WHAT IS THE CORPORATE GOVERNANCE AND CORPORATE SOCIAL RESPONSIBILITY DISCLOSURE
EVIDENCE FROM CHINA

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1 Introduction

Extant research on corporate governance documents the effects of a firm’s disclosure policy (Chen & Jaggi, 2000; Craswell & Taylor 1992; Eng & Mak, 2003; Forker, 1992; Ho & Shun, 2001; Hossain, Tan, & Adams, 1994; Malone, Fries, & Jones, 1993; McKinnon & Dalimunthe, 1993; Mitchell, Chia, & Loh, 1995; Raffournier, 1995; Williamson, 1985). However, most of the studies concentrate on financial information disclosure policy. For example, Forker (1992) examines the association between corporate governance and share option disclosure. Chen and Jaggi (2000) examine the association between independent non executive directors and comprehensiveness of information in mandatory financial disclosures. Few studies examine the association between corporate governance and firm’s disclosure policy on nonfinancial information. Since corporate disclosure includes both financial information and nonfinancial information, given the importance of non-financial information as an integrated part of a firm’s disclosure, this study examines the association between corporate governance and corporate social responsibility (CSR) disclosure quality, using Chinese public firms’ CSR disclosure data between 2009 and 2011 as our main sample.

Corporate social responsibility has become increasingly important for Chinese public firms, stakeholders, and regulators, due to publicity about CSR related activities, such as environmental

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pollution, poisoned milk formula, charitable donations, and soon. To encourage firms’ ethical behavior and social responsibility, Chinese regulatory agencies (Shenzhen Stock Exchange, SZSE, and Shanghai Stock Exchange, SSE) released several policy statements recently to encourage firms to issue their CSR reports. In 2006, the Shenzhen Stock Exchange released the Guide on Listed Companies’ Social Responsibility (hereafter “Shenzhen Guide”). In 2008, the State-Owned Assets Supervision and Administration Commission of the State Council (SASACSC), the Chinese SEC-Fujian branch, and the SSE all issued guidelines on CSR of public firms and institutions.

As a result, 290 listed companies published CSR reports for fiscal year 2008, and 471 firms provided reports in 2009 (Lin, 2010). Interestingly, in 2010, a mutual fund index (Jian Xin ShangZhen CSR index Mutual Fund) was created to invest in Chinese stocks based on their CSR ratings.

The increasing popularity of CSR disclosure also generates attention in academic research. While US studies (Dhaliwal, Radhakrishnan, Tsang, & Yang, 2011; Dhaliwal, Radhakrishnan, Tsang, & Yang, 2012; Goss & Roberts, 2011; Menz, 2010) document benefits associated with CSR reports, such as reducing information asymmetry and enhancing analyst forecasts, Chinese academia has begun to investigate the determinants and impacts of CSR reports. Some focus on the determinants of CSR disclosure (Mao & Zhang, 2009; Shen, 2006; Shen, 2007; Shen & Jin, 2006; Shen et al., 2010; Wang, 2008; Wang, Lin, & Yu, 2013; Xiao & Yang, 2011; Zhang, 2012), while others examine the impact of CSR disclosure on shareholder’s value, cost of capital, analyst forecast, and financing constraints (Chen & Ma, 2005; He, Xiao, & Chen, 2012; He, Xiao, & Zhu, 2012; Huang & Li, 2012; Li, 2006; Li & Zhang, 2010; Liu & Kong, 2006; Meng, Xiao, & Qu, 2010; Song & Gong, 2007; Wang, 2008; Wen & Fang, 2008; Zhang, Liu, & Zhang, 2009; Zhu, 2011).

In particular, Meng, Xiao, and Qu (2010) and Huang and Li (2012) examine the effects of CSR disclosure on cost of capital and find that firms with CSR disclosure have lower cost of debt and cost of equity.
He, Xiao, and Zhu (2012) examine the impact of CSR disclosure on analyst followings, and find that CSR disclosure, as an additional information disclosure, can increase the number of analyst followings and reduce analyst forecast errors and forecast dispersions. He, Xiao, and Chen (2012) investigate the relation between CSR disclosures and financial constraints. They find that CSR disclosure can reduce a firm’s financial constraints.

While these studies enhance our understanding of the relation between CSR disclosure and a firm’s financial policies, little has been done to investigate the association between corporate governance and CSR disclosures. Extant studies examine the association between corporate governance and firm disclosure and document a positive association between strong corporate governance and firm disclosure levels, including Forker (1992), Chen and Jaggi (2000), Ho and Shun (2001), and Eng and Mak (2003). This chapter is an extension of the research on corporate governance and firm disclosure.

We extend prior work by examining corporate governance from two aspects, ownership structure and board composition, and examine disclosure in the broader context of voluntary disclosure such as nonfinancial information disclosure. In particular, we argue that strong corporate governance can strengthen the monitoring power over managers, which might increase a firm’s CSR disclosures.

Using Chinese public firms’ CSR disclosure data between 2009 and 2011, this study examines the association between corporate governance and CSR disclosure quality. We expect that CSR disclosure, as additional nonfinancial information disclosure from a firm, is positively associated with a firm’s corporate governance, measured by ownership structure and board composition. The CSR disclosure quality is measured by Ruling’s CSR index within firms that have CSR disclosure. Our results show that ownership structure and board composition affect a firm’s CSR disclosure and find that large board size and higher percentage of independent directors are positively associated with higher CSR disclosure. In addition, our study documents that higher managerial ownership, significant largest shareholder ownership, and higher share percentage of
large shareholders (between the second and tenth largest shareholders) are associated with increased disclosure. The results are robust after several sensitivity tests.

This research contributes to the literature as the first study that examines the impact of ownership structure and board composition on firm’s CSR disclosure in China. Prior US and international research has documented that CSR disclosure is related to reducing information asymmetry (Dhaliwal et al., 2011; Dhaliwal et al., 2012). Prior research on China has examined topics such as determinants of CSR disclosure (Mao & Zhang, 2009; Shen, 2007; Shen et al., 2010; Wang, 2008; Zhang, 2012), or impact of CSR disclosure on firm value and firm’s financial policies (Chen & Ma, 2005; He, Xiao, & Chen, 2012; He, Xiao, & Zhu, 2012; Li, 2006; Li & Xiang, 2007; Liu & Kong, 2006; Song & Gong, 2007; Wen and Fang, 2008). This study extends this research stream and provides additional information about the determinants of CSR disclosure from the perspective of corporate governance.

Second, this study contributes to the voluntary disclosure literature and nonfinancial disclosure literature. Traditionally, research has documented that both mandatory and voluntary financial disclosure can reduce information asymmetry (reduce cost of capital or analyst forecast) and reduce agency problems (see Healy and Palepu, 2001, and Bushman and Smith, 2001, for more details). Recent research identifies the important role of nonfinancial disclosures in firm valuation and cost of capital. Dhaliwal, Radhakrishnan, Tsang, and Yang (2011) document that the initiation of voluntary disclosure of CSR activities has potential benefit associated with a reduction in firms’ cost of equity capital. Dhaliwal, Radhakrishnan, Tsang, and Yang (2012) also provide international evidence that CSR disclosure can reduce analyst forecast errors and forecast dispersions.

Recently, Menz (2010) and Goss and Roberts (2011) also find that CSR disclosure can reduce cost of debt and cost of capital.
In a similar vein, Chinese studies (He, Xiao, & Chen; 2012; He, Xiao, & Zhu, 2012) also document similar associations. This study provides additional evidence on the impact of corporate governance on nonfinancial disclosures, such as CSR.

Last, this study contributes to the related policy makers, including the Chinese SEC, SSE, and SZSE. In particular, after SSE and SZSE both issued requirements for certain types of firms to disclose CSR reports, a mutual fund index (JianXin ShangZhen CSRindex Mutual Fund) was created in 2010 to invest Chinese stocks based on their CSR ratings. This study can shed light on the policy implications.

This chapter is organized as follows. Section 4.2 describes the literature review and hypothesis development. Section 4.3 presents model specification. Section 4.4 discusses data selection and provides summary statistics. Section 4.5 presents regression results and checks robustness. Section 4.6 summarizes and concludes the chapter.

2 Literature Review and Hypothesis Development
Agency problems arise between the management and shareholders due to the separation of ownership, when the interests of owners and managers are not aligned. Thus, managers may choose actions that might maximize their personal interest. Corporate governance mechanisms are used to monitor the management. Previous literature documents that separation of the roles of board chairman and chief executive officer (CEO) is an important monitoring mechanism for disciplining managers. Fama and Jensen (1983) suggest that separation of board chairman and CEO may constrain the opportunistic behavior of managers. Jensen (1993) thinks that when a CEO is also the chairman of the board, the CEO has too much power on board decisions, which might not effectively reduce agency problems. Dechow, Sloan, and Sweeney (1996) also argue that when a CEO is also the chairman of the board, the CEO can even use his trusted followers to obtain corporate decisions that serve his/her own needs. Thus, a CEO may easily display opportunistic behavior for the purpose of higher earnings. Klein (2002) finds that the management of a company’s earnings will be given more respect when the CEO also serves on the nomination committee or remuneration committee. Wang (2007) finds that dual roles make it hard to effectively control the management of earnings. Wang and Zhang (2007) and Yang et al.
(2008) also have a similar conclusion. In addition, Ahmed and Duellman (2007) document that dual roles decrease accounting conservatism.

