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Article

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Determinants and features of voluntary disclosure in the Chinese stock market

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ABSTRACT

This paper offers in-depth analysis of the determinants and features of voluntary disclosure based on information in the annual reports of 1066 Chinese firms listed on the Shanghai and Shenzhen Stock Exchanges. This extensive sample represents about 80% of all public companies in China. Our findings suggest that voluntary disclosure in China is positively related to firm size, leverage, assets-in-place, and return on equity and is negatively related to auditor type and the level of maturity or sophistication of the intermediary and legal environments. We also find some evidence to suggest a quadratic convex association between state ownership and voluntary disclosure. However, our analysis provides no evidence that extensive disclosure benefits public companies in China in the form of a lower cost of equity.

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1. Introduction

Voluntary disclosure is a common way for a public company to disseminate company information not required by mandatory disclosure requirements to its investors and the general public. Earlier studies have suggested that this type of disclosure may benefit both investors and the public companies themselves in

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specific areas. For example, [Diamond and Verrecchia \(1991\)](#) and [Kim and Verrecchia \(1994\)](#) claim that voluntary disclosure can reduce information asymmetry between informed and uninformed investors. Moreover, empirical studies carried out by [Barry and Brown \(1986\)](#), [Botosan \(1997\)](#) and [Piotroski \(1999\)](#) demonstrate, among other things, that voluntary disclosure helps to reduce the cost of equity.

However, more recent studies have indicated that the abovementioned benefits may not hold for all stock markets. Using a dataset comprising 110 public companies with both A- and B-share listings in China, [Wang et al. \(2008\)](#) investigate the effects of voluntary disclosure and find no evidence that these companies benefited from that disclosure in the form of a lower cost of debt capital. Their analysis suggests that voluntary disclosure in the Chinese stock market exhibits determinants and characteristics that may be very different from those found in the stock markets of developed countries.

We intend to carry this line of thought further by investigating more closely the determinants and consequences of voluntary disclosure in the Chinese stock market using a much larger dataset – 1066 Chinese public companies – than that used in [Wang et al. \(2008\)](#). This extensive dataset represents about 80% of public companies listed on the Chinese stock exchanges that have a relatively complete historical record of annual reports.

Our investigation is motivated by two considerations. First, since their establishment in 1990 and 1991, respectively, the Shanghai and Shenzhen Stock Exchanges have become major global stock exchanges in terms of total capitalization, trading volume and the rapid pace of growth in the number and size of public companies. Also, a large individual investor population trades shares on both exchanges and China boasts an ever-increasing number of institutional investors. Further, foreign investors with Qualified Foreign Institutional Investor (QFII) status have also begun to invest directly in the Chinese stock market. Previous studies have found that both individual and institutional investors in China are less experienced and more restricted than their counterparts in developed countries such as the United States ([Chen et al., 2004](#); [Bailey et al., 2009](#); [Deng and Xu, 2011](#)), which may influence their understanding of financial reports and, in turn, affect the disclosure motivation of listed firms. The growing complexity of China's stock market calls for a better understanding of the key aspects involved, which will benefit investors, public companies, and regulators alike. Voluntary disclosure is one such key aspect, the effects of which concern all of these market players.

Second, China has a distinct political and geographical environment. As an emerging economy, China's capital market is not as efficient as those in developed countries, such as the United States. Moreover, the country's regulatory environment is less mature than those in developed countries, which have taken half a century or more to develop. Also different from more mature economies, the majority of listed companies on the Chinese stock exchanges are ultimately controlled by the central or local governments owing to the country's long history of a planned economy. These firms are called state-owned enterprises (SOEs). A large percentage of SOEs are in essential industries, rich in resources, and directly responsible to the government, and often enjoy rights and privileges unavailable to private companies. Consequently, they have different corporate governance mechanisms compared to firms listed in the United States, most of which are privately controlled ([Xu and Wang, 1999](#); [Qiang, 2003](#); [Clarke, 2003](#); [Wang et al., 2004](#)). These corporate governance mechanisms result in the Chinese stock market having a number of distinct characteristics that in turn influence the determinants and consequences of voluntary disclosure by the public companies listed in China.

These two considerations suggest both the necessity and the particularity of an in-depth, thorough investigation aimed at reaching a better understanding of the nature and effects of voluntary disclosure in the Chinese stock market.

Some studies have been conducted in this and related areas. [Ferguson et al. \(2002\)](#) examine voluntary disclosures in the annual reports of SOEs listed on the Hong Kong Stock Exchange and conclude that these companies tend to disclose significantly more information than other companies listed on the same exchange. Using a dataset of the 300 largest public companies at that time, [Xiao et al. \(2004\)](#) analyzes the factors behind Chinese listed companies' voluntary adoption of Internet-based financial reporting and the extent of their disclosure. [Wang et al. \(2008\)](#) conduct a more focused study to test the determinants and consequences of voluntary disclosure in China using a relatively small sample comprising only firms issuing both A and B

shares. Our study can thus be viewed as a natural step forward in offering more extensive analysis based on a greatly expanded dataset.

The dataset we use includes all companies listed on the Shanghai and Shenzhen Stock Exchanges at the end of 2006, with the exception of banks and insurance companies. The level of voluntary disclosure is modeled by DSCORE, an index score generated on the basis of the voluntary information released in firms' annual reports. This score has its origins in earlier studies, such as those of [Botosan \(1997\)](#), and is tailored to the Chinese context.

A set of factors commonly investigated in the literature, including firm size, leverage, liquidity, assets-in-place, return on equity (ROE), auditor type, and ownership diffusion, among others, is analyzed to determine the effects of each on voluntary disclosure. Our statistical analysis reveals that firm size, leverage, assets-in-place, ROE, ownership diffusion, and auditor type are significantly associated with voluntary disclosure, with auditor type strongly associated. However, our findings suggest that liquidity and the proportion of non-executive directors on the board have no significant influence on voluntary disclosure. We also add two Chinese market-specific factors, the intermediary and legal environments and state ownership, to the regression to test whether they play any role in the voluntary disclosure decision. Although most of the foregoing general factors remain significant in this regression, we find a negative and significant relationship between the intermediary and legal environments and voluntary disclosure.

With regard to state ownership, we conjecture that it has a quadratic convex relationship with the level of disclosure, as there is both theoretical and empirical evidence to suggest a more complicated association between the two than a linear relationship. To further test the influence of state ownership and governance, we carry out another test by first dividing the sample into two subsets based on the firms' ultimate owners and then performing the regression separately on each subset.

In this test, many of the aforementioned factors lose their significance in one or both subsets. For firms ultimately controlled by the government, firm size, ROE, auditor type, the intermediary and legal environments, and state ownership remain significant and in the same direction as those in the general regression. For firms ultimately controlled by private families, leverage, auditor type, ownership diffusion, and state ownership remain significant. This evidence demonstrates the different characteristics underlying the disclosure preferences of different types of firms. What is particularly notable is that the signs of the coefficients of state ownership in the two regressions are opposite: the level of disclosure decreases with state ownership in privately controlled firms, but increases in government-controlled firms. These results reveal a clear quadratic association between state ownership and voluntary disclosure, as predicted.

