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The Dynamic Effect of Disclosing Corporate Social Responsibility on Firms Financial Performance: Evidence from China

By

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Abstract

This paper examines the dynamic impact of corporate social responsibility (CSR) on firms' performance by estimating the yearly effect of disclosing CSR on the financial performances among 1667 firms in the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) from 2005 to 2019. The study exploits CSR as a quasi-natural experiment to test the hypothesis that firms' mandatory disclosure of CSR activities undermines their financial performance in the short run but benefits their financial performance in the long run with the difference-in-difference method. The firm financial performance is measured by widely used metrics for evaluating profitability and returns: return on equity (ROE), Tobin's Q, and annualized stock return. The difference-in-difference model controls for the year fixed effect and the industry fixed effect while considering influencing firm characteristics such as free-float market capitalization, total asset, leverage ratio, and ownership status as controls. The empirical results of the ROE, Tobin's Q, and annualized stock return support the hypothesis that the mandatory disclosure of CSR report undermines firm financial performance in the short run but benefits the firm performance in the long run. The regression indicates that the mandatory CSR disclosure decreases Chinese firms' stock return in the first 9 years but starts to enhance stock return after the 9th year after the mandate. Likewise, when Tobin's Q is used to measure firm performance, the decreasing trend of the negative CSR coefficients (measuring Tobin's Q changes) starts to increase after the 7th year after the mandate. Also, when ROE is used to measure firm performance, the increasing trend of the negative CSR coefficients (measuring ROE changes) starts to decrease after the 9th year after the mandate. Overall, the investigation provides useful guidance for firms' stakeholders and regulators in understanding how such a non-financial factor influences a firm's performance in the short versus the long run.

Key Words: Corporate Social Responsibility, Financial Performance, 2008 Chinese CSR Mandate

Contents

1 Introduction

Over the past few decades, corporations have been increasingly encouraged to embrace responsibilities toward a broader group of stakeholders and strive to generate positive societal impact beyond profit maximization. Meanwhile, investors increasingly view corporate social responsibility (CSR) as an indicator of greater transparency and integrity in operations and are more inclined to invest in companies with such an initiative (Provoke 2016). Nevertheless, whether adopting and disclosing corporate social responsibility drives firms' profits is still under debate. On the one hand, being socially responsible attracts investors, clients, partners, and better talents, drives operation efficiency (e.g., using more energy-efficient appliances), and generates long-term benefits with social goodwill. On the other hand, increasing CSR activities and preparing CSR reporting can be costly. Firms may generate positive externalities at the expense of shareholders. Also, CSR could motivate greenwashing that undermines stakeholders' trust and in turn reduces financial returns. Previous literature empirically examined the impact of corporate social responsibility on firm financial performance with different methodologies and measures in different countries, periods, and industries, which demonstrated distinctive results. For example, CSR disclosure tends to improve stock performance for firms in developed countries such as the United States, as investors who applied a buy-and-hold strategy increased their portfolio value by investing in stocks of corporations with CSR disclosure (Arx 2013). However, among several developing countries such as Turkey, there is no significant relationship or even adverse influence between corporate social responsibility and firm financial performance measured by return on asset and volatility (Ozcelik 2014).

While exploring the impact of CSR disclosure, it is important to consider the disclosure motivation and the dynamics of the impact. Mandatory CSR disclosure and voluntary CSR disclosure could lead to essentially distinctive firm reactions and financial impacts, as firms who voluntarily disclose their CSR have positive disclosure incentives (Dai 2019). In addition, while the majority of previous literature focuses on the short-term impact of CSR, the intensity and direction of CSR impact may change over time. For example, there is an initial fixed cost associated with CSR implementation and disclosure such as purchasing energy-efficient appliances and preparing CSR documentation (Sahm 2020). Also, it takes time for investors and other stakeholders to react to the firms' CSR disclosure, such as investing in more stocks. In this paper, the analysis of the CSR effect focuses on the mandatory CSR disclosure with evidence from China. More importantly, it examines the dynamic CSR impact over time. The research aims to provide the audiences: corporate executives, investors, as well as other stakeholders such as clients, partners, employees, and regulators useful guidance to gain insights into the CSR impact and optimize their decision making to enhance returns or governance. Overall, the study examines the research question: **To what extent does mandatory Corporate Social Responsibility disclosure impact firm financial performance in the short versus long run?** To improve the foregoing limitations, this paper a sample of 1667 A-share firms (shares of companies based in mainland China) in the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2005 to 2019 to investigate the effect of disclosing CSR on firms' return on equity (ROE), Tobin's Q, and annualized stock return. It exploits the 2008 mandate of CSR disclosure in China as a quasi-natural experiment with the difference-in-difference design, where the firms subject to the mandate are the treatment group while the firms that never disclose their CSR are the control group. The empirical results contribute to the literature on the impact of corporate social responsibility.