In terms of firm disclosure, extant literature also documents that separation of the roles of board chairman and CEO can increase firm disclosure. Prior studies (Jensen, 1993; Yermack, 1996) argue that the presence of a dual CEO is an indicator of poor governance that leads to poor disclosure. Byard, Li, and Weintrop (2006) studied the relationship between corporate governance and accuracy of financial forecasts and find that duality may reduce the accuracy of financial forecasts. In addition, Karamanou and Vafeas (2005) find that in firms with a more effective board (where the CEO is not acting as the board chair) and audit committee structures, managers are more likely to make or update an earnings forecast, and their forecast is less likely to be imprecise, it is more accurate, and it elicits a more favorable market response. Thus, I formulate the following hypothesis:

**H1:** Firms where the CEO is the chairman of the board have higher quality of CSR disclosure than their counterparts.

Independent directors play important monitoring roles in a corporate governance mechanism. Independent directors have lesser conflicts of interest with managers, thus they are more likely to provide impartial judgment on corporate decisions. Fama and Jensen (1983) argue that independent directors are strongly motivated to fulfill their supervision responsibilities, as they want to establish and maintain their professional reputation in the market. Britain's Cadbury Report in 1992 also emphasizes the importance of non-executive directors. Peasnell, Pope, and Young (2000) find that in the pre-Cadbury period, non-executive directors’ proportion and earnings management are not significantly correlated; in the post-Cadbury period, non-executive directors’ proportion and earnings management are significantly negatively correlated. Peasnell, Pope, and Young (1998) find that outside directors’ proportion and earnings management are negatively correlated, while Klein (2002) and Xie, Davidson, and DaDalt (2003) argue that higher independent director proportion leads to better supervision of managers.
Outside directors who are less aligned to the management maybe more inclined to encourage firms to disclose more information to outside investors. Then, it is expected that having more outsidedirectors on the board will also result in more voluntary disclosure.

In terms of firm disclosure, Chen and Jaggi (2000) find the ratio of independent board director is associated with mandatory disclosures.

Eng and Mak (2003) find that an increase in outside directors reduces corporate disclosure. Byard et al. (2006) find lower independent director proportion may reduce financial forecast accuracy; Ajinkya, Bhojraj, and Sengupta (2005) document that firms with a higher independent percentage have higher management forecast frequency and accuracy. Sengupta (2004) finds that a higher outsidedirector proportion may publish financial statements earlier, proving that outside directors can supervise managers and accelerate the process of financial statement production, which enables the public to know a company’s financial information earlier. Ahmed and Duellman (2007) find that a higher independent director proportion provides timelier bad news in financial reports. The reason is that independent directors, as part of their supervisory duties, urge managers to announce bad news for the company as soon as possible in order to reduce information asymmetry between the company and public.

In China, Zhang and Wang (2006) find that higher independent director proportion constrains earnings management; Liu and Du (2003) find that higher outside director proportion may lower the probability of financial fraud occurring; Wu and Wang (2007) find that the board’s independence and professionalism greatly affects listed companies’ financial information quality, which means company’s earnings management will be more constrained when the company has more independent directors or an audit committee.

Thus, based on empirical findings from prior studies, I formulate the following hypothesis:

\[ H2: \text{Firms with a higher number of independent directors have higher quality of CSR disclosure than their counterparts.} \]
Board size is also an important element in the corporate governance mechanism. Jensen (1993) believes that a small board is more efficient for decision-making processes. Dechow et al. (1996) and Yermack (1996) also have drawn a similar conclusion in their empirical studies. Lipton and Lorsch (1992) believe that increasing the board size will lead to lower efficiency when board size reaches a certain level. Beasley (1996) finds that larger board size contributes to a higher probability of financial statement fraud. Thus, they believe that there will be significant agency problems when board size is larger. When there are many people on the board, increasing the board size produces more contradictions and divergences among board directors, and thus might not improve efficiency. However, another line of research argues that a larger board might strengthen the board’s monitoring power. For example, Dalton, Daily, Johnson, and Ellstrand (1999) believe that larger size provides diversity in directors, that is, directors with a professional background and more information resources or connections, thus enabling better monitoring of managers. Xie et al. (2003) find that the larger the board, the higher the financial report quality. Chtourou, Bedard, and Courteau (2001) find that the larger the board size, the better the constraining of earnings management.

In China, Su and Wang (2006) and Zhang and Wang (2006) believe that an appropriate increase in board size may effectively improve the effect of supervision, constraining earning management.

Yu (2009) points out that a significant premise for a small board to be more efficient is that every board member must be truly conscientious, being able to jointly protect the overall interests of the company rather than individuals’ own interests. But he argues that the premise is too idealistic, for it is difficult to achieve in daily life. As a result, he concludes that a big board is better.

Based on the above inconsistent findings, I develop a null hypothesis as follows:

H3: Board size is not associated with the quality of CSR disclosure.

Management shareholding is an alternative way to mitigate agency problems. By providing management shareholdings, the corporation might align the interests of the management with that of shareholders. Thus, management might increase firm disclosures so that their personal wealth
based on stock values might reflect the company’s performance so that management might reap higher personal wealth.

Warfield, Wild, and Wild (1995) believe that with increasing the proportion of shareholding managers, managers’ interest and the company’s overall interest will gradually converge. Thus, managers’ motivation to sacrifice the company’s interest to benefit themselves will gradually weaken. Accordingly, Warfield et al. (1995) find that a higher proportion of shareholding managers could better constrain earnings management.

In terms of disclosure, extant research documents that management shareholdings are positively associated with a firm’s voluntary disclosure. Since managers are compensated with shares, stock price appreciation is a natural incentive for managers to release good news.

In the case of bad news, since investors with rational expectations respond not only to disclosure but also to nondisclosure, which they rationally perceive as “worse” news, managers are also motivated to disclose bad news as no disclosure is interpreted as worse news.

Therefore, Nagar, Nanda, and Wysocki (2003) argue that managers are privy to information that investors demand and are reluctant to publicly disseminate it unless they are provided appropriate incentives such as shares and options. They find that firm disclosures, measured both by management earnings forecast frequency and analysts’ subjective ratings of disclosure practice, are positively related to the value of shares held by the CEO. Thus, I formulate the following hypothesis:

**H4:** Firms with higher management shareholdings have higher quality of CSR disclosure than their counterparts.

Larger shareholder stake is also an important feature of the corporate governance system. Due to ownership diffusion, firms with a large number of shareholders with higher shareholdings can exercise their monitoring power more easily than many diffused small shareholders. A large shareholder can wield power to replace board directors, to replace management, and use job
security as a threat to monitor management. In addition, a higher proportion of shareholding by a controlling shareholder makes the controlling shareholders’ interests more consistent with the overall interests of the company. If a controlling shareholder wants to maximize his own wealth, he must maximize the wealth of the whole company. Thus, a controlling shareholder has a stronger motivation to monitor managers, forcing managers to give up opportunistic behavior, which is beneficial to improving financial information quality. Thus, Shleifer and Vishny (1986) surmise that concentrations of shares and earnings management are significantly negatively correlated. Gorton and Schmid (2000) find that German companies’ concentration of shareholdings and corporate performance are positively correlated.

In China, evidence is consistent with these prior studies. Zhao and Yu (2005) find that highly concentrated ownership leads to better company performance; Xu et al. (2006) find that the proportion of shareholding by the largest shareholder and corporate performance are positively correlated.

In terms of firm disclosure, Fan and Wong (2002) find that a high degree of concentrated shares may have a significant influence on financial reporting and credibility. First, from a major shareholder’s perspective, they have more power when they have a higher proportion of equity, and they are more likely to conceal some information in exchange for some personal benefits. Thus, the financial report might provide information that shows the company is doing worse than expected. Second, from the public perspective, when large shareholders wield too much power, the public may suspect that they conceal some information for their personal interests. Thus, even though large shareholders may provide a highly qualified financial report, the public may still doubt its quality. In other words, the credibility of the financial report falls when large shareholders have too much equity. Besides Fan and Wong (2002), La Porta et al. (1998) also draw a similar conclusion based on their research. Thus, I formulate the following hypothesis:

H5: Firms with a higher largest shareholder’s share percentage have a higher quality of CSR disclosure than their counterparts.
The relationship between the largest shareholder and other large shareholders is also important in understanding the corporate governance system. Gomes and Novaes (2005) believe that several large shareholders supervising each other can benefit the company. Bennedsen and Wolfenzon (2000) argued that the monitoring power of minority shareholders can prevent large shareholders from tunneling interest from minority shareholders. Overall, large shareholders may do their duty of supervision together. Through joint supervision by several large shareholders, better managerial performance can be achieved. Pagano and Röell (1998) and Bloch & Hege (2003) also arrive at a similar conclusion. In addition, Bai, Liu, Lu, Song, and Zhang (2004), Volpin (2002), Maury and Pajuste (2005), Hong and Xue (2008), and Tang et al. (2006) point out that the pattern of several large shareholders standing together may increase the company’s value. Several large shareholders’ joint supervision is important in the situation of tunneling, when largest shareholders dominate. La Porta, Lopez-de-Silages, Shleifer, and Vishny (2000), Bertrand, Mehta, and Mullainathan (2002), Bae, Kang, and Kim (2002), Cheung, Rau, and Stouraitis (2006) and Friedman, Johnson, and Mitton (2003) find that the largest shareholder is likely to tunnel the interests of minority shareholders or the company. McKinnon and Dalimunthe (1993) find that increased ownership diffusion increases the disclosure of segment information. Mitchell, Chia, and Loh (1995) find that ownership diffusion, firm size, and industry membership are factors influencing the voluntary disclosure of segment information. Thus, I formulate the following hypothesis:

**H6:** Firms with a higher number of large shareholders’ share percentage (higher ownership diffusion) have a higher quality of CSR disclosure than their counterparts.

### 3 Model Specification

To test the above hypothesis, we developed the following regression model. Specifically, we use CSR disclosure quality as the dependent variable and each element of corporate governance (such as duality, board size, etc.) as the independent variable.

\[
\text{SCORE (M30/C50/T20/I5/RANK/PAGE)} = \alpha + \beta_1 \text{DUAL} + \beta_1 \text{INDP} \\
+ \beta_2 \text{BSIZE} + \beta_3 \text{MSHARE} + \beta_3 \text{LSHARE} + \beta_3 \text{ZINDEX} + \beta_3 \text{HINDEX} \\
+ \beta_3 \text{ACCR} + \beta_3 \text{ROA} + \beta_3 \text{LEV} + \beta_3 \text{BM} + \beta_4 \text{GROWTH} + \beta_3 \text{SIZE} \\
+ \beta_3 \text{SOE} + \Sigma \text{YEAR_DUMMY} + \Sigma \text{INDUS_DUMMY} + \varepsilon
\]
Different measures of CSR disclosure quality have been used. SCORE is a CSR disclosure index developed by the RunlingDatabase. SCORE is the overall scores divided by the maximum. Firms with higher SCORE have a higher quality of CSR disclosure.