To test the relevance of voluntary disclosure to the cost of equity in the capital market, we construct an ordinary least squares (OLS) model between the two. The results of the model reveal no evidence that firms benefit from extensive voluntary disclosure in terms of a lower cost of equity, which is contrary to the claims made in studies of stock markets in developed countries. In China, voluntary disclosure appears to have no significant influence on the cost of equity.

This study contributes to a better understanding of the determinants and features of voluntary disclosure in the fast-growing Chinese stock market. By examining a much larger dataset than previous studies and testing a wider range of factors, we are able to report relatively reliable, more general results and to offer useful insights into investors, public companies, and regulators with regard to voluntary disclosure in the Chinese context.

The remainder of the paper is organized as follows: Section 2 develops our hypotheses with the help of prior theoretical results. Section 3 describes the sample dataset and test methods, and Section 4 reports the empirical test results. Section 5 analyses the regression results and Section 6 concludes the paper.

2. Hypothesis development

This section develops 11 hypotheses that are subjected to statistical testing. These hypotheses are developed with reference to two well-known theories, agency theory, and signaling theory, which are briefly reviewed here in the context of voluntary disclosure. The section also offers a discussion of relevant issues such as corporate governance, litigation risk, and proprietary costs. This review and discussion provide the foundation and justification for the explanatory variables extracted and considered in our hypothesis development.

2.1. Agency theory variables

Agency theory suggests the existence of information asymmetry, and thus possible conflicts of interest, between investors and firm management. Consistent with this theory, management's incentive to engage in voluntary disclosure has been shown to be influenced by such factors as leverage and assets-in-place (Jensen and Meckling, 1976; Chow and Wong-Boren, 1987; Lang and Lundholm, 1993; Hossain et al., 1995).

2.1.1. Leverage

Previous studies have provided mixed evidence on the relationship between leverage and the level of voluntary disclosure. Belkaoui and Kahl (1978), Fries et al. (1993), Hossain et al. (1995) and Barako et al. (2006) suggest that the two are positively related in developed markets and in some emerging markets, and Francis et al. (2005) obtain results consistent with this suggestion using a multinational database. Chow and Wong-Boren (1987) and El-Gazzar et al. (2008), in contrast, claim that leverage is not a determinant of voluntary disclosure, as they find no significant relationship between the two in their analysis. Eng and Mak (2003) find a negative relationship between leverage and voluntary disclosure using a Singaporean sample.

However, the widely held view remains that firms with a higher degree of leverage suffer serious agency problems and incur higher agency costs. Leveraged firms are more likely to disclose more information voluntarily to satisfy the information acquisition requirements of creditors and to lower the cost of raising capital. Fama and Miller (1972) provide a classic result along this line, showing that a positive relationship exists between firms' voluntary disclosure and the degree of leverage owing to high agency costs. Using the ratio of total debt to total assets as a measure of leverage, we develop the following hypothesis to test our conjecture that there is a positive relationship between leverage and the level of voluntary disclosure among Chinese public companies.

H1. A firm's disclosure level is positively related to its degree of leverage.

2.1.2. Assets-in-place

Myers (1977) asserts that the degree of difficulty a firm has in transferring wealth between shareholders and debt-holders grows with larger assets-in-place. The implication is that fewer agency problems and less information asymmetry may exist in firms with larger assets-in-place, thus indicating a positive relationship between assets-in-place and disclosure.

An alternative explanatory theory is proprietary cost theory, which posits that the potential entry of new competitors into a market influences the future profitability of established firms in a given industry. Therefore, firms that are protected in their sectors by high entry barriers are likely to disclose more information than firms that are not.¹ Fixed assets are usually employed to measure proprietary costs, as they are an easily measurable indicator of barriers to entry. It thus appears likely that a positive relationship exists between larger fixed assets and voluntary disclosure.

However, the existing empirical research reports conflicting evidence from different countries. Bradbury (1992) and Hossain et al. (1995) find no significant relationship between assets-in-place and the extent of voluntary disclosure in New Zealand, whereas Haniffa and Coode (2002) report a positive relationship in Malaysia.

As China is still in the early stages of a market economy, the assets-in-place barrier is very important to many firms, as it protects them from potential competitors. Thus, we conjecture that there is a positive relationship between assets-in-place and voluntary disclosure across the board in Chinese public companies, as stated in our second hypothesis. Note that we use the ratio of fixed assets to total assets as our measurement of assets-in-place.

H2. The disclosure level is positively related to assets-in-place.

¹ Proprietary costs can be measured by barriers to entry. More details can be found in Darrough and Stoughton (1990) and Darrough (1995).

2.2. Signaling theory variables

Signaling theory posits that firms with good performance tend to make voluntary disclosures more readily, as doing so is regarded as an easy means of distinguishing themselves from others in the marketplace. Hence, we conjecture that voluntary disclosure is positively related to firm performance and quality. Both [Chow and Wong-Boren \(1987\)](#) and [Lang and Lundholm \(1993\)](#) provide empirical support for this supposition.

2.2.1. Liquidity

Liquidity represents a firm's ability to meet its short-term liabilities. Firms with greater liquidity are considered to be operating better businesses. In accordance with signaling theory, these firms are prone to disclose more information voluntarily ([Cooke, 1989](#)).² Agency theory, in contrast, suggests the opposite conclusion: to alleviate information asymmetry, firms with less liquidity are likely to release more information to investors, creditors in particular. Indeed, several studies (e.g., [Wallace et al., 1994](#)) claim that weak liquidity may prompt firms to amplify their disclosure to justify their liquidity status.

The empirical findings on the liquidity-disclosure relationship are also inconclusive. [Wallace et al. \(1994\)](#) document a negative relationship between liquidity and disclosure in both listed and unlisted Spanish companies, whereas [Alsaeed \(2006\)](#) and [Barako et al. \(2006\)](#) find no significant relationship in Saudi Arabia or Kenya. No previous study in China has taken liquidity into consideration. Using the current ratio as a proxy for liquidity, we conjecture that there is generally a positive relationship between the two in Chinese public companies, as stated in the following hypothesis.

H3. The disclosure level is positively related to liquidity.

2.2.2. ROE and auditor type

Under the signaling theory framework, firms with strong performance and good quality have more incentives to voluntarily disclose information to distinguish themselves from underperforming firms. [Singhvi and Desai \(1971\)](#) claim that greater profitability may induce management to supply more information, to illustrate its ability, to maximize shareholder value, and to elevate managerial compensation.

Auditor type (or rank) is popularly employed as a signal to the market. Financial reports audited by higher ranking auditors are regarded as better in quality and more credible. However, the literature provides mixed evidence in this respect. Using a relatively small dataset, [Xiao et al. \(2004\)](#) find a positive relationship between the Big 5 (or Big 4) auditors and internet-based voluntary disclosure in China.³ However, several studies ([Hossain et al., 1995](#); [Depoers, 2000](#); [Alsaeed, 2006](#)) have shown that neither Big 5 (nor Big 6) auditors nor ROE have a significant influence on management's disclosure decision.