The remainder of the paper proceeds as follows. Section 2 explains the background of the government mandate in China. Section 3 explores relevant literature. Section 4 elaborates the computational methodology and models to justify internal validity. Section 5 describes the data and statistical visualization. Section 6 provides the core results and theoretical implications. Section 7 concludes the investigation. Section 8 discusses the topic and demonstrates directions for further improvements.

2 Background

The 2008 Chinese milk scandal, the 2008 Sichuan earthquake, and the 2008 Chinese winter storms were significant incidents in the year 2008. The dairy product companies' illegal production of infant formula that was adulterated with melamine led to the hospitalization of thousands of babies. Construction firms' shoddy construction exacerbated the aftermath of the Sichuan earthquake. The series of winter storm events caused extensive damage and aroused widespread environmental concern among the public. The three incidents motivated the Chinese regulators to intervene to enhance the ethics of corporate practice and mitigate the recurrence of similar tragedies. On December 31st of 2008, the government mandated around 360 selected firms listed on Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) to disclose a corporate social responsibility report along with their annual financial report. More specifically, the government requires firms in SEE Corporate Governance Index, firms with shares listed overseas, and financial firms as well as all firms on Shenzhen Stock Exchange's "Shenzhen 100 Index" to issue a Corporate Social Responsibility report along with their annual report. The regulators also strongly encouraged all the other listed firms to attach importance to business ethics by voluntarily disclosing their CSR performance. Over the past 10 years, the selected firms have strictly followed the mandate while more and more firms have opted in to voluntarily disclose their CSR reports. As of 2019, 1006 firms have disclosed valid CSR reports (both mandatory and voluntary disclosure) with rigorous third-party audits (Hexun 2020).

3 Literature Review

Several authors have evaluated the relationship between firms' corporate social responsibility and their financial and accounting performances across both developed and developing countries. Garas et al. (2020) examined the dynamic relationship between environmental, social, and governance (ESG) scores and financial measures such as ROA and Tobin's Q among 577 public-listed companies in South Asia from 2008 to 2017 with interactive simultaneous equations. Their study reveals that a higher disclosure score improves firms' market value, ROA, and Tobin's Q while reducing its market risk, and the relationship is bi-directional (Garas 2020). In terms of leading stock markets in the U.S. and Europe, Arx et al. (2013) performed cross-sectional OLS regressions to regress the average monthly stock returns on the CSR index under different assets pricing models, such as the Capital Asset Pricing Model and Fama–French three-factor model. The result also suggests that firms with environmental and social activities achieved higher average monthly stock returns compared to non-disclosure firms within the industry (Arx 2013).

In the Chinese market, Naseem et al. (2019) examined the disclosure of CSR for multi-stakeholders such as responsibilities for shareholders, creditors, and customers and used financial ratios such as dividend per share and interest coverage ratio as a moderator to explain the link between CSR disclosure for multi-stakeholders and financial performance. The result demonstrates a significantly better performance measured by Tobin's Q for CSR disclosure firms than both CSR non-disclosure firms and industry averages with evidence from 1,500 non-financial firms listed on the Shanghai Stock Exchange from 2008 to 2012 (Naseem 2019). From another perspective, Ali et al. (2019) examined the role of ownership in the relationship between corporate social responsibility and firm performance among 2000 listed Chinese firms. While confirming the positive and significant association between CSR score and financial performance, the study reveals that ownership structure plays a moderating role in such a relationship, where the CSR effect is more significant in non-state-owned compared to state-owned firms (Ali 2019).

