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Research on the impact of corporate social responsibility information disclosure and corporate innovation in China

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Abstract: China started to implement a new system in 2008, asking fractional companies to make public their corporate social responsibility information disclosure. The financial and corporate governance data of Chinese A-share listed businesses from 2007 to 2016 was gathered in order to determine any potential relationships between the mandated corporate social responsibility disclosure system and company patents. According to the two opposite hypotheses of the information hypothesis and reputation hypothesis, the results show that the number of patents of companies surveyed has increased significantly after the implement of the policy of mandatory CSR disclosure. Additionally, after company's patents are separated into invention type patents and utility models, industrial design (non-invention type) patents, invention type patents significantly increase in comparison. This means that the information hypothesis has been supported more. CSR disclosure can effectively alleviate the information asymmetry existed in the internal of the enterprise, increase shareholders' confidence, and reduce the problems of corporate financial restrictions. Several robustness tests have proved that the model and conclusions are both steady. This may provide a reference for the government to improve the mandatory disclosure policy further and help improve the capital market development in China.

Keywords: Corporate social responsibility, Information asymmetry, Information disclosure, Corporate innovation.

1. Introduction

Enterprise innovation is crucial to business management and is a major determinant of the direction, scope, and pace of an organization's growth [1]. Only enterprises with strong innovation can maintain their advantages in the fierce market competition [2]. However, the innovation of enterprises usually faces information asymmetry and agent problems. The interests of shareholders and managers of the company are inconsistent, leading to financial constraints on enterprise innovation [3].

Corporate social responsibility (CSR) disclosure refers to how an enterprise systematically delivers its ideas, tactics, and social responsibility methods [4]. Including the successes and shortcomings, stakeholders are informed of both the direct and indirect effects of its business activities on the economy, environment, society, and other sectors. In other words, a CSR report acts as a significant link between businesses and stakeholders as well as a crucial channel for the disclosure of non-financial information [5]. Financial information measures the enterprise's prior commercial

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actions in the form of money in the increasingly complex business environment. However, neither the opportunities nor the hazards that the company faces, nor the worth of the company, can be adequately reflected by this. This shortcoming is made up for by the non-financial information included in the corporate social responsibility report, and the two used together can provide a more accurate picture of the enterprise's financial future. Because of the pressure from investors, customers, and other stakeholders as well as the demands of internal operations, an increasing number of businesses are choosing to publish CSR reports.

China launched a new era of required CSR disclosure in the end of 2008 when the Stock Exchange in Shanghai and Shenzhen, as well as China Securities Regulatory Commission jointly issued a notice requiring some listed companies to disclose CSR reports. The number of businesses who make CSR information public keeps growing in the public eye. More than 600 corporate social responsibility reports were published by Chinese businesses in 2009, according to information from the RSD corporate social responsibility office (including reports published under corporate citizenship reports and sustainable development reports.).

Many academics have been interested in the financial effects of CSR disclosure. Existing literature indicates that CSR disclosure has an “information effect”, which can reduce information asymmetry inside the companies, reduce corporate financing restrictions, and improve the accuracy of analysts’ forecasts [6-8]. However, some studies have found that CSR disclosure is an “instrumental” disclosure, which allows managers to cover up misconduct and divert shareholders’ attention [9].

There is a dearth of pertinent research on whether CSR disclosure can influence the growth of businesses at the micro-level, despite the fact that many studies now concentrate on the marketing field. The goal of this article is to find out the potential economic relationship between enterprise innovation performance and obligatory CSR disclosure as well as to present data demonstrating how mandatory CSR disclosure affects small businesses.

2. Literature Review

The innovation ability of enterprises has always been the focus of attention. Enterprises with good innovation can often perform better in market competition. However, the ability of enterprise innovation is restricted by many factors. Therefore, in order to explore the reasons that affect the innovation of enterprises, many scholars have conducted much research from different angles.