We use both auditor type and ROE as proxies of firms' performance quality and posit a positive relationship between both proxies and voluntary disclosure in Chinese public companies, as stated in the two following hypotheses.

H4. The disclosure level is positively related to a firm's ROE.

H5. Firms audited by the Big 4 are more likely to disclose information voluntarily.

2.3. Corporate governance variables

Firms' level of corporate governance also appears to be an important influential factor in their decision to make voluntary disclosures. As many studies argue, sound corporate governance mechanisms are treated as a sign that the firm in question has strong management and better monitoring in place, which in turn leads to

² [Cooke \(1989\)](#) provides evidence to show that firms with a higher degree of liquidity enjoy a sounder financial position. Therefore, they are more willing to disclose information than those suffering a low degree of liquidity.

³ The sample used by [Xiao et al. \(2004\)](#) is made up of the 300 largest listed companies in China, which is a much smaller sample than that used in this research.

more voluntary disclosures. Jaggi and Yee Low (2000), Eng and Mak (2003) and Chen et al. (2008) find some evidence to support that argument in Singapore and the United States.

2.3.1. Ownership diffusion

Ownership diffusion is a variable used to measure a firm's governance mechanism. The more diffuse its ownership is, the better able its owners are to monitor managerial behavior and thus require greater information disclosure. Alsaeed (2006) finds a positive relationship between the extent of voluntary disclosure and the ownership diffusion in Saudi Arabian companies. Hossain et al. (1994) and Haniffa and Coode (2002), in contrast, show that the level of disclosure among Malaysian companies is inversely related to their ownership diffusion level. Many other empirical studies have failed to find a statistically significant relationship.⁴

We use the average shareholding proportion, which is the total number of shares divided by the total number of shareholders for each individual firm, as a measure of ownership diffusion. Informed by corporate governance theory, we hypothesize a positive diffusion-disclosure relationship in the Chinese stock market.

H6. A firm's disclosure level is positively related to its degree of ownership diffusion.

2.3.2. Proportion of non-executive directors on the board

Similar to ownership diffusion, the proportion of non-executive directors on the board are also a measure of corporate governance or monitoring capability. Non-executive directors are less aligned with management and are therefore more inclined to encourage firms to disclose a larger amount of information to outside investors. Jaggi and Yee Low (2000) find empirical evidence to show that the proportion of independent directors have a positive influence on disclosure, and Xiao et al. (2004) produce similar results using a limited dataset in China. We conjecture that the same relationship holds for Chinese public companies more generally and test this conjecture using a much larger and more general dataset than that used by Xiao et al. (2004).

H7. A firm's disclosure level is positively related to the proportion of non-executive directors on its board.

2.3.3. State ownership

State ownership is a somewhat distinct feature of the Chinese stock market. Before China implemented market reforms and adopted an open-door policy, almost all firms in the country were totally owned by the government. These firms are referred to as SOEs. It was only after 1978, and especially after 1990 when the Shanghai and Shenzhen Stock Exchanges were established, that the Chinese government began to encourage private business and, at the same time, took a series of actions to promote the privatization of SOEs. Although an increasing number of public companies are owned by non-government entities, a majority of listed companies on the Shenzhen and Shanghai Stock Exchanges remain ultimately owned by the central or local governments.⁵ Even in firms that are ultimately controlled by a private family, state ownership still plays an important role.

Compared with other types of firms in China, particularly private firms, state-owned firms tend to be perceived as suffering from more severe information asymmetry, agency problems, and adverse selection costs. Such a perception may prompt the management of these firms to disclose additional information to ease investors' concerns regarding their quality, the role of the government as a major shareholder, and other issues. Wang et al. (2008) indeed find the level of disclosure to be positively related to the proportion of state ownership.

In contrast, Ferguson et al. (2002) argue that because red-chip firms face a more uncertain situation and higher competition costs on the Hong Kong Stock Exchange, they seem to disclose less information than H-share firms. State ownership has also been associated with a lack of emphasis on efficiency and profitability, which suggests a negative relationship between state ownership and disclosure. Consistent with this argument, Xiao et al. (2004) find that companies with a higher proportion of state ownership make fewer internet-based

⁴ See, for example, Raffournier (1995) and Donnelly and Mulcahy (2008).

⁵ In our sample, 722 of the 1058 firms were ultimately controlled by the government, with the other 366 ultimately controlled by private families.

disclosures to the public. These inconclusive empirical results motivate us to conjecture that rather than a common linear relationship, and there may be a more complicated association between state ownership and voluntary disclosure. Tian and Estrin (2008) find that the relationship between state ownership and corporate value is U-shaped, and Fan et al. (2006) find that most Chinese listed firms are ultimately controlled by local governments and private entrepreneurs. We posit that when the proportion of state ownership is relatively small (usually in privately controlled firms), less state ownership means more uncertainty and more competition, which induces firms to disclose more information voluntarily. After a certain point, however, when state ownership accounts for a large proportion of total shares (usually in state-controlled firms), agency theory starts to apply. Thus, the higher the proportion of state ownership, the more severe the agency problem and the more voluntary disclosure there is to alleviate that problem and lower the cost of capital.

H8. A quadratic relationship exists between state ownership and the disclosure level: the disclosure level initially decreases with state ownership, but then increases with ownership after it reaches a certain point.

2.4. Litigation risk-related variables

Litigation risk also tends to prompt firms to make voluntary disclosures. Previous studies show that litigation risk is always under consideration when the management of a firm makes a voluntary disclosure decision. Field et al. (2005), for example, show that firms with greater litigation risk tend to voluntarily release more information. There is also some evidence that firms with bad news are more willing to disclose information to avoid possible lawsuits.

2.4.1. Intermediary and legal environments

The legal environment obviously affects the voluntary disclosure level of the firms operating therein. La Porta et al. (1998) claim that when investors have relatively few legal rights, managers can be induced to return money to them if one or a very small number of them owns the majority of shares. Evidence from Jaggi and Yee Low (2000) suggests that firms from common law countries are associated with higher levels of financial disclosure relative to firms from code law countries.⁶

However, previous studies on voluntary disclosure have paid insufficient attention to the legal and intermediary environments of listed companies, single-nation research in particular. For reasons to be stated, it seems that the legal environment may have a strong bearing on the voluntary disclosure behavior of public companies, particularly in China. China has a more diverse geographical range than many other countries, leading to a more diversified market and greater regional disparities in the legal environment. At the same time, for reasons of policy and history, the development levels in China's various regions and provinces have not been even. For instance, different provinces may have different preferential policies or rules to encourage investment and the growth of local niche sectors. Such unevenness contributes to a distinct legal environment in China, and it is in this environment that Chinese public companies must operate.

The legal environment also shapes the development of an intermediary environment, the sophistication of which obviously plays an important role in shaping the behavior of public companies. In a more advanced intermediary environment, firms tend to disclose more information to satisfy intermediary institutions' requirements for more information. Fan et al. (2007) create an index to measure the development of a combined intermediary and legal environment for each province in China. We use their index for 2006 in this study. Based on the foregoing arguments, we predict the intermediary and legal environments to have positive effects on firm disclosure. Consistent with Jaggi and Yee Low (2000), we also predict that intermediary advancement and legal system development have positive effects on voluntary disclosure.