However, all the above studies examined firms that voluntarily disclose their CSR. But firms choose to disclose their CSR for a positive incentive. With the fixed effect model, Dai's study reveals that the CSR disclosure aggravates the stock price crash risk for mandatory disclosure but not for voluntary disclosure (Dai 2019). Therefore, disclosure motivation matters. Several authors have investigated the impact of mandatory CSR disclosure with the difference-in-difference method. Chen et al. (2018) proposed that the mandated firms would feel pressure to increase their commitment to CSR at a cost to performance. They examined the effect of mandatory CSR disclosure on firm profitability by comparing the change in ROE between the mandatory disclosure and non-disclosure firms before and after the mandate from 2006 to 2011. It concludes that firms experience a decrease in profitability (ROE) subsequent to the mandatory CSR disclosure (Chen 2018). Likewise, He et al. (2020) also employed the difference in difference method to study the effect of mandatory reporting requirements on abnormal returns and volatility between 2006 and 2010. The study also demonstrates that mandatory disclosure reduces abnormal returns and increases volatility, and thus hampers the individual stock performance (He 2020). However, with a similar method, Hung's (2013) study reveals that mandatory CSR reporting firms experience a decrease in information asymmetry after the mandate, where the measure of information asymmetry captures the price impact (PI) of a trade and the adverse selection component of the bid-ask spread (AS) (Hung 2013).

Although previous studies have evaluated the effect of corporate social responsibility on firm financial performance with different measures, they focused on the overall effect in the short run, such as 2 to 3 years after the mandate. Whether or not disclosing CSR leads to profitability in the long run and the extent to which the tradeoff between its cost and benefit changes over time merits further investigation. Therefore, my study contributes to the existing literature on CSR disclosure by considering the impact of mandatory CSR disclosure in both the short run and long run. It investigates the yearly impact of mandatory CSR after the mandate, to explore whether there is a break-even point when the benefits of CSR dominates its cost, or at least a decelerating trend in the decrease of financial performance over years.

4 Empirical Methods

The study aims to examine the dynamic effect of disclosing corporate social responsibility on firm financial performance. The 2008 governmental mandate of CSR disclosure in China constitutes an exogenous shock. Thus, similar to previous literature that analyzed Chinese mandatory CSR disclosure (Chen 2018, He 2020, Hung 2013), the study exploits the CSR mandate as a quasi-natural experiment using the difference-in-difference method with fixed effects. However, instead of examining the short-term impact of CSR, the study aims to gain insights into the dynamic of CSR influence at a yearly level following the mandate. More specifically, it applies a sample of 1667 A-share firms (shares of companies based in mainland China) in the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2005 to 2019 to test the hypothesis that disclosing CSR undermines firm financial performance in the short run but benefits their financial performance in the long run. In the quasi-natural experiment, the year 2005 to 2007 are the pre-treatment period while the years 2009 to 2019 are the post-treatment period. Also, the A-share firms subject to the CSR disclosure mandate serve as the treatment group while all the non-disclosure A-share firms serve as the control group. In other words, the firms that voluntarily disclose their CSR are excluded from the investigation to avoid noises and biases.

The study uses 3 different dependent variables to measure firm financial performance: **return on equity (ROE), Tobin's Q, and annualized stock return**. These 3 measures are widely used metrics for evaluating firm financial performance such as investment returns and relative profitability. They are employed to examine the impact of CSR disclosure from different perspectives. More specifically, the ROE measures the profitability of a corporation in relation to stockholders' equity. Tobin's Q measures whether a firm is relatively overvalued or undervalued through the relationship between its market valuation and intrinsic value. The annualized stock return measures the extent to which investors' investment in a firm's stock has increased on average each year. Previous literature has applied one or more of these metrics to measure firm financial performance in investigating the CSR impact, such as Naseem et al's analysis of CSR impact on firms' Tobin's Q and Chen et al's investigation of CSR impact on firms' ROE. Since the dependent variables contain negative values, the regressions do not take a natural log of the financial measures, thus investigating the change in financial performance impacted by the mandate instead of their percentage change. To evaluate the effect of mandatory CSR disclosure, this study compares the yearly changes in ROE, Tobin's Q, and annualized stock return among treatment firms with control firms from 2009 to 2019.