Among them, the agency costs and asymmetry information of enterprises are one of the focuses of academic circles. Corporate social responsibility disclosure is an important measure to solve asymmetry information. Earlier studies have found that corporate social responsibility disclosure can attract more investors by alleviating the degree of asymmetry of information [10]. In addition, a series of studies have found that CSR disclosure helps transmit enterprise risk information [11]. It also improves analysts’ attention and forecast accuracy [12]. Moreover, it can reduce enterprise capital costs [13] and enhance enterprise financing convenience [14]. The reciprocal relationship between corporate R & D spending and corporate social responsibility was also taken into consideration by Gallego Alvarez et al. [15]. They see corporate social responsibility as the engine that propels business innovation initiatives, on the one hand. They contend that in order to increase resource efficiency, decrease resource consumption, and lessen environmental pollution, CSR businesses need innovation in their manufacturing techniques and end products. On the other hand, they think that businesses' need for innovation will motivate them to uphold their social obligations in order to create product distinctiveness. The following first hypothesis can be put up in light of the existing studies:

Hypothesis 1 (H1): Disclosure of CSR data helps to advance innovation.

However, some scholars believe that CSR disclosure may increase agency costs, a “instrumental” disclosure for managers’ self-interest. Waller et al. discovered that executives may use a lack of effective corporate CSR regulation and management as a self-interest weapon to further their own

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goals [16]. In addition, CSR disclosure can help the management divert investors' attention and cover up bad news. Still, it increases information asymmetry and the risk of stock price collapse [17]. Therefore, the second hypothesis can be suggested:

Hypothesis 2 (H2): Disclosure of CSR data results in less creativity.

3. Research Method and Design

3.1. Data Source and Selection of Sample

This research assesses the impact of the mandatory CSR disclosure system's implementation in the end of 2008 using financial and enterprise governance data of Chinese listed businesses from the CSMAR database. CSMAR database a reputable platform for economic and financial data. It covers the Chinese stock market, Chinese listed companies, Chinese fund market, Chinese bond market, Chinese derivatives market, Chinese economy, Chinese money market, special research, and other research series. It is among the most complete databases for economic and financial studies. The CSMAR database's A-share listed company statistical data from 2007 to 2016 is used in this study to create panel data.

Since the issuance of the notice in December 2008, China has begun to force listed enterprises in the "Shanghai Stock Exchange Overseas sector", "Shanghai Stock Exchange Financial sector", "Shanghai Stock Exchange Corporate Governance sector" and "Shenzhen Stock Exchange 100 index" to disclose CSR reports in their annual reports, and encourage other enterprises to disclose them voluntarily. Since the CSR Report on mandatory disclosure of enterprises was published in April 2009, this paper assumes that the influence of the compulsory CSR disclosure system starts in 2009, defines 2009-2016 as the experimental period, and defines 2007 and 2008 as the non-experimental comparison period. The original samples are processed in accordance with the following guidelines as a result: (1) Exclude the financial and insurance companies; (2) Eliminate samples which have any missing variables; (3) Eliminate the samples of companies that voluntarily disclose CSR information; (4) St and Pt listed companies are excluded.

3.2. The Measures of Innovation

Compared with the R & D input costs of enterprises, according to Hall et al., the output of innovation successes could more accurately reflect firms' levels of innovation because of the high-risk and long-term characteristics of R & D activities [18]. This study uses the quantity of patent applications to gauge how innovative an organization is. At the same time, taking the research methods of Li Wenjing et al. and Hall et al. as reference, enterprise patent applications are separated into invention type patents and utility models, industrial design (non-invention type) patents [19]. The former is a "high-quality" innovation behavior that promotes enterprise technological progress and gains competitive advantage. At the same time, the latter is an innovation strategy to meet supervision and cater to stakeholders by pursuing innovation "speed". Theoretically, Enterprises with more invention patents have higher innovation quality. Accordingly, this article measures the quantity of innovations with the total number of applications for patents as well as the quality of innovations with the definition from Hall et al.. The two are integrated into the enterprise innovation performance.

3.3. The Measures of CSR Information Disclosure

The CSR disclosure status is represented by the dummy variable CSR. The value of enterprises in the mandatory CSR disclosure list is 1. Otherwise, it is 0.

The identifying variable throughout the test period is the policy, and the value during that time is 1. If not, it is 0.

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Table 1: Definitions of the key variables utilized in the analysis.

