**International Journal of Management, IT & Engineering**
Vol. 8 Issue 3, March 2018,
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

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

**Aly YOROTE**

**Salif DIOP***

## 1 Introduction

Extant research on corporate governance documents the effects ofa firm's disclosure policy (Chen & Jaggi, 2000; Craswell & Taylor1992; 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 onfinancial information disclosure policy. For example, Forker (1992) examines the association between corporate governance and shareoption disclosure. Chen and Jaggi (2000) examine the associationbetween independent nonexecutive directors and comprehensivenessof information in mandatory financial disclosures. Few studies examine the association between corporate governance and firm's disclosure policyon nonfinancial information. Since corporate disclosure includes both financial information and nonfinancial information, given the importance of non-financial information as anintegrated part of a firm's disclosure, this study examines the associationbetween corporate governance and corporate social responsibility (CSR) disclosure quality, using Chinese public firms' CSRdisclosure data between 2009 and 2011 as our main sample.

Corporate social responsibility has become increasingly importantfor Chinese public firms, stakeholders, and regulators, dueto publicity about CSR related activities, such as environmental

* **Assistance Professor in Universités de Bamako FSEG**

pollution, poisoned milk formula, charitable donations, and soon. To encourage firms' ethical behavior and social responsibility, Chinese regulatory agencies (Shenzhen Stock Exchange, SZSE, andShanghai Stock Exchange, SSE) released several policy statementsrecently to encourage firms to issue their CSR reports. In 2006, theShenzhen Stock Exchange released the Guide on Listed Companies'Social Responsibility (hereafter "Shenzhen Guide"). In 2008, theState-Owned Assets Supervision and Administration Commissionof 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 reportsfor fiscal year 2008, and 471 firms provided reports in 2009 (Lin,2010). 1 Interestingly, in 2010, a mutual fund index (Jian Xin ShangZhen CSR index Mutual Fund) was created to invest in Chinesestocks 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) documentbenefits associated with CSR reports, such as reducing informationasymmetry and enhancing analyst forecasts, Chinese academia hasbegun 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'svalue, 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 thatfirms with CSR disclosure have lower cost of debt and cost of equity.

He, Xiao, and Zhu (2012) examine the impact of CSR disclosure onanalyst followings, and find that CSR disclosure, as an additionalinformation disclosure, can increase the number of analyst followingsand reduce analyst forecast errors and forecast dispersions. He, Xiao, and Chen (2012) investigate the relation between CSR disclosuresand financial constraints. They find that CSR disclosure canreduce a firm's financial constraints.

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

We extend prior work by examining corporate governance fromtwo aspects, ownership structure and board composition, and examine disclosure in the broader context of voluntary disclosure suchas nonfinancial information disclosure. In particular, we argue thatstrong corporate governance can strengthen the monitoring powerover managers, which might increase a firm's CSR disclosures.

Using Chinese public firms' CSR disclosure data between 2009and 2011, this study examines the association between corporate governance and CSR disclosure quality. We expect that CSR disclosure, as additional nonfinancial information disclosure froma firm, is positively associated with a firm's corporate governance, measured by ownership structure and board composition. The CSRdisclosure quality is measured by Ruling's CSR index within firmsthat 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 determinantsof CSR disclosure (Mao & Zhang, 2009; Shen, 2007; Shenet al., 2010; Wang, 2008; Zhang, 2012), or impact of CSR disclosureon 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 andFang, 2008). This study extends this research stream and providesadditional information about the determinants of CSR disclosurefrom the perspective of corporate governance.

Second, this study contributes to the voluntary disclosure literatureand nonfinancial disclosure literature. Traditionally, researchhas documented that both mandatory and voluntary financial disclosurecan reduce information asymmetry (reduce cost of capital oranalyst forecast) and reduce agency problems (see Healy and Palepu, 2001, and Bushman and Smith, 2001, for more details). Recentresearch identifies the important role of nonfinancial disclosuresin firm valuation and cost of capital. Dhaliwal, Radhakrishnan, Tsang, and Yang (2011) document that the initiation of voluntarydisclosure of CSR activities has potential benefit associated with areduction in firms' cost of equity capital. Dhaliwal, Radhakrishnan, Tsang, and Yang (2012) also provide international evidence thatCSR 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, includingthe Chinese SEC, SSE, and SZSE. In particular, after SSE andSZSE both issued requirements for certain types of firms to discloseCSR reports, a mutual fund index (JianXin ShangZhen CSRindex Mutual Fund) was created in 2010 to invest Chinese stocksbased on their CSR ratings. This study can shed light on the policyimplications.

This chapter is organized as follows. Section 4.2 describes theliterature review and hypothesis development. Section 4.3 presents model specification. Section 4.4 discusses data selection and providessummary statistics. Section 4.5 presents regression resultsand checks robustness. Section 4.6 summarizes and concludes thechapter.

**2 Literature Review and Hypothesis Development**

Agency problems arise between the management and shareholdersdue to the separation of ownership, when the interests of ownersand managers are not aligned. Thus, managers may choose actionsthat might maximize their personal interest. Corporate governancemechanisms are used to monitor the management. Previous literature documents that separation of the roles of board chairman andchief executive officer (CEO) is an important monitoring mechanismfor disciplining managers. Fama and Jensen (1983) suggestthat separation of board chairman and CEO may constrain theopportunistic behavior of managers. Jensen (1993) thinks that whena CEO is also the chairman of the board, the CEO has too muchpower on board decisions, which might not effectively reduce agencyproblems. Dechow, Sloan, and Sweeney (1996) also argue that whena CEO is also the chairman of the board, the CEO can even usehis trusted followers to obtain corporate decisions that serve his/herown needs. Thus, a CEO may easily display opportunistic behaviorfor the purpose of higher earnings. Klein (2002) finds that the managementof a company’s earnings will be given more respect whenthe CEO also serves on the nomination committee or remunerationcommittee. Wang (2007) finds that dual roles make it hard toeffectively control the management of earnings. Wang and Zhang (2007) and Yang et al.

(2008) also have a similar conclusion. Inaddition, Ahmed and Duellman (2007) document that dual rolesdecreases accounting conservatism.

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

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

Independent directors play important monitoring roles in a corporategovernance mechanism. Independent directors have lesserconflicts of interest with managers, thus they are more likely to provideimpartial judgment on corporate decisions. Fama and Jensen (1983) argue that independent directors are strongly motivated tofulfill their supervision responsibilities, as they want to establishand maintain their professional reputation in the market. Britain'sCadbury Report in 1992 also emphasizes the importance of nonexecutivedirectors. Peasnell, Pope, and Young (2000) find that inthe pre-Cadbury period, nonexecutive directors' proportion andearnings management are not significantly correlated; in the post-Cadbury period, nonexecutive directors' proportion and earningsmanagement are significantly negatively correlated. Peasnell, Pope, and Young (1998) find that outside directors' proportion and earningsmanagement are negatively correlated, while Klein (2002) andXie, Davidson, and DaDalt (2003) argue that higher independentdirector 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 informationto 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 ofindependent board director is associated with mandatory disclosures.

Eng and Mak (2003) find that an increase in outside directorsreduces corporate disclosure. Byard et al. (2006) find lower independentdirector proportion may reduce financial forecast accuracy; Ajinkya, Bhojraj, and Sengupta (2005) document that firms witha higher independent percentage have higher management forecast frequency and accuracy. Sengupta (2004) finds that a higher outsidedirector proportion may publish financial statements earlier, provingthat outside directors can supervise managers and accelerate theprocess of financial statement production, which enables the publicto know a company's financial information earlier. Ahmed andDuellman (2007) find that a higher independent director proportionprovides timelier bad news in financial reports. The reasonis that independent directors, as part of their supervisory duties, urgemanagers to announce bad news for the company as soon as possiblein order to reduce information asymmetry between the companyand public.

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

Thus, based on empirical findings from prior studies, I formulatethe following hypothesis:
*H2: Firms with a higher number of independent directors have higherquality of CSR disclosure than their counterparts.*

Board size is also an important element in the corporate governancemechanism. Jensen (1993) believes that a small board ismore efficient for decision-making processes. Dechow et al. (1996) and Yermack (1996) also have drawn a similar conclusion in theirempirical studies. Lipton and Lorsch (1992) believe that increasingthe board size will lead to lower efficiency when board size reachesa certain level. Beasley (1996) finds that larger board size contributesto higher probability of financial statement fraud. Thus, they believe that there will be significant agency problems when boardsize is larger. When there are many people on the board, increasingthe board size produces more contradictions and divergences amongboard 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 indirectors, that is, directors with a professional background and moreinformation resources or connections, thus thus enabling better monitoring of managers. Xie et al. (2003) find that the larger theboard, the higher the financial report quality. Chtourou, Bedard, and Courteau (2001) find that the larger the board size, the betterthe constraining of earnings management.

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

Yu (2009) points out that a significant premise for a smallboard to be more efficient is that every board member must betruly conscientious, being able to jointly protect the overall interestsof the company rather than individuals' own interests. But heargues that the premise is too idealistic, for it is difficult to achievein daily life. As a result, he concludes that a big board is better.

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

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

Management shareholding is an alternative way to mitigate agencyproblems. By providing management shareholdings, the corporationmight align the interests of the management with that of shareholders. Thus, management might increase firm disclosures so that theirpersonal wealth

based on stock values might reflect the company'sperformance so that management might reap higher personal wealth.

Warfield, Wild, and Wild (1995) believe that with increasing theroportion of shareholding managers, managers' interest and thecompany'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 thata higher proportion of shareholding managers could better constrainearnings management.

In terms of disclosure, extant research documents that managementshareholdings are positively associated with a firm's voluntarydisclosure. Since managers are compensated with shares, stock priceappreciation is a natural incentive for managers to release good news.

In the case of bad news, since investors with rational expectationsrespond not only to disclosure but also to nondisclosure, which theyrationally perceive as "worse" news, managers are also motivatedto disclose bad news as no disclosure is interpreted as worse news.

Therefore, Nagar, Nanda, and Wysocki (2003) argue that managersare privy to information that investors demand and are reluctantto publicly disseminate it unless they are provided appropriateincentives such as shares and options. They find that firm disclosures, measured both by management earnings forecast frequencyand analysts' subjective ratings of disclosure practice, are positivelyrelated to the value of shares held by the CEO. Thus, I formulate thefollowing hypothesis:

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

Larger shareholder stake is also an important feature of the corporategovernance system. Due to ownership diffusion, firms witha large number of shareholders with higher shareholdings can exercisetheir monitoring power more easily than many diffused smallshareholders. A large shareholder can wield power to replace boarddirectors, to replace management, and use job

security as a threatto monitor management. In addition, a higher proportion of shareholdingby a controlling shareholder makes the controlling shareholders'interests more consistent with the overall interests of thecompany. If a controlling shareholder wants to maximize his ownwealth, 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 isbeneficial to improving financial information quality. Thus, Shleiferand Vishny (1986) surmise that concentrations of shares and earningsmanagement are significantly negatively correlated. Gortonand Schmid (2000) find that German companies' concentration ofshareholdings and corporate performance are positively correlated.