SCORE is derived from four dimensions: macrocosm, content, technique, and industry. The macrocosm indicator (M30) includes firm strategy disclosure, corporate governance disclosure, and stakeholder disclosure. It is calculated as the ratio of score on macrocosm over 30 (the maximum score is 30). The content indicator includes firm performance, employee relations and human rights, environmental protection, ethical operation, consumer relations, and community relations. It is calculated as the ratio of the score on content over 50 (the maximum score is 50). The technique indicator includes the quality of disclosed information, such as consistency, comparability, reliability, and relevance. It is calculated as the ratio of score on technique over 20 (the maximum score is 20).

Industry is the measure of industry practices (I5 is the ratio of score on Industry over 5). PAGE is the number of pages in CSR reports, and it is arguable that firms that issue long CSR reports have higher CSR disclosure quality. RANK is the rankings of the firms due to their CSR disclosure, starting from 1 to 17. The highest ranking is AA as 17.

The variable of interest includes board composition and ownership structure. For board composition variables, DUAL INDP, and BSIZE are used. DUAL is a dummy variable that takes 1 if the CEO is acting as the chairman of the board. INP is the percentage of outside directors on the board. BSIZE is the size of the board. For ownership structure variables, MSHARE is the proportion of ordinary shares held by the CEO and executive directors. LSHARE is the proportion of shares owned by the largest shareholders. ZINDEX is the ratio of the largest shareholder’s ownership to the second largest shareholder’s ownership. HINDEX is the sum of the square of the shareholdings of the second largest shareholder to the tenth largest shareholder.

The control variables include the following: ROA measures firm performance as return on assets. LEV is the leverage ratio as the ratio of total liabilities divided by total assets. ACCR is used to
proxy for financial information disclosure quality. It is measured as the ratio of accruals over total assets. LEV is the ratio of long-term debt over total assets, measuring the risk of the firm. MB is the market value of the firm (sum of market value of ordinary shares, preferenceshares, and book value of long-term and short-term debt) divided by the book value of total assets. GROWTH measures firm growth.

It is calculated as the growth rate of main sales. SIZE measures a firm’s size and it is calculated as the logarithm of the total asset.

The INDUS_DUMMY is industry dummy identified using one digit of Chinese SIC code (for manufacturing firms, two digits are used). The YEAR_DUMMY is year dummy. Table 4.1 presents the description of each variable.

Table 1 Description of variables
<table>
<thead>
<tr>
<th><strong>Variable</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>SCORE</td>
<td>The CSR rating score obtained from the Runling Database for quality of the CSR reports</td>
</tr>
<tr>
<td>M30</td>
<td>Macrocosm indicator includes firm strategy disclosure, corporate governance disclosure, and stakeholder disclosure</td>
</tr>
<tr>
<td>C50</td>
<td>Content indicator includes firm performance, employee relation and human rights, environmental protection, ethical operation, consumer relations, and community relations</td>
</tr>
<tr>
<td>T20</td>
<td>Technique indicator includes quality of disclosed information, such as consistency, comparability, reliability, and relevance</td>
</tr>
<tr>
<td>I5</td>
<td>Industry indicator includes specific features of CSR for each industry</td>
</tr>
<tr>
<td>RANK</td>
<td>The CSR rankings by Runling Database, from AAA to CCC. AAA is 16 while CCC is 1</td>
</tr>
<tr>
<td>PAGE</td>
<td>Log of pages of the CSR report</td>
</tr>
<tr>
<td>INDP</td>
<td>The percentage of outside directors on the board</td>
</tr>
<tr>
<td>BSIZE</td>
<td>Number of directors in the board</td>
</tr>
<tr>
<td>DUAL</td>
<td>Dummy variable, it takes 1 if CEO is the chairman of the board, 0 otherwise</td>
</tr>
<tr>
<td>MSHARE</td>
<td>The proportion of ordinary shares held by CEO and executive directors and shares in which they are deemed to have interest</td>
</tr>
<tr>
<td>LSHARE</td>
<td>The proportion of shares owned by largest shareholders</td>
</tr>
<tr>
<td>ZINDEX</td>
<td>The ratio of the largest shareholder’s shareholdings to the second largest shareholder’s shareholdings</td>
</tr>
<tr>
<td>HINDEX</td>
<td>The share distribution between the second largest shareholder and the tenth largest shareholder</td>
</tr>
<tr>
<td>ACCR</td>
<td>Ratio of accruals over total assets</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on assets</td>
</tr>
<tr>
<td>LEV</td>
<td>Leverage ratio, calculated by total liabilities divided by total assets</td>
</tr>
<tr>
<td>MB</td>
<td>Market value of firm (sum of market value of ordinary shares, preference shares, book value of long-term and short-term debt) divided by book value of total assets</td>
</tr>
<tr>
<td>SIZE</td>
<td>Calculated as the log of the total asset</td>
</tr>
<tr>
<td>GROWTH</td>
<td>The yearly growth rate of total sales</td>
</tr>
<tr>
<td>SOE</td>
<td>Dummy variable that takes 1 if it is a SOE firm, 0 otherwise</td>
</tr>
<tr>
<td>INDUS_DUMMY</td>
<td>Identified using one digit of Chinese SIC code</td>
</tr>
<tr>
<td>YEAR_DUMMY</td>
<td>Year_Dummy09=takes 1 if year is 2009, otherwise 0; Year_Dummy10=takes 1 if year is 2010, otherwise 0</td>
</tr>
</tbody>
</table>
Data Selection and Summary Statistics

In this section, we describe the sample selection procedure and documentsummary statistics of our sample firms.

4.1 Measure of CSR Disclosure

Since many firms started CSR disclosure after China’s CSEC regulation, this study takes advantage of CSR disclosure in Chinesepublic firms (A share) in the period 2009–2011. We obtained the measure of CSR disclosure from the Runling Database. This database provides extensive data on the ratings of firms’ CSR disclosurequality. As mentioned in the introduction, the Runling CSR Disclosure Database has been used in many studies. The Runling Database collects extensive CSR information from firms’ CSR reports and constructs a CSR index. It is the most comprehensive database available for evaluating a firm’s CSRs (this data has been widely used in scholarly research and cited in important journal articles, including He, Xiao, & Zhu, 2012; and He, Xiao, & Chen, 2012). The Runling Database assigns ratings based on several datasources, including company filings and other voluntary disclosure channels such as corporate websites, public announcements, and news. Once information is collected, its sector-specific analyst’s rate the social performance of firms using a framework of four indicators (105), including: macrocosm (30), content (50), technique (20), and industry (5).

4.2 Sample Selection

Public firms (A share) that are listed on the SSE and SZSE are selected for the period 2009–2011 from the CSMAR database. The reason to start from 2009 is that the Runling Database only includes firms with CSR disclosure from 2009; firms that voluntarily disclose CSR in prior years are scarce. Initially the sample was around 4,900 firm-year observations, and after deleting firms in the financing industry (44) and firms with missing variables (109), the total number of firm-year observations is 4,747. Table 4.2 lists the sample selection

Table 4.2 Sample selection procedures of firms that are used in the progression study

<table>
<thead>
<tr>
<th>Sample selection procedure</th>
<th>Firm-year observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial sample</td>
<td>4,900</td>
</tr>
<tr>
<td>–Deleting firms in the financing industry</td>
<td>44</td>
</tr>
<tr>
<td>–Firms with missing variables</td>
<td>109</td>
</tr>
<tr>
<td>Total firm-year sample with all data</td>
<td>4,747</td>
</tr>
<tr>
<td>Firm-year sample with CSR disclosure</td>
<td>1,097 (23%)</td>
</tr>
</tbody>
</table>
Process. The financial reporting data is collected from CSMAR and the Juling Database. Among 4,747 firm-year observations, a 23% firm-year sample (1,099) provides CSR reports while the rest do not. Consistent with previous practice in the literature, financial firms are excluded because of the different nature of investment for these firms. In order to mitigate the influence of outliers, we winsorize all continuous variables at the 5% and 95% levels by year at the firm-year level.

**Summary Statistics**

Table 4.3 presents summary statistics for the variables just described on the sample of the firm’s characteristics. The mean of SCORE is 0.354, and the maximum is 83.7%. The mean of M30 is 34.5% while the maximum is 89.4%. The mean of C50 is 34.5%, the maximum value is 81.3%, the minimum value is 0.098, and the median is 32.2%. The mean of T20 is 33.4%, the maximum value is 80.8%, the median value is 29.6%, and the minimum value is 0.028. The mean of I5 is 22.6%, the median is 11.2%, the minimum is 0, and the maximum is 0.53%. The mean of PAGE is 2.546 while the mean of RANK is 5.291.

The mean of DUAL is about 0.87, indicating that most firmshave CEOs acting as the chairman. The mean of BSIZE is about nine people. The mean of MSHARE is only 1.8%, indicating that Chinese firms have lower managerial ownership. The mean of LSHARE is about 38.8%, indicating that the largest shares have strong monitoring powers. The mean of SIZE across all firm-years

*Table 4.3* Summary statistics for variable used in the study
equals 22 and the maximum is 25. These values are consistent with prior research (Zhang & Lv, 2009).