As illustrated in the background section, the mandated firms are selected based on criteria such as exemplary governance and large free-float market capitalization to disclose their CSR information. Therefore, the sample may suffer from selection bias. Nevertheless, although the control group and the treatment group are not randomly selected like the randomized controlled trial, the study focuses on comparing the difference between the control and treatment before and after the mandate to examine the extent to which the trend changes due to the CSR disclosure. Furthermore, to minimize the bias, the regression controls for key firm characteristics associated with the CSR selection criteria, such as the free-float market capitalization and total assets. Inspired by previous literature (Chen 2018, He 2020, Ali 2019), the study also controls for other influencing factors that have been proven to be correlated with firm performance, such as state ownership and the leverage ratio (Debt-to-Assets ratio). These controls improve the accuracy of estimating the effect of the CSR mandate on the firm financial performance.

While satisfying the parallel-trend test, the difference-in-difference method fulfills the internal validity in making inferences for the effect of the mandatory CSR disclosure on firm financial performance, which has also been used in previous studies in the literature review (Chen 2018, He 2020, Hung 2013). Although disclosing CSR does not guarantee to adopt CSR, it motivates corporations to engage in CSR activities since their CSR performance becomes publicly available for stakeholders such as investors and partners. The Chinese government's motive for implementing such a mandate is to encourage firms to embrace corporate social responsibility and promote corporate ethics. Thus, the action of disclosing CSR is generally associated with an increase in CSR activities. However, even after controlling for observable characteristics such as total assets, market capitalization, and ownership status, mandatory disclosure requirements are unlikely to be as-if randomly assigned because the mandatory disclosure firms are selected by the government. Therefore, instead of using OLS to regress financial performances on the CSR score, the quasi-natural experiment of the mandatory CSR disclosure estimates and emphasizes the CSR impact while allowing for differences in the level of financial performance between firms that are required to report and those that are not.

5 Data

5.1 Data Collection and Processing

CSR Information: The corporate social responsibility information of all the A-share firms from the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2005 to 2019 are web-scraped from the Hexun website, one of the two most widely used corporate social responsibility rating systems for research on CSR in China's capital market. The website exhibits the search results of all A-share firms' CSR information by firms and years, including the CSR disclosure indicators and scores. Among the existing literature, Ali et al. (2019) also referred to the Hexun website to collect CSR data to examine the role of ownership in the relationship between corporate social responsibility and firm performance among 2000 listed Chinese firms. The CSR data are displayed as search results instead of a ready-to-use dataset. Thus, this study web-scraped the CSR disclosure indicators among all the A-share firms from the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2005 to 2019. I web-scrape the CSR information in a yearly frequency and appended the years together. As a result, the processed CSR data contains a dummy variable indicating whether or not the firm is under the CSR disclosure mandate. To fit into the difference-in-difference models, the 11 regressors of interests, D_{iy}^{k}, are generated based on the CSR mandate indicator, indicating whether or not the company i is subject to CSR mandate when the year y is k years after the mandate.

Financial Performance & Firm Characteristics: The corporate financial data are collected from the China Security Market and Accounting Research (CSMAR) database – the comprehensive database for Chinese business research, covering data on the Chinese stock market and financial statements of Chinese listed firms. All the studies from the literature review section that investigated the Chinese market utilize the CSMAR database (Naseem et al 2019, Ali et al 2019, Dai et al 2020, Chen et al 2018, etc). The database is publicly available and accessible. I extracted and organized key financial and accounting indicators from all listed firms' financial statements, which contains all the financial information needed for this study, such as the dependent variables: ROE, Tobin's Q, and annualized stock return as well as the control variables: free-float market capitalization, total assets, leverage ratio (Debt-to-Assets ratio), and ownership status. All the financial performance and firm characteristics data are in yearly frequency. I further code and merge the financial data with CSR information for analysis, such as turning the ownership list to a dummy variable indicating whether or not the firm is state-owned.

