	0.53
CFO	0.0491**	2.52	0.0139	0.60
_cons	0.0855***	3.78	0.0120	0.31
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	5.64***		2.04***	
Adjusted R2	0.0705		0.0341	
N	1289		594	

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). a, b, c Significant at the 1%，5%，10% level (one-tailed). T-statistic for test of equality in coefficient refers to t-statistic for test of equality in the coefficient on NF between the SOEs and the NSOEs. Please see Table 1 for definition of variables.

Table 6: The Moderating Role of Corporate Governance in the Relation between Non-financial Disclosure and Investment Efficiency by Ownership Type

Panel A. Under-investment sub-sample

	Dependent Variable: UNDER			
	SOEs		NSOEs	
	Coef.	T	Coef.	T
NF	0.0077*	1.83	0.0017	0.38
CG	0.0437	1.16	0.0940***	2.99
NF*CG	0.1847*	1.81	0.1886*	1.93
t-statistic for test of equality in coefficient: [-0.02]				
LN (ASSET)	0.0022***	6.46	0.0021***	5.22
LEV	-0.0028	-1.48	-0.0066***	-3.18
REV	0.0024***	3.48	0.0022**	2.50
ROE	0.0017	0.93	-0.0008	-0.40
CFO	0.0021	0.43	0.0055	1.07
_cons	-0.0794***	-10.58	-0.0680***	-7.87
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	26.18***		20.26***	
Adjusted R^2	0.2153		0.2694	
t-statistic for: $\beta1+\beta3=0$	9.59***		11.45***	
N	2112		1150	

Panel B. Over-investment sub-sample

	Dependent Variable: OVER			
	SOEs		NSOEs	
	Coef.	T	Coef.	T
NF	-0.0332**	-2.00	0.0290	1.15
CG	-0.4137***	-3.21	-0.3602***	-2.80
NF*CG	-0.1920	-0.49	-0.7763**	-2.08
t-statistic for test of equality in coefficient: [1.67][b]				
LN (ASSET)	0.0000	-0.02	0.0018	1.02
LEV	0.0155*	1.82	0.0242**	2.19
REV	-0.0191***	-6.56	-0.0118***	-2.65
ROE	0.0167	1.63	0.0164	1.15
CFO	0.0434**	2.27	0.0210	0.92
_cons	0.0601***	2.66	-0.0176	-0.46
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	

F Value	7.16	3.25***
Adjusted R^2	0.0993	0.0774
t-statistic for: $\beta1+\beta3=0$	4.25**	12.89***
N	1289	594

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). T-statistic for test of equality in coefficient refers to t-statistic for test of equality in the coefficient on NF*CG between the SOEs and the NSOEs. Please see Table 1 for definition of variables.

Table 7: Relation between Voluntary Non-financial Disclosure and Investment Efficiency by Regional Market Development

Panel A. Under-investment sub-sample

	High-marketization Firms		Low-marketization Firms	
	Coef.	t	Coef.	t
NF	0.0046	1.04	0.0048	1.11
t-statistic for test of equality in coefficient: [-0.14]				
LN (ASSET)	0.0019***	4.78	0.0028***	8.52
LEV	-0.0045**	-1.98	-0.0046***	-2.59
REV	0.0009	1.05	0.0031***	4.48
ROE	0.0024	0.74	0.0004	0.24
CFO	0.0052	0.92	0.0031	0.66
_cons	-0.0659***	-7.83	-0.0899***	-12.56
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	21.67***		24.85***	
Adjusted R^2	0.2715		0.1929	
N	1166		2096	

Panel B. Over-investment sub-sample

	High-marketization Firms		Low-marketization Firms	
	Coef.	t	Coef.	t
NF	0.0006	0.02	-0.0086	-0.49
t-statistic for test of equality in coefficient: [0.02]				
LN (ASSET)	0.0023	1.26	-0.0010	-1.05
LEV	-0.0082	-0.63	0.0304***	3.68
REV	-0.0212***	-4.75	-0.0165***	-5.64
ROE	-0.0013	-0.06	0.0177*	1.92
CFO	0.0285	0.99	0.0394**	2.21
_cons	0.0024	0.06	0.0715***	3.23
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	3.28***		4.60***	
Adjusted R2	0.0715		0.0554	
N	593		1290	

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). a, b, c Significant at the 1%，5%，10% level (one-tailed). T-statistic for test of equality in coefficient refers to t-statistic for test of equality in the coefficient on NF between the high-marketization firms and the low-marketization firms. Please see Table 1 for definition of variables.