In China, evidence is consistent with these prior studies. Zhao andYu (2005) find that highly concentrated ownership leads to bettercompany performance; Xu et al. (2006) find that the proportion ofshareholding by the largest shareholder and corporate performanceare positively correlated.

In terms of firm disclosure, Fan and Wong (2002) find that ahigh degree of concentrated shares may have a significant influenceon financial reporting and credibility. First, from a majorshareholder's perspective, they have more power when they havea higher proportion of equity, and they are more likely to concealsome information in exchange for some personal benefits. Thus, the financial report might provide information that shows thecompany is doing worse than expected. Second, from the publicperspective, when large shareholders wield too much power, thepublic may suspect that they conceal some information for their personal interests. Thus, even though large shareholders may providea highly qualified financial report, the public may still doubtits quality. In other words, the credibility of the financial report falls when large shareholders have too much equity. Besides Fanand Wong (2002), La Porta et al. (1998) also draw a similar conclusionbased on their research. Thus, I formulate the followinghypothesis:

*H5: Firms with a higher largest shareholder's share percentage have ahigher quality of CSR disclosure than their counterparts.*

The relationship between the largest shareholder and other largeshareholders is also important in understanding the corporate governancesystem. Gomes and Novaes (2005) believe that severallarge shareholders supervising each other can benefit the company.

Bennedsen and Wolfenzon (2000) argued that the monitoringpower of minority shareholders can prevent large shareholdersfrom tunneling interest from minority shareholders. Overall, largeshareholders may do their duty of supervision together. Throughjoint supervision by several large shareholders, better managerialperformance can be achieved. Pagano and R ö ell (1998) and Bloch& Hege (2003) also arrive at a similar conclusion. In addition, Bai, Liu, Lu, Song, and Zhang (2004), Volpin (2002), Maury andPajuste (2005), Hong and Xue (2008), and Tang et al. (2006) pointout that the pattern of several large shareholders standing togethermay increase the company's value. Several large shareholders' jointsupervision 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 largestshareholder is likely to tunnel the interests of minority shareholdersor the company. McKinnon and Dalimunthe (1993) find thatincreased ownership diffusion increases the disclosure of segmentinformation. Mitchell, Chia, and Loh (1995) find that ownershipdiffusion, firm size, and industry membership are factors influencingthe voluntary disclosure of segment information.
Thus, I formulatethe following hypothesis:
*H6: Firms with a higher number of large shareholders' share percentage (higher ownership diffusion) have a higher quality of CSR disclosurethan their counterparts.*

**3 Model Specification**

To test the above hypothesis, we developed the following regressionmodel. Specifically, we use CSR disclosure quality as the dependentvariable 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 maximum105. 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 onmacrocosm over 30 (the maximum score is 30). The content indicatorincludes firm performance, employee relations and human rights, environmental protection, ethical operation, consumer relations, and community relations. It is calculated as the ratio of thescore on content over 50 (the maximum score is 50). The techniqueindicator includes the quality of disclosed information, such as consistency, comparability, reliability, and relevance. It is calculated asthe ratio of score on technique over 20 (the maximum score is 20).

Industry is the measure of industry practices (I5 is the ratio of scoreon Industry over 5). PAGE is the number of pages in CSR reports, and it is arguable that firms that issue long CSR reports have higherCSR 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 ownershipstructure. For board composition variables, DUAL INDP, andBSIZE are used. DUAL is a dummy variable that takes 1 if the CEOis 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 ownershipstructure variables, MSHARE is the proportion of ordinaryshares held by the CEO and executive directors. LSHARE is theproportion of shares owned by the largest shareholders. ZINDEX is the ratio of the largest shareholder's ownership to the second largestshareholder' ownership. HINDEX is the sum of the square of theshareholdings of the second largest shareholder to the tenth largestshareholder.

The control variables include the following: ROA measures firmperformance as return on assets. LEV is the leverage ratio as theratio of total liabilities divided by total assets. ACCR is used to

proxyfor financial information disclosure quality. It is measured as theratio of accruals over total assets. LEV is the ratio of long-term debtover total assets, measuring the risk of the firm. MB is the marketvalue of the firm (sum of market value of ordinary shares, preferenceshares, and book value of long-term and short-term debt) divided bythe book value of total assets. GROWTH measures firm growth.

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

The INDUS_DUMMY is industry dummy identified using onedigit of Chinese SIC code (for manufacturing firms, two digits areused). The YEAR_DUMMY is year dummy. Table 4.1 presents thedescription of each variable.

**Table 1 Description of variables**

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

**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 themeasure 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 CSRDisclosure Database has been used in many studies. The RunlingDatabase 2 collects extensive CSR information from firms' CSRreports and constructs a CSR index. It is the most comprehensivedatabase available for evaluating a firm's CSRs (this data has beenwidely used in scholarly research and cited in important journalarticles, 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 disclosurechannels such as corporate websites, public announcements, and news. Once information is collected, its sector-specific analyst's ratethe 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 selectedfor the period 2009–2011 from the CSMAR database. The reasonto start from 2009 is that the Runling Database only includes firmswith CSR disclosure from 2009; firms that voluntarily disclose CSR in prior years are scarce. Initially the sample was around 4,900 firmyearobservations, and after deleting firms in the financing industry (44) and firms with missing variables (109), the total number offirm-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

| *Sample selection procedure* | *Firm-year observation* |
|---|---|
| Initial sample | 4,900 |
| –Deleting firms in the financing industry | 44 |
| –Firms with missing variables | 109 |
| Total firm-year sample with all data | 4,747 |
| Firm-year sample with CSR disclosure | 1,097 (23%) |

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 firmyear level.

**Summary Statistics**

Table 4.3 presents summary statistics for the variables just describedon the sample of the firm's characteristics. The mean of SCOREis 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 maximumvalue is 81.3%, the minimum value is 0.098, and the medianis 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. Themean 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 meanof 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 aboutnine people. The mean of MSHARE is only 1.8%, indicating thatChinese firms have lower managerial ownership. The mean ofLSHARE is about 38.8%, indicating that the largest shares havestrong monitoring powers. The mean of SIZE across all firm-years

**Table 4.3** Summary statistics for variable used in the study

| *Variable* | *Sample* | *Mean* | *Median* | *MIN* | *Q1* | *Q3* | *MAX* | *S.D.* |
|---|---|---|---|---|---|---|---|---|
| SCORE | 1097 | 0.354 | 0.319 | 0.130 | 0.270 | 0.394 | 0.837 | 0.127 |
| M30 | 1097 | 0.345 | 0.305 | 0.094 | 0.241 | 0.398 | 0.894 | 0.147 |
| C50 | 1097 | 0.345 | 0.322 | 0.098 | 0.263 | 0.401 | 0.813 | 0.122 |
| T20 | 1097 | 0.334 | 0.296 | 0.028 | 0.270 | 0.359 | 0.804 | 0.118 |
| I5 | 1097 | 0.226 | 0.112 | 0.000 | 0.000 | 0.334 | 0.536 | 0.300 |
| PAGE | 1097 | 2.546 | 2.398 | 0.693 | 1.946 | 3.045 | 5.231 | 0.809 |
| RANK | 1097 | 5.291 | 3.219 | 1.000 | 3.000 | 4.000 | 7.000 | 16.000 |
| DUAL | 1097 | 0.876 | 1.000 | 0.000 | 1.000 | 1.000 | 1.000 | 0.330 |
| BSIZE | 1097 | 9.751 | 9.000 | 5.000 | 9.000 | 11.000 | 15.000 | 2.197 |
| INDP | 1097 | 0.370 | 0.333 | 0.091 | 0.333 | 0.385 | 0.500 | 0.062 |
| MSHARE | 1097 | 0.018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.112 | 0.076 |
| LSHARE | 1097 | 0.388 | 0.393 | 0.036 | 0.254 | 0.511 | 0.654 | 0.163 |
| ZINDEX | 1097 | 16.098 | 5.667 | 1.000 | 1.880 | 19.017 | 59.482 | 28.213 |
| HINDEX | 1097 | 20.381 | 17.330 | 1.100 | 8.820 | 29.700 | 47.670 | 14.064 |
| ACCR | 1097 | 0.004 | −0.002 | −0.347 | −0.038 | 0.043 | 0.141 | 0.082 |
| ROA | 1097 | 0.057 | 0.049 | −0.173 | 0.024 | 0.082 | 0.153 | 0.052 |
| LEV | 1097 | 0.109 | 0.066 | 0.000 | 0.003 | 0.174 | 0.371 | 0.126 |
| MB | 1097 | 6.892 | 2.752 | 0.052 | 1.211 | 5.660 | 28.338 | 15.384 |
| GROWTH | 1097 | 0.288 | 0.183 | −0.953 | 0.043 | 0.372 | 0.787 | 1.416 |
| SIZE | 1097 | 22.855 | 22.679 | 19.663 | 21.730 | 23.788 | 25.655 | 1.547 |
| STATE | 1097 | 0.424 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 | 0.494 |

*Note*: This table presents summary statistics for each variable that is used in the model. The sample size is 1,097 for firms with CSR reports. SCORE is the CSR rating score obtained from the Runling Database for quality of the CSR reports. RANK is the CSR rankings by the Runling Database, from AAA to CCC; PAGE is the number of pages in the CSR report, M30 (Macrocosm), C50 (Content), T20 (Technique), or I5 (Industry). The INDUS_DUMMY is identified using one digit of the Chinese SIC code (for manufacturing firms, two digits are used). The YEAR_DUMMY is calculated as Year_ Dummy09, Year_Dummy10, Year_Dummy11. See Table 4.1 for variable definitions. All variables are winsorized at the 1% and 99% levels.

equals 22 and the maximum is 25. These values are consistent with prior research (Zhang & Lv, 2009).

equals 22 and the maximum is 25. These values are consistent withprior research (Zhang & Lv, 2009).