VARIABLE	SYMBOL	DEFINITION
INNOVATION	PATENT	The quantity of patents applied by the corporation in the year
CSR INFORMATION DISCLOSURE	CSR	If the CSR report is revealed, the value is 1, otherwise, it is 0
POLICY	POLICY	The value is 1 if the policy is implemented; otherwise, 0
INFORMATION ENVIRONMENT	FOLLOW	Ln (the number of analyst teams + 0.01)
SCALE OF FIRMS	SIZE	Ln (total year-end assets)
BUSINESS GROWTH	GROWTH	Pace of business revenue growth
CAPITAL STRUCTURE	STRUCTURE	Total liabilities/ total assets of the company
INVESTMENT VALUE	Q	The market value of the corporation/ total assets
OWNERSHIP CONCENTRATION	OWNER1	Equity held by the first major shareholders divided by total equity of the company
PROPERTY RIGHTS	SOE	state-owned is 1; private is 0
CORPORATION AGE	AGE	years from the establishment of the company

3.4. Empirical Model

To find out the potential influence of mandatory CSR disclosure on the performance outcomes of Chinese A-share listed enterprises, this article constructs a benchmark regression model (1) of the classic DID method as follows:

$$Patent_{i,t} = \alpha + \delta Policy_i * CSR_t + \mu_i + \lambda_t + \beta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

To investigate the influence of CSR information disclosure on enterprise innovation, Model (1) was developed (H1 and H2). is an individual fixed effect and is a time-fixed effect. X stands for the chosen control variables, which include the enterprise's financial and governance measures. The coefficient δ represents the processing influence of required CSR disclosure effected on the innovation performance outcomes of listed businesses is the focus of this article. If is statistically significant positive, Hypothesis 1 is proved, claiming that the information effect of CSR information disclosure is the main point. If is noticeably unfavorable, Hypothesis 2 is supported, announcing clearly that the reputational impact of disclosing CSR information is strong.

4. Empirical Analysis Results

4.1. Descriptive Statistics

Table 2 provides descriptive information for each sample. Table 2 indicates that between 2007 and 2016, there were an average of 11.361 patent applications filed, with a standard error of 95.401. This indicates that there are significant disparities in different enterprises' levels of innovation. At 0.238, the average CSR information disclosure shows that there hasn't been much of a push to popularize CSR information disclosure among Chinese listed firms. Because the average of each variable falls within a sufficient range, we may conclude that the sample size was appropriate.

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Table 2: Descriptive statistics.

VARIABLE	N	MIN	MAX	MEAN	SD
PATENT	8680	0.000	5976	11.361	95.401
CSR	8680	0.000	1.000	0.238	0.426
POLICY	8680	0.000	1.000	0.800	0.400
FOLLOW	8680	0.000	4.175	1.326	1.210
SIZE	8680	18.467	28.509	22.125	1.351
GROWTH	8680	-0.986	58.357	0.204	1.409
STRUCTURE	8680	0.007	1.056	0.498	0.191
Q	8680	0.684	31.401	2.032	1.456
OWNER1	8680	3.391	100.000	36.146	15.378
SOE	8680	0.000	1.000	0.639	0.481
AGE	8680	0.000	38.000	15.646	5.029

4.2. Correlation Analysis

To determine whether there is collinearity among the variables, Table 3 displays the correlation analysis among these variables. The results show that there is no collinearity among the variables.

Table 3: Correlation matrix.

	PATENT	PC	FOLLOW	SIZE	GROWTH	STRUCT~E	Q	OWNER1	SOE	AGE
PATENT	1									
PC	0.069	1								
FOLLOW	0.098	0.337	1							
SIZE	0.120	0.489	0.432	1						
GROWTH	-0.004	-0.021	0.015	-0.013	1					
STRUCTURE	0.028	0.087	-0.010	0.399	0.037	1				
Q	-0.028	-0.086	0.001	-0.390	0.009	-0.341	1			
OWNER1	0.024	0.149	0.138	0.287	0.032	0.086	-0.145	1		
SOE	0.014	0.155	0.049	0.252	-0.029	0.123	-0.161	0.233	1	
AGE	0.018	0.035	-0.140	0.134	0.009	0.062	0.045	-0.214	0.006	1

4.3. Regression Analysis

The required CSR disclosure system can greatly boost the number of enterprise patent applications, favorably raising the number of invention patent applications, according to the model's regression analysis. The computed coefficients for the number of analysts' teams and the size of the organization are both significant and positive at 0.01. This suggests that an organization's capacity for innovation

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increases with both size and analyst appeal. However, the coefficient of SOE is highly negative, indicating that state-owned firms do relatively poorly in terms of innovation, but very well in terms of non-invention innovation.