4.4 Regression Analysis and Results

4.5.1 Regression Results on the Relation Between Board Compositions, Ownership Structure and CSR Disclosure Quality

Table 4.4 presents regression results on the relation between corporate governance and CSR disclosure quality. In particular, it

Table 4.4 Regression results on the association between board composition and share structure and CSR disclosure quality
<table>
<thead>
<tr>
<th>Variable</th>
<th>SCORE</th>
<th>M30</th>
<th>C50</th>
<th>T20</th>
<th>I5</th>
<th>RANK</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.601***</td>
<td>-0.655***</td>
<td>-0.555***</td>
<td>-0.427***</td>
<td>-0.827***</td>
<td>-18.728***</td>
<td>-3.701***</td>
</tr>
<tr>
<td>DUAL</td>
<td>-0.010</td>
<td>-0.012</td>
<td>-0.013</td>
<td>0.003</td>
<td>-0.017</td>
<td>-0.226</td>
<td>-0.101</td>
</tr>
<tr>
<td>BSIZE</td>
<td>0.003*</td>
<td>0.002</td>
<td>0.004**</td>
<td>0.002</td>
<td>0.003</td>
<td>0.100**</td>
<td>0.012</td>
</tr>
<tr>
<td>INDP</td>
<td>0.133**</td>
<td>0.148**</td>
<td>0.117**</td>
<td>0.110**</td>
<td>0.163</td>
<td>2.859**</td>
<td>0.966**</td>
</tr>
<tr>
<td>MSHARE</td>
<td>0.241*</td>
<td>0.274*</td>
<td>0.270**</td>
<td>0.204*</td>
<td>-0.362</td>
<td>6.797**</td>
<td>1.517*</td>
</tr>
<tr>
<td>LSHARE</td>
<td>0.048*</td>
<td>0.049</td>
<td>0.067**</td>
<td>0.018</td>
<td>0.041</td>
<td>1.277**</td>
<td>0.385**</td>
</tr>
<tr>
<td>ZINDEX</td>
<td>0.001</td>
<td>0.000</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>HINDEX</td>
<td>0.001***</td>
<td>0.002***</td>
<td>0.001***</td>
<td>0.001***</td>
<td>0.002**</td>
<td>0.035***</td>
<td>0.008***</td>
</tr>
<tr>
<td>ACCR</td>
<td>-0.083*</td>
<td>-0.096*</td>
<td>-0.047</td>
<td>-0.102*</td>
<td>-0.213**</td>
<td>-1.648</td>
<td>-0.338</td>
</tr>
<tr>
<td>ROA</td>
<td>0.156*</td>
<td>0.094</td>
<td>0.202*</td>
<td>0.074</td>
<td>0.253</td>
<td>4.199**</td>
<td>0.405</td>
</tr>
<tr>
<td>LEV</td>
<td>-0.067*</td>
<td>-0.055</td>
<td>-0.060*</td>
<td>-0.095**</td>
<td>-0.042</td>
<td>-1.897**</td>
<td>-0.459*</td>
</tr>
<tr>
<td>MB</td>
<td>0.035</td>
<td>0.040</td>
<td>0.035</td>
<td>0.034</td>
<td>0.073</td>
<td>0.509</td>
<td>0.234</td>
</tr>
<tr>
<td>GROWTH</td>
<td>-0.004*</td>
<td>-0.004*</td>
<td>-0.004*</td>
<td>-0.003</td>
<td>-0.001</td>
<td>-0.102*</td>
<td>-0.025*</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.036***</td>
<td>0.039***</td>
<td>0.033***</td>
<td>0.028***</td>
<td>0.047***</td>
<td>0.914</td>
<td>0.243</td>
</tr>
<tr>
<td>STATE</td>
<td>0.010</td>
<td>0.012</td>
<td>0.010</td>
<td>0.007</td>
<td>0.009</td>
<td>0.197</td>
<td>0.086</td>
</tr>
<tr>
<td>INDDUMMY</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>YEARDDUMMY</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SAMPLE</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
<td>1079</td>
</tr>
<tr>
<td>Adj. R square</td>
<td>0.278</td>
<td>0.303</td>
<td>0.257</td>
<td>0.225</td>
<td>0.452</td>
<td>0.270</td>
<td>0.264</td>
</tr>
</tbody>
</table>

Note: This table presents regression results for each variable that is used in the model. The sample size is 1,097 for firms with CSR reports during 2009–2011. See Table 4.1 for variable definitions. All variables are winsorized at the 1% and 99% levels. All regressions include industry and year dummies. The standard errors reported in parentheses are based on heteroskedasticity—consistent standard errors that are adjusted for clustering at the firm level.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
shows that INDP, MSHARE, LSHARE, HINDEX have significant positive coefficients throughout six regression models. It indicates that firms with higher independent director percentage, higher managerial ownership, and higher largest shareholder’s share, and higher share diffusion between the second and tenth shareholders have higher CSR disclosure quality. In addition, it fails to document significant coefficients of DUAL or ZINDEX, suggesting that firms with a CEO acting as the chairman or the share diffusion between largest shareholders and the second largest shareholders do not improve the CSR disclosure quality. Therefore, H2, H3, H4, H5, and H6 are supported. But we fail to find supporting evidence for H1 about duality.

Table 4.4 also provides results on the control variables. For example, the coefficient of ACCR is significantly negative; suggesting that firms with higher accruals have lower CSR disclosure quality.

In addition, it documents a significantly positive coefficient of ROA, indicating that firms with better performance have better disclosure quality. The positive coefficient of SIZE also indicates that large firms have higher CSR disclosure quality.

4.5 Regression Results on the Relation Between Overall Corporate Governance Index and CSR Disclosure Quality

As documented in the analysis, we provide empirical evidence on the different aspects of corporate governance, including board features, ownership structures, and other mechanisms. Since corporate governance is an overall level for each firm, this study follows Bai, Liu, Lu, Song, and Zhang (2005), Jin and Yuan (2008), He, Xiao, and Zhu’s (2012) method and constructs an overall Corporate Governance Index (CGINDEX) using the Principle Component Analysis (PCA) method (Appendix A). Table 4.5 presents regression results using the overall corporate governance index as the main variable. Regression results indicate that CGINDEX have significantly positive coefficients for most of the models, indicating that firms with a higher corporate governance index have higher CSR disclosure quality. The coefficients of control variables are similar to our baseline regression.
Table 2 Regression results of the association between type of corporate governance (CGINDEX) and CSR disclosure quality

<table>
<thead>
<tr>
<th>Variable</th>
<th>SCORE</th>
<th>M30</th>
<th>C50</th>
<th>T20</th>
<th>IS</th>
<th>RANK</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.554***</td>
<td>-0.602***</td>
<td>-0.516***</td>
<td>-0.376***</td>
<td>-0.813***</td>
<td>-17.59***</td>
<td>-3.464***</td>
</tr>
<tr>
<td>CGINDEX</td>
<td>0.060</td>
<td>0.068</td>
<td>0.060</td>
<td>0.056</td>
<td>0.121</td>
<td>1.534</td>
<td>0.394</td>
</tr>
<tr>
<td>ACR</td>
<td>0.021***</td>
<td>0.025***</td>
<td>0.015*</td>
<td>0.021***</td>
<td>0.015</td>
<td>0.472***</td>
<td>0.128***</td>
</tr>
<tr>
<td>ROA</td>
<td>0.006</td>
<td>0.007</td>
<td>0.006</td>
<td>0.006</td>
<td>0.013</td>
<td>0.164</td>
<td>0.042</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.113**</td>
<td>-0.129**</td>
<td>-0.075</td>
<td>-0.128***</td>
<td>-0.230**</td>
<td>-2.414**</td>
<td>-0.501</td>
</tr>
<tr>
<td>LEV</td>
<td>0.050</td>
<td>0.057</td>
<td>0.050</td>
<td>0.047</td>
<td>0.102</td>
<td>1.284</td>
<td>0.330</td>
</tr>
<tr>
<td>MB</td>
<td>0.216**</td>
<td>0.152</td>
<td>0.268***</td>
<td>0.104</td>
<td>0.313*</td>
<td>5.810**</td>
<td>0.745</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.092</td>
<td>0.105</td>
<td>0.092</td>
<td>0.087</td>
<td>0.188</td>
<td>2.371</td>
<td>0.609</td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.072**</td>
<td>-0.059</td>
<td>-0.067*</td>
<td>-0.097***</td>
<td>-0.034</td>
<td>-2.012**</td>
<td>-0.514**</td>
</tr>
<tr>
<td>STATE</td>
<td>0.036</td>
<td>0.040</td>
<td>0.036</td>
<td>0.034</td>
<td>0.072</td>
<td>0.915</td>
<td>0.235</td>
</tr>
<tr>
<td>INDDUMMY</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>YEARDUMMY</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.003*</td>
</tr>
<tr>
<td>SAMPLE</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.002</td>
</tr>
<tr>
<td>Adj. Rsquare</td>
<td>0.022</td>
<td>0.032</td>
<td>0.022</td>
<td>0.022</td>
<td>0.005</td>
<td>0.057</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Note: This table presents regression results for each variable that is used in the model. The sample size is 1,097 for firms with CSR reports during 2009–2011. See Table 4.1 for variable definitions. All variables are winsorized at the 1% and 99% levels. All regressions include industry and year dummies. The standard errors reported in parentheses are based on heteroskedasticity—consistent standard errors that are adjusted for clustering at the firm level.

5. Robustness Check: Regression Results on Sensitivity of the Relation Between Corporate Governance and CSR Disclosure in SOEs Versus NON-SOEs

Previous studies (Jia & Zhang, 2010; Li, 2010; Wang & Qian, 2011; Wang et al., 2013) document that non-SOEs are more motivated to use CSR reports to establish and maintain good relations with regulators and governmental officials. However, other studies indicate that the SOEs are more motivated to disclose information.

This is because, first, SOEs are likely to present significantly greater adverse selection and moral hazard problems. SOEs face significantly greater incentives to voluntarily disclose additional information to ease investor concerns regarding management quality, the potential for asset stripping, or misappropriation, and the role of the government as a major shareholder. Second,
additional disclosure by SOEs is also likely to be less costly since they operate in industries of strategic importance and are hence shielded from international competition. Ferguson, Lam, and Lee (2002) empirically examined the impact of international capital market pressure on voluntary disclosure in the annual reports of formerly wholly SOEs listed on the Stock Exchange of Hong Kong (SEHK) and found that SOEs disclosed significantly more strategic and more financial information.