### 4.4 Regression Analysis and Results

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

Table 4.4 presents regression results on the relation between corporategovernance 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

| *Variable* | *SCORE* | *M30* | *C50* | *T20* | *I5* | *RANK* | *PAGE* |
|---|---|---|---|---|---|---|---|
| Intercept | −0.601*** | −0.655*** | −0.555*** | −0.427*** | −0.827*** | −18.728*** | −3.701*** |
| | 0.062 | 0.071 | 0.062 | 0.059 | 0.128 | 1.596 | 0.411 |
| DUAL | −0.010 | −0.012 | −0.013 | 0.003 | −0.017 | −0.226 | −0.101 |
| | 0.010 | 0.012 | 0.010 | 0.010 | 0.021 | 0.261 | 0.067 |
| BSIZE | 0.003* | 0.002 | 0.004** | 0.002 | 0.003 | 0.100** | 0.012 |
| | 0.002 | 0.002 | 0.002 | 0.002 | 0.004 | 0.048 | 0.012 |
| INDP | 0.133** | 0.148** | 0.117** | 0.110** | 0.163 | 2.859** | 0.966** |
| | 0.055 | 0.062 | 0.054 | 0.052 | 0.112 | 1.400 | 0.361 |
| MSHARE | 0.241* | 0.274* | 0.270** | 0.204* | −0.362 | 6.797** | 1.517* |
| | 0.136 | 0.154 | 0.136 | 0.129 | 0.280 | 3.490 | 0.899 |
| LSHARE | 0.048* | 0.040 | 0.061** | 0.018 | 0.041 | 1.277** | 0.385** |
| | 0.026 | 0.030 | 0.026 | 0.025 | 0.054 | 0.667 | 0.172 |
| ZINDEX | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | −0.002 | −0.001 |
| | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.003 | 0.001 |
| HINDEX | 0.001*** | 0.002*** | 0.001*** | 0.001*** | 0.002** | 0.035*** | 0.008*** |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.008 | 0.002 |
| ACCR | −0.083* | −0.096* | −0.047 | −0.102* | −0.213** | −1.648 | −0.338 |
| | 0.050 | 0.056 | 0.050 | 0.047 | 0.102 | 1.274 | 0.328 |
| ROA | 0.156* | 0.094 | 0.202* | 0.074 | 0.253 | 4.199** | 0.405 |
| | 0.093 | 0.105 | 0.092 | 0.088 | 0.191 | 2.377 | 0.613 |
| LEV | −0.067* | −0.055 | −0.060* | −0.095** | −0.042 | −1.897** | −0.459* |
| | 0.035 | 0.040 | 0.035 | 0.034 | 0.073 | 0.909 | 0.234 |
| MB | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.002 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.002 |
| GROWTH | −0.004* | −0.004* | −0.004** | −0.003 | −0.001 | −0.102* | −0.025* |
| | 0.002 | 0.003 | 0.002 | 0.002 | 0.005 | 0.057 | 0.015 |
| SIZE | 0.036*** | 0.039*** | 0.033*** | 0.028*** | 0.047*** | 0.914 | 0.243 |
| | 0.003 | 0.003 | 0.003 | 0.003 | 0.006 | 0.073 | 0.019 |
| STATE | 0.010 | 0.012 | 0.010 | 0.007 | 0.009 | 0.197 | 0.086 |
| | 0.007 | 0.008 | 0.007 | 0.007 | 0.015 | 0.182 | 0.047 |
| INDDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| YEARDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| SAMPLE | 1079 | 1079 | 1079 | 1079 | 1079 | 1079 | 1079 |
| Adj. *R* square | 0.278 | 0.303 | 0.257 | 0.225 | 0.452 | 0.270 | 0.264 |

*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 significantpositive coefficients throughout six regression models. It indicatesthat firms with higher independent director percentage, highermanagerial ownership, and higher largest shareholder's share, andhigher share diffusion between the second and tenth shareholdershave higher CSR disclosure quality. In addition, it fails to documentsignificant coefficients of DUAL or ZINDEX, suggesting thatfirms with a CEO acting as the chairman or the share diffusionbetween largest shareholders and the second largest shareholders donot improve the CSR disclosure quality. Therefore, H2, H3, H4, H5, and H6 are supported. But we fail to find supporting evidencefor H1 about duality.

Table 4.4 also provides results on the control variables. For example, the coefficient of ACCR is significantly negative; suggestingthat 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 disclosurequality. The positive coefficient of SIZE also indicates that largefirms have higher CSR disclosure quality.

### 4.5 Regression Results on the Relation Between Overall CorporateGovernance Index and CSR Disclosure Quality

As documented in the analysis, we provide empirical evidence onthe different aspects of corporate governance, including board features, ownership structures, and other mechanisms. Since corporategovernance is an overall level for each firm, this study followsBai, Liu, Lu, Song, and Zhang (2005), Jin and Yuan (2008), He, Xiao, and Zhu's (2012) method and constructs an overall CorporateGovernance Index (CGINDEX) using the Principle ComponentAnalysis (PCA) method (Appendix A). Table 4.5 presents regressionresults using the overall corporate governance index as the mainvariable. Regression results indicate that CGINDEX have significantlypositive coefficients for most of the models, indicating thatfirms with a higher corporate governance index have higher CSRdisclosure quality. The coefficients of control variables are similar toour baseline regression.

**Table 2**Regression results of the association between type of corporate governance (CGINDEX) and CSR disclosure quality

| *Variable* | *SCORE* | *M30* | *C50* | *T20* | *I5* | *RANK* | *PAGE* |
|---|---|---|---|---|---|---|---|
| Intercept | −0.554*** | −0.602*** | −0.516*** | −0.376*** | −0.813*** | −17.59*** | −3.464*** |
| | 0.060 | 0.068 | 0.060 | 0.056 | 0.121 | 1.534 | 0.394 |
| CGINDEX | 0.021*** | 0.026*** | 0.016** | 0.021*** | 0.015 | 0.472*** | 0.128*** |
| | 0.006 | 0.007 | 0.006 | 0.006 | 0.013 | 0.164 | 0.042 |
| ACCR | −0.113** | −0.129** | −0.075 | −0.128*** | −0.230** | −2.414** | −0.501 |
| | 0.050 | 0.057 | 0.050 | 0.047 | 0.102 | 1.284 | 0.330 |
| ROA | 0.216** | 0.152 | 0.268*** | 0.104 | 0.313* | 5.810** | 0.745 |
| | 0.092 | 0.105 | 0.092 | 0.087 | 0.188 | 2.371 | 0.609 |
| LEV | −0.072** | −0.059 | −0.067* | −0.097*** | −0.034 | −2.012** | −0.514** |
| | 0.036 | 0.040 | 0.036 | 0.034 | 0.072 | 0.915 | 0.235 |
| MB | 0.001* | 0.001** | 0.000 | 0.000* | 0.000 | 0.008 | 0.003* |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.002 |
| GROWTH | −0.003* | −0.004 | −0.004* | −0.002 | 0.000 | −0.091 | −0.021 |
| | 0.002 | 0.003 | 0.002 | 0.002 | 0.005 | 0.057 | 0.015 |
| SIZE | 0.041*** | 0.043*** | 0.038*** | 0.031*** | 0.053*** | 1.022*** | 0.270*** |
| | 0.003 | 0.003 | 0.003 | 0.003 | 0.005 | 0.069 | 0.018 |
| STATE | 0.009 | 0.010 | 0.009 | 0.005 | 0.012 | 0.165 | 0.083* |
| | 0.007 | 0.008 | 0.007 | 0.006 | 0.014 | 0.177 | 0.045 |
| INDDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| YEARDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| SAMPLE | 1079 | 1079 | 1079 | 1079 | 1079 | 1079 | 1079 |
| Adj. *R* square | 0.255 | 0.282 | 0.233 | 0.211 | 0.449 | 0.246 | 0.244 |

*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.

## 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 greateradverse selection and moral hazard problems. SOEs face significantlygreater incentives to voluntarily disclose additional informationto ease investor concerns regarding management quality, thepotential for asset stripping, or misappropriation, and the role of thegovernment as a major shareholder. Second,

additional disclosure bySOEs is also likely to be less costly since they operate in industriesof strategic importance and are hence shielded from internationalcompetition. Ferguson, Lam, and Lee (2002) empirically examinedthe impact of international capital market pressure on voluntary disclosurein the annual reports of formerly wholly SOEs listed on theStock Exchange of Hong Kong (SEHK) and found that SOEs disclosedsignificantly more strategic and more financial information

**Table 3**Regression results on the association between type of corporategovernance (CGINDEX) and CSR disclosure quality in SOEs

| *Variable* | *SCORE* | *M30* | *C50* | *T20* | *I5* | *RANK* | *PAGE* |
|---|---|---|---|---|---|---|---|
| Intercept | −0.651*** | −0.686*** | −0.599*** | −0.512*** | −0.863*** | −19.38*** | −4.087*** |
| | 0.089 | 0.102 | 0.087 | 0.087 | 0.184 | 2.282 | 0.561 |
| CGINDEX | 0.017* | 0.018* | 0.010 | 0.024** | 0.038* | 0.329 | 0.074 |
| | 0.010 | 0.011 | 0.010 | 0.010 | 0.021 | 0.256 | 0.063 |
| ACCR | −0.179** | −0.209** | −0.139* | −0.161** | −0.302* | −3.716* | −1.045** |
| | 0.087 | 0.099 | 0.085 | 0.085 | 0.180 | 2.225 | 0.546 |
| ROA | 0.259* | 0.195 | 0.313** | 0.115 | 0.418 | 8.125** | 1.673* |
| | 0.149 | 0.171 | 0.146 | 0.145 | 0.308 | 3.819 | 0.938 |
| LEV | −0.064 | −0.034 | −0.067 | −0.110** | 0.033 | −1.268 | −0.242 |
| | 0.055 | 0.063 | 0.054 | 0.054 | 0.114 | 1.409 | 0.346 |
| MB | 0.000 | 0.000 | 0.000 | −0.001 | 0.000 | −0.004 | 0.000 |
| | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.012 | 0.003 |
| GROWTH | −0.016* | −0.013 | −0.018* | −0.009 | −0.025 | −0.423** | −0.103* |
| | 0.009 | 0.010 | 0.009 | 0.009 | 0.019 | 0.232 | 0.057 |
| SIZE | 0.045*** | 0.047*** | 0.041*** | 0.037*** | 0.058** | 1.092*** | 0.295*** |
| | 0.004 | 0.004 | 0.004 | 0.004 | 0.008 | 0.099 | 0.024 |
| INDDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| YEARDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| SAMPLE | 468 | 468 | 468 | 468 | 468 | 468 | 468 |
| Adj. *R* square | 0.356 | 0.377 | 0.302 | 0.323 | 0.503 | 0.337 | 0.335 |

*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) findthat the level of voluntary disclosure is positively related to the proportionof state ownership.

To further determine whether the relationship between corporategovernance and CSR disclosure varies in SOE vs non-SOE firms, we categorize firms into two groups: SOE firms and non-SOEfirms. Tables 4.6 and 4.7 present the regression results in SOE firmsand non-SOE firms.

Empirical evidence indicates that the positiveimpact of corporate governance on CSR disclosure quality exists inboth SOE and non-SOE firms.