H9. The disclosure level is positively related to the level of development in the intermediary and legal environments in which a firm operates.

⁶ La Porta et al. (1998) claims that "relatively speaking, common law countries protect investors the most, and French civil law countries protect them the least. German civil law countries are in the middle, though probably closer to the civil law group."

2.5. Proprietary theory variables

Voluntary disclosure may burden the disclosing firm with the so-called proprietary costs. Verrecchia (1983) was the first to take proprietary costs into consideration when modeling management's disclosure decisions. When information that may reveal certain crucial aspects of a firm's operations is disclosed to investors, it is also disclosed to the firm's competitors, which may disadvantage it competitively (Lev, 1992; Darrrough, 1995). In this regard, firms tend to hide information when proprietary costs are sufficiently high.

2.5.1. Firm size

King et al. (1990) investigate the relationship between disclosure and firm size. Their study of the so-called transaction cost hypothesis indicates that the level of disclosure increases with firm size, as the incentives for private information acquisition are greater for large firms. An alternative explanation is the legal cost hypothesis (Skinner, 1992), which posits that disclosure increases with firm size because the dollar value of securities litigation damages is a function of firm size.

Other work has produced similar results. Lang and Lundholm (1993), for example, find evidence to show that larger firms tend to disclose more information in the United States. Chow and Wong-Boren (1987), Cooke (1989), Hossain et al. (1994, 1995), Depoers (2000) and Eng and Mak (2003) report similar results for Mexico, Sweden, New Zealand, France, and Singapore, respectively. A previous study in the Chinese market using a sample of listed firms issuing both A and B shares (Wang et al., 2008) suggests a positive relationship between firm size and disclosure.

Drawing on signaling theory, we predict a positive relationship between firm size and disclosure in the Chinese stock market in general, not just in particular sections of the market. To test this prediction, we develop the following hypothesis and use the natural log of a firm's total market value as our measure of firm size.

H10. The disclosure level is positively related to firm size.

2.6. Cost of equity

With reference to agency theory, Barry and Brown (1986) conclude that firms with a high level of disclosure are more likely to have a lower cost of capital, and a number of empirical studies have produced results consistent with that conclusion. Botosan (1997) finds that in firms with low analyst following, there is a negative relationship between the cost of equity and the extent of voluntary disclosure. Francis et al. (2005) also find that firms engaging in more extensive disclosure have a lower cost of both debt and equity after controlling for cross-country institutional differences in legal and financial systems.

As the Chinese stock market is still in its early stages of development, whether agency theory, which applies in the United States, holds among Chinese public companies is an empirical question. Wang et al. (2008) test the relationship between disclosure and the cost of debt using a partial Chinese dataset and find no significant association. We carry out a similar test in this study using a large sample of firms in the Chinese stock market to determine whether there is any association between the cost of equity and voluntary disclosure in the Chinese context. Our final hypothesis is as follows:

H11. The cost of equity is negatively related to the disclosure level.

3. Methodology

3.1. Sample selection

The firms included in this study were selected from the entire list of companies that traded shares on the Shanghai and Shenzhen Stock Exchanges at the end of 2006. As of December 31, 2006, there were 576 firms listed on the Shenzhen Stock Exchange and 824 firms listed on the Shanghai Stock Exchange. Banks and insurance firms were excluded because their business activities and financial reports are not comparable with those of firms in other industries. A few additional firms were also excluded, as they lacked some of the

Table 1
Sample description.

	Number of firms	%
<i>Panel A: Industry distribution</i>		
Real estate	117	10.98
Commercial	74	6.94
Public service	72	6.75
Industrial firms	730	68.48
Other	73	6.85
Total	1066	100.00
<i>Panel B: Ultimate ownership</i>		
State-controlled	722	67.73
Private-controlled	336	31.52
Foreign firm-controlled	8	0.75
Total	1066	100.00

required data. The final sample thus includes 653 firms listed on the Shanghai Stock Exchange and 422 listed on the Shenzhen Stock Exchange. These firms represent more than 80% of all public companies in China in 2006.

Disclosure level information was collected for each firm from the annual reports published by the two stock exchanges. Information about their attributes and cost of equity was collected from the WIND and GTA databases. Table 1 presents the industry and ultimate controller categories of the sample firms.

3.2. Variable measurement

3.2.1. Dependent variable: disclosure index

Following previous studies (Chow and Wong-Boren, 1987; Cooke and Wallace, 1989; Ferguson et al., 2002; Gray et al., 1995; Hossain et al., 1995; Botosan, 1997; Xiao et al., 2004; Wang et al., 2008), we use a two-step approach to develop a disclosure index for the sample firms:

Step 1. Generate a preliminary list of 136 items as the initial disclosure index.

Step 2. Use Chinese accounting standards to select discretionary items from the 136-item list to create the final disclosure index.

As a result, 17 items related to mandatory disclosure are eliminated. The final voluntary disclosure index thus includes 119 items, all of which are evaluated with the corresponding information disclosed in the sample firms' annual reports, and serves to measure the extent of voluntary disclosure.⁷

For most of the items, the following quantitative measure is used. If a firm disclosed an item from the list, it receives a score of 1 and 0 otherwise. For forecast items, the following quantitative measure is adopted. A score of 2 is assigned for these items if a firm provided a point estimate, a score of 1 if it provided interval estimates and a score of 0 if it provided no forecast of any kind. The sum of the scores that a firm received for all items was its raw score. Because we focus on all users of corporate annual reports rather than any specific user group requiring specialized information, we do not assign different weights to different items, but assume that each item is equally important when computing the raw score (see Cooke, 1989; Gray et al., 1995). Similar to Botosan (1997), we calculate the disclosure score by a relative value, which is the raw score of an individual firm divided by the maximum raw score in the sample and multiplied by 1/5, as follows:

$$DSCORE^i = \frac{RAW\ SCORE^i}{MAX\ SCORE} * 20\%$$

⁷ See Appendix A.

Table 2
Explanation of independent variables.

Firm size (LMV)	Natural log of total assets at year-end
Leverage (D/A)	Ratio of total debt to total assets at year-end
Assets-in-place (FA/A)	Ratio of fixed assets to total assets at year-end
Liquidity (Liquidity)	Current ratio of firm at year-end
Return on equity (ROE)	Net income divided by shareholders' equity at year-end
Auditor type (Audit)	Dummy variable, where 1 represents a firm audited by the BIG-4, and 0 otherwise
Ownership diffusion (Avershare)	Average proportion of shares held by each individual investor
Non-executive directors (NED)	Proportion of non-executive directors on the board
State ownership (State)	Proportion of shares held by the government
Intermediary and legal environments (I&L)	Index developed by Fan et al. (2007) that represents the development of the intermediary and legal environment of China's provinces

3.2.2. Independent variables

The independent variables are firm attributes that we judge to be possible determinants of a firm's disclosure level. These variables, listed in Table 2, were measured using 2006 year-end data from the WIND and GTA databases.