In general, the results in Table 4 successfully verify hypothesis 1; that is, the mandatory CSR disclosure policy can encourage enterprises to innovate.

Table 4: Correlation matrix Regression results of CSR information disclosure and innovation.

	(1)	(2)	(3)
	PATENT	PATENTinv	PATENTdes
POLICY*CSR	0.585**	0.301*	-0.560*
	(0.805)	(0.743)	(0.323)
FOLLOW	4.293***	1.466***	0.593***
	(0.880)	(0.360)	(0.228)
SIZE	7.488***	2.224***	-0.007
	(1.714)	(0.840)	(0.170)
GROWTH	-0.246	0.005	-0.082
	(0.190)	(0.083)	(0.028)
STRUCTURE	-5.193	-0.655	0.548
	(3.570)	(1.083)	(1.003)
Q	0.409	0.212	-0.086
	(0.328)	(0.162)	(0.065)
OWNER1	-0.048	-0.045	0.009
	(0.114)	(0.052)	(0.011)
SOE	-2.428**	-0.219*	-0.683*
	(1.884)	(0.629)	(0.391)
AGE	0.184	0.187	0.086*
	(0.290)	(0.152)	(0.050)
_CONS	-158.000***	-48.960**	-0.516
	(37.100)	(19.260)	(3.347)
INDUSTRY	YES	YES	YES
YEAR	YES	YES	YES
N	8680	8680	8680
ADJ. R-SQ	0.017	0.007	0.001
STANDARD ERRORS IN PARENTHESES * P<0.1, ** P<0.05, *** P<0.01			

4.4. Parallel Test

A parallel trend is a premise of using DID method, taking the first year as the base year, this paper makes a parallel trend test with the data, and the test results are as follows:

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Table 5: Parallel Trend Test.

	(1)	
	PATENT	
D_1	18.65	
	5.775	
CURRENT	2.716	
	3.901	
D1	2.782	
	5.504	
D2	3.369	
	8.662	
D3	11.550	
	9.322	
D4	-3.279	
	7.129	
D5	-13.32***	
	-5.122	
D6	-5.116	
	-7.498	
D7	13.412	
	23.741	
FOLLOW	1.459	
	0.981	
GROWTH	-0.260	
	0.229	
OWNER1	-0.018	
	0.195	
AGE	-0.031	
	0.728	
Q	-0.065	
	0.440	
SIZE	10.35**	
	4.446	
SOE	-9.634	
	8.639	
STRUCTURE	-11.860	
	13.680	
_CONS	-206.5***	
	79.230	
N	8680	
ADJ. R-SQ	0.005	
STANDARD ERRORS IN PARENTHESES * P<0.1, ** P<0.05, *** P<0.01		

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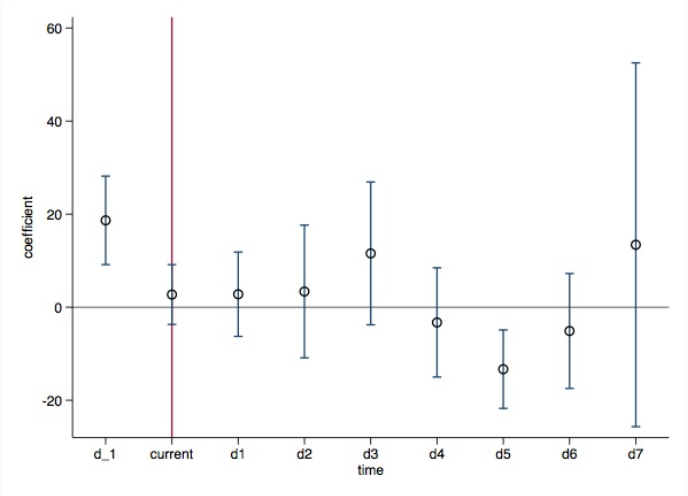

Figure 1: The Result of the Parallel Treat Test.