Results from the regression analysis indicate that corporate governanceis positively associated with CSR disclosure. In particular, wedocument that firms with a higher independent director percentage,

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

| *Variable* | *SCORE* | *M30* | *C50* | *T20* | *I5* | *RANK* | *PAGE* |
|---|---|---|---|---|---|---|---|
| Intercept | −0.376*** | −0.423*** | −0.388*** | −0.120*** | −0.621*** | −14.106*** | −2.532*** |
| | 0.086 | 0.096 | 0.087 | 0.076 | 0.171 | 2.204 | 0.586 |
| CGINDEX | 0.019** | 0.026*** | 0.020** | 0.009 | −0.010 | 0.458** | 0.167*** |
| | 0.009 | 0.010 | 0.009 | 0.008 | 0.017 | 0.225 | 0.060 |
| ACCR | −0.050 | −0.057 | −0.020 | −0.072 | −0.166 | −1.121 | −0.014 |
| | 0.061 | 0.068 | 0.062 | 0.054 | 0.122 | 1.574 | 0.419 |
| ROA | 0.162 | 0.079 | 0.229** | 0.079 | 0.187 | 3.623 | 0.017 |
| | 0.118 | 0.131 | 0.120 | 0.104 | 0.235 | 3.024 | 0.805 |
| LEV | −0.064 | −0.078 | −0.042 | −0.068* | −0.130 | −2.284** | −0.623** |
| | 0.048 | 0.053 | 0.049 | 0.042 | 0.095 | 1.229 | 0.327 |
| MB | 0.000 | 0.001** | 0.000 | 0.000** | 0.000 | 0.009 | 0.003** |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.007 | 0.002 |
| GROWTH | −0.002 | −0.003 | −0.003 | −0.002 | 0.002 | −0.065 | −0.014 |
| | 0.002 | 0.002 | 0.002 | 0.002 | 0.004 | 0.057 | 0.015 |
| SIZE | 0.033*** | 0.036*** | 0.032*** | 0.019*** | 0.042*** | 0.874*** | 0.232*** |
| | 0.004 | 0.004 | 0.004 | 0.003 | 0.008 | 0.100 | 0.027 |
| INDDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| YEARDUMMY | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| SAMPLE | 628 | 628 | 628 | 628 | 628 | 628 | 628 |
| Adj. *R* square | 0.119 | 0.163 | 0.137 | 0.099 | 0.393 | 0.122 | 0.129 |

*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.

higher managerial ownership, and higher largest shareholder's share, and higher share diffusion between the second and tenth shareholdershave a higher CSR disclosure quality. In addition, firms with ahigher corporate governance index have higher CSR disclosure quality.

Moreover, regression results also indicate that such an associationexists in both SOE and non-SOE firms.

## 5. Conclusion

Awareness about CSR has been raised due to publicity on corporateenvironmental pollution, ethics, and other social responsibilityrelated activities. While recent studies on CSR enhance understandingof the relation between CSR disclosure and firm valuation andfinancial policies, little has been done to investigate the associationbetween corporate governance and CSR disclosure. Extant literature documents that due to agency problems, managers who haveprivate information are reluctant to disclose information to outsideinvestors. However, corporate governance can monitor managers toinduce information disclosure through either mandatory or voluntarydisclosure. Thus, firms with strong corporate governance areassociated with higher disclosure quality. CSR disclosure is part ofvoluntary disclosure that discloses nonfinancial information, andhence this study tries to fill the gap by studying the relation betweencorporate governance and CSR disclosure in China and argues thatstrong corporate governance should be associated with higher qualityof CSR disclosure.

Using Chinese firms' disclosure of CSR as our sample, we documentthat strong corporate governance is positively associated withthe quality of CSR disclosure. In particular, we document that firmswith a higher independent director percentage, higher managerialownership, higher largest shareholder's share, and higher share diffusionbetween the second and tenth shareholders have higher CSRdisclosure quality. In addition, firms with a higher corporate governanceindex have higher CSR disclosure quality. Moreover, regressionresults also indicate that such an association is more sensitive innon-SOE firms.

This study contributes to the existing literature as it is the firstpaper about Chinese firms to examine the impact of corporate governanceon CSR disclosure quality Thus, this study contributes to the mandatory/voluntary disclosure literature and nonfinancialdisclosure literature. Second, as the emerging market gains importancein global research, our study uses Chinese public firms' dataand documents a significant relation between corporate governanceand CSR

disclosures, thus providing evidence from the emergingeconomy. In conclusion, this study contributes to the related policymakers, including the Chinese SEC, SSE, and SZSE with the recommendationthat stronger corporate governance indeed increasesfirm disclosure. Thus, this study can shed light on policy implicationsand 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 GovernanceIndex (CGINDEX) using the Principle Component Analysis (PCA)method. The main components used in calculating the CGINDEXare 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 thesecond largest shareholder's ownership − 0.13
7. HINDEX: sum of square of the shareholdings of the secondlargest 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 participantsin 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 informationin a timely manner to the public and all companies are encouragedto publish CSR reports in addition to annual financial reports.

In December 2008, the Shanghai Stock Exchange further acceleratedthe development of CSE disclosure by mandating three types of listedcompanies to issue the CSR annual report from fiscal year 2008. Thecompanies include those that are listed in the Shanghai Stock Exchange

Corporate Governance Index, companies that list shares overseas, andcompanies 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 requirementwhile 32 companies did it voluntarily.

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

**References**


- Ahmed, A. S., & Duellman, S. 2007. Accounting conservatism and boardof director characteristics: an empirical analysis. *Journal of Accountingand Economics*, 43(2): 411–437.
- Ajinkya, B., & Bhojraj, S. 2005. The association between outside directors, institutional investors and the properties of management earningsforecasts. *Journal of accounting Research*, 43(3): 343–376.
- Bae, K. H., Kang, J. K., & Kim, Jin-Mo. 2002. Tunneling or value added?
- Evidence from mergers by Korean business groups. *The Journal of Finance*, 57(6): 2695–2740.
- Bai, C., & Liu, Q., Lu, J., Song, F. M., & Zhang, J. 2004. Corporategovernance and market valuation in China.*Journal of Comparative Economics*, 32(4): 599–616.
- ———. 2005. Empirical study on corporate governance. *Journal of Economic Review* (China), 2: 81–91.
- Beasley, M. S. 1996. An empirical analysis of the relation between theboard of director composition and financial statement fraud. *Accounting Review*, 71(4): 443–465.
- Bennedsen, M., & Wolfenzon, D. 2000.The balance of power in closelyheld corporations. *Journal of Financial Economics*, 58(1): 113–139.
- Bertrand, M., Mehta, P., & Mullainathan, Sendhil. 2002. Ferreting outtunneling: an application to Indian business groups. *The QuarterlyJournal of Economics*, 117(1): 121–148.
- Bloch, F. & Hege, U. 2003. Multiple shareholders and control contests. Working paper.

- Bushman, R. M., & Smith, A. J. 2001.Financial accounting informationand corporate governance. *Journal of Accounting & Economics*, 32:237–333.
- Byard, D., Y. Li, & Weintrop, J. 2006. Corporate governance and the qualityof financial analysts' information. *Journal of Accounting and Public Policy*, 25(5): 609–625.
- Chen, C. J. P., & Jaggi, B. 2000. Association between independent non-executive directors, family control and financial disclosures in Hong Kong. *Journal of Accounting and Public Policy*, 19: 285–310.
- Chen, Y., & Ma, L. 2005. Market reaction on corporate social responsibility disclosure. *Journal of Accounting Research* (China), 11: 76–81.
- Cheung, Y., Rau, P. R., & Stouraitis, A. 2006. Tunneling, propping, and expropriation: evidence from connected party transactions in Hong Kong. *Journal of Financial Economics* 82(2): 343–386.
- Craswell, A., & Taylor, S. 1992. Discretionary disclosure of reserves by oil and gas companies: an economic analysis. *Journal of Business Finance and Accounting* 19: 295–308.
- Dalton, D. R., Daily, C. M., Johnson, J. L., & Ellstrand, A. E. 1999.
- Number of directors and financial performance: a meta-analysis. *Academy of Management Journal*, 42(6): 674–686.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. 1996. Causes and consequences of earnings manipulation: an analysis of firm's subject to enforcement actions by the sec*. *Contemporary Accounting Research*, 13(1): 1–36.
- Dhaliwal D., Radhakrishnan S., Tsang A., & Yang, Y. G. 2011. Voluntary nonfinancial disclosure and the cost of equity capital: the initiation of corporate social responsibility reporting. *The Accounting Review*, 86(1): 59–100.
- ———. 2012. Nonfinancial disclosure and analyst forecast accuracy: international evidence on corporate social responsibility. *The Accounting Review*, 87(3): 723–759.
- Eng L. L., & Mak, Y. T. 2003. Corporate governance and voluntary disclosure[J]. *Journal of Accounting and Public Policy*, 22(4): 325–345.
- Fama, E. F., & Jensen, M. C. 1983.Separation of ownership and control. *Journal of Law and Economics*, 26: 301–325.

- Fan, J. P., & Wong, T. J. 2002. Corporate ownership structure and the informativeness of accounting earnings in East Asia. *Journal of Accounting and Economics*, 33(3): 401–425.
- Ferguson M. J., Lam, K. C. K., & Lee, G. M. 2002. Voluntary disclosure by state-owned enterprise listed on the stock exchange of Hong
- Kong. *Journal of International Financial Management and Accounting*, 13: 125–152.
- Forker J. J. 1992.Corporate governance and disclosure quality. *Accounting and Business Research*, 22(86): 111–124.
- Friedman, E., Johnson, S., & Mitton, T. 2003. Propping and tunneling. *Journal of Comparative Economics*, 31(4): 732–750.
- Gomes, A. R., & Novaes, W. 2005. Sharing of control as a corporate governance mechanism. PIER Working Paper No. 01–029.
- Gorton, G., & Schmid, F. A. 2000. Universal banking and the performance of German firms. *Journal of Financial Economics*, 58(1): 29–80.
- Goss, A., & Roberts, S. 2011. The impact of corporate social responsibility on the cost of bank loans. *Journal of Banking & Finance*, 35(7): 1794–1810.
- He, X., Xiao, S., & Chen, X. 2012. Corporate social responsibility and financing constraints. *Journal of Finance and Economics*, 38(8):60–83.
- He, X., Xiao, S., & Zhu, H. 2012. Ownership feature, governance environment and the economic consequence of corporate social responsibility disclosure—from analyst forecast behavior, working paper.
- Healy, Paul M., & Palepu, Krishna G. 2001. Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1–3): 405–440.
- Ho, S. S. M., & Shun Wong, K. 2001. A study of the relationship between corporate governance structures and the extent of voluntary disclosure[J]. *Journal of International Accounting, Auditing and Taxation*, 10(2): 139–156.
- Hong, J. & Xue, H. 2008. The effect of counter-balance towards the largest shareholder on the amount of related party transactions and the consistence of related party sales. *Nankai Business Review*, 01: 24–30.

- Hossain, M., Tan, L. M., & Adams, M. 1994. Voluntary disclosure in an emerging capital market: some empirical evidence from companies listed on the K.L. Stock Exchange. *International Journal of Accounting,* 29: 334–351.
- Huang yixiang & Li yuanhui. 2012. Corporate social responsibility, financial performance and debt cost. *Friends of Accounting,* 7: 29–32.
- Jensen, M. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review,* 76: 323–329.
- Jensen, M. C. 1993. The modern industrial revolution, exit, and the failure of internal control systems. *The Journal of Finance,* 48(3): 831–880.
- Jia, M., & Zhang, J. 2010. Management's political connections and firm's charity behavior. *Management World,* 4: 99–112.
- Jin, Q., & Yuan, H. 2008. Corporate governance and the IPO share price. *The Economics,* 8: 249–270.
- Karamanou, I., & Vafeas, N. 2005. The association between corporate boards, audit committees, and management earnings forecasts: an empirical analysis. *Journal of Accounting Research,* 43(3): 453–486.
- Klein, A. 2002. Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics,* 33(3): 375–400.
- La Porta, R., Lopez-de-Silages, F., Shleifer, A., & Vishny, R. 1998. Law and finance. *Journal of Political Economy,* 106: 1113–1155.
- ———. 2000. Investor protection and corporate governance. *Journal of Financial Economics,* 58(1): 3–27.
- Li, S. 2010. Institutional environment, political connection and firm donation. *China Journal of Accounting Research,* 2: 161–178.
- Li, W., & Zhang, R. 2010. Corporate social responsibility, ownership structure, and political interference. *Journal of Business Ethics,* 96(4): 631–645.
- Li, Z. 2006. Corporate social responsibility and firm value. *China Industrial Economics,* 2: 77–83.
- Li, Z & Xiang, R. 2007. Study on content definition, measure methods and status quo of information disclosure on community responsibility in Chinese enterprises. *Accounting Research,* 7: 3–11.

- Lin, Li-Wen. 2010. Corporate social responsibility in China: window dressing or structural change? *Berkeley Journal of International Law*, 28(1): 64–70.
- Lipton, M., & Lorsch, J. W. 1992. A modest proposal for improved corporate governance. *The Business Lawyer*, 48(1): 59–77.
- Liu C., & Kong, X. 2006. Empirical study on corporate social responsibility disclosure. *Journal of Accounting Research* (China), 10: 36–43.
- L ó pez De Silanes, F., & La Porta, R., et al. 1998. Law and finance. *Journal of Political Economy*, 106: 1113–1155.
- Malone, D., Fries, C., & Jones, T. 1993. An empirical investigation of the extent of corporate financial disclosure in the oil and gas Industry. *Journal of Accounting, Auditing and Finance*, 8(3): 249–273.
- Mao, H., & Zhang, Z. 2009. The determinants of corporate social responsibility disclosure and its economic consequence. *Science Decisions*, 8: 87–94.
- Maury, B., & Pajuste, A. 2005.Multiple large shareholders and firm value. *Journal of Banking & Finance*, 29(7): 1813–1834.
- McKinnon J. L., & Dalimunthe, L. 1993. Voluntary disclosure of segment information by Australian diversified companies[J]. *Accounting &Finance*, 33(1): 33–50.
- Meng, X., Xiao, Z., & Qu, J. 2010. Corporate social responsibility disclosure and cost of capital-from perspective of information asymmetry. *Journal of Accounting Research* (China), 9: 25–29.
- Menz K. 2010. Corporate social responsibility: is it rewarded by the corporate bond market? a critical note. *Journal of Business Ethics*, 11:117–134
- Mitchell, J. D., Chia, C. W. L., & Loh, A. S. 1995. Voluntary disclosure of segment information: further Australian evidence[J]. *Accounting & Finance*, 35(2): 1–16.
- Nagar V., Nanda, D., & Wysocki, P. 2003. Discretionary disclosure and stock-based incentives[J]. *Journal of Accounting and Economics*, 34(1): 283–309.
- Pagano, M., & R ö ell, A. 1998. The choice of stock ownership structure: agency costs, monitoring, and the decision to go public. *The Quarterly Journal of Economics*, 113(1): 187–225.
- Peasnell, K. V., Pope, P. F., & Young, S. 1998. Outside directors, board effectiveness, and earnings management, University of Lancaster, working paper.

- ———. 2000. Accrual management to meet earnings targets: UK evidence pre-and post-Cadbury. *The British Accounting Review,* 32(4): 415–445.
- Raffournier, B. 1995. The determinants of voluntary financial disclosure by Swiss listed companies. *European Accounting Review,* 4(2): 261–280.
- Sengupta, P. 2004. Disclosure timing: determinants of quarterly earnings release dates. *Journal of Accounting and Public Policy,* 23(6): 457–482.
- Shen, H. 2006. Corporate features and corporate social responsibility: Evidence from china. Proceedings of Chinese Accounting Annual Conference, 580–664.
- ———. 2007. Firm character and corporate social responsibility disclosure-empirical evidence from China public firms. *Journal of Accounting Research* (China), 3: 9–16.
- Shen, H., & Jin, T. 2006. An empirical study on corporate social responsibility disclosure. *Journal of Audit and Economics Review,* 6: 84–87.
- Shen, Hongtao & Li, Yuxiaolu. 2010. The environmental information disclosure for heavy pollution industry. *Security Market Herald,* 6: 51–57.
- Shleifer, A., & Vishny, R. W. 1986.Large shareholders and corporate control. *The Journal of Political Economy,* 94(3): 461.
- Song, X., & Gong, M. 2007. Corporate social responsibility disclosure quality and value for decision making-based on financial reports. *Journal of Accounting Research* (China), 3: 37–43.
- Su, W. & Wang, J. 2006. Earnings management and board features— from the panel data prospective. *World Economic Papers*, 06:56–68.
- Tang, Y., Li, W., & Xie, R. 2006. Blockholders counterbalance, information asymmetry and external auditing constraints: evidences from
- Chinese listed companies from 2001 to 2004. *Auditing Research,* 05: 33–39.
- Volpin, P. F. 2002. Governance with poor investor protection: evidence from top executive turnover in Italy. *Journal of Financial Economics,* 64(1): 61–90.
- Wang, C., Lin, H., & Yu. 2013. Political connection, government intervention and corporate social responsibility disclosure. *Journal of Shanxi*
- *Finance and Economics University* 35(2): 72–82.

- Wang, H., & Qian, C. 2011. Corporate philanthropy and corporate financial performance: the roles of stakeholder response and political access. *The Academy of Management Journal*, 54(6): 1159–1181.
- Wang J. 2007. Corporate governance, earning management motives and reversal of value decline of long-lived assets—an empirical evidence from china's securities markets. Accounting Research, 2007, 05: 60–96
- ———. 2008. Environment information disclosure, industry difference and institutional pressure. *Journal of Accounting Research* (China), 6: 54–64.
- Wang, J. & Zhang, Q. 2007. An Empirical Research Between Corporate Governance and Disclosure Transparency, *Journal of Shanxi Finance and Economics University*, 02: 70–74.
- Wang K. & Claiborne, M. C. 2008. Determinants and consequences of voluntary disclosure in an emerging market: evidence from China[J].
- *Journal of International Accounting, Auditing and Taxation,* 17(1): 14–30.
- Warfield, T. D., Wild, J. J., & Wild, K. L. 1995. Managerial ownership, accounting choices, and informativeness of earnings. *Journal of Accounting and Economics,* 20(1): 61–91.
- Wen, S., & Fang, Y. 2008.Corporate social responsibility and firm performance. *China Industrial Economics,* 10: 150–160.
- Williamson, O. E. 1985. The modern corporation: origins, evolution, attribute. *Journal of Economic Literature,* 91(10): 1537–1568.
- Wu, Q. & Wang, P. 2007. Quality of company earnings: an investigation into micro-governance effect of board—evidence from the forced change for independent director institution, *Application of Statistics and Management,* 01: 30–40.
- Yermack, D. 1996. Higher market valuation of companies with a small board of directors. *Journal of Financial Economics,* 40(2): 185–211.
- Xiao, Z., & Yang, J. 2011. The impact of corporate governance on firm's corporate social responsibility, *Security Market News.* August 2.
- Xie, B., Davidson, W. N., III, & DaDalt, P. J. 2003. Earnings management and corporate governance: the role of the board and the audit committee. *Journal of Corporate Finance,* 9(3): 295–316.

- Xu, L., Xin, Y., & Chen, G. 2006. Ownership concentration, outside blockholders, and operating performance: evidence from China's listed companies. *Economic Research Journal* (1): 90–100.
- Yang, Q., Zhang, Y., & Zhang, L. 2008. An empirical study on board characters and earnings management: empirical evidence from Chinese listed companies. *China Soft Science,* 11: 133–140.
- Yu, Nutao. 2009. Corporate governance and earnings management (Chinese), Southwest Communication University, working paper.
- Zhang, C. & Wei, L. 2009. Disclosure, information intermediary and over-investment. *Accounting Research* 1. 1: 60–66.
- Zhang, Z., Liu, X., & Zhang, Q. 2009. Corporate social responsibility disclosure and financial management reform—based on stakeholder theory. *Journal of Accounting Research* (China), 3: 54–59.
- Zhang, Z., Liang, Z., & Yin, K. 2012. Research on Corporate Social Responsibility from the stakeholder perspective. *China Soft Science:* 139–146
- Zhao J. & Yu, Z. 2005. Can check-and-balance ownership structure improve firms' operating performance? *Accounting Research,* 12: 59–96.
- Zhu, S. 2011. Corporate social responsibility, market evaluation and accruals. *Journal of Accounting Research* (China), 11: 27–34.

# HOW CHINA'S SMALL AND MICROTECHNOLOGY ENTERPRISES' NETWORK EMBEDDEDNESS IMPACTS PERFORMANCE: THE MEDIATED EFFECTOF ENTREPRENEURIAL OPPORTUNITY

## 1 Introduction

Entrepreneurship is regarded as a process of opportunity, discovery, and alertness. In dynamic contexts, the enterprise or enterprisingindividuals need to make a proactive action on promising entrepreneurialopportunities. Shane and Venkataraman (2000) state thatentrepreneurship "involves the processes of discovery evaluation, and exploitation of profitable opportunities," thus, entrepreneurshipcan be considered a series of activities that include identifyingopportunity; assessing and exploring; and delivering new products, services, governance structure, marketing methods, procedures, andmaterials to clients or markets that have not existed before.

High-technology entrepreneurship is a prominent process of newtechnology commercializing in uncertain high-technology industries, thus the experts' market competence, employees' perception ofnew technology, and technological capabilities are critical to new orhigh-technology venturing firms, especially the nascent technologyenterprises. In the funding phase, lack of key resources and abilitymake it hard to survive in the market. However, embedding inan industrial network can be critical to the success of small andmicrotechnology enterprises. Access to the network can help withobtaining 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 samenetwork and are exploring the new market, which involves sharingnew technology knowledge, capabilities, and market information.

Working with others can help the small and microtechnology enterprisecut down on transaction costs. Third, the industrial networkcan attract plenty of technological expertise and high-technologicalventuring 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 thatthe technological small spin-offs' starting-up process at UC Berkeleyand Stanford were impacted saliently by the embedding networkenvironment.

In a “surplus economy,” innovation and entrepreneurial capability are vital for the enterprise’s survival (Kornai, 1986). Entrepreneurshipin small and microtechnology enterprises strives to make more andmore obvious contributions to emerging industry formation anddevelopment and regional industry upgrading. Contrary to largeenterprises that rely on scarce resources and the government’s “softbudget constraint” to win competitive advantage, the small and microtechnology enterprises embedded in industrial network canfully explore their own core resources, absorbing different kindsfrom the network to exploit opportunity and carry out technologicalentrepreneurship. According to the Third Plenum of 18th CPCCentral Committee the allocation of resources plays a decisive rolein the market. It will provide good policy guidance for the small andmicrotechnology enterprises to gain competitive advantage by developingnew models and exploring entrepreneurial opportunities.