Data Cleaning: The study excludes foreign shares firms because they are subject to different market trading mechanisms. Also, I remove firms that voluntarily disclose CSR reports as the performance data for these firms may be biased upwards as they have an incentive to disclose CSR. In addition, I drop firms with ST (special treatment) and PT (particular transfer) symbols, which are firms experiencing financial distress and delisting risk. Their financial performance data could be outliers and affect the accuracy of the results. Moreover, the composite of the SSE corporate governance index and Shenzhen 100 index changes every year. Thus, there are firms added to and removed from the mandatory list each year. The study drops the few firms that go in and out of the list each year as the study mainly aims to investigate the yearly effect of mandatory CSR report on mandated firms over the 11 years. Thus, the sample focuses on the firms that are always subject to the mandate (treatment) or are never subject to the mandate (control). Lastly, the extreme outliers of the dependent variables are identified with the interquartile range (IQR) and box plots, where observations fall outside the extreme outlier fences are removed to ensure accuracy. After dropping the observations with missing values and extreme outliers, the sample size is 23,165 firm-years from 2005 to 2019, with 2,612 mandatory firm-years (treatment) and 20,553 non-disclosure firm-years (control).

5.2 Descriptive Statistics

The dataset[1] (Github Link) contains 23,165 observations and 25 variables (including CSR information, financial information, and firm characteristics). The descriptive statistics demonstrate the distribution of key variables, including the 3 dependent variables, 4 control variables, and

[1]The dataset, as well as web-scraping and data processing code, can be found at GitHub: https://github.com/Qichen-Huang/MAPSS-Thesis-Draft

Table 1: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
ROE	23,165	.0660	0.154	-4.319	3.835
TobinQ	23,165	2.733	1.366	0.219	24.876
Stock Return	23,165	0.233	0.765	-0.867	11.202
Free Float Marketcap	23,165	1.09e+07	4.19e+07	41670	1.67e+09
Total Asset	23,165	5.11e+10	7.63e+11	4.13e+07	3.01e+13
Leverage	23,165	0.439	0.211	0.00173	0.987
Ownership Status	23,165	0.398	0.489	0	1
Always Mandated	23,165	.113	.316	0	1

the master CSR indicator. According to the summary statistics, the ROE from the year 2005 to 2019 ranges from -4.319 to 3.835. The average ROE over the 15 years is 0.0660, with a standard deviation of 0.154. The variation in ROE among the 23,165 firm-years is relatively large, with several firms experiencing negative returns. The Tobin's Q from the year 2005 to 2019 ranges from 0.219 to 24.876. The average TobinQ over the 15 years is 2.733, with a standard deviation of 1.366. lastly, the stock return from the year 2005 to 2019 ranges from -0.867% to 11.202%. The average stock return over the 15 years is 0.233%, with a standard deviation of 0.765%. The variability of the ROE, Tobin's Q, annualized stock return among the different firms may also relate to factors such as the difference in firms' free-float market capitalization, total asset, leverage, and ownership status, etc. Also, the CSR indicator is the dummy variable that takes 0 or 1. The mean of the overall CSR disclosure dummy is 0.113, which indicates that 11.3% of the firm-years in the sample is always mandatory to disclose their CSR reports.

5.3 Visualization

The correlation plot demonstrates the correlation coefficients among the key variables, such as the firm characteristics and financial performance. There is a positive correlation between

Figure 1: CSR Correlation

the CSR disclosure indicator and the control variables, such as the free-float market capitalization, total asset, state-ownership indicator, and leverage. In other words, the free-float market capitalization, total asset, state ownership indicator, and leverage are larger for firms that are always mandatory to disclose their CSR information than the firms that never disclosed their CSR information. Therefore, it is important to control for these firm characteristics to minimize bias. Also, all of these firm characteristics are positively correlated with each other. In terms of the dependent variables, there is a negative correlation between Tobin's Q and control variables such as the total assets, state ownership indicator, and leverage, with the coefficient between Tobin's Q and leverage being the most negative (-0.35). On the other hand, there is no obvious correlation between the stock return and the control variables, which reveals less noise between the controls and the stock return that the study aims to measure the effect.