3.2.3. Cost of equity

A variety of methods have been developed to measure the cost of equity. Typical among these are the dividend discount model (Botosan, 1997; Botosan and Plumlee, 2002; Francis et al., 2008), applied cost of capital model (Ashton, 2005) and generalized least squares (GLS) model (Gebhardt et al., 2001). As the first two of these rely on forecast and value-line information, which are unavailable in China, we adopt the GLS model developed by Gebhardt et al. (2001). The model structure is as follows:

$$P_t = B_t + \frac{FROE_{t+1} - r_t}{(1 + r_t)} B_t + \frac{FROE_{t+2} - r_t}{(1 + r_t)^2} B_{t+1} + TV$$

where B_t = the book value of the firm in 2006 divided by the number of shares outstanding in each period, r_t = the cost of equity, and $FORE_{t+i}$ = the forecast ROE for period $t + i$. For the first six periods,⁸ we obtain the values directly from the firms' annual reports. Beyond the sixth period, we forecast FORE using a linear interpolation to the industry median ROE. $B_{t+i} = B_{t+i-1} + FEPS_{t+i} - FDPS_{t+i}$, where $FDPS_{t+i}$ is the forecast dividend per share for period $t + i$, estimated using the current dividend payout ratio (k). We assume $FDPS_{t+i} = FEPS_{t+i} * k$. Finally, TV refers to the terminal value of the firm. For any horizon T , the terminal value calculation is given as

$$TV = \sum_{i=3}^{T-1} \frac{FROE_{t+i} - r_t}{(1 + r_t)^i} B_{t+i} + \frac{FROE_{t+T} - r_t}{r_t(1 + r_t)^{T-1}} B_{t+T}$$

Consistent with Gebhardt et al. (2001), we forecast earnings for up to 12 periods and estimate a terminal value, TV, for cash flows beyond period 6. The industry target ROE is a moving median of the ROEs of all firms in a given industry in the 10 years prior to 2006. We exclude loss firms on the assumption that the population of profitable firms better reflects long-term industry equilibrium rates of returns. The dividend payout ratio (k) is calculated as the average dividend payout ratio over the past 10 years or as long as the firm remains listed.

4. Results

4.1. Descriptive statistics

Panel A of Table 3 reports the descriptive statistics of the dependent and independent variables in this study. The raw score ranges from 23 to 70 and DSCORE from 1.6429 to 5. The overall mean for DSCORE

⁸ We calculate the cost of equity over a quarterly horizon.

Table 3
Summary statistics.

Variable	Mean	Median	Maximum	Minimum	Standard deviation							
<i>Panel A: Descriptive statistics, N = 1066</i>												
Raw score	41.4545	42	70	23	7.3036							
DSCORE	0.1184	0.12	0.2	0.0657	0.0209							
LMV	21.4583	21.2699	27.3962	19.4364	1.0256							
D/A	0.5074	0.5198	5.4936	0.0207	0.2354							
Liquidity	0.8571	0.9291	1	0.0524	0.1766							
FA/A	0.3240	0.2947	0.9564	0.0005	0.1911							
ROE	8.0173	7.17	104.49	-175.5	14.7212							
Audit	0.0732	0	1	0	0.2605							
Avershare	0.0546	0.0405	0.3432	0.0016	0.0484							
NED	0.3558	0.3333	1	0.1111	0.0656							
I&L	6.6287	5.52	13.07	1.49	3.2219							
State	0.3158	0.3401	0.8375	0	0.2300							
Variable	Raw score	DSCORE	LMV	D/A	FA/A	Liquidity	ROE	Audit	Aver-share	NED	I&L	State
<i>Panel B: Correlation matrix</i>												
Raw score	1.00											
DSCORE	0.99*	1.00										
LMV	0.11*	0.1021*	1.00									
D/A	-0.01	-0.01	-0.06*	1.00								
FA/A	0.08*	0.0922*	0.11*	-0.01	1.00							
Liquidity	-0.10*	-0.0834*	-0.23*	-0.14*	-0.34*	1.00						
ROE	0.10*	0.0896*	0.30*	-0.13*	-0.08*	-0.03*	1.00					
Audit	-0.06	-0.06	0.44*	-0.04*	0.09*	-0.15*	0.04	1.00				
Avershare	0.02	0.02	-0.14*	0.01	-0.15*	0.16*	0.17*	-0.08*	1.00			
NED	-0.04	-0.04	-0.04	0.001	-0.04*	0.02	-0.00	-0.00	0.04*	1.00		
I&L	-0.11*	-0.0972*	0.17*	-0.03*	-0.19*	0.08*	0.04*	0.17*	0.03*	0.04*	1.00	
State	0.04	0.03	0.27*	0.02	0.17*	-0.16*	0.02*	0.09*	-0.22*	-0.06*	-0.05*	1.00

* Statistically significant at the 0.05 level.

is 2.9610, which is an approximation of the median value. Only a small proportion, just 7.32%, of the sample firms were audited by Big 4 auditors. A relatively high proportion of shares in the sample firms were held by the government (the mean value is 31.58%).

Panel B of Table 3 presents the Pearson correlation between each pair of independent variables. It is generally accepted that correlations between independent variables are not harmful in multivariate analysis unless they exceed 0.80 or 0.90 (Gujarati, 1988). The Pearson correlation values shown in Panel B suggest that multicollinearity between the independent variables is unlikely to pose a serious problem in interpreting the results of our multivariate analysis, as they are all less than the stated threshold.

4.2. Multivariate tests

4.2.1. Results for commonly tested factors in China

Of the independent variables included in this study, the most commonly tested in the Chinese context are firm size, leverage, assets-in-place, liquidity, ROE, auditor type, ownership diffusion, and the proportion of non-executive directors. We use an OLS model as a multivariate test to assess the effect of each of these variables on voluntary disclosure in the Chinese market. Our test is based on the following model.

$$\text{DSCORE} = \beta_0 + \beta_1 \text{LMV} + \beta_2 \text{D/E} + \beta_3 \text{FA/A} + \beta_4 \text{Liquidity} + \beta_5 \text{ROE} + \beta_6 \text{Audit} + \beta_7 \text{Avershare} + \beta_8 \text{NED} + e$$

To account for differences in voluntary disclosure in different industries, an additional test is performed using the adjusted disclosure score (Adj-DSCORE) rather than DSCORE. A firm's Adj-DSCORE is equal to its DSCORE minus the average DSCORE of the industry to which it belongs. The adjusted model is as follows:

$$\text{Adj-DSCORE} = \beta_0 + \beta_1 \text{LMV} + \beta_2 \text{D/E} + \beta_3 \text{FA/A} + \beta_4 \text{Liquidity} + \beta_5 \text{ROE} + \beta_6 \text{Audit} + \beta_7 \text{Avershare} + \beta_8 \text{NED} + e$$

The results of these tests are summarized in Table 4, which shows that the general regression and industry-adjusted regression results are consistent for most of the variables, implying that they are quite robust. The coefficients of firm size and assets-in-place are highly significant, whereas those for leverage, ROE, and ownership diffusion are only marginally significant. These findings are consistent with both existing theories and our hypotheses. The sign of auditor type, in contrast, is significantly negative, which is inconsistent with our prediction, prior empirical findings (Xiao et al., 2004; Wang et al., 2008) and traditional signaling theory. It is possible that firms audited by the Big 4 attract more attention than other firms and release more information through other channels, such as the media, and therefore rely less on voluntary disclosure in annual reports. The coefficient of liquidity is negative and marginally significant in the general regression, but loses its significance in the industry-adjusted regression. These test results indicate that we can take liquidity and the proportion of non-executive directors on the board as insignificant variables in explaining voluntary disclosure levels.

4.2.2. Specific roles of intermediary and legal environments and state ownership

China stands out from other countries in terms of its large and diversified regions and the state ownership of its firms. We test H8 and H9 to determine the influence of the intermediary and legal environments (I&L) and state ownership (State) on the disclosure level. We add these two variables into the equation to determine whether they have additional explanatory power. As previous empirical studies have reported inconsistent evidence concerning the sign of state ownership, we hypothesize a convex quadratic association between State and DSCORE. The models we test are as follows:

$$\text{DSCORE} = \beta_0 + \beta_1 \text{LMV} + \beta_2 \text{D/E} + \beta_3 \text{FA/A} + \beta_4 \text{Liquidity} + \beta_5 \text{ROE} + \beta_6 \text{Audit} + \beta_7 \text{Avershare} + \beta_8 \text{NED} + \beta_9 \text{I\&L} + \beta_{10} \text{State} + \beta_{11} \text{State}^2 + e$$

Table 4
Relationship between general factors and voluntary disclosure level.

Variable	Expected sign	General regression	Industry-adjusted regression
LMV	+	0.0026 ^{***} (3.51)	0.0357 ^{***} (3.42)
D/A	+	0.0071 [*] (1.92)	0.1052 ^{**} (2.05)
FA/A	+	0.0072 ^{**} (1.99)	0.1251 ^{**} (2.49)
Liquidity	+	-0.0068 [*] (-1.72)	-0.0642 (-1.15)
ROE	+	0.0001 [*] (1.89)	0.0012 [*] (1.85)
Audit	+	-0.0098 ^{***} (-3.59)	-0.1383 ^{**} (-3.61)
Avershare	+	0.0248 [*] (1.77)	0.3320 [*] (1.70)
NED	+	-0.0061 (-0.57)	-0.0923 (-0.63)
Constant		1.5881 (3.59)	-0.7878 (-3.21)
Obs.		1038	1038
Adjusted R ²		0.0348	0.0337
F-stat		5.68	5.53
p-Value		(0.0000)	(0.0000)

* Statistically significant at the 0.10 level.

** Statistically significant at the 0.05 level.

*** Statistically significant at the 0.01 level.

$$\text{Adj-DSCORE} = \beta_0 + \beta_1 \text{LMV} + \beta_2 \text{D/E} + \beta_3 \text{FA/A} + \beta_4 \text{Liquidity} + \beta_5 \text{ROE} + \beta_6 \text{Audit} \\ + \beta_7 \text{Avershare} + \beta_8 \text{NED} + \beta_9 \text{I\&L} + \beta_{10} \text{State} + \beta_{11} \text{State}^2 + e$$

The results are summarized in Table 5. When I&L and State are added to the equation, assets-in-place loses its significance in the general regression, and ownership diffusion becomes insignificant in both regressions. The signs and significance of the other common factors remain the same as those reported in Section 4.2.1. These results are consistent with both independence between these factors and between I&L and state ownership.

The coefficient of I&L, $-0.0007/-0.0079$ ($p < 0.01$), is not in the hypothesized direction, which suggests that firms operating in provinces with a more advanced market and better legal environment disclose less information than those in less developed environments. One explanation for the negative statistical association between I&L and DSCORE is that there may be some substitution effect between I&L and voluntary disclosure. The overall legal environment in China is incomplete, and thus, management rarely focuses on litigation risk and legal rights. At the same time, intermediary institutions may not put pressure on firms to disclose more information in annual reports. However, voluntary disclosure and legal advances compensate for each other. Hence, companies in regions with an advanced legal environment tend to disclose less information because the environment itself serves as a signal of a good reputation and transparency.

The coefficients of State and State² are highly significant ($p < 0.05$) in both regressions, and their directions are consistent with H8. This convex association suggests that the disclosure level initially decreases with state ownership, but after a certain point, it increases with an increase in state ownership. This finding is largely consistent with those of previous studies on state ownership in the Chinese market (Ferguson et al., 2002). To further verify it, we conduct another test, as reported in the next section.

Table 5
Relationship between I&L, state ownership and voluntary disclosure level.

Variable	Expected sign	General regression	Industry-adjusted regression
LMV	+	0.0026 ^{***} (3.35)	0.0363 ^{***} (3.32)
D/A	+	0.0073 ^{**} (2.00)	0.1082 ^{**} (2.11)
FA/A	+	0.0050 (1.37)	0.1005 ^{**} (1.97)
Liquidity	+	-0.0063 (-1.59)	-0.0586 (-1.05)
ROE	+	0.0001 [*] (1.87)	0.0012 [*] (1.83)
Audit	+	-0.0086 ^{***} (-3.12)	-0.1239 ^{***} (-3.22)
Avershare	+	0.0205 (1.44)	0.2743 (1.37)
NED	+	-0.0045 (-0.43)	-0.0761 (-0.52)
I&L	+	-0.0007 ^{***} (-3.16)	-0.0079 ^{***} (-2.69)
State	-	-0.0215 ^{**} (-2.28)	-0.2615 ^{**} (-1.99)
State ²	+	0.0349 ^{**} (2.40)	0.4097 ^{**} (2.01)
Constant		0.0691 (3.84)	-0.7303 (-2.90)
Obs.		1038	1038
Adjusted R2		0.0459	0.0409
F-stat		5.53	5.02
p-Value		(0.0000)	(0.0000)

* Statistically significant at the 0.10 level.

** Statistically significant at the 0.05 level.

*** Statistically significant at the 0.01 level.

4.2.3. Difference between firms ultimately controlled by the government and those controlled by private families

The evidence in Section 4.2.2 suggests a convex quadratic association between the disclosure level and the proportion of government ownership. At-test and multiple-OLS regression are now used to further investigate the underlying relationship.

Panel A of Table 6 reports the results of a *t*-test between the subgroup of firms ultimately controlled by the government and those ultimately controlled by private families. The null hypothesis that there is no difference in the proportion of government ownership between the two groups ($H_0: \text{diff} = 0$) is rejected at the $p = 0.01$ level, indicating that a statistically significant difference does exist. This difference is -0.3693 , which suggests that firms ultimately controlled by the government have a much larger proportion of their shares in government hands (36.93%). This finding is consistent with our analysis in Section 4.2.2.

In performing separate multiple regressions for these two groups, many disparities emerge. Firm size and ROE become insignificant for the privately controlled firms, whereas they remain highly significant for government-controlled firms. Debt becomes an insignificant variable for the latter. This is an unsurprising finding in the Chinese context, where state-owned companies are more likely to obtain bank loans because of the

Table 6
State ownership and voluntary disclosure level.

Group	Observ.	Mean	Std. dev.	
<i>Panel A: T-test of the difference in state ownership between privately controlled and government-controlled firms</i>				
0	336	0.0656	0.1329	
1	722	0.4349	0.1603	
Variable	Private controller		Government controller	
	General regression	Industry-adjusted regression	General regression	Industry-adjusted regression
<i>Panel B: Regression results</i>				
LMV	0.0013 (0.83)	0.0155 (0.73)	0.0029*** (3.05)	0.0401*** (3.03)
D/A	0.0140** (2.10)	0.2143** (2.33)	0.0047 (1.05)	0.0657 (1.04)
FA/A	0.0040 (0.55)	0.0730 (0.72)	0.0028 (0.66)	0.0785 (1.29)
Liquidity	0.00002 (0.00)	0.0234 (0.19)	-0.0075^* (-1.66)	-0.0734 (-1.15)
ROE	0.00002 (0.27)	0.0001 (0.11)	0.0001^{**} (2.11)	0.0020^{**} (2.27)
Audit	-0.0093 (-1.56)	-0.1412^* (-1.72)	-0.0075^{**} (-2.30)	-0.1080^{**} (-2.36)
Avershare	0.0459^{**} (2.31)	0.5903^{**} (2.15)	-0.0088 (-0.40)	-0.0294 (-0.09)
NED	-0.0220 (-0.95)	-0.2990 (-0.93)	-0.0028 (-0.24)	-0.0546 (-0.33)
I&L	0.0001 (0.31)	0.0002 (0.04)	-0.0010^{***} (-4.08)	-0.0118^{***} (-3.31)
State	-0.0152^* (-1.77)	-0.2101^* (-1.77)	0.0092^* (1.83)	0.0948 (1.33)
Constant	0.0890^{**} (2.46)	-0.3905 (-0.78)	0.0634^{***} (3.01)	-0.8142^{***} (-2.74)
Obs.	328	328	702	702
Adjusted R^2	0.0189	0.0190	0.0688	0.0581
F-stat	1.63	1.63	6.18	5.33
p-Value	(0.0972)	(0.0963)	(0.0000)	(0.0000)

Notes: A firm belongs to group 0 if it is ultimately controlled by a private family and to group 1 if it is ultimately controlled by the government.

* Statistically significant at the 0.10 level.

** Statistically significant at the 0.05 level.

*** Statistically significant at the 0.01 level.

preferential lending policy exercised by the country's government-controlled banks. However, this weakens the potential relationship between debt and the disclosure level.

The roles of assets-in-place and liquidity are not very significant in either group when tested separately. Ownership diffusion, measured by Avershare, is significantly positive for privately controlled firms, whereas no significant relationship is found in government-controlled firms. This result is consistent with monitoring theory. When the government takes primary responsibility for monitoring state-owned firms, ownership diffusion becomes less important.

Auditor type remains negatively and significantly related to the disclosure level, whereas the proportion of non-executive directors on the board remain in significant in both regressions. It is a not very surprising that I&L becomes in significant for privately controlled firms, and no existing theory provides a satisfactory explanation. The coefficient of state ownership in the regression on the private subgroup is -0.0152 (-0.2101) and highly significant ($p < 0.1$). The same coefficient in the general regression on the government group is 0.0092 and significant at the 0.1 level, whereas in the industry-adjusted regression on this group, it is 0.0948 , which is less significant than that in the general regression. This finding further verifies our conjecture in Section 4.2.2 that the type of ultimate controller explains the quadratic association between state ownership and the disclosure level, at least in part.

5. Cost of equity

Establishing the relationship between the cost of equity and voluntary disclosure affords a deeper understanding of the economic consequences of such disclosure. To determine this critical relationship, we perform the following OLS regression.

$$\text{Cost} = \beta_0 + \beta_1 \text{Adj-DSCORE} + \beta_2 \text{LA} + \beta_3 \text{D/E} + \beta_4 \text{Beta} + \beta_5 \text{ROA} + \beta_6 \text{Analyst} + e$$

where LA is the natural log of the book value of total assets; D/E is the market value of debt divided by equity; Beta is the beta value in the past 100 days; ROA is return on assets; and Analyst is the number of analysts following the firm.

Table 7
Regression results for the cost of equity model.

Variable	General regression	adjusted for industry cluster
Adj-DSCORE	-0.0006 (-0.20)	-0.0006 (-0.23)
LA	0.0124^{***} (10.31)	0.0124^{***} (6.11)
D/E	-0.0006 (-0.44)	-0.0006 (-0.24)
Beta	0.0073^* (1.82)	0.0073 (1.49)
Analyst	-0.0015^{***} (-8.53)	-0.0015^{***} (-5.38)
ROA	-0.0591^{***} (-3.15)	-0.0591^{**} (-2.66)
Constant	-0.2210^{***} (-8.03)	-0.2210^{***} (-5.86)
Control industry	Yes	Yes
Obs.	760	760
Adjusted R^2	0.3400	0.3621
F-stat	16.10	
p-Value	(0.0000)	

* Statistically significant at the 0.10 level.

** Statistically significant at the 0.05 level.

*** Statistically significant at the 0.01 level.

It is possible that investors prefer the stocks of firms in a specific industry. The industry-adjusted disclosure score was thus employed in this equation to alleviate any industry influence on the cost of equity. LA and ROA are adopted to control for the effects of firm size and performance on the cost of equity, and the D/E ratio is used to measure the leverage risk of individual firms. These three factors are the same as those used by Wang et al. (2008). In addition to these firm-specific characteristics, we add two other factors in the regression: Beta and Analyst. Beta is a proxy for the relative market risk of individual firms, and Analyst represents the public attention paid to a firm. Both have been verified as relevant to the cost of equity (Botosan and Plumlee, 2002; Francis et al., 2008). We also control for industry effects using dummy variables. Table 7 reports the results of this regression analysis, including the general regression and standard errors adjusted for industry clustering.

The Wang et al. (2008) OLS model has very little explanatory power, whereas the adjusted R^2 in our test is 16.1%, which is suggestive of better explanatory power. Contrary to our hypothesis, the coefficient of Adj-DSCORE is not significant, which is consistent with the evidence in Wang et al. (2008) and suggests that investors in China do not rely too much on the voluntary disclosure information in annual reports. In other words, such information is not a credible predictor of stock price movements. LA, Beta, and Analyst, in contrast, all have significant explanatory power in our model. Our findings suggest that larger firms face a higher cost of equity, which is contrary to the findings of most studies. The coefficient of Beta is positive and marginally significant, whereas that of Analyst is negative and highly significantly related to the cost of capital.

6. Conclusion

This study investigates the determinants and features of voluntary disclosure among companies listed on the Chinese stock market. Using a sample representing more than 80% of all public companies in China, we find evidence that differs from the findings of previous studies employing smaller samples, indicating that the Chinese stock market has a number of distinct features in connection with voluntary disclosure.