In the United States, many of the well-known large enterprisesin the information technology industry, such as Microsoft, Intel, Apple, and Facebook, are expanding from the science and technologysmall and micro-enterprise the number of small and microtechnologyenterprises account for more than 50 percent of the total, and the quantity of small and microtechnology enterprise increases2 percent per year, contributing about 20 percent of US gross domesticproduction. The GEM2011 survey data unveiled that in “productinnovation” 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 anddevelop entrepreneurial opportunities in small and micro-enterprisesis not fully tapped and released, therefore, the new model ofidentifying and exploiting entrepreneurial opportunities for China’ssmall and microtechnology enterprise can make a quick technologytransferring, technological innovation and implementation of “innovation driven” the national strategy. In this study, we will drawinsightful, practical implication from these research questions oftechnological 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 onentrepreneurship that the concept of opportunity be introducedinto entrepreneurship; it helps the academics who consider businessventuring as an

"opportunity identification, development, andexploration" process (Stevenson & Gumpert, 1985). Similar withother core concept of entrepreneurial management theory such asroutine and ability, entrepreneurial opportunities can be regardedas a black box, although previous literature makes "opportunity" a preliminary classification for "discovered, created, and imaginedopportunity" (Kirzner, 1997; Foss, Klein, Kor, & Joseph, 2008; Klein, 2008), which triggers the dispute regarding whether the conceptof entrepreneurial opportunities is subjective or objective, latentor cognitive. Thus, the unit of choice in the analysis of entrepreneurialopportunities is controversial: some scholars believe that "theprocess of identifying opportunities" should be treated as the unitof analysis, but obviously the opportunity is not equally appealingto all entrepreneurs (Dimov, 2010), and opportunity judgments aremade by relating personal entrepreneurial experience and previousknowledge, which indicates the subjective nature of opportunitypursuit. Other scholars insist that the entrepreneur who identifiesopportunity should be the unit of analysis; a few scholars underlinethe latent trait of opportunity concepts, thus entrepreneurial actioncan be treated as a proxy unit of analysis. Because of the inconsistencyof entrepreneurial opportunity cognition, more and moreentrepreneurs will be inevitably confused by the market and unable to effectively forecast the risks in the field of high-tech venturing andalso will not make relatively precise strategic decisions and reasoning.

Therefore, to understand the characteristics of entrepreneurialopportunities, the focus of research should be based on the perspectiveselection of entrepreneurial opportunity.

Since the 2000s, China's domestic scholars, such as ZhangShujun and Li Xinchun (2011), also focused on "entrepreneurialopportunities" research, initiating that small and micro nascententerprises that lacked resources pushed enterprises to make growthstrategy using two dimensions: technology factor and productmarket. Yang Jing and Wang Chongming (2012) elaborated thatmost entrepreneurial opportunity research to date has addressed "objective and subjective integration perspective, constructive perspective," although throughout China and abroad, literature onentrepreneurial opportunity argued that few scholars developeda network embeddedness perspective to explore entrepreneurialopportunities. The present domestic and foreign inquiry into entrepreneurialopportunity made assertion that in this area of researchmainly

concentrated on three different perspectives: objective discoveryand cognitive perspective; creation subjective perspective; and entrepreneurial action integration perspective. Although theprior studies provide a system of perspective for entrepreneurialopportunity, these research perspective for the study of the systemof entrepreneurial opportunity lay a solid foundation for the scholarswho have not formed a consensus regarding the different perspectives.

In respect to research methods, a good deal of theoreticalwork adopted the qualitative analysis method; the findings basedon this method, however, theorized about inductive logic and tooksome conclusions from special case study, obviously lacking theuniversality of real applications, thus the theory was unable to helpdifferent types of enterprises effectively identify and seize entrepreneurialopportunities. In other words, most studies in entrepreneurialopportunities explained what "opportunity" is but rarelyfocused on how and why diverse types of entrepreneurial opportunitiesimpacted entrepreneurial outcomes. Therefore, in response, based on the network embeddedness perspective, this study willdivide entrepreneurial opportunities into three types "discovery, creation, and imagine opportunities" to explore and develop the relationship linking the entrepreneurial opportunities to entrepreneurialperformance.

### .2.1 Network Embeddedness, Entrepreneurial Opportunities, and Entrepreneurial Performance

For market transaction, any individual or enterprise prefers to makea deal with another person or corporation who has a good reputation.

Uzzi (1999) contends that the likelihood of a resource exchangebetween two market actors depends on the quality of their mutualtrust and their relationship; the ties existing in the entrepreneurialnetwork shows that entrepreneurs do not have confidence in theclaims of new institutional economics, through which the actorshave adopted its system design and the implicit contract of "universalethics" to regulate business behaviors and strengthen the antifraudfunction of ties. Network embeddedness emphasizes that thestrength of the network relationship (or structural relationship) canform trust and prevent fraud. Bringing the network embeddednessperspective into the entrepreneurship research field, scholars haveadvocated that entrepreneurs are embedding in a social network, which plays a critical role in the entrepreneurial process; however, the relationship among network embeddedness, identification

ofentrepreneurial opportunities, and entrepreneurial performance isremaining underexplored. Therefore, the major task of this studyis to examine how these three main constructs are associated witheach other.

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

Faced with increasingly fierce global competition, the science andtechnological small and micro-enterprise can't survive individualcombat and grow behind closed doors without external resourceexchange. The requirements of diverse cooperation within theentrepreneurial networks increases from the firm's inception, andit strengthens interpersonal and interorganizational relationshipsbetween entrepreneurs. The mutual trust and cooperation are necessityfor the small and micro-enterprises to enhance their competitiveand cooperative ability. Embedded in the entrepreneurial network, these enterprises can share social capital, financial resource, innovativetechnology, and fine-grained information, even though theyare legally independent enterprises, in order to promote technologyinnovation and product development. Evidently, scholars cannotensure that being embedded in an entrepreneurial network will promoteperformance improvement or technology innovation in smalland micro-enterprises., although the existing literature contendsthat strategic networking can enhance the enterprise's competition'sability and the entrepreneurial performance of small- and mediumsizedenterprises from different perspectives. Unfortunately, theentrepreneurs are reluctant to face the practical question: how doesthe strength of entrepreneurial network embeddedness promoteentrepreneurial performance and why will the strength change duringdifferent enterprise locations? Having no answer to these problems in previous entrepreneurial research, this study puts forwardthe following hypothesis:

H1: the network embeddedness of the science and technologicalsmall micro-enterprise will positively impact technological entrepreneurialperformance (financial performance and innovativeperformance).

H1a: the embedded network size of the science and technologicalsmall micro-enterprise will affect technological entrepreneurialperformance.

H1b: the network embeddedness strength of the science and technologicalsmall micro-enterprise will impact technological entrepreneurialperformance.

H1c: the heterogeneity of the science and technological small microenterprisewill impact technological entrepreneurial performance.

*How Network Embeddedness Impacts on the Typesof Entrepreneurial Opportunities*

The entrepreneurial network in which the individuals of technologyentrepreneurship or technological ventures embedded is regardedas an important resource of many new creative ideas and profitableopportunities. Hills et al. (1997) found that over 50 percent ofentrepreneurs 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 venturingorganizations (Aldrich & Martinez, 2001). Evidently, knowledgeand information are two critical variables associated with theentrepreneurial network. Coleman (1988) advocated that a strongtie with a network can help the actors access a broad network ofresources and encourage mutual cooperation and trust; thus, thestrong tie with an external or entrepreneurial network is a long-termrelationship, in which the entrepreneurs' embeddedness will obtainmore market information of products and services, and this will assistthe entrepreneurs in improving the capability of exploiting entrepreneurialopportunity. Contrary to Coleman (1988), other scholarscontend that weak ties with external network resources could relievethe negative effect of intimacy network resources inertia and allowthe actor or entrepreneur access to diverse resources through differentchannels. Obviously, relative to the networks in which the entrepreneursare embedded, both the weak and strong ties, are helpfulin the process of technology venturing and starting-up. Hence, forscience and technological small and micro-enterprises, the degree ofnetwork embeddedness, the size of network, and the heterogeneity

of network will affect their entrepreneurial opportunity exploringand technological entrepreneurship performance? Therefore, thisstudy puts forward the following hypothesis:

H2: the network embeddedness of the science and technologicalsmall micro-enterprise have a positive effect on the entrepreneurialopportunity identification.

H2a: the size of network embeddedness has a positive impact ont he entrepreneurial opportunity type.

H2b: the strength of network embeddedness has a positive impacton the entrepreneurial opportunity type.

H2c: the heterogeneity of network embeddedness has a positiveimpact on the entrepreneurial opportunity type.

*The Mediating Role of Entrepreneurial Opportunities*

Economic resource exchange between two actors will take the previoussocial 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 anddevelopment. These help us to make a further supposition that theopportunity discovery relies on prior knowledge and information.

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

Then, after successfully identifying available technical entrepreneurialopportunities, useful resources, and a rational justification of opportunities, how does networks embeddedness impact theenterprise's technological entrepreneurship performance? In thisstudy, we need to figure out how the science and technological smalland micro-enterprise's network embeddedness affect opportunitydiscovery? How does an entrepreneur effectively obtain resources toimprove the technological and entrepreneurial performance, especiallythe scale of network embeddedness, the strength of embedding (strong tie or weak tie), and how the network characteristicsaffect the entrepreneurial opportunity identification and how theabove factors ultimately affect the enterprise's technological entrepreneurshipperformance? Thus, this study puts forward the followinghypothesis:

H3: entrepreneurial opportunities play a mediating role in the scienceand technological small micro-enterprise's network embeddednessand technological entrepreneurship performance.

H3a: discovery opportunities play a mediating effect in the scienceand technological small micro-enterprise's network embeddednessand technological entrepreneurship performance;

H3b: Creation opportunity have a mediating effect in the scienceand technological small micro-enterprise's network embeddednessand technological entrepreneurship performance;

H3c: Imagination opportunity plays a mediating role in the scienceand technological small micro-enterprise's network embeddednessand technological entrepreneurship performance.

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

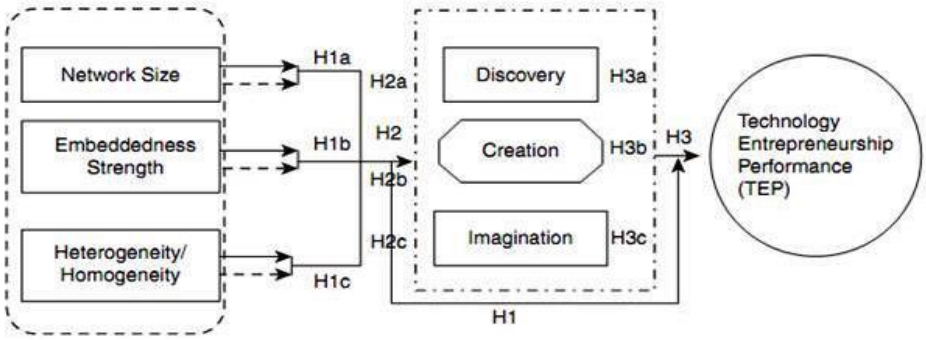


**Figure .1** The conceptual framework.

**.3 Research Design**

**.3.1 The Research Sample**

In this study, according to the "conditions and methods of nationalhigh 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 smalland micro-enterprise is defined as "a technology company, it isexploring height ratio of high-tech human resource and technologyresources (depending on its patents or unique inventions; employingmore than 30% of the total staff; annual technical product developmentfunds not be less than 3%) which engages in new technologyproduct research, development, production and service with a certainsize (its

number of workers is no more than 100).” However, thisstudy mainly draws samples from the Center of China Ministry ofScience and Technology’s Technical Innovation Project Fund website, which publishes annual assisting 2012 technological innovationresearch object for the enterprise of science and technology smallandmedium-sized enterprises.