Table 3: Regression results on the association between type of corporate governance (CGINDEX) and CSR disclosure quality in SOEs

<table>
<thead>
<tr>
<th>Variable</th>
<th>SCORE</th>
<th>M30</th>
<th>C50</th>
<th>T20</th>
<th>I5</th>
<th>RANK</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.651***</td>
<td>-0.686***</td>
<td>-0.599***</td>
<td>-0.512***</td>
<td>-0.863***</td>
<td>-19.38***</td>
<td>-4.087***</td>
</tr>
<tr>
<td>CGINDEX</td>
<td>0.017*</td>
<td>0.018*</td>
<td>0.010</td>
<td>0.024**</td>
<td>0.038*</td>
<td>0.329</td>
<td>0.074</td>
</tr>
<tr>
<td>ACCR</td>
<td>-0.179**</td>
<td>-0.209**</td>
<td>-0.139*</td>
<td>-0.161**</td>
<td>-0.302*</td>
<td>-3.716*</td>
<td>-1.045**</td>
</tr>
<tr>
<td>ROA</td>
<td>0.259*</td>
<td>0.195</td>
<td>0.313**</td>
<td>0.115</td>
<td>0.418</td>
<td>8.125**</td>
<td>1.673*</td>
</tr>
<tr>
<td>LEV</td>
<td>-0.064</td>
<td>-0.034</td>
<td>-0.067</td>
<td>-0.110**</td>
<td>0.033</td>
<td>-1.268</td>
<td>-0.242</td>
</tr>
<tr>
<td>MB</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.001</td>
<td>0.000</td>
<td>-0.004</td>
<td>0.000</td>
</tr>
<tr>
<td>GROWTH</td>
<td>-0.016*</td>
<td>-0.013</td>
<td>-0.018*</td>
<td>-0.009</td>
<td>-0.025</td>
<td>-0.423**</td>
<td>-0.103*</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.045***</td>
<td>0.047****</td>
<td>0.041***</td>
<td>0.037****</td>
<td>0.058**</td>
<td>1.092**</td>
<td>0.295***</td>
</tr>
<tr>
<td>INDDUMMY</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>YEARDUMMY</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SAMPLE</td>
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<td>468</td>
<td>468</td>
<td>468</td>
<td>468</td>
<td>468</td>
<td>468</td>
</tr>
<tr>
<td>Adj. Rsquare</td>
<td>0.366</td>
<td>0.377</td>
<td>0.302</td>
<td>0.323</td>
<td>0.503</td>
<td>0.337</td>
<td>0.335</td>
</tr>
</tbody>
</table>

Note: This table presents regression results for each variable that is used in the model. The sample size is 1,097 for firms with CSR reports during 2009–2011. See Table 4.1 for variable definitions. All variables are winsorized at the 1% and 99% levels. All regressions include industry and year dummies. The standard errors reported in parentheses are based on heteroskedasticity—consistent standard errors that are adjusted for clustering at the firm level.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

than other SEHK firms. Similarly, Wang and Claiborne (2008) find that the level of voluntary disclosure is positively related to the proportion of state ownership.

To further determine whether the relationship between corporate governance and CSR disclosure varies in SOE vs non-SOE firms, we categorize firms into two groups: SOE firms and non-SOE firms. Tables 4.6 and 4.7 present the regression results in SOE firms and non-SOE firms.
Empirical evidence indicates that the positive impact of corporate governance on CSR disclosure quality exists in both SOE and non-SOE firms.

Results from the regression analysis indicate that corporate governance is positively associated with CSR disclosure. In particular, we document that firms with a higher independent director percentage, higher managerial ownership, and higher largest shareholder’s share, and higher share diffusion between the second and tenth shareholders have a higher CSR disclosure quality. In addition, firms with a higher corporate governance index have higher CSR disclosure quality.

**Table 4** Regression results on the association between corporate governance (CGINDEX) and CSR disclosure quality in non-SOEs

<table>
<thead>
<tr>
<th>Variable</th>
<th>SCORE</th>
<th>M30</th>
<th>C50</th>
<th>T20</th>
<th>I5</th>
<th>RANK</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.376***</td>
<td>-0.423***</td>
<td>-0.388***</td>
<td>-0.120***</td>
<td>-0.621***</td>
<td>-14.106***</td>
<td>-2.532***</td>
</tr>
<tr>
<td>CGINDEX</td>
<td>0.009**</td>
<td>0.026***</td>
<td>0.020**</td>
<td>0.009</td>
<td>-0.010</td>
<td>0.458**</td>
<td>0.167***</td>
</tr>
<tr>
<td>ACCR</td>
<td>-0.050</td>
<td>-0.057</td>
<td>-0.020</td>
<td>-0.072</td>
<td>-0.166</td>
<td>-1.121</td>
<td>-0.014</td>
</tr>
<tr>
<td>ROA</td>
<td>0.061</td>
<td>0.068</td>
<td>0.062</td>
<td>0.054</td>
<td>0.122</td>
<td>1.574</td>
<td>0.419</td>
</tr>
<tr>
<td>LEV</td>
<td>0.162</td>
<td>0.079</td>
<td>0.229**</td>
<td>0.079</td>
<td>0.187</td>
<td>3.623</td>
<td>0.017</td>
</tr>
<tr>
<td>MB</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>GROWTH</td>
<td>-0.002</td>
<td>-0.003</td>
<td>-0.003</td>
<td>-0.002</td>
<td>0.002</td>
<td>0.005</td>
<td>0.014</td>
</tr>
<tr>
<td>SIZE</td>
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<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
<td>0.004</td>
<td>0.057</td>
<td>0.015</td>
</tr>
<tr>
<td>INDDUMMY</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>YEARDUMMY</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SAMPLE</td>
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<td>628</td>
<td>628</td>
<td>628</td>
<td>628</td>
<td>628</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.119</td>
<td>0.163</td>
<td>0.137</td>
<td>0.099</td>
<td>0.393</td>
<td>0.122</td>
<td>0.129</td>
</tr>
</tbody>
</table>

Note: This table presents regression results for each variable that is used in the model. The sample size is 1,097 for firms with CSR reports during 2009–2011. See Table 4.1 for variable definitions. All variables are winsorized at the 1% and 99% levels. All regressions include industry and year dummies. The standard errors reported in parentheses are based on heteroskedasticity—consistent standard errors that are adjusted for clustering at the firm level.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Moreover, regression results also indicate that such an association exists in both SOE and non-SOE firms.

5. Conclusion

Awareness about CSR has been raised due to publicity on corporate environmental pollution, ethics, and other social responsibility related activities. While recent studies on CSR enhance understanding of the relation between CSR disclosure and firm valuation and financial policies, little has been done to investigate the association between corporate governance and CSR disclosure. Extant literature documents that due to agency problems, managers who have private information are reluctant to disclose information to outside investors. However, corporate governance can monitor managers to induce information disclosure through either mandatory or voluntary disclosure. Thus, firms with strong corporate governance are associated with higher disclosure quality. CSR disclosure is part of voluntary disclosure that discloses nonfinancial information, and hence this study tries to fill the gap by studying the relation between corporate governance and CSR disclosure in China and argues that strong corporate governance should be associated with higher quality of CSR disclosure.

Using Chinese firms’ disclosure of CSR as our sample, we document that strong corporate governance is positively associated with the quality of CSR disclosure. In particular, we document that firms with a higher independent director percentage, higher managerial ownership, higher largest shareholder’s share, and higher share diffusion between the second and tenth shareholders have higher CSR disclosure quality. In addition, firms with a higher corporate governance index have higher CSR disclosure quality. Moreover, regression results also indicate that such an association is more sensitive in non-SOE firms.

This study contributes to the existing literature as it is the first paper about Chinese firms to examine the impact of corporate governance on CSR disclosure quality. Thus, this study contributes to the mandatory/voluntary disclosure literature and nonfinancial disclosure literature. Second, as the emerging market gains importance in global research, our study uses Chinese public firms’ data and documents a significant relation between corporate governance and CSR
disclosures, thus providing evidence from the emerging economy. In conclusion, this study contributes to the related policymakers, including the Chinese SEC, SSE, and SZSE with the recommendation that stronger corporate governance indeed increases firm disclosure. Thus, this study can shed light on policy implications and investment strategies.

APPENDIX A
Following Bai et al. (2005), Jin and Yuan (2008), and He, Xiao, and Zhu’s (2012) method, we construct the Corporate Governance Index (CGINDEX) using the Principle Component Analysis (PCA) method. The main components used in calculating the CGINDEX are as follows:

Loading Factor:
1. INDP: percentage of independent directors 0.20
2. DUAL: whether CEO is the chairman of the board − 0.31
3. BSIZE: size of the board 0.14
4. MSHARE: ownership percentage of management 0.34
5. LSHARE: the largest shareholder’s ownership − 0.04
6. ZINDEX: ratio of the largest shareholder’s ownership to the second largest shareholder’s ownership − 0.13
7. HINDEX: sum of square of the shareholdings of the second largest shareholder to the tenth largest shareholder 0.22

Notes
Dr. Naqiong TONG, HSBC Business School, Peking University, Shenzhen, China, email: nqtong@phbs.pku.edu.cn. We thank seminar participants in HSBC Business School, Peking University, for their valuable comments.

All errors are ours.

1. Under the scheme provided in the Shanghai Guide and the Notice, certain public companies are required to disclose environmental information in a timely manner to the public and all companies are encouraged to publish CSR reports in addition to annual financial reports.

In December 2008, the Shanghai Stock Exchange further accelerated the development of CSE disclosure by mandating three types of listed companies to issue the CSR annual report from fiscal year 2008. These companies include those that are listed in the Shanghai Stock Exchange
Corporate Governance Index, companies that list shares overseas, and companies in the financial sector. According to the information released by the Shanghai Stock Exchange, there were 290 listed companies publishing CSR reports for fiscal year 2008. Among the 290 companies, 258 companies issued the report because of the mandatory requirement while 32 companies did it voluntarily.

2. Please see the details of the CSR index from the website of Runling Global Corporate Social Responsibility Rating Co.: http://www.rksratings.com/.