Figure 2 exhibits the box plots of the total assets and free-float market capitalization among

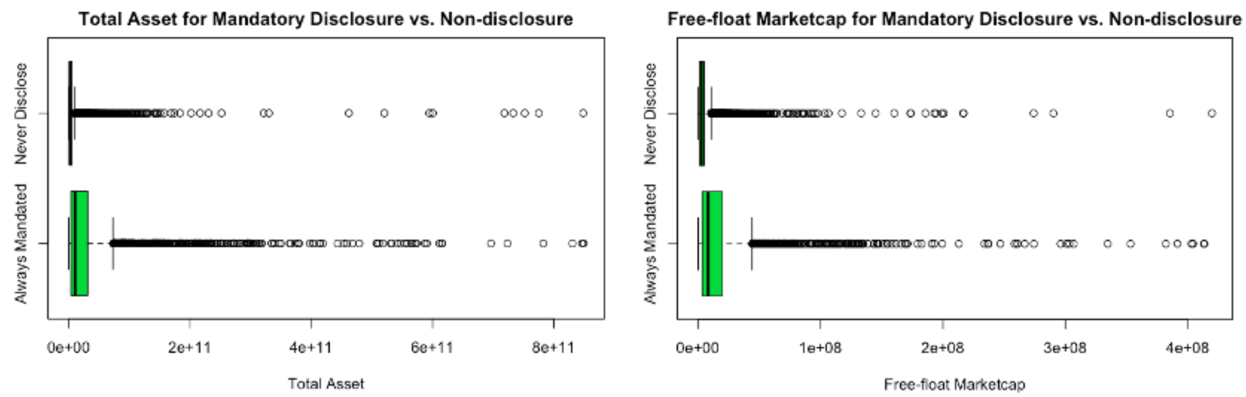

Figure 2: Boxplots for Total Assets & Free-float Market Capitalization

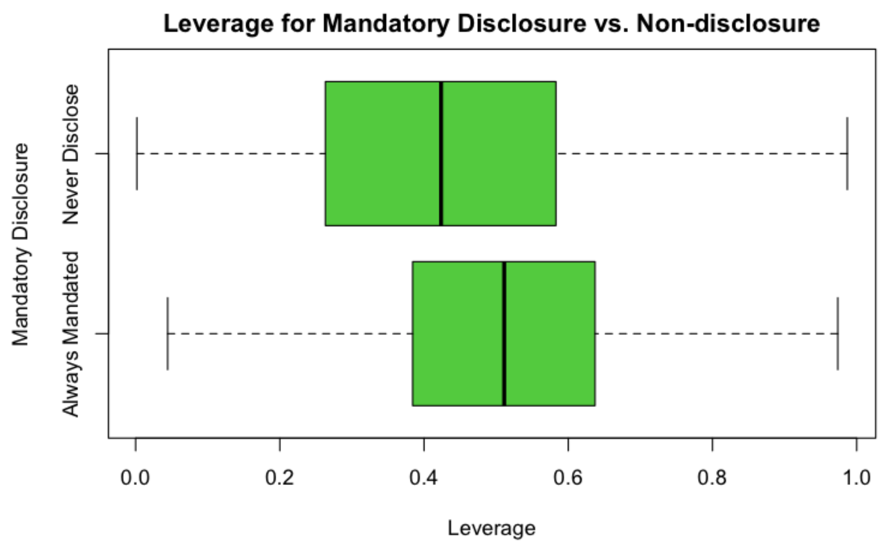

Figure 3: Boxplots for Leverage

firms that are always subject to CSR disclosure mandate vs. firms that never disclosed their CSR information. It reveals that the firms subject to the CSR mandate have higher free-float market capitalization and total assets, which aligns with part of the selection criteria for the firms that are mandatory CSR disclosure. The sample contains outliers for both the total assets and free-float market capitalization. However, many of the firms with the largest free-float market capitalization are the treatment firms, which are crucial for the investigation. Thus, the outliers are not removed from the dataset. Nevertheless, the total assets and free-float market capitalization serve as control variables to reduce bias.