Our investigation started from March 2013, and endedSeptember2012. We sent a total of 1,000 questionnaires to 800high-tech small and micro-enterprises, which were released bythe Ministry of Science and Technology and 350 university spinoffcompanies. This study finally collected 412 valid questionnaires (including 201 recovery from the Ministry of Science andTechnology and 211 samples from university spin-off companies).

Due to the high communication costs, using typical business

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

| *Industry* | *Number* | *Percentage (%)* | *Year* | *Num(%)* | *Region* | *Num(%)* |
|---|---|---|---|---|---|---|
| Machinery | 27 | 6.6 | 1–5 | 134 (32.5) | **North** | 77 (18.7) |
| Electro & Info | 180 | 43.7 | 6–10 | 123 (29.9) | **North-e** | 40 (9.7) |
| Bio & Medic | 114 | 27.7 | 11–20 | 128 (31.1) | **South-e** | 21 (5.1) |
| Agri. | 18 | 4.4 | above20 | 27 (6.6) | **South** | 74 (18.0) |
| Man & Cons | 23 | 5.6 | Total | 412 (100) | **East** | 81 (19.6) |
| Others | 50 | 12.1 | | | **South-w** | 25 (6.1) |
| Total | 412 | 100 | | | **Central** | 94 (22.8) |
| Size (staff) | <=5 | 6–10 | 11–20 | 21–50 | >50<100 | Total |
| Number of firm | 92 | 120 | 80 | 48 | 72 | 412 |
| Percentage (%) | 22.3 | 29.1 | 19.4 | 11.7 | 17.5 | 100 |

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

telephone interview and friends’ introduction, the total drawn backsamples are 490 (total recovery rate was 49%), with a total efficiencyrate of 84.1 percent (due to the design of the questionnaire and theprofessional website’s unique function, if the questionnaire was not complete or had incomplete data, the applicant couldn’t submit thequestionnaire, which helped us obtain high-quality questionnairesby excluding duplicate IP address samples). The research sample distributionis shown in Table .1

### .3.2 Measurement and Methods

*Network Embeddedness*

Prior academic research always divided network embeddedness intothree usual dimensions: structural embeddedness, relational embeddedness, and cognitive embeddedness. Based on measurement methodsof Tsai (2001) and Muthusamy and White (2005), we mainlyadopted the following alternative variables to measure networkembeddedness and its main three dimensions: network embeddednessscale (tightness); network embeddedness strength (strength); nature of network (heterogeneity/homogeneity). The number ofembedded networks is used to compute the main number of scienceand technological enterprises cooperating with embedding in thenetwork 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)

| *Variables* | *Dimensions* | *Items* |
|---|---|---|
| Network embeddedness (KMO = 0.672 Chi-Square = 606.451) | Tightness | Number of partners in start-up step (Emb1-factor load value = 0.899) |
| | Strength | How many times contact with partner per month? (Emb2-factor load value=0.866)<br>How long the relationship lasting for between firm and main partner? (Emb3-factor load value = 0.835)<br>How to evaluate the tightness of partnership (Emb4-factor load value = 0.823) |
| | Heterogeneity | What's the type of the partnership during the entrepreneurship? (Emb5-factor load value = 0.770)<br>How many partners its distance to the firm over 30 minutes driving (Emb6-factor load value = 0.861) |
| Entrepreneur opportunity (KMO = 0.770 Chi-Square = 642.33) | Discovery | We can find the unsatisfied requirement in the market quickly (Opp1-factor load value = 0.873)<br>We can find the unexploited resources in the market (Opp2-factor load value = 0.730) |
| | Creation | In the procedure of entrepreneurship? we can discover and explore good opportunity (Opp3-factor load value = 0.597)<br>Only when the entrepreneurs experienced and struggled for many years, can the entrepreneurial opportunity be identified (Opp4-factor load value = 0.874) |
| | Imagination | Although entrepreneurs lacking some experience in the Industry, we also can exploit many good entrepreneurial opportunities. (Opp5-factor load value = 0.805)<br>Although there are no ties among the opportunities, we also can exploit it. (Opp6-factor load value = 0.893) |
| Performance of technical entrepreneurship (KMO = 0.730 Chi-Square = 338.733) | Finacial Performance | The growth rate of employees in the firm from 2009 to (Tep1-factor load value = 0.880)<br>The net revenue of firm (net revenue /sales*%) (Tep2-factor load value = 0.704) |
| | Innovation Performance | The percentage of revenue that contributed by the firm's own intellectual rights in the total sales (Tep3-factor load value = 0.542)<br>The percentage of new products or services in the total sales (Tep4-factor load value = 0.935) |

strength network embeddness, which should have affected acomprehensive survey that how many times the enterprises makea face-to-face communication, the duration of tight relationship,how the technology enterprise makes an evaluation of the degreeof cooperation with the other partners; the nature of embeddingnetwork is mainly measured by two indicators: one is based on thenetwork embeddedness of enterprises and technological entrepreneurshipin selecting different type of partners, and another variableis "how many the tight partner whose distance is over 30 minutesdriving from the nascent entrepreneurial company in the beginningphrase?"

$$\left[\frac{\sum_{i=1}^{n} f_i + \sum_{i=1}^{n} d_i + \sum_{i=1}^{n} a_i}{3n}\right] \Big/ 3$$ (Soetanto & Geenhuizen, 2010)

(The details are shown in Table .2).

*Entrepreneurial Opportunity*

At present, there is no consensus for the measurement scale forentrepreneurial opportunities, however, some academics such asTimmons tried to organize a scale that included eight parts, industryand market, feedback ability, economic factors, competitive advantage, management team, fatal flaws yes or no, entrepreneurshiptraits, and strategic distinction, and other fifty-three indicators toevaluate the opportunities. Based on Timmons' study, Haitao Chenand Li Cai (2008) adopted the clustering analysis method to exploittwo dimensions (profitability and feasibility) and six sub-dimensionsof entrepreneurial opportunity model; Li and Chen adopted twodimensions of opportunities consisting of "the opportunity of enteringthe market" and "the opportunity to declare new products andservices." Learning from the Klein's measurement and the aforementionedscholars' scale, this study takes three dimensions and six itemsto measure the different types of entrepreneurial opportunity: discoveryopportunity, creation opportunity, and imagination opportunity.

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

*Technological Entrepreneurial Performance*

As a technology venturing enterprise, it's established and growth is ahigh risk and resource-consuming process, especially for some nascenttechnology startups own very limited management and financialresources in most cases; therefore, they are especially vulnerable inthe technology venturing process and so easy failed in the early phaseas a minimization problem. Li and Atuahene-Gima (2001) contendthat the technological entrepreneurial performance refers to financialperformance and market performance, which are made up of five financial indicators

and four market indicators. However, dueto a high correlation between the nine indexes, nine indicators areintegrated into only one indicator. Based on the above view, in thisstudy, 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 ofinnovation and growth performance; all items also use the 5-Likertscore 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 takethe following steps: first, we will use the pre-investigation data ofeach measure test items, and drop out the measure item which ownCrossing Loading, according to the Churchill and Peter (1984) recommendations, we make a judgment on the main variables reliabilityif it verified by Cronbach's $\alpha$coefficient.

Judging by the test results in Table 6.3 , the network embeddednessscale reliability coefficient Cronbach $\alpha$= 0.594, and its various dimensions,which are numeric types temporarily unable to obtain reliabilitycoefficient; the entrepreneurial opportunity reliability coefficientCronbach $\alpha$= 0.784, and the reliability coefficient of three dimensions are between 0.600–0.753; the technological entrepreneurshipperformance reliability coefficient Cronbach $\alpha$= 0.726, reliabilitycoefficient of the two dimensions were 0.582 and 0.599. The reliabilitycoefficient 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 entrepreneurshipperformance by the validity of convergent validity and discriminationvalidity, respectively. First step, determine the convergent validity, mainly according to the criteria of Fornell and Larker (1981) thatmeasurement items loading factor

value to latent variable are greaterthan 0.5 (Sig. < 0.05) and the average value of extraction (AVE) ofeach latent variable makes a judgment if it is greater than the 0.50.

Table 6.3 shows that factor loading of each measurement items isbetween 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 performanceAVE 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 followingtwo steps: first, each of the two constructs' correlation coefficientsshould be less than 0.85; second, the AVE value of constructitself must be greater than the correlation coefficient square value

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

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

of the construct. In the main structure of the calculation of mean, standard deviation, and the concept of correlation coefficients, andconstruct AVE value shown in Table 6.3, above, value indicates thatthis 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 themain dimensions of network embeddedness on technological andentrepreneurial performance. Network embeddedness and its main dimensions for direct regression technology entrepreneurial performanceresults show that network embeddedness has a positive effecton entrepreneurial performance (=0.348, $p < 0.01$) (Table 6.4). One of the sub-dimensions of embedded network scale and the embeddednetwork characteristics (=0.202, $p < 0.05$; =0.069, $p < 0.05$) also showed a positive effect on technological entrepreneurshipperformance, and network embeddedness for the effect of technologyentrepreneurship performance are not significant (= − 0.032, $p = 0.451$) (see Figure 6.2). Therefore, science and technologysmall and micro-enterprises for the network embeddedness hassignificant positive effect to enhance its technical entrepreneurial performance, theref ore, hypothesis H1 and H1a/H1c gains support, and and the hypothesis of H1b was not supported.

The mediating role of entrepreneurial opportunity between networkembeddedness and technology entrepreneurial performance oftechnology-based small microenterprise, the testing method is in linewith Baron and Kenny (1986). In **Table .4,** network embeddness

of discovery opportunities and creation opportunities have had apositive effect (=0.06, p<0.05; =0.08 p<0.05;, =0.084, p<0.0,1); theH2 is supported, and the “embeddedness scale” has the effect ofpositive relation with entrepreneurial opportunities (regression coefficientfor =0.14 p<0.01), thus,the H2a is supported; the other twodimensions of entrepreneurial opportunity effects were not significant,thus, the H2b is not supported; and for the hypothesis of H2c,network embeddness has a significant positive effect on the imaginationopportunities (=0.09, p<0.05), the creation opportunity isnot significant, thus, the H2c gets partially support.