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HOW CHINA’S SMALL AND MICROTECHNOLOGY ENTERPRISES’ NETWORK EMBEDDEDNESS IMPACTS PERFORMANCE: THE MEDIATED EFFECT OF ENTREPRENEURIAL OPPORTUNITY

1 Introduction
Entrepreneurship is regarded as a process of opportunity, discovery, and alertness. In dynamic contexts, the enterprise or enterprising individuals need to make a proactive action on promising entrepreneurial opportunities. Shane and Venkataraman (2000) state that entrepreneurship “involves the processes of discovery evaluation, and exploitation of profitable opportunities,” thus, entrepreneurship can be considered a series of activities that include identifying opportunity; assessing and exploring; and delivering new products, services, governance structure, marketing methods, procedures, and materials to clients or markets that have not existed before.

High-technology entrepreneurship is a prominent process of new technology commercializing in uncertain high-technology industries, thus the experts’ market competence, employees’ perception of new technology, and technological capabilities are critical to new or high-technology venturing firms, especially the nascent technology enterprises. In the funding phase, lack of key resources and ability make it hard to survive in the market. However, embedding in an industrial network can be critical to the success of small and microtechnology enterprises. Access to the network can help with obtaining complementary resources. Second, technology venturing tends to be more expensive and complicated. However, there are many similar enterprises that are attempting to embed in the same network and are exploring the new market, which involves sharing new technology knowledge, capabilities, and market information.

Working with others can help the small and microtechnology enterprise cut down on transaction costs. Third, the industrial network can attract plenty of technological expertise and high-technological venturing entrepreneurs who can make recognition quick assessment of market opportunities and bear the risk in the meantime (Doz & Hamel, 1998). Kenney and Richard (2004) reported that the technological small spin-offs’ starting-up process at UC Berkeley and Stanford were impacted saliently by the embedding network environment.
In a “surplus economy,” innovation and entrepreneurial capability are vital for the enterprise’s survival (Kornai, 1986). Entrepreneurship in small and microtechnology enterprises strives to make more and more obvious contributions to emerging industry formation and development and regional industry upgrading. Contrary to large enterprises that rely on scarce resources and the government’s “soft budget constraint” to win competitive advantage, the small and microtechnology enterprises embedded in industrial network can fully explore their own core resources, absorbing different kinds from the network to exploit opportunity and carry out technological entrepreneurship. According to the Third Plenum of 18th CPC Central Committee the allocation of resources plays a decisive role in the market. It will provide good policy guidance for the small and microtechnology enterprises to gain competitive advantage by developing new models and exploring entrepreneurial opportunities.

In the United States, many of the well-known large enterprises in the information technology industry, such as Microsoft, Intel, Apple, and Facebook, are expanding from the science and technology small and micro-enterprise the number of small and microtechnology enterprises account for more than 50 percent of the total, and the quantity of small and microtechnology enterprise increases 2 percent per year, contributing about 20 percent of US gross domestic production. The GEM 2011 survey data unveiled that in “product innovation” for the entrepreneurial activity index China (15%) is only listed twenty-first out of twenty-four economies driving the “efficiency” force. Obviously for China, the ability to identify and develop entrepreneurial opportunities in small and micro-enterprises is not fully tapped and released, therefore, the new model of identifying and exploiting entrepreneurial opportunities for China’s small and microtechnology enterprise can make a quick technology transferring, technological innovation and implementation of “innovation driven” the national strategy. In this study, we will draw insightful, practical implication from these research questions of technological small and micro-enterprises.

2 Theoretical Background and Hypotheses

In developed countries, the research on entrepreneurial opportunity starts earlier. It is an important watershed in the research on entrepreneurship that the concept of opportunity be introduced into entrepreneurship; it helps the academics who consider business venturing as an
“opportunity identification, development, and exploration” process (Stevenson & Gumpert, 1985). Similar with other core concept of entrepreneurial management theory such as routine and ability, entrepreneurial opportunities can be regarded as a black box, although previous literature makes “opportunity” a preliminary classification for “discovered, created, and imagined opportunity” (Kirzner, 1997; Foss, Klein, Kor, & Joseph, 2008; Klein, 2008), which triggers the dispute regarding whether the concept of entrepreneurial opportunities is subjective or objective, latent or cognitive. Thus, the unit of choice in the analysis of entrepreneurial opportunities is controversial: some scholars believe that “the process of identifying opportunities” should be treated as the unit of analysis, but obviously the opportunity is not equally appealing to all entrepreneurs (Dimov, 2010), and opportunity judgments are made by relating personal entrepreneurial experience and previous knowledge, which indicates the subjective nature of opportunity pursuit. Other scholars insist that the entrepreneur who identifies opportunity should be the unit of analysis; a few scholars underline the latent trait of opportunity concepts, thus entrepreneurial action can be treated as a proxy unit of analysis. Because of the inconsistency of entrepreneurial opportunity cognition, more and more entrepreneurs will be inevitably confused by the market and unable to effectively forecast the risks in the field of high-tech venturing and also will not make relatively precise strategic decisions and reasoning.

Therefore, to understand the characteristics of entrepreneurial opportunities, the focus of research should be based on the perspectives of selection of entrepreneurial opportunity.

Since the 2000s, China’s domestic scholars, such as Zhang Shujun and Li Xinchun (2011), also focused on “entrepreneurial opportunities” research, initiating that small and micro nascent enterprises that lacked resources pushed enterprises to make growth strategy using two dimensions: technology factor and product market. Yang Jing and Wang Chongming (2012) elaborated that most entrepreneurial opportunity research to date has addressed “objective and subjective integration perspective, constructive perspective,” although throughout China and abroad, literature on entrepreneurial opportunity argued that few scholars developed a network embeddedness perspective to explore entrepreneurial opportunities. The present domestic and foreign inquiry into entrepreneurial opportunity made assertion that in this area of research mainly
concentrated on three different perspectives: objective discovery and cognitive perspective; creation subjective perspective; and entrepreneurial action integration perspective. Although the prior studies provide a system of perspective for entrepreneurial opportunity, these research perspective for the study of the system of entrepreneurial opportunity lay a solid foundation for the scholars who have not formed a consensus regarding the different perspectives.

In respect to research methods, a good deal of theoretical work adopted the qualitative analysis method; the findings based on this method, however, theorized about inductive logic and took some conclusions from special case study, obviously lacking the universality of real applications, thus the theory was unable to help different types of enterprises effectively identify and seize entrepreneurial opportunities. In other words, most studies in entrepreneurial opportunities explained what “opportunity” is but rarely focused on how and why diverse types of entrepreneurial opportunities impacted entrepreneurial outcomes. Therefore, in response, based on the network embeddedness perspective, this study will divide entrepreneurial opportunities into three types “discovery, creation, and imagine opportunities” to explore and develop the relationship linking the entrepreneurial opportunities to entrepreneurial performance.

2.1 Network Embeddedness, Entrepreneurial Opportunities, and Entrepreneurial Performance

For market transaction, any individual or enterprise prefers to make a deal with another person or corporation who has a good reputation. Uzzi (1999) contends that the likelihood of a resource exchange between two market actors depends on the quality of their mutual trust and their relationship; the ties existing in the entrepreneurial network shows that entrepreneurs do not have confidence in the claims of new institutional economics, through which the actors have adopted its system design and the implicit contract of “universal ethics” to regulate business behaviors and strengthen the antifraud function of ties. Network embeddedness emphasizes that the strength of the network relationship (or structural relationship) can form trust and prevent fraud. Bringing the network embeddedness perspective into the entrepreneurship research field, scholars have advocated that entrepreneurs are embedding in a social network, which plays a critical role in the entrepreneurial process; however, the relationship among network embeddedness, identification
of entrepreneurial opportunities, and entrepreneurial performance is remaining underexplored. Therefore, the major task of this study is to examine how these three main constructs are associated with each other.

**Network Embeddedness, Identification of Entrepreneurial Opportunities, and Entrepreneurial Performance**

Faced with increasingly fierce global competition, the science and technological small and micro-enterprise can’t survive individual combat and grow behind closed doors without external resource exchange. The requirements of diverse cooperation within the entrepreneurial networks increases from the firm’s inception, and it strengthens interpersonal and interorganizational relationships between entrepreneurs. The mutual trust and cooperation are necessity for the small and micro-enterprises to enhance their competitive and cooperative ability. Embedded in the entrepreneurial network, these enterprises can share social capital, financial resource, innovative technology, and fine-grained information, even though they are legally independent enterprises, in order to promote technology innovation and product development. Evidently, scholars cannot ensure that being embedded in an entrepreneurial network will promote performance improvement or technology innovation in small and micro-enterprises, although the existing literature contends that strategic networking can enhance the enterprise’s competition’s ability and the entrepreneurial performance of small- and mediumsized enterprises from different perspectives. Unfortunately, the entrepreneurs are reluctant to face the practical question: how does the strength of entrepreneurial network embeddedness promote entrepreneurial performance and why will the strength change during different enterprise locations? Having no answer to these problems in previous entrepreneurial research, this study puts forward the following hypothesis:

**H1:** the network embeddedness of the science and technological small micro-enterprise will positively impact technological entrepreneurial performance (financial performance and innovative performance).

**H1a:** the embedded network size of the science and technological small micro-enterprise will affect technological entrepreneurial performance.
H1b: the network embeddedness strength of the science and technological small micro-enterprise will impact technological entrepreneurial performance.

H1c: the heterogeneity of the science and technological small micro-enterprise will impact technological entrepreneurial performance.

How Network Embeddedness Impacts on the Types of Entrepreneurial Opportunities

The entrepreneurial network in which the individuals of technology entrepreneurship or technological ventures embedded is regarded as an important resource of many new creative ideas and profitable opportunities. Hills et al. (1997) found that over 50 percent of entrepreneurs identified opportunities, developed business opportunities, and tended to start businesses through entrepreneurial networks.