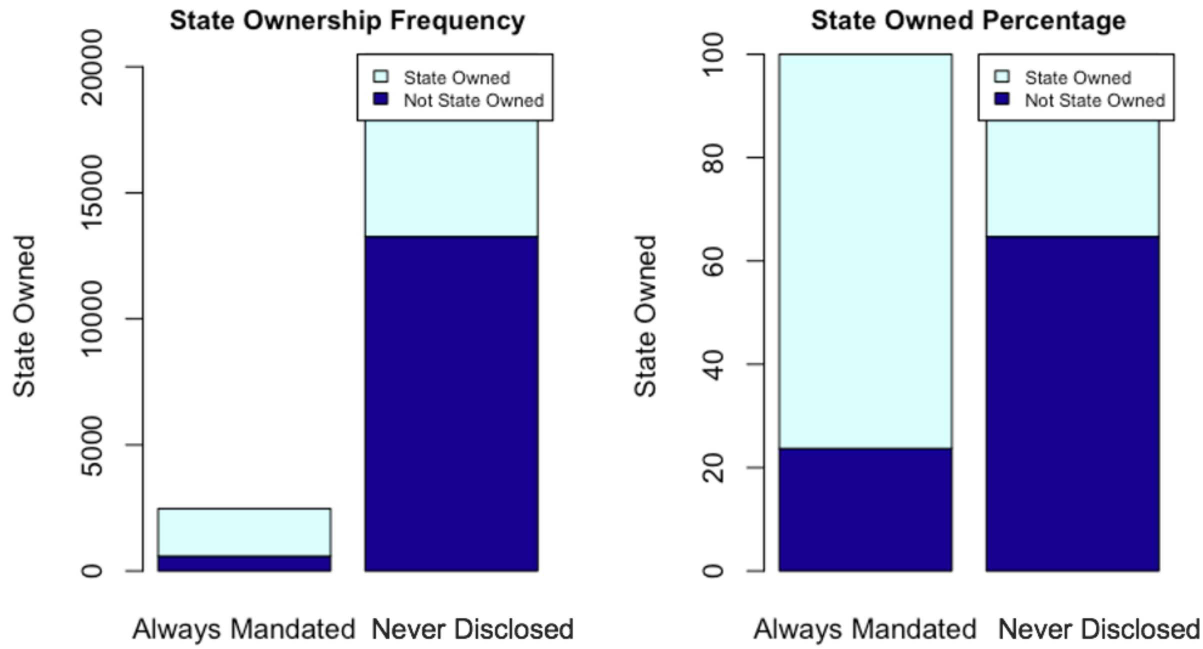

Figure 4: TobinQ mean plots by CSR disclosure status

Likewise, figure 3 exhibits the box plots of another control variable, the leverage, among firms that are always subject to CSR disclosure mandate vs. firms that never disclosed their CSR information. The leverage is measured by the debt-to-assets ratio. The mandated firms have median leverage of approximately 0.5 while the non-mandated firms have median leverage of approximately 0.4. As discussed in the correlation plot, the leverage ratio is greater for firms that are always mandatory to disclose their CSR report.

Figure 4 indicates the bar plots that compare the frequency/percentage of state-owned firms between firms that are always subject to CSR disclosure mandate with the firms that never disclosed their CSR information. 76% of firms that are always subject to CSR disclosure mandate are state-owned while only 35% of the firms that never disclosed their CSR information are state-owned. The government tends to regulate state-owned firms as the mandated firms are more likely to have state ownership. Ali et al's study concluded that the CSR effect is more significant in non-state-owned compared to non-state-owned firms (Ali 2019). Thus, the state ownership should be controlled as it has different distributions among the control and treatment groups while is correlated with the dependent variables.