Table 8: The Moderating Role of Corporate Governance in the Relation between Non-financial Disclosure and Investment Efficiency by Marketization Level

Panel A. Under-investment sub-sample

	Dependent Variable: UNDER			
	High-marketization Firms		Low-marketization Firms	
	Coef.	t	Coef.	t
NF	0.0045	1.04	0.0055	1.29
CG	0.0404	1.21	0.0723**	2.12
NF*CG	0.1507	1.61	0.1713*	1.76
t-statistic for test of equality in coefficient: [-0.10]				
LN (ASSET)	0.0017***	4.27	0.0023***	6.78
LEV	-0.0042*	-1.85	-0.0043**	-2.48
REV	0.0007	0.89	0.0029***	4.18
ROE	0.0021	0.65	0.0004	0.25
CFO	0.0053	0.95	0.0026	0.57
_cons	-0.0615***	-7.28	-0.0787***	-10.70
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	20.65***		24.55***	
Adjusted R^2	0.2795		0.2054	
t-statistic for: β1+β3=0	6.88***		10.89***	
N	1166		2096	

Panel B. Over-investment sub-sample

	Dependent Variable: OVER			
	High-marketization Firms		Low-marketization Firms	
	Coef.	t	Coef.	t
NF	-0.0130	-0.56	-0.0033	-0.19
CG	-0.3235***	-2.81	-0.3216**	-2.23
NF*CG	-0.6702*	-1.86	-0.6506*	-1.65

t-statistic for test of equality in coefficient: [-0.02]				
LN (ASSET)	0.0031*	1.77	0.0002	0.23
LEV	-0.0101	-0.79	0.0317***	3.89
REV	-0.0189***	-4.32	-0.0152***	-5.26
ROE	0.0013	0.06	0.0198**	2.19
CFO	0.0224	0.80	0.0408**	2.32
_cons	-0.0160	-0.42	0.0352	1.56
YEAR	Yes		Yes	
INDUSTRY	Yes		Yes	
F Value	4.63***		6.14***	
Adjusted R^2	0.1189		0.0841	
t-statistic for: $\beta1+\beta3=0$	11.25***		11.44***	
N	593		1290	

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). T-statistic for test of equality in coefficient refers to t-statistic for test of equality in the coefficient on NF*CG between the high-marketization firms and the low-marketization firms. Please see Table 1 for definition of variables.

Table 9: Baseline Regression after Controlling for Potential Endogeneity

Panel A. Determinants of voluntary non-financial disclosure (NF)

	Coef.	t-statistic
LN (ASSET)$_{t-1}$	0.003**	2.401
NEW EXTERNAL FINANCING $_{t-1}$	-0.008	-0.889
NEW EXTERNAL FINANCING $_{t}$	0.016*	1.705
NEW EXTERNAL FINANCING $_{t+1}$	0.018**	2.240
TOBINQ $_{t-1}$	-0.004**	-2.562
TOBINQ $_{t}$	-0.001	-0.415
TOBINQ $_{t+1}$	-0.002*	-1.691
LEV $_{t-1}$	-0.000	-1.150
ROA $_{t-1}$	0.000	1.018
ROA $_{t}$	0.001***	3.555
ROA $_{t+1}$	0.000	1.609
SOE $_{t-1}$	0.002	0.890
POLITICALCONNECTION $_{t-1}$	-0.006**	-2.475
MARKETIZATION $_{t-1}$	-0.001	-0.232
YEAR	YES	
INDUSTRY	YES	
_cons	0.269***	8.549
F Value	22.70	
Adjusted R^2	0.115	
N	5145	

Panel B. Baseline regression using abnormal non-financial disclosure (ANF)

	Dependent Variable: UNDER; OVER			
	UNDER		OVER	
	Coef.	t	Coef.	T
ANF	0.005	1.620	-0.009	-0.630
CG	0.058**	2.360	-0.296***	-3.410
ANF*CG	0.170**	2.480	-0.658***	-2.600
OTHER CONTROLS	YES		YES	
F Value	42.95***		9.72***	
Adjusted R^2	0.2292		0.0956	
t-statistic for: β1+β3=0	6.48**		6.86***	
N	3262		1883	

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). Please see Table 1 and the text for definition of variables.

Table 10: Baseline Regression after Controlling for Financial Information Quality

	Dependent variable: UNDER		Dependent variable: OVER	
	Coef.	t	Coef.	t
NF	0.0048	1.55	-0.0076	-0.55
CG	0.0673***	2.82	-0.2955***	-3.33
NF* CG	0.1554**	2.30	-0.6716***	-2.61
DA	-0.0033**	-2.40	0.0148**	2.41
OTHER CONTROLS	YES		YES	
F Value	42.04***		9.44***	
Adjusted R^2	0.2320		0.0972	
t-statistic for: $\beta 1+\beta 3=0$	18.43***		23.46***	
N	3262		1883	

*, **, *** Significant at the 10%, 5%, 1% levels (two-tailed test). DA denotes discretionary accruals (a larger value indicates lower financial information quality). Please see Table 1 for definition of variables.

Table 11: Baseline Regression Using Number of Sentences to Measure Non-financial Information Disclosure

	Dependent variable: UNDER		Dependent variable: OVER	
	Coef.	t	Coef.	t
NF	0.0006	0.93	0.0001	0.91
CG	0.0149	0.32	-0.1021	-0.75
NF* CG	0.0334**	2.07	-0.1602***	-3.55
OTHER CONTROLS	YES		YES	
F Value	43.19***		10.86***	
Adjusted R^2	0.2297		0.1073	
t-statistic for: $\beta 1+\beta 3=0$	2.23		7.70***	
N	3262		1883	

***, **, * Significant at the 0.01, 0.05 and 0.10 levels, respectively (two-tailed test). Please see Table 1 for definition of variables.

Appendix: Scoring Method of Non-financial Disclosure

Disclosure Item	Scoring	Remark (illustration using the example of Wanke, which got the highest value of NFD, 10/16, in the 2011 annual report)
Source of funding for company's planned **new** investment projects?	1 if yes, 0 if no	
Cost of capital for company's planned **new** investment projects?	1 if yes, 0 if no	
Expected usage of funds for company's planned **new** investment projects?	1 if yes, 0 if no	
Schedule/time-table for developing company's planned **new** investment projects?	1 if yes, 0 if no	On page 39, the company discussed its planned new investments for 2012, including target total building area, total area for which construction work will begin in 2012, and total building area that will be completed in 2012.
Expected performance impact of company's planned **new** investment projects?	1 if yes, 0 if no	
Company's advantage in ensuring that the planned **new** investment will be a success?	1 if yes, 0 if no	
Difficulties in relation to company's planned **new** investment projects?	1 if yes, 0 if no	On page 45, the following risks are discussed: A. possible changes to the macro economy or individual projects' sales; B. new and stricter approval procedures that may cause delays to property development；C. possible negative impacts of delays in removal projects；D. possible delays to project completion dates caused by bad weather conditions; E. negative impacts of other force majeure on project completion date.
Contingency plans/measures for dealing with difficulties in relation to company's planned **new** investment projects?	1 if yes, 0 if no	
Source of funding for company's **ongoing** investment projects?	1 if yes, 0 if no	On page 36, the company disclosed its source of financing for the ongoing investment projects.
Cost of capital for company's **ongoing** investment projects?	1 if yes, 0 if no	On page 36, the company disclosed the cost of funds (issued new equity at RMB31.53/share; issuing cost is RMB 63,398,268.11).
Usage of funds for company's **ongoing** investment projects?	1 if yes, 0 if no	On page 36, the company disclosed the planned amount of capital input, capital input in the current year, and cumulative total capital input.
Progress of **ongoing**	1 if yes,	On page 29, the company reported the progress in 2011 of the

investment projects?	0 if no	major ongoing investment projects, including total area under construction and total area completed.
The impact of company's **ongoing** investment projects on current year performance?	1 if yes, 0 if no	On page 36, the company reported the realized return to the ongoing investment projects.
The impact of company's **ongoing** investment projects on future years' performance?	1 if yes, 0 if no	On page 36, the company indicated that the ongoing investment projects have met the expected returns (performance target).
Financing difficulties encountered in relation to company's **ongoing** investment projects?	1 if yes, 0 if no	On page 25, several difficulties were mentioned: Central Bank's 3 times of hiking of discount window interest rate has drained liquidity and resulted in shortage of funds; a slow-down in payment received for sales, etc.
Contingency plans/measures for dealing with the difficulties encountered in relation to company's **ongoing** investment projects?	1 if yes, 0 if no	On page 26, the company reported taking the following measures in response: to expedite receipt of payment, the company has focused on small- to medium-sized housing units and on owner-occupied units; to avoid further financing difficulties, the company has adopted a conservative investment strategy and maintained below-industry-average leverage.

Notes:

The disclosure scores are based on a content analysis of the information disclosed in firms' annual reports and other corporate announcements as recorded in the Corporate Governance Index for Chinese Listed Companies database maintained by the Nankai University, China. Each year, Nankai University organizes over 50 academic staff and postgraduate students in business and management to collect corporate governance related information from interim and annual reports, and compiles a score on firms' corporate governance quality. The information items are chosen following the relevant regulations, such as the *Code of Corporate Governance for Listed Companies,* and *Administrative Guidance on Information Disclosures by Listed Companies*, etc. To ensure accuracy, every company is handled by two people, and their work is checked independently by a third person. The information items chosen for this study are those that pertain to firms' current and planned investment projects.