The prior knowledge and previous experience are vital for the entrepreneurs who transform a novel idea into a technological venturing organizations (Aldrich & Martinez, 2001). Evidently, knowledge and information are two critical variables associated with the entrepreneurial network. Coleman (1988) advocated that a strong tie with a network can help the actors access a broad network of resources and encourage mutual cooperation and trust; thus, the strong tie with an external or entrepreneurial network is a long-term relationship, in which the entrepreneurs’ embeddedness will obtain more market information of products and services, and this will assist the entrepreneurs in improving the capability of exploiting entrepreneurial opportunity. Contrary to Coleman (1988), other scholars contend that weak ties with external network resources could relieve the negative effect of intimacy network resources inertia and allow the actor or entrepreneur access to diverse resources through different channels. Obviously, relative to the networks in which the entrepreneurs are embedded, both the weak and strong ties, are helpful in the process of technology venturing and starting-up. Hence, for science and technological small and micro-enterprises, the degree of network embeddedness, the size of network, and the heterogeneity of network will affect their entrepreneurial opportunity exploring and technological entrepreneurship performance? Therefore, this study puts forward the following hypothesis:

H2: the network embeddedness of the science and technological small micro-enterprise have a positive effect on the entrepreneurial opportunity identification.
H2a: the size of network embeddedness has a positive impact on the entrepreneurial opportunity type.
H2b: the strength of network embeddedness has a positive impact on the entrepreneurial opportunity type.
H2c: the heterogeneity of network embeddedness has a positive impact on the entrepreneurial opportunity type.

The Mediating Role of Entrepreneurial Opportunities

Economic resource exchange between two actors will take the previous social interactions and transaction history records for reference; hence, the economic transaction behavior will never take place in a vacuum without network embedding (Granovetter, 1985). Then, the tie of arm-length in economic exchange will eventually convert into interfirm networks embeddedness relationship (Uzzi, 1997).

According to Shane and Venkataraman’s advocacy of entrepreneurship, it is a process of entrepreneurial opportunity discovery and development. These help us to make a further supposition that the opportunity discovery relies on prior knowledge and information.

The firms should ensure the rationality and institutional legitimacy of technological innovation during the process of entrepreneurship.

Then, after successfully identifying available technical entrepreneurial opportunities, useful resources, and a rational justification of opportunities, how does networks embeddedness impact the enterprise’s technological entrepreneurship performance? In this study, we need to figure out how the science and technological small and micro-enterprise’s network embeddedness affect opportunity discovery? How does an entrepreneur effectively obtain resources to improve the technological and entrepreneurial performance, especially the scale of network embeddedness, the strength of embedding (strong tie or weak tie), and how the network characteristics affect the entrepreneurial opportunity identification and how the above factors ultimately affect the enterprise’s technological entrepreneurship performance? Thus, this study puts forward the following hypothesis:
H3: entrepreneurial opportunities play a mediating role in the science and technological small micro-enterprise’s network embeddedness and technological entrepreneurship performance.
H3a: discovery opportunities play a mediating effect in the science and technological small micro-enterprise’s network embeddedness and technological entrepreneurship performance;
H3b: Creation opportunity have a mediating effect in the science and technological small micro-enterprise’s network embeddedness and technological entrepreneurship performance;
H3c: Imagination opportunity plays a mediating role in the science and technological small micro-enterprise’s network embeddedness and technological entrepreneurship performance.

Based on the above mentioned theoretical analysis and hypothesis of the network embeddedness, this study tries to construct the conceptual framework of the types of entrepreneurial opportunities and technological entrepreneurial performance in figure 1.

Figure 1 The conceptual framework.

3 Research Design
3.1 The Research Sample

In this study, according to the “conditions and methods of national high tech Industrial Development Zone of high-tech enterprise” listed by the Ministry of Science and Technology in China and “small and medium-sized enterprises division type standard” published by four national ministries in June 2011, the technology small and micro-enterprise is defined as “a technology company, it is exploring height ratio of high-tech human resource and technology resources (depending on its patents or unique inventions; employing more than 30% of the total staff; annual technical product development funds not be less than 3%) which engages in new technology product research, development, production and service with a certain size (its
number of workers is no more than 100).” However, this study mainly draws samples from the Center of China Ministry of Science and Technology’s Technical Innovation Project Fund website, which publishes annual assisting 2012 technological innovation research object for the enterprise of science and technology small and medium-sized enterprises.

Our investigation started from March 2013, and ended September 2012. We sent a total of 1,000 questionnaires to 800 high-tech small and micro-enterprises, which were released by the Ministry of Science and Technology and 350 university spinoff companies. This study finally collected 412 valid questionnaires (including 201 recovery from the Ministry of Science and Technology and 211 samples from university spin-off companies). Due to the high communication costs, using typical business telephone interview and friends’ introduction, the total drawn backsamples are 490 (total recovery rate was 49%), with a total efficiency rate of 84.1 percent (due to the design of the questionnaire and the professional website’s unique function, if the questionnaire was not complete or had incomplete data, the applicant couldn’t submit the questionnaire, which helped us obtain high-quality questionnaires by excluding duplicate IP address samples). The research sample distribution is shown in Table .1.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number</th>
<th>Percentage (%)</th>
<th>Year</th>
<th>Num(%)</th>
<th>Region</th>
<th>Num(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery</td>
<td>27</td>
<td>6.6</td>
<td>1–5</td>
<td>134 (32.5)</td>
<td>North</td>
<td>77 (18.7)</td>
</tr>
<tr>
<td>Electro &amp; Info</td>
<td>180</td>
<td>43.7</td>
<td>6–10</td>
<td>123 (29.9)</td>
<td>North-e</td>
<td>40 (9.7)</td>
</tr>
<tr>
<td>Bio &amp; Medic</td>
<td>114</td>
<td>27.7</td>
<td>11–20</td>
<td>128 (31.1)</td>
<td>South-e</td>
<td>21 (5.1)</td>
</tr>
<tr>
<td>Agri</td>
<td>18</td>
<td>4.4</td>
<td>above 20</td>
<td>27 (6.6)</td>
<td>South</td>
<td>74 (18.0)</td>
</tr>
<tr>
<td>Man &amp; Cons</td>
<td>23</td>
<td>5.6</td>
<td>Total</td>
<td>412 (100)</td>
<td>East</td>
<td>81 (19.6)</td>
</tr>
<tr>
<td>Others</td>
<td>50</td>
<td>12.1</td>
<td></td>
<td></td>
<td>South-w</td>
<td>25 (6.1)</td>
</tr>
<tr>
<td>Total</td>
<td>412</td>
<td>100</td>
<td></td>
<td></td>
<td>Central</td>
<td>94 (22.8)</td>
</tr>
<tr>
<td>Size (staff)</td>
<td>&lt;=5</td>
<td>6–10</td>
<td>11–20</td>
<td>21–50</td>
<td>&gt;50&lt;100</td>
<td>Total</td>
</tr>
<tr>
<td>Number of firm</td>
<td>92</td>
<td>12.0</td>
<td>80</td>
<td>48</td>
<td>72</td>
<td>412</td>
</tr>
<tr>
<td>Percentage (%)</td>
<td>22.3</td>
<td>29.1</td>
<td>19.4</td>
<td>11.7</td>
<td>17.5</td>
<td>100</td>
</tr>
</tbody>
</table>

Table .1 Descriptive statistics of the sample (N = 412)

Note: Electro & Info: Electronic and Information Industry; Bio & Medic: Biology and Medical Industry; Agri: Agriculture; Man & Cons: Management and Consulting; North-e: Northeast; South-e: Southeast; South-w: Southwest.

3.2 Measurement and Methods
Network Embeddedness

Prior academic research always divided network embeddedness into three usual dimensions: structural embeddedness, relational embeddedness, and cognitive embeddedness. Based on measurement methods of Tsai (2001) and Muthusamy and White (2005), we mainly adopted the following alternative variables to measure network embeddedness and its main three dimensions: network embeddedness scale (tightness); network embeddedness strength (strength); nature of network (heterogeneity/homogeneity). The number of embedded networks is used to compute the main number of science and technological enterprises cooperating with embedding in the network of enterprises and enterprises generate a tight network; the strength of the

Table 2 EFA results for key variables: dimensions naming, factors loading, and items measuring (N = 201)
strength network embeddness, which should have affected a comprehensive survey that how many times the enterprises make a face-to-face communication, the duration of tight relationship, how the technology enterprise makes an evaluation of the degree of cooperation with the other partners; the nature of embedding network is mainly measured by two indicators: one is based on the network embeddedness of enterprises and technological entrepreneurship in selecting different types of partners, and another variable is “how many the tight partner whose distance is over 30 minutes driving from the nascent entrepreneurial company in the beginning phrase?”
Entrepreneurial Opportunity

At present, there is no consensus for the measurement scale for entrepreneurial opportunities, however, some academics such as Timmons tried to organize a scale that included eight parts, industry and market, feedback ability, economic factors, competitive advantage, management team, fatal flaws yes or no, entrepreneur ship traits, and strategic distinction, and other fifty-three indicators to evaluate the opportunities. Based on Timmons’ study, Haitao Chen and Li Cai (2008) adopted the clustering analysis method to exploit two dimensions (profitability and feasibility) and six sub-dimensions of entrepreneurial opportunity model; Li and Chen adopted two dimensions of opportunities consisting of “the opportunity of entering the market” and “the opportunity to declare new products and services.” Learning from the Klein’s measurement and the aforementioned scholars’ scale, this study takes three dimensions and six items to measure the different types of entrepreneurial opportunity: discovery opportunity, creation opportunity, and imagination opportunity.

All items use the 5-Likert score to make evaluations; the specific measurement items are shown in Table 2.

Technological Entrepreneurial Performance

As a technology venturing enterprise, it’s established and growth is a high risk and resource-consuming process, especially for some nascent technology startups own very limited management and financial resources in most cases; therefore, they are especially vulnerable in the technology venturing process and so easy failed in the early phase as a minimization problem. Li and Atuahene-Gima (2001) contend that the technological entrepreneurial performance refers to financial performance and market performance, which are made up of five financial indicators.
and four market indicators. However, due to a high correlation between the nine indexes, nine indicators are integrated into only one indicator. Based on the above view, in this study, we reduce the measurement indicators and take the nature of the science and technology small and micro-enterprises for consideration.