In order to use these interactive terms as explanatory variables in a regression, I first create the interactive terms for the year dummy variable and the treatment group dummy variable. I specifically want to see that there is no statistically significant interaction between the virtual variable prior to the policy time point and the virtual variable for the treatment group. However, the fact should to be paid close attention that phase I must be chosen as the reference group in this instance; otherwise, there would be a severe collinearity issue. In this case, 2009 was taken as the current year and the first year was dropped. The results show that the coefficients of the two years before the implementation of the required CSR information disclosure system are insignificant, which means that the results conform to the parallel trend hypothesis.

4.5. Placebo Test

This paper employed a placebo test to validate the model and verify its resilience. Assume that rather than a fixed period of time, the implementation of the required disclosure policy is what leads to the improvement in enterprise innovation performance. In that case, the estimation results of the double difference model will no longer be valid after changing the implementation time of the policy. Therefore, this paper reduces the sample period to the previous mandatory disclosure period, takes 2012 as the virtual policy year, and constructs a virtual did model from 2007 to 2016. Suppose the regression results similar to the above can still be obtained after changing the virtual policy years. In that case, it indicates that the above analysis results may be caused by random factors, which cannot support the hypothesis of this paper. In Table 7, the test results show that the interactive term TEST PC coefficient is no longer significantly positive, indicating that the improvement of innovation performance in the previous article is not the result of the placebo effect, and the test results are relatively reliable.

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Table 6: Placebo Test.

	(1)	(2)	(3)
	PATENT	PATENTinno	PATENTdes
TEST PC	0.661	0.421	-0.132
	(4.106)	(1.813)	(0.871)
CV	YES	YES	YES
INDUSTRY	YES	YES	YES
YEAR	YES	YES	YES
N	8680	8680	8680
ADJ. R-SQ	0.024	0.045	0.019
STANDARD ERRORS IN PARENTHESES * P<0.1, ** P<0.05, *** P<0.01			

5. Conclusions and Suggestions

The research sample for this essay is the Chinese A-share listed enterprises from 2007 to 2016. It experimentally researches the influence of required CSR disclosure on enterprise innovation performance using the difference in differences approach. (1) Mandatory CSR disclosure considerably enhances enterprise innovation performance, as seen by the rise in the total quantity of applications for patents, according to the findings. In overall, this study demonstrates that mandatory CSR disclosure enhances the improvement of enterprise innovation performance and plays a good role in encouraging the development of China's real economy. The number of invention patents has increased significantly compared to non-invention patents.

The quasi-natural experiment of China's social responsibility disclosure requirements being changed in December 2008 is used in this research to find out the effects of mandated CSR disclosure system on the manifestation of enterprise innovation. The study's findings have some instructive value and expansion of knowledge on the financial effects of CSR disclosure. (1) This research supports the benefits of mandated CSR disclosure's implementation. This helps external investors better understand the positive effects of mandatory policies, and through the disclosure of incremental information to strengthen investment decision-making judgment. (2) This may provide a reference for the government to further improve the mandatory disclosure policy. (3) Unlike the relatively mature mandatory disclosure policies of other western countries, China is in the early stage of policy construction, and there are still problems in the standardization and supervision of the disclosure process and content. Therefore, in future system construction, we can consider introducing an authoritative and impartial third-party assurance institution to cooperate with the government. This can supervise and audit CSR disclosure to enhance the effectiveness of CSR disclosure and strengthen the level of enterprise social responsibility in China.

It should be pointed out that this study may have some limitations. Based on the quasi-natural experiment of changing China’s social responsibility information disclosure rules, this paper focuses on whether enterprises carry out mandatory CSR disclosure. However, it does not make a text analysis of the content of CSR disclosure. Although China's obligatory disclosure policy includes uniform standards for the structure and timing of disclosure, it does not preclude the possibility that the disclosure's contents may be biased in some way that may affect information users. At the same time, the detailed analysis of the disclosure content is helpful in understanding and evaluating the CSR performance of enterprises in the “post-disclosure era”. Moreover, it provides a reference for the research of the effectiveness of the mandatory CSR disclosure policy. Finally, future research can

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compare mandatory CSR disclosure enterprises with voluntary disclosure enterprises. This further study may provide more powerful proof for exploring the influence of mandatory disclosure policies.

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