Using HLM to Study the CSR Information Disclosure-the Evidence by Chinese Manufacturing Companies in China

Ziyu Chen

Postdoctoral Center, China Merchants Group Limited
[1]Taizi Rd, Shenzhen, China 518067

Abstract—In recent years, more and more businesses, academics, and others in China have promoted corporate social responsibility (CSR) as a necessary component of the country's sustainable development. However, in-depth studies of the CSR reporting practices of Chinese companies are still needed. Given China's size and regional diversity, we expect CSR reporting practices to be unevenly developed within the country as well. Using the Shanghai Stock Exchange to develop a sample of Chinese companies that issue CSR reports, this paper will contribute to the research on the variety of CSR reporting in each region and industry sector, which is not addressed in other previous literature in China. And at the aggregate level, we find that regional effect could strengthen the relationship between the ROE and CSR information disclosure by introducing the hierarchical linear model instead.

Keywords—*CSR; Regional Diversity; Variety of CSR reporting; HLM*

I. INTRODUCTION

In recent years, corporate social responsibility (CSR) reporting has been gaining ground in China under the pressure of the opening global market and multinational companies. In turn, China is rapidly becoming a key player in the global market, and what China does in the realm of CSR reporting will affect many companies around the world through the global supply chain. There have been many studies that try to identify the drivers of CSR reporting and practice, including those focused on corporate reputation, brand value, and financial performance [1-2]. Reputation is a very important signal to the public about a company's products, jobs, and strategies in a competitive market. As companies get bigger, preventing reputational damage is increasingly costly. So companies would like to reduce their risk through CSR practices such as CSR reporting. Bebbington et al. verified this argument that CSR reporting could be a part of the reputation risk management process, and companies choose to issue CSR reports in order to protect their reputation. They also find the linkage to the high quality of management strategies and sustained financial performance in the same study [3].

Despite the attention to CSR reporting by researchers and companies alike, in-depth studies of CSR reporting practices of Chinese companies are still not common. Relatively little CSR research has compared the differences of CSR reporting in each region in China. By doing so, when the CSR disclosure is used as a dependent variable, it is usually assumed to be homogenous and randomly distributed. However, corporations are embedded in multiple social environments, regional institutions, and even industries, so CSR reporting in China may vary among regions and industrial sectors and have some spatial patterns. Understanding variations in the CSR reporting across space will help to explain the geographic unevenness in terms of diffusion processes if there is some spatial pattern between two regions. Due to the regional variety of CSR information disclosure level, the hierarchical multiple modeling method will be introduced to capture the group level effect.

In general, this study will contribute to the literature on the nature and mechanisms of CSR practices in China, including potential sub-national variables. Due to the limitation of the OLS modeling, HLM will be introduced to capture the group level effect (province GDP per capita) to account for the shared variance in hierarchically structured data.

II. CSR DISCLOSURE VARIES FOR EACH REGION

China has one of the highest degrees of income inequality in the world after its dramatic economic growth since the beginning of economic reform in the 80s, and this widening income disparity is mainly between the coastal area and the interior regions. However, several evidences indicated that there is a positive relationship between degree of wealth and CSR reporting. For example, CSR certification like ISO 14001 in other economies are more likely to diffuse into a wealthier economy since there is a link between a country's level of economic development and the development of CSR performance [4-5]. It makes sense that higher levels of wealth per capita may provide more resources for the social and environmental initiatives. Also, consumers or employees will have more demands for CSR practice if they have higher levels of income [6]. As indicated above, due to the different regional economic development level according to the uneven distribution of GDP per capita and FDI in China, we expect that CSR reporting will vary among each region. The variance in CSR practice among regions will be investigated at three areas: the variation in the proportion of CSR disclosure, the variation in the extent of CSR disclosure, and the variation in the content of CSR disclosure.

A. *The variation in the proportion of CSR disclosure among regions*

Although the SSE has issued guidance on CSR disclosures, such disclosures are still voluntary. Of the 1092 listed companies that issued A-share stocks, 440 of them issued CSR reports in 2015. And there is a great variation in the proportion of CSR reporting among the provinces. Figure 1 highlights the provinces that have a high proportion of CSR reporting

companies. There are Yunnan, Beijing, Fujian, Tianjin, Qinghai, Guizhou, and among these provinces, half of them are from the Western region. On the other side, the lower proportion of CSR disclosure provinces are Ningxia, Tibet, Gansu, Hunan, Shanxi, and Heilongjiang, and among these provinces, more than half of them are from the same Western region. Thus, it is not hard to conclude that there is a great variation in the proportion of CSR reporting among provinces, and it does not totally depend on the regions where the companies are located.