We only focus on investigating two dimensions composed of innovation and growth performance; all items also use the 5-Likert score evaluation, the concrete measure items shown in Table 2.

3.3 Reliability and Validity of Scale

Reliability Test

The test of the questionnaire’s reliability and validity, we will take the following steps: first, we will use the pre-investigation data of each measure test items, and drop out the measure item which own Crossing Loading, according to the Churchill and Peter (1984) recommendations, we make a judgment on the main variables reliability if it verified by Cronbach’s \( \alpha \) coefficient. Judging by the test results in Table 6.3, the network embeddedness scale reliability coefficient Cronbach \( \alpha = 0.594 \), and its various dimensions, which are numeric types temporarily unable to obtain reliability coefficient; the entrepreneurial opportunity reliability coefficient Cronbach \( \alpha = 0.784 \), and the reliability coefficient of three dimensions are between 0.600–0.753; the technological entrepreneurship performance reliability coefficient Cronbach \( \alpha = 0.726 \), reliability coefficient of the two dimensions were 0.582 and 0.599. The reliability coefficient value is higher when the measurement items are above ten; generally speaking, the value should achieve 0.80, however, in this study, the number of each two-dimensional item is under 10, thus, the reliability coefficient over 0.50 is acceptable.

Validity Test

In this study, we make validity test for network embeddedness, entrepreneurial opportunities, and technological entrepreneurship performance by the validity of convergent validity and discrimination validity, respectively. First step, determine the convergent validity, mainly according to the criteria of Fornell and Larker (1981) that measurement items loading factor
value to latent variable are greater than 0.5 (Sig. < 0.05) and the average value of extraction (AVE) of each latent variable makes a judgment if it is greater than the 0.50.

Table 6.3 shows that factor loading of each measurement items is between 0.543–0.899 (above the 0.5 level requirement); the AVE of “network embeddedness” is 0.722, AVE of “entrepreneurship opportunity” is 0.643 (three dimensions of AVE values were: 0.647, 0.559, 0.7225, respectively); technology entrepreneurship performance AVE value 0.609 (the two dimensions of AVE were 0.634, 0.583, respectively). If AVE values were more than 0.55, the measurementscale had good convergent validity. Second step, to determine the construct discrimination validity, we mainly processed the following two steps: first, each of the two constructs’ correlation coefficient should be less than 0.85; second, the AVE value of construct itself must be greater than the correlation coefficient square value.

Table 3 The result of reliability of scale (N = 412)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cronbach’s α</th>
<th>Dimensions</th>
<th>Cronbach’s α of sub-items</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network embeddedness</td>
<td>α = 0.594</td>
<td>Tightness</td>
<td>Numeric type (null)</td>
<td>Emb1</td>
</tr>
<tr>
<td>Opportunity (KMO = 0.770 Chi-Square = 642.33)</td>
<td>α = 0.784</td>
<td>Strength</td>
<td>Numeric type (null)</td>
<td>Emb2-Emb4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nature of network</td>
<td>Numeric type (null)</td>
<td>Emb5-Emb6</td>
</tr>
<tr>
<td>Discovery</td>
<td></td>
<td>Discovery</td>
<td>Cronbach’s α = 0.633</td>
<td>Opp1-Opp2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creation</td>
<td>Cronbach’s α = 0.600</td>
<td>Opp3-Opp4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Imagination</td>
<td>Cronbach’s α = 0.753</td>
<td>Opp5-Opp6</td>
</tr>
<tr>
<td>Technological entrepreneurship performance</td>
<td>α = 0.726</td>
<td>Finacial Prf</td>
<td>Cronbach’s α = 0.582</td>
<td>Tep1-Tep2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Innovation Prf</td>
<td>Cronbach’s α = 0.599</td>
<td>Tep3-Tep4</td>
</tr>
</tbody>
</table>

of the construct. In the main structure of the calculation of mean, standard deviation, and the concept of correlation coefficients, and construct AVE value shown in Table 6.3, above, value indicates that this scale has good discrimination validity.

.4 Empirical Results
For small and micro technology enterprises of the embedded networkscale, the embedment depth, and the characteristic of the network, we used regression analysis to determine the effects of the main dimensions of network embeddedness on technological and entrepreneurial performance. Network embeddedness and its main dimensions for direct regression technology entrepreneurial performance results show that network embeddedness has a positive effect on entrepreneurial performance ($=0.348$, $p < 0.01$) (Table 6.4). One of the sub-dimensions of embedded network scale and the embedded network characteristics ($=0.202$, $p < 0.05$; $=0.069$, $p < 0.05$) also showed a positive effect on technological entrepreneurship performance, and network embeddedness for the effect of technology entrepreneurship performance are not significant ($= − 0.032$, $p = 0.451$) (see Figure 6.2). Therefore, science and technology small and micro-enterprises for the network embeddedness has a significant positive effect to enhance its technical entrepreneurial performance, therefore, hypothesis H1 and H1a/H1c gains support, and the hypothesis of H1b was not supported.

The mediating role of entrepreneurial opportunity between network embeddedness and technology entrepreneurial performance of technology-based small microenterprise, the testing method is in line with Baron and Kenny (1986). In Table 4, network embeddedness of discovery opportunities and creation opportunities have had a positive effect ($=0.06$, $p<0.05$; $=0.08$ $p<0.05$; $=0.084$, $p<0.01$); the H2 is supported, and the “embeddedness scale” has the effect of a positive relation with entrepreneurial opportunities (regression coefficient for $=0.14$ $p<0.01$), thus, the H2a is supported; the other two dimensions of entrepreneurial opportunity effects were not significant, thus, the H2b is not supported; and for the hypothesis of H2c, network embeddedness has a significant positive effect on the imagination opportunities ($=0.09$, $p<0.05$), the creation opportunity is not significant, thus, the H2c gets partially support.

Table 4 Multiple regression results
Bringing the relative parameters of Table 4 into formulas 1 and 2, according to the formulas, after putting the entrepreneurial opportunity and main dimensions of variables into the regression formula, the effect of network embeddedness influence technology entrepreneurship performance significantly change; first of all, the overall coefficient of network embeddedness decreased from 0.348 to 0.23, for the positive role of network embeddedness scale, which is transferred into \(-0.08\) negative effect, and significantly (p<0.05); When the mediating role of entrepreneurial opportunity was added, the positive effect of network embeddedness rised slightly, and the coefficient was 0.16 (p<0.01). From the above results we can judge that entrepreneurial opportunities play a significant mediating role Between network embeddedness and technology entrepreneurship performance, therefore, assuming H3 and H3a/b/c are supported.
Figure 2 The testing result.

\[ Y_{TEP} = 2.329 + 0.348X_{EMB} + 0.202X_{EMB_t} - 0.032X_{EMB_s} \\
+ 0.069X_{EMB_h} + \epsilon \]

\[ Y_{TEP} = 2.36 + 0.23X_{EMB} - 0.08X_{EMB_t} + 0.04X_{EMB_s} + 0.16X_{EMB_h} - 0.37M_{opp} + 0.14M_{opp_d} - 0.01M_{opp_e} + 0.12M_{opp_i} + \epsilon \]

5 Findings and Implications

This study discusses the network embedding behavior of small and microtechnology enterprises, the mechanism between entrepreneurial opportunities, and technological entrepreneurial performance.

Entrepreneurial opportunities and network embeddedness have been divided into multi-dimensions, according to the multiple regressive analysis, it is revealing that small and microtechnology enterprises’ network embeddedness, network size, and network heterogeneity are conducive to enhancing the performance of technology entrepreneurship; the major dimensions network embeddedness help small and microtechnology enterprises identify and develop imagination type entrepreneurial opportunity. The main types of entrepreneurial opportunities are playing a significant mediating role between network embeddedness and technical entrepreneurial performance.

High-tech small and micro-enterprises in the technology business process need to focus not just on the government’s policy and financial support but also embedding in the industry and pay attention to the network size, embedding degree, and network characteristics.
Especially, in the mobile Internet era. No business can survivewithout considering other companies’ shared interests, it shows thats small and microtechnology enterprises cannot simply protect their own technological and commercial secrets by keeping distance with the dynamic industry network, which can incubate more and more fantastic small and microtechnology enterprises, and these enterprises are definitely not to keep up with the market’s increasing customer demand. High-tech small and micro-enterprises continuously upgradetechnology entrepreneurial performance to get more business opportunities through a network embedding and by identifying and developing opportunities. Enterprise networks are often embedded resources, bringing together a variety of unique and diverse information and professionals, which will inspire more new ideas and opportunities and create an industry. From earlier empirical results, we can see that high-tech small and micro-enterprises prefer to be embedded into large-scale enterprise networks and heterogeneous networks and are not concerned about the size of embedding degree, indicating that these companies realize the reality of the issue, namely the development of entrepreneurial opportunity to get together with low barriers to easily form an innovative project launched many others small and micro-enterprises. These businesses can immediately enter the market and quickly saturate it, so companies cannot maintain a lasting competitive advantage. Technology entrepreneurship is characterized by high investment and high risk; the product may be new, but the market outlook may not be clear. This requires technology entrepreneurs and start-ups to have the ability to recognize opportunity and have many different characteristics of different businesses and qualitative resources to help the enterprises to create, imagine, or seize new business opportunities.

This paper analyzes the high-tech small and micro-enterprise network embedding performance impact on technology entrepreneurship and entrepreneurial opportunities to discuss the effect of mediation. Of course, in this chapter, there are some deficiencies, such as in the measurement of key concepts, the need to further improve and expand. Embedded in the network, for example, we mainly investigated the structure of such enterprises and the relationships embedding dimension. Subsequent studies also need to add a dimension to a comprehensive study of cognitive corporate emphasis on embedded industrial network culture and atmosphere.
Although the focus on science and technology sample of small and micro-enterprises, but location factors such enterprises, which do not have to be considered. Future research also will need to consider that policy and industrial factors within different locations will have an impact on the company’s technology entrepreneurial performance.

References