In tests of the entire sample, we find that firm size, leverage, assets-in-place, ROE, and ownership diffusion are significantly associated with voluntary disclosure and that auditor type and the intermediary and legal environments are highly significantly associated with voluntary disclosure. The sign on auditor type does not conform to previous studies, suggesting a different situation in China. We also find a quadratic convex association between state ownership and disclosure level, which helps to explain the inclusive empirical evidence presented by Xiao et al. (2004) and Wang et al. (2008).

When subsamples are tested, many of the explanatory variables lose their significance in one or both groups. This disparity suggests a significant difference in firm characteristics and accounting policy preferences between government and privately controlled firms. More importantly, the signs of the coefficients of state ownership in these two regressions are in opposite directions. The disclosure level decreases with state ownership in the privately controlled subsample, but increases with it in the government-controlled subsample, revealing a clear quadratic relationship. Furthermore, voluntary disclosure exerts no significant influence on the cost of equity, which casts doubt on the relevance of the voluntary information disclosed in annual reports to investors' decisions in the Chinese context.

The findings of this study will help Chinese regulators to fine-tune the country's regulatory policies to better suit the needs of the market. For instance, both state-owned businesses with a lower proportion of state ownership and private businesses with a higher proportion of such ownership may require more regulation to guarantee transparency. The findings will also benefit investors by providing them with a better understanding of the credibility of the annual reports supplied by companies with certain characteristics. The irrelevance of voluntary disclosure to the cost of equity reveals several deficiencies in the Chinese stock market and points to the need for better regulation and reform.

These potential implications of our findings suggest the desirability of future research that further refines and broadens our analysis. Three limitations of the study are particularly worth mentioning. First, the study involved a one-year test. Although industry and ultimate controller biases are controlled for, it is possible that there are year-specific influences, particularly with regard to the cost of equity. Second, although most of our regression models are statistically significant, their range of adjusted R -squares suggests that other potential determinants of voluntary disclosure may exist. Finally, we focus on only one form of disclosure vehicle, the

annual report. Additional studies could be conducted to analyze other vehicles, such as quarterly reports and press releases.

What is the benefit of voluntary disclosure for Chinese firms? We posit two possible benefits for testing in further research: future seasoned equity offerings (SEOs) and a lower cost of equity in the future. First, as [Chen and Wang \(2007\)](#) report, Chinese listed firms prefer to issue additional shares after their initial public offering through SEOs. To attract investors for future SEOs, firms have the motivation to disclose more information than is mandatory. Second, although we are unable to find any evidence to indicate that voluntary disclosure affects the cost of equity in this study, the Chinese stock market is developing very quickly. As investors become more experienced, it is likely that firms engaging in more extensive voluntary disclosure will benefit in terms of a lower cost of equity in the future.

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Appendix A

List of voluntary disclosure items

General information

1. Corporate history
2. Corporate structure
3. Statement of strategy and objectives: general
4. Statement of strategy and objectives: financial
5. Statement of strategy and objectives: marketing
6. Statement of strategy and objectives: social
7. Detailed strategic plan and barriers

Financial information

(a) Macro economic analysis

8. Index of selling prices
9. Index of raw material prices
10. Impacts of environment, policy and law

(b) Industry analysis

11. Industry trend analysis
12. Competitor analysis

(c) Trend analysis

13. Discussion of industry trends: prior
14. Discussion of industry trends: future

(d) Financial review data

15. Net profit
16. Gearing ratios
17. Current ratios
18. Return on equity
19. Other ratios
20. Increase in income

21. Increase in sales
22. Increase in net profits
23. Increase in ROA

(e) Analysis of financial performance

24. Analysis of why income has changed
25. Analysis of why sales have changed
26. Analysis of why costs have changed
27. Analysis of why gross profits have changed
28. Analysis of why gross margins have changed
29. Analysis of why net profits have changed
30. Analysis of why core business profits have changed
31. Analysis of why core business incomes have changed
32. Analysis of why core business costs have changed
33. Analysis of why income from other businesses has changed
34. Analysis of why non-operating income has changed
35. Analysis of why non-operating expenditures have changed
36. Analysis of why administrative costs have changed
37. Analysis of why operational costs have changed
38. Analysis of why financial costs have changed
39. Analysis of why interest income (or cost) has changed
40. Analysis of why inventories have changed
41. Analysis of why construction in process has changed
42. Analysis of why engineering materials have changed
43. Analysis of why accounts receivable have changed
44. Analysis of why accounts payable have changed
45. Analysis of why notes receivable have changed
46. Analysis of why other accounts receivable have changed
47. Analysis of why other accounts payable have changed
48. Analysis of why notes payable have changed
49. Analysis of why accounts payable in advance have changed
50. Analysis of why pre-paid accounts have changed
51. Analysis of why capital expenditures have changed
52. Analysis of why R&D expenditures have changed
53. Analysis of why return on investment has changed
54. Analysis of why market shares have changed
55. Analysis of why cash flows have changed
56. Analysis of why cash and cash equivalents have changed
57. Analysis of why currency assets have changed
58. Analysis of why intangible assets have changed
59. Analysis of why debts have changed
60. Analysis of why total assets have changed
61. Analysis of why debts due in one year have changed
62. Analysis of why fixed assets have changed
63. Analysis of why ROE has changed
64. Analysis of why long-term investment has changed
65. Analysis of why short-term investment has changed
66. Analysis of why taxes payable have changed
67. Analysis of why wages or welfare payable have changed
68. Analysis of why short-term debts have changed
69. Analysis of why long-term debts have changed

70. Analysis of why long-term deferred expenses have changed
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82. Forecasts of capital expenditures
83. Forecasts of returns on R&D expenditures
84. Forecasts of revenue
85. Forecasts of sales
86. Forecasts of revenues from main business
87. Forecasts of costs
88. Forecasts of product quantities
89. Forecasts of profits
90. Effects of future opportunities on sales and profits
91. Effects of future risks on sales and profits

Non-financial information

(a) Analysis of products and markets

92. Discussion of product development
93. Description of marketing network: domestic
94. Description of marketing network: foreign

(b) Business issues

95. Description of business issues
96. Description of plans to resolve issues
97. Description of consequences of issues
98. Comments on issues

(c) Managerial information

99. Structure of the board of directors
100. General information about directors and senior managers
101. Work experience of directors and senior managers
102. Shares held by directors and senior managers
103. Pay packages of directors and senior managers
104. Description of reasons for board member changes

(d) Shareholder information

105. Description of top-10 shareholders
106. Description of institutional shareholder relationship
107. Description of ultimate controllers
108. Description of other shareholders holding more than 10% of total shares

(e) Analysis of capital market

- 109. Description of IPO
- 110. Description of year-end market value
- 111. Analysis of fluctuation in stock prices
- 112. Analysis of changes in dividend policy

(f) Analysis of employees

- 113. General information about employees
- 114. Employee training and welfare
- 115. Description of safety issues and costs

(g) Others

- 116. Description of important matters concerning guarantees
 - 117. Description of investment performance and comments on any changes
 - 118. Description of utilization of raised funds
 - 119. Description of utilization of non-raised funds
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