**Table .4** Multiple regression results

| *Item* | *Model 1* | *Model 2* | *Model 3* | *Model 4* | *Model 5* |
|---|---|---|---|---|---|
| *Dependant variables* | *Opportunity* | *Discovery* | *Creation* | *Imagination* | *Perf* |
| **Constant** | 3.09*** | 3.55*** | 2.86*** | 2.61*** | 2.36*** |
| **Control variables** | | | | | |
| Size | 0.03 | 0.05 | 0.01 | 0.05 | 0.06* |
| Industry 1 | −0.01 | 0.13 | −0.17 | 0.02 | −0.03 |
| Industry 2 | −0.11 | 0.01 | −0.09 | −0.18 | 0.38* |
| Industry 3 | −0.42 | −0.27 | −0.37* | −0.37 | 0.19 |
| Industry 4 | −0.18 | −0.49** | 0.11 | 0.41 | −0.23 |
| Industry 5 | 0.01 | −0.17 | −0.05 | −0.26 | −0.02 |
| **Independent variables** | | | | | |
| **Embed** | 0.06** | 0.08** | 0.084*** | 0.03 | 0.23*** |
| Tightness | 0.14*** | 0.12*** | 0.11*** | 0.18*** | −0.08** |
| Strength | −0.03 | −0.05 | −0.69 | 0.05 | 0.04 |
| Nature | −0.04 | −0.07** | −0.04 | 0.09** | 0.16*** |
| **Opportunity** | | | | | −0.37** |
| Discovery | | | | | 0.14* |
| Creation | | | | | −0.01 |
| Imagination | | | | | 0.12** |
| *F*-Value | 8.97*** | 6.797*** | 4.91*** | 7.32*** | 9.38*** |
| $\Delta R^2$ | 0.16 | 0.12 | 0.09 | 0.13 | 0.22 |

*Note*: ***$p < 0.001$, ** $p < 0.05$, *$p < 0.1$; Industry 1–5 refers to Tabel 6.1's five industries.

Bringing the relative parameters of Table .4 into formulas .1and .2, according to the formulas, after putting the entrepreneurialopportunity and main dimensions of variables into the regressionformula,, the effect of network embeddedness influence technologyentrepreneurship performance significantly change; first of all, the overall coefficient of network embeddedness decreased from 0.348to 0.23, for the positive role of network embeddedness scale, whichis 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 judgethat entrepreneurial opportunities play a significant mediating role

Between network embeddedness and technology entrepreneurshipperformance, therefore, assuming H3 and H3a/b/c are supported.

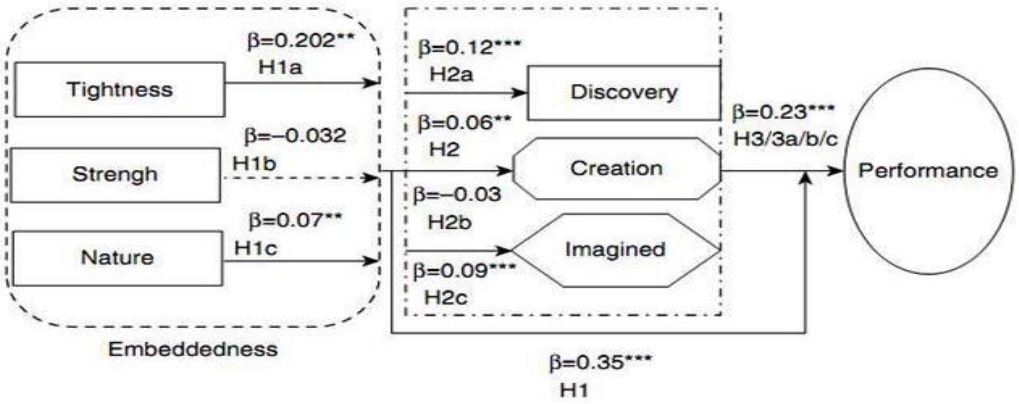


**Figure .2** The testing result.

$$Y_{TEP} = 2.329 + 0.348X_{EMB} + 0.202X_{EMB\_t} - 0.032X_{EMB\_s} + 0.069X_{EMB\_h} + \varepsilon_1 \quad (6.1)$$

$$Y_{TEP} = 2.36 + 0.23X_{EMB} - 0.08X_{EMB\_t} + 0.04X_{EMB\_s} + 0.16X_{EMB\_h} - 0.37M_{OPP} + 0.14M_{opp\_d} - 0.01M_{opp\_c} + 0.12M_{opp\_i} + \varepsilon_{31} \quad (6.2)$$

## 5 Findings and Implications

This study discusses the network embedding behavior of small andmicrotechnology enterprises, the mechanism between of entrepreneurialopportunities, and technological entpreneurial performance.

Entrepreneurial opportunities and network embeddedness have beendivided into multi-dimensions, according to the multiple regressiveanalysis, it is revealing that small and microtechnology enterprises'network embeddedness, network size, and network heterogeneityare conducive to enhancing the performance of technology entrepreneurship;

the major dimensions network embeddedness help smalland microtechnology enterprises identify and develop imaginationtype entrepreneurial opportunity. The main types of entrepreneurialopportunities are playing a significant mediating role between network embeddedness and technical entrepreneurial performance.

High-tech small and micro-enterprises in the technology businessprocess need to focus not just on the government's policy and financial support but also embedding in the industry and pay attentionto 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 thatsmall and microtechnology enterprises cannot simply protect theirown technological and commercial secrets by keeping distance withthe dynamic industry network, which can incubate more and morefantastic small and microtechnology enterprises, and these enterprisesare definitely not to keep up with the market's increasing customerdemandHigh-tech small and micro-enterprises continuously upgradetechnology entrepreneurial performance to get more businessopportunities through a network embedding and by identifying anddeveloping opportunities. Enterprise networks are often embeddedresources, bringing together a variety of unique and diverse informationand professionals, which will inspire more new ideas and opportunitiesand create an industry. From earlier empirical results, we cansee that high-tech small and micro-enterprises prefer to be embeddedinto large-scale enterprise networks and heterogeneous networksand are not concerned about the size of embedding degree, indicatingthat these companies realize the reality of the issue, namely thedevelopment of entrepreneurial opportunity to get together with lowbarriers to easily form an innovative project launched many othersmall and micro-enterprises. These businesses can immediately enterthe market and quickly saturate it, so companies cannot maintain alasting competitive advantage. Technology entrepreneurship is characterizedby high investment and high risk; the product may be new, but the market outlook may not be clear. This requires technologyentrepreneurs and start-ups to have the ability to recognize opportunityand have many different characteristics of different businessesand qualitative resources to help the enterprises to create, imagine, or seize new business opportunities.

This paper analyzes the high-tech small and micro-enterprisenetwork embedding performance impact on technology entrepreneurshipand entrepreneurial opportunities to discuss the effectof mediation. Of course, in this chapter, there are some deficiencies, such as in the measurement of key concepts, the need to furtherimprove and expand. Embedded in the network, for example, we mainly investigated the structure of such enterprises and the relationships embedding dimension. Subsequent studies also needto add a dimension to a comprehensive study of cognitive corporateemphasis 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 nothave to be considered. Future research also will need to consider thatpolicy and industrial factors within different locations will have animpact on the company's technology entrepreneurial performance.

**References**


- Aldrich, H. E., & Martinez, M. 2001. Many are called, but few are chosen: an evolutionary perspective for the study of entrepreneurship. *Entrepreneurship Theory and Practice*, 25(4), 41–56.
- Baron R M, Kenny D A. The moderator–mediator variable distinctionin social psychological research: Conceptual, strategic, and statistical considerations[J]. Journal of personality and social psychology, 1986, 51(6): 1173–1182.
- Chen, Haitao, Li Cai. 2008. Empirical study on entpreneurial opportunitydimensions, *Journal of Industry Technology Economics*, 27(2): 82–86.
- Churchill, Jr. G. A., & Peter J. P. 1984. Research design effects on the reliability of rating scales: a meta-analysis[J]. *Journal of Marketing Research*, 360–375.
- Danny P. Soetanto, & Van Geenhuizen, M. 2010. Social capital through networks: the case of university spin-off firms in different stages.
- Tijdschrift voor Economische en Sociale Geografie, 101(5) : 509–520.
- Dimov, D. 2010. Nascent entrepreneurs and venture emergence: opportunity confidence, human capital, and early planning. *Journal of Management Studies* 47, 1123–1153.
- Doz, Y. L., & Hamel, G. 1998.*Alliance advantage: the art of creating value through partnering.* Boston, MA: Harvard Business School Press.
- Fornell, C. & Larker, D. F.1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* , 18(1): 39–50.
- Foss, N. J., Klein, P. G., Kor, Y. Y., & Joseph T. M. 2008. Entrepreneurship, subjectivism, and the resource–based view: toward a new synthesis[J]. *Strategic Entrepreneurship Journal*, 2(1): 73–94.
- Granovetter. 1985. Economic action and social structure: the probelem of embeddedness[J]. *American Journal of Sociology* , 91(3): 481–510.

- Hills, G. E., G. T, Lumpkin, & R. P. Singh (1997). Opportunity recognition: Perceptions and behaviors of entrepreneurs.*Frontiers of Eentrepreneurship Research,* 17: 168–182.
- Kenney, M., & Richard, Goe W. 2004. The role of social embeddednessin professorial entrepreneurship: a comparison of electrical engineeringand computer science at UC Berkeley and Stanford[J]. *Research Policy, 33*(5): 691–707.
- Kirzner, I. M. 1997. Entrepreneurial discovery and the competitive marketprocess: an Austrian approach[J]. *Journal of economic Literature,* 35(1):60–85.
- Klein, P. G. 2008. Opportunity discovery, entrepreneurial action, and economic organization[J]. *Strategic Entrepreneurship Journal,* 2(3):175–190.
- Kornai, J. 1986. The soft budget constraint[J]. *Kyklos* , 39(1): 3–30.
- Liang Qiang, Zhang Shujun and Li Xinchun,2011, The Analysis on Tacticsand Implications of Nacent Disadvantage: Based on EntrepreneurialOpportunity, *Foreign Economics&Management* , 31(1):19–25.
- Li H., & Atuahene-Gima, K. 2001. Product innovation strategy andthe performance of new technology ventures in China[J]. *Academy ofManagement Journal,* 44(6): 1123–1134.
- Muthusamy, S.K. and M. A. White, (2005). Learning and knowledgetransfer in strategic alliances: a social exchange view. *OrganizationStudies* , 26 **:** 415–441.
- Stevenson, H. H., & Gumpert, D. E. 1985. The heart of entrepreneurship[J]. *Harvard Business* , (3–4): 85–93.
- Shane, S. & Venkataraman, S. 2000. The promise of entrepreneurship as afield of research. Academy of Management Review, 25(1) : 217–226.
- Tsai, W. 2001. Knowledge transfer in intraorganizational networks: effectsof network position and absorptive capacity on business unit innovationand performance[J]. *Academy of Management Journal,* 44(5):996–1004
- Uzzi, B. 1997. Social structure and competition in interfirm networks: theparadox of embeddedness [J]. *Administrative Science Quarterly,* 42(1):35–67.
- Uzzi, B. 1999. Embeddedness in the making of financial capital: howsocial relations and networks benefit firms seeking financing. *AmericanSociological Review,* 64: 481–505.
- Yang Jing and Wang Chongming. 2012. The Leading Edge Study onEntrepreneurial Opportunity. *Foreign Economics & Management* , 34(5):9–17. N