Source: created with data from Shanghai stock Exchange

Fig. 1   CSR ratios by regions

B. *The variation in the extent of CSR disclosure among regions*

When investigating the extent of CSR disclosure for each listed company, it is difficult to measure the depth and quality of CSR reporting by simply counting the paragraphs or pages of the reports, especially since the CSR reporting styles are not uniform. For the purposes of this research, we are going to use an index created by a CSR rating agency named Hexun which located in Beijing since 1996. Table 1indicates that the Coastal

region has the highest average score which is 30.76, followed closely by Central area with 29.22. The Western area is at the minimal level with 21.12. Even though Coastal and Central regions seem to be a similar level, the penetration of CSR reporting among companies in some provinces is very low, so the individual score of one company could affect the average result significantly.

TABLE I   EXTENT OF CSR REPORTING ISSUED BY COMPANIES ON SSE BY REGIONS

Region/Score	>80	60-80	40-60	20-40	<20	Average
COASTAL REGION						
Beijing	0	17	8	51	18	32.98
Tianjin	0	1	1	6	3	28.28
Hebei	0	1	2	1	2	36.29
Liaoning	0	2	3	3	2	41.25
Shanghai	0	11	5	38	13	33.05
Zhejiang	0	6	3	16	7	31.31
Fujian	0	2	3	13	8	27.42
Guangxi	0	0	0	2	2	11.58
Jiangsu	0	2	21	5	0	28.93
Guangdong	0	4	2	19	2	33.81
Hainan	0	0	2	0	1	35.76
Shandong	0	1	3	9	7	28.48
Coastal total	**0**	**47**	**53**	**163**	**65**	**30.76**
CENTRAL REGION						
Inner Mongolia	0	1	0	0	2	29.75
Shanxi	0	0	1	2	4	22.10
Heilongjiang	0	1	1	0	2	37.67
Jilin	0	1	0	1	5	20.32
Anhui	0	3	1	3	7	28.44
Jiangxi	0	3	0	3	1	40.16
Henan	0	2	2	4	5	27.80
Hubei	0	1	0	5	3	23.13

Table I, cont						
Hunan	0	1	0	2	1	33.57
Central total	**0**	**13**	**5**	**20**	**30**	**29.22**
WESTERN REGION						
Chongqing	0	1	1	1	1	41.95
Sichuan	0	2	1	6	2	31.24
Guizhou	0	0	1	0	3	24.07
Yunan	0	1	1	2	5	22.31
Shanxi	0	0	0	1	3	15.17
Gansu	0	0	0	1	1	12.12
Qinghai	0	0	0	0	3	7.67
Ningxia	0	0	0	0	0	0
Tibet	0	0	0	0	0	0
Xinjiang	0	0	0	4	4	21.12
Western total	**0**	**4**	**4**	**15**	**22**	**17.57**

Sources: Hexun Stock website

In terms of distinguishing the extent and quality of CSR reporting, we categorize the CSR reporting score into five levels as done by previous studies, even though the previous classification used another rating system rather than Hexun's: (1) excellent-that is more than 80; (2) leader-that is, 60~80; (3) followers-that is 40~60; (4) beginners-that is 20~40; and (5) observers-that is less than 20 (Science, n.d.). As shown in Table 2, most companies in the Coastal region are at the beginners' level, while most companies in the Central and Western region are at the observers' level. Overall, the extent of CSR disclosure is relatively low, and it varies among regions.

TABLE II THE PROPORTION OF COMPANIES IN EACH PROVINCE FOR CSR ACTIVITIES

	% companies reporting employee responsibility	% companies reporting environment responsibility	% companies reporting shareholder responsibility	% companies reporting community involvement	% companies reporting supplier and customer responsibility
COASTAL REGION					
Beijing	100.00%	26.6%	100.0%	100.0%	26.6%
Tianjin	100.0%	18.2%	100.0%	100.0%	18.2%
Hebei	100.0%	50.0%	100.0%	100.0%	50.0%
Liaoning	100.0%	50.0%	100.0%	100.0%	50.0%
Shanghai	100.0%	23.9%	100.0%	100.0%	23.9%
Zhejiang	100.0%	28.1%	100.0%	100.0%	28.1%
Fujian	100.0%	19.2%	100.0%	100.0%	19.2%
Guangxi	100.0%	0.0%	100.0%	100.0%	0.0%
Jiangsu	100.0%	17.9%	100.0%	100.0%	17.9%
Guangdong	100.0%	22.2%	100.0%	100.0%	22.2%
Hainan	100.0%	66.7%	100.0%	100.0%	66.7%
Shandong	95.0%	20.0%	100.0%	100.0%	20.0%
Coastal average	**99.6%**	**28.6%**	**100.0%**	**100.0%**	**28.6%**
CENTRAL REGION					
Inner Mongo	100.0%	33.3%	100.0%	100.0%	33.3%
Shanxi	100.0%	14.3%	100.0%	100.0%	14.3%
Heilongjiang	100.0%	50.0%	100.0%	75.0%	50.0%
Jilin	100.0%	14.3%	100.0%	100.0%	14.3%
Anhui	100.0%	28.6%	100.0%	100.0%	28.6%
Jiangxi	100.0%	42.9%	100.0%	100.0%	42.9%
Henan	100.0%	30.8%	100.0%	100.0%	30.8%
Hubei	100.0%	11.1%	100.0%	100.0%	11.1%
Hunan	100.0%	25.0%	100.0%	100.0%	25.0%
Central average	**100.0%**	**27.8%**	**100.0%**	**97.2%**	**27.8%**
WESTERN REGION					
Chongqing	100.0%	50.0%	100.0%	100.0%	50.0%
Sichuan	100.0%	27.3%	100.0%	100.0%	27.3%
Guizhou	100.0%	25.0%	100.0%	100.0%	25.0%
Yunnan	100.0%	22.2%	100.0%	100.0%	22.2%
Shanxi	100.0%	0.0%	100.0%	100.0%	0.0%
Gansu	100.0%	0.0%	100.0%	100.0%	0.0%
Qinghai	100.0%	0.0%	100.0%	100.0%	0.0%
Ningxia	n/a	n/a	n/a	n/a	n/a
Tibet	n/a	n/a	n/a	n/a	n/a
Xinjiang	100.0%	0.0%	100.0%	100.0%	0.0%
Western average	**100.0%**	**15.6%**	**100.0%**	**100.0%**	**15.6%**

Sources: Hexun Stock website

C. The variation in the content of CSR disclosure among regions

In terms of specific content, Table 2 shows that almost all the companies report the issue of shareholder responsibilities, employee responsibilities and community involvement in very general terms, and there is no obvious difference among regions. However, in no region do more than a third of companies disclose the information of environmental and supplier and customer responsibility. The Western region, in particular, lags behind other regions for the issues of environmental responsibility and customer and supplier responsibility, for which only 15.6% of companies choose to make the disclosure. This result confirms the findings of previous studies that Chinese companies pay less attention to environmental disclosures.

D. Spatial dependency test on the extent and content of CSR reporting

Since CSR reporting varies among regions by proportion, extent, and content, we will next exam if there is a spatial autocorrelation between the extent and content of CSR reporting in each region. If there is a spatial autocorrelation, we could suggest that CSR information disclosure as a dependent variable is not homogenous but heterogeneous and it is relative to the nearby locations. Bansal also pointed out that CSR practice is very uncertain because of changing social expectations and complexity of social issues [7]. Thus, agents who were in a social context tended to use their own experience along with the experience of their neighbors to make their decision. Early papers in this literature were from Ellison and Fudenberg, they found out agents always base their decisions on the past experience of their peers[8].Information networks determined who shared information with whom, and they represented information sharing through direct social connection, such as friendships and business partners. If we assumed the information spreading through the social network, the most direct way would be by word of mouth communication. Feng and Seasholes created an epidemic model to explain this finding, showing that trading decisions over the quarter are correlated because investors who lived near each other pass information between themselves[9]. Audretsch and Feldman tested the influence of geographic location on innovative activity in different industries[10] and Jaffe, Trajtenberg and Henderson argued that knowledge spillovers are geographically localized. In the area of the effect of distance on portfolio choice[11], Coval & Moskowitz were the first to attempt to construct this test. They investigated whether investors have a preference for geographical proximity to choose their portfolio, and highlighted a new application for geography in the economy[12].As indicated above, CSR practice may be not only the behavior of an individual corporation but also influenced by the behavior of other corporations. Geography continues to play a key role in the domestic economy, even though the cost of transportation and communication declines in contemporary society. Thus, if there is an information network connecting to the corporations, then we assume that companies with geographic proximity may have similarities of CSR practices. In other words, geography may play a key role in the CSR reporting of companies in each region.

To be specific, in order to exam the spatial dependent for the extent of CSR reporting score, Moran' I will be the first to be tested. And a spatial weight matrix wij can be constructed based on the distance where listed companies with distance dij receive a weight that is inversely proportional to the distance and replaces the diagonal entries with zero. However, if an inverse distance measure is used, and distances are very short, then wij may become very large and distort Moran I. In this case, an adjustment for short distances can be used, usually scaling the distance to one mile. Moran's I method is one of the classic and most common ways of measuring the degree of spatial autocorrelation in areal data. It's a weighted correlation coefficient used to detect departures from spatial randomness, indicating spatial patterns like clusters. It assumes that values in different regions are spatially independent, and the observed values are assigned at random to locations. When there is no spatial autocorrelation, Moran I is close to zero, depending on sample size. When rates in nearby areas are similar, Moran's I will be large and positive. When rates are dissimilar, Moran's I will be negative. The model used is shown as follow:

$$I = \frac{m \sum_i^m \sum_j^m w_{ij}(y_i - y)(y_j - y)}{(\sum_i^m \sum_j^m w_{ij}) \sum_i^m (y_i - y)^2}$$

After calculating, Moran I equals -0.028 with a P-Value of 0.066, so it is not significant enough to reject H0, and we conclude that there is no spatial dependency between CSR reporting of companies.

Next, we will test if the geographic proximity will affect the content of CSR reporting of each company. Euclidean distance will be applied to measure the similarity of CSR reporting practices. We set each company's CSR profile as a vector with 5 dimensions, and five dimensions are the score of shareholders responsibility, employee responsibility, suppliers and consumer responsibility, environment responsibility and community involvement that each company got. Then we calculate the Euclidean distance between each two companies and finally generate the similarity matrix for all the companies. And the distance map will be used to visualize the Euclidean distance between two companies. Figure 2 plots the distance map between each company in three regions, we could see that there is no clear cluster between companies in the three regions. That means the content of CSR reports in the same region may not be similar to each other. Thus, even though there is no spatial autocorrelation between CSR reporting by each region, it is still possible to be affected by the regional level since there are varies between regions.
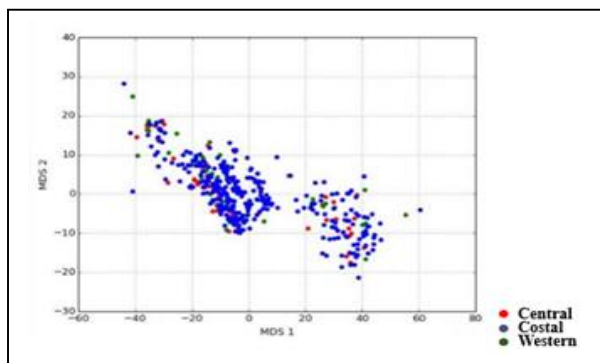
Fig. 2 Plotting similarity matrix between each company

III. SAMPLE AND METHODOLOGY

A. Sample

Companies that listed on the SSE and published their CSR reports are the main target study objects and the rationale for selecting listed companies as the target of the study is attributed

to the reason that most of them are blue chips SOE companies with great economic performance and influence. Moreover, they are more likely to disclose their social and environmental information due to the reliance on the financing from a variety of investors. Second, among of them, we obtained a total of 207 firms in manufacturing sector as the sample to avoid confounding effects from a large variety of industries [13], and scrutinized their most recent CSR reports dealing with shareholders responsibility, employee responsibility, supplier and consumer responsibility, environment responsibility and community involvement in the period of from January 2015 to December 2015. For the data source of dependent and independent data are mainly collected manually from the Hexun website, Cninfo website, and database of WIND.

For the dependent variable, in order to know their quality level of CSR information disclosure, we use the secondary data that was collected and evaluated by Hexun Stock website directly as mentioned before. For the independent variables, Table 3 summarizes the definition and measurement of independent variables used in this research.

TABLE III   VARIABLES USED FOR HLM REGRESSION

Driver	Variable	Measurement	Definition
Internal Factors	Revenue	Firm size	Log of total revenue
	Roe	Profitability	Net income/shareholders' equity
	Industry	Environmentally sensitive	Heavy pollution industry 1; otherwise 0
	SOE	Ownership type	State-owned enterprise 1; otherwise 0
	Dual	CEO Duality	Both CEO and Chairman 1; otherwise 0
	Directors	Board size of directors	Numbers of directors on board
	Supervisors	Supervisory board size	Numbers of supervisors on board
	BD	Board diversity	Ratio of women on board
External Factors	Subsidy	Government dependency	Subsidy /revenue
	Export	Globalization pressure	Export sales/revenue

B. Empirical methodology: Hierarchical Linear Modeling

The hierarchical levels of grouped data are a common phenomenon in social work, health, education and business studies, in this case, Hierarchical Linear Modeling as a statistical technique that accounts for the hierarchy will be used to apply the analysis of nested data structure [14]. Hierarchical Linear Modeling (HLM) is a complex form of ordinary least squares (OLS) regression, and it is used to generate a linear model that account for variations at each level when the independent variables are varying hierarchical levels [15].

As we hypothesis before, CSR information disclosure varied by the regions, and companies in the higher economic development regions tend to have a higher quality of CSRID, although the extent and content of CSRID have no obvious spatial autocorrelation. There are several indicators to compare the economic development level of each region, for example,

GDP, GDP per capita, and FDI in each province. However, here we think GDP per capita may better represent the distribution of the total GDP and measure the wealthy level of a province. Thus, we use GDP per capita as a group effect to distinct the province disparity of the economic development. Also, the major potential contribution of FDI is to lead to higher growth rather than contributing to poverty reduction [16]. So we will not consider using FDI to measure the regional wealth degree. Due to the nested data structure, companies within a particular region may tend to be more homogeneous. Based on this discussion, HLM model will be developed and tested in the following parts.

The basic concept behind HLM modeling is similar to that of OLS regression. On the individual level, the analysis is similar to that of OLS regression that the dependent variable is predicted as a linear function of independent variables:

$$Yij = \beta_{0j} + \beta_{1j}X_1 + \cdots \beta_{kj}X_k + r_{ij}$$

Where β_{0j} represents the intercept of group j, β_{1j} represents the slope of variable X_1 of group j, and r_{ij} represents the residual for individual i within group j.

Then on the group level, the individual level slopes and intercept become dependent variables, and be explained by group-level predictors:

$$\beta_{0j} = \tau_{00} + \tau_{01}W_1 + \cdots + \tau_{0k}W_k + u_{0j}$$

$$\beta_{1j} = \tau_{10} + \tau_{11}W_1 + \cdots + \tau_{1k}W_k + u_{1j}$$

Where τ_{00} and τ_{10} are intercepts, and τ_{01} and τ_{11} are slopes predicting β_{0j} and β_{1j} with independent variable W. Though this process, HLM model captures the effect of both individual and group characteristics on the outcome variables.

IV. RESULTS AND DISCUSSION

As a first step, a one-way analysis of variance (null model) is performed to confirm if there are any differences at the group level on the outcome variable. If the outcome variable is affected by the level 2 group, HLM model will be necessary to be applied. The models are constructed as below:

Level-1 Model:	CSRIDij = β0j + rij
Level-2 Model:	β0j = γ00 + u0j
Mixed Model:	CSRIDij = γ00 + u0j+ rij

The results of the null model test are shown in Table 4. From the Final Estimation of Variance Components table, the chi-square test χ2 equals 35.29 with P-value<0.1, which is statistically significant. So there is variance in the outcome variable by the level-2 grouping, and it supports the use of HLM.

TABLE IV   FINAL ESTIMATION OF VARIANCE COMPONENTS

Random Effect	Standard Deviation	Variance Component	d.f.	χ2	p-value
INTRCPT 1, u_0	2.66220	7.08732	25	35.2858	0.083
level-1, r	19.61907	384.90802			

Next, the intraclass correlation coefficient (ICC) can be calculated to determine what percentage of the variance in CSRID is attributable to the level-2 grouping. If the ICC is very low, the HLM analyses may not have different results from a traditional analysis. The equation of ICC calculation is shown as below:

$$ICC = \frac{\tau}{\sigma 2 + \tau}$$

Thus the ICC can be calculated using the variance σ2 in level 1 model and τ in level 2 model, which results in an ICC of 0.018. The result suggests that only 1.8% of the variance in CSRID is at the group level, so the group level effect may not be significant.

In the final step, HLM Model will be used to capture the interactions between the level 1 and level 2 predictor variables:

Level-1 Model:

Y = B0 + B1*(REVENUE) + B2*(ROE) + B3*(SOE) + B4*(INDUSTRY) + B5*(EXPORT) + B6*(DUAL) + B7*(DIRECTOR) + B8*(SUPERVIS) + B9*(BD) + B10*(SUBSIDY) + R

Level-2 Model:

B0 = G00 + G01*(GDP per capita) + U0

B1 = G10 + G11*(GDP per capita)

B2 = G20 + G21*(GDP per capita)

B3 = G30 + G31*(GDP per capita)

B4 = G40 + G41*(GDP per capita)

B5 = G50 + G51*(GDP per capita)

B6 = G60 + G61*(GDP per capita)

B7 = G70 + G71*(GDP per capita)

B8 = G80 + G81*(GDP per capita)

B9 = G90 + G91*(GDP per capita)

B10 = G100 + G101*(GDP per capita)

From Table 5, the cross level interaction between level 1 variables and province's GDP per capita data is not statistically significant, which means there is not a statistically significant linear relationship between province GDP per capita and firm-level factors. Except cross level interaction between ROE (profitability) and GDP per capita is significant with p value of 0.069. So higher GDP per capita in one region would have a positive influence on the strength of the relationship between profitability and quality of CSR information disclosure.

Moreover, at the individual level, the results show that profitability, environmentally sensitive industry, Supervisory board size, and globalization pressure are significant at the various levels to increase the quality of companies' CSR information disclosure. While the firm size, ownership type, CEO duality, board size of directors, board diversity, and government pressure have no significant effect on the CSR information disclosure.

TABLE V   FINAL ESTIMATION OF FIXED EFFECTS

Fixed Effect	Coefficient	Std.Error	T-ratio	P-value
For INTRCPT1, B0				
INTRCPT2, G00	25.473653	2.343982	10.868	0.000
GDP, G01	0.000099	0.000114	0.873	0.392
For REVENUE slope, B1				
INTRCPT2, G10	1.857819	3.175982	0.585	0.559
GDP, G11	-0.000026	0.000154	-0.169	0.866
For ROE slope, B2				
INTRCPT2, G20	0.790833	0.154010	5.135	0.000
GDP, G21	-0.000014	0.000008	-1.834	0.069
For SOE slope, B3				
INTRCPT2, G30	1.624589	3.762052	0.432	0.666
GDP, G31	-0.000039	0.000151	-0.259	0.796
For INDUSTRY slope, B4				
INTRCPT2, G40	6.431382	3.158644	2.036	0.044
GDP, G41	0.000086	0.000141	0.609	0.543
For Export slope, B5				
INTRCPT2, G50	26.594319	7.609925	3.495	0.001
GDP, G51	-0.000449	0.000327	-1.373	0.173
For DUAL slope, B6				
INTRCPT2, G60	-1.111327	4.605145	-0.241	0.810
GDP, G61	0.000078	0.000193	0.406	0.685
For Director slope, B7				
INTRCPT2, G70	0.597470	0.944810	0. 632	0.528
GDP, G71	0.000001	0.000058	0.025	0.980
For SUPERVIS slope, B8				
INTRCPT2, G80	-2.251931	1.347770	-1.671	0.097
GDP, G81	0.000037	0.000072	0.515	0.607
For BD slope, B9				
INTRCPT2, G90	-10.853954	10.506418	-1.033	0.304
GDP, G91	0.000124	0.000434	0.287	0.775
For SUBSIDY slope, B10				
INTRCPT2, G10	-292.517118	229.234457	-1.276	0.205
GDP, G101	0.005749	0.006698	0.858	0.393
R^2	0.47			

In terms of company characteristics factors, profitability (ROE) and Environmental sensitive (Industry) are significantly positively correlated with the CSR information disclosure quality (CSRID). The regression coefficient of profitability (ROE) on social responsibility information disclosure quality (CSRID) is 5.135 and is significant at 1% probability level, which shows that the profitability of a company is positively related to the quality of CSR disclosure. The regression coefficient of the industry is also positive and significant at 5% probability level, which shows that the environmentally sensitive industry has a significant influence on the quality of CSR disclosure information of Chinese listed companies. Because much more environmental information is mandated to disclose by the government for the companies having higher environmentally sensitivities. So they may tend to disclose more details than companies in non-heavy polluting industries.

In the aspect of corporate governance, the board size of supervisors is obviously negative related to the quality of corporate social responsibility information disclosure at the significant level of 0.1. It indicates that the increase in the size of the board of supervisors will decrease the quality of social responsibility information disclosure, and it is one of the surprising findings. Because the board of supervisors should improve the transparency of information disclosure to a certain extent, and ensure the authenticity and legality of information disclosure. However, one of the explanation to this contrary results could be attributed to the inefficiency of operation. In China, the size of the board of supervisors is generally small, and most of them are the employees of the companies without any authority. So the board of supervisors and directors of the listed company usually maintained the same attitude and did not make any evaluation and supervision on the decisions made by the board of directors [17].

For the external factors, we find that globalization pressure also affects the CSR information disclosure. Specifically, the coefficient of export is 3.495, which is significant at 1% probability level. It indicates that companies with more export sales may have the globalization pressure to follow the rules to disclose more CSR information.

However, the other six factors of firm size, ownership type, board diversity, CEO duality, board size of directors and government pressure were not found to be correlated. Surprising to us, we found whether the company is the ownership type of SOE or not does not affect the quality of reports, although we might have expected SOEs to be more likely to incorporate the social responsibility. This may not be the case under the current climate of SOEs having to be focused on profitability, or the sample companies we selected are all from SSE, so they are too big to tell the differences of CSR practices by their ownership attributes. Contrary to the argument that board diversity has a positive relationship with the strength disclosure of CSR information, we found that there is no relationship between board diversity and CSR information disclosure. One explanation is that the mere presence of a single female on board may not increase the sensitivity to CSR issues because their voice is hard to be heard. Again, the CEO duality or the board size of directors also have no effect on the CSR information disclosure since we support the corporate governance structure in China is not sufficient and efficient enough. Also, due to the inherent connection with the big companies listed on SSE, sample companies may not under pressure to build links with government or access to bank loans, so government pressure may not become an important factor to affect the disclosure of general CSR information. However, it may affect CSR performance at a specific area, for example, philanthropy. Thus, the following study will offer us a great opportunity to investigate the relationship between existing factors and different elements of CSR issues.

V. CONCLUSION

Corporate social responsibility reporting is an important way to gain the CSR information for the investors, consumers and other stakeholders. The trend of CSR reports issued by listed companies in China is moving to the direction of popularization and standardization, and it is no longer only for the foreign companies or industry monopolies. More and more listed companies in the different industry and ownership structures have participated in the practice of CSR reporting. However, although the quantity of CSR reports in China is increasing year by year, the overall quality is still relatively low for the listed companies on the board of Shanghai Stock Exchange. Especially for the aspects of the environment, customers and suppliers which are concerned by the stakeholders are still a lack of detailed and complete quantitative information disclosure.

And this study contributes to the research on the variety of CSR reporting in each region and industry sector, which is not addressed in other previous literature in China. At the aggregate level, we find that regional effect could strengthen the relationship between the ROE and CSR information disclosure by introducing the hierarchical linear model instead. But at the local scale, we reject the hypothesis that CSR information

disclosure has some spatial autocorrelation by calculating Moran I.

However, there are still some limitations of this research:

First, as we tested by Moran I, there is a little spatial dependency on the quality of CSR disclosure, which means what is observed at one point is determined by what happens near or around this point. In order to provide a more realistic test of how transnational flows of external pressures and neighborhood information influence the local CSR practice, the spatial lag model may work better to capture the spillover effect. Also in the future, more studies are expecting to do from geographers' perspectives, which we may rethink CSR as a cross-regional diffusion way. It means there is a need for researchers to explore the flows of information or knowledge spillover carried by the business trips, direct foreign investment and so on.

Second, if we study the uptake of CSR reporting in a region as a whole, the average of CSR score may not be appropriate. Because the number of companies issued CSR reports and the CSR score by an individual company in each region varies a lot. So it may not really reflect the level of CSR practice in each region. So another index of CSR measurement may be introduced to study, for example, ISO 14001 as one of the most popular voluntary environmental standards in the world.

REFERENCE

[1] G. Lenssen, Y. Blagov, D. Bevan, H. Chen, and X. Wang, "Corporate social responsibility and corporate financial performance in China: an empirical research from Chinese firms," Corp. Gov. Int. J. Bus. Soc., vol. 11, no. 4, pp. 361–370, 2011.

[2] X. Pan, J. Sha, H. Zhang, and W. Ke, "Relationship between corporate social responsibility and financial performance in the mineral Industry: Evidence from Chinese mineral firms," Sustainability, vol. 6, no. 7, pp. 4077–4101, 2014.

[3] J. Bebbington, C. Larrinaga-González, J. M. Moneva-Abadí, C. Larrinaga, and J. M. Moneva, Corporate social reporting and reputation risk management, vol. 21, no. 3. 2008.

[4] C. C. Baughn, N. L. D. Bodie, and J. C. Mcintosh, "Corporate Social and Environmental Responsibility in Asian Countries and Other Geographical Regions," vol. 205, pp. 189–205, 2007.

[5] R. Perkins and E. Neumayer, "Geographic variations in the early diffusion of corporate voluntary standards: Comparing ISO 14001 and the Global Compact," Environ. Plan. A, vol. 42, no. 2, pp. 347–365, 2010.

[6] W. T. Hung and B. Ramasamy, "A comparative analysis of corporation social responsibility awareness, Malaysian and Singaporean corporations," J. Corp. Citizsh., vol. 13, pp. 109–123, 2004.

[7] P. Bansal, "Evolving sustainably: A longitudinal study of corporate sustainable development," Strateg. Manag. J., vol. 26, no. 3, pp. 197–218, 2005.

[8] G. Ellison and D. Fudenberg, "Word-of-mouth communication and social learning," Q. J. Econ., pp. 93–125, 1995.

[9] L. Feng and M. S. Seasholes, "Correlated trading and location," J. Finance, vol. 59, no. 5, pp. 2117–2144, 2004.

[10] D. B. Audretsch and M. P. Feldman, "R&D spillovers and the geography of innovation and production," Am. Econ. Rev., vol. 86, no. 3, pp. 630–640, 1996.

[11] A. B. Jaffe, M. Trajtenberg, and R. Henderson, "Geographic localization of knowledge spillovers as evidenced by patent citations," Q. J. Econ., pp. 577–598, 1993.

[12] J. D. Coval and T. J. Moskowitz, "Home bias at home: Local equity preference in domestic portfolios," J. Finance, vol. 54, no. 6, pp. 2045–2073, 1999.

[13] K. M. Eisenhardt, "Building theories from case study research," Acad. Manag. Rev., vol. 14, no. 4, pp. 532–550, 1989.

[14] J. W. Osborne, "The advantages of hierarchical linear modeling." ERIC Clearinghouse on Assessment and Evaluation, University of Maryland, 2000.

[15] H. Woltman, A. Feldstain, J. C. MacKay, and M. Rocchi, "An introduction to hierarchical linear modeling," Tutor. Quant. Methods Psychol., vol. 8, no. 1, pp. 52–69, 2012.

[16] R. JENKINS, "Globalization, Corporate Social Responsibility and poverty," Int. Aff., vol. 81, no. 3, pp. 525–540, 2005.

[17] S. Li and X. Wu, "Earning management, audit opinion and board of supervisors," Audit Study, vol. 1, p. 4s–s4, 2003.