6 Model

The baseline model with the difference-in-difference (DID) technique is:

$$\mathrm{Y}_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=1}^{K} \beta_k D_{iy}^k + controls_{iy} + \epsilon_{iy},$$

where

- $\mathrm{Y}_{iy} = \mathrm{ROE}_{iy}$, $\mathrm{Tobin'sQ}_{iy}$, and $\mathrm{StockReturn}_{iy}$
- $controls_{iy} = \gamma_t totalassets_{iy} + \gamma_m marketcap_{iy} + \gamma_l leverageratio_{iy} + \gamma_o ownershipstatus_{iy} + \gamma_c completeness_{iy}$.
- i represents the firm, y represents the year, g represents the industry

Fixed Effects: The model controls for year-specific fixed effect, industry-specific fixed effect, and 'treated firm' fixed effect. α_y represents the year fixed effect, which captures the structural effect in the economy that affects all the Chinese firms throughout the years of investigation. Likewise δ_g represents the industry fixed effect, where the g is the industry that firm i belongs to, which controls for the average differences among firms across industries. M_i controls for the 'treated firm' fixed effect, which equals 1 for firms subject to the CSR disclosure mandate and 0 for firms without the CSR disclosure requirements. It captures the systematic differences between the treated and untreated firms.

Outcomes of Interest: The outcomes of interest in the 3 models are ROE_{iy}, $\mathrm{Tobin'sQ}_{iy}$, and $\mathrm{StockReturn}_{iy}$, which respectively represent the return on equity (ROE) of the company i on the year y, the Tobin's Q of the company i on the year y, and the annualized stock return of the company i on the year y.

Regressors of Interest: The regressors of interest D_{iy}^k are CSR dummies. The dummy variables capture the yearly differences between the control and treatment groups to estimate the dynamic effect of CSR disclosure throughout the years after the mandate. The k indexes the number of years after the company i being mandated to disclose its CSR report, where k = 1,..., K = 11. The value for K is set equal to 11 to examine the effect of CSR disclosure in each of the 11 years following the mandate. Each dummy variable D_{iy}^{k} indicates whether or not the company i is subject to CSR mandate when the year y is k years after the mandate. It equals 1 if the company i is required to disclose CSR report when the year y is k years after and takes 0 otherwise. For example, the dummy variable D_{iy}^{10} equals 1 when the year y (where y=2018) is 10 years after the mandate and takes 0 otherwise. The coefficient β_k is the difference in the expected trends in Y_{iy} since 2008 between tested and controlled firms. Under the conditional common trends assumption, it represents the average effect of the mandate on treated firms.

Control Variables: As discussed earlier, the Chinese government requires firms in SEE Corporate Governance Index, firms with shares listed overseas, and financial firms as well as firms on Shenzhen Stock Exchange's "Shenzhen 100 Index" to issue a Corporate Social Responsibility report along with their annual report. The SSE Corporate Governance Index consists of companies with exemplary governance practices while the SZSE 100 Index consists of the top A-share listed companies in terms of free-float market capitalization. Thus, the models control for (1) free-float market capitalization and other relevant firm characteristics such as (2) total assets, (3) leverage ratio (Debt-to-Assets ratio), (4) ownership status (dummy variables indicating whether or not the firm is under state ownership). These control variables have been investigated and applied in previous literature either as moderators or control variables. For example, Ali et. al's study reveals that ownership structure plays a moderating role in the relationship between CSR and firm financial performance, where the CSR effect is more significant in non-state-owned compared to non-state-owned firms (Ali 2019). The control variables help minimize the selection bias.

The regression models are constructed to test the hypothesis that disclosing CSR undermines firm financial performance in the short run but benefits the firm performance in the long run. Thus, for each of the 3 measures of outcome, the null hypothesis is $\beta_k^S = 0$ while the alternative hypothesis is $\beta_k < 0$ when k < T and $\beta_k > 0$ when k > T, where T is the breakeven point when the return of the CSR disclosure exceeds the cost of the CSR disclosure.

7 Results

7.1 Empirical Results

The impacts of CSR disclosure on stock return/ Tobin's Q/ ROE are estimated with 3 high-dimensional fixed effect regressions using the reghdfe command in Stata. The high-dimensional fixed effect regressions absorb the year fixed effect and the industry fixed effect. The regression results of the effect of mandatory CSR disclosure on firm financial performance are presented in Table 2. Column 1 reveals the yearly effect of mandatory CSR disclosure on stock return. Column 2 reflects the yearly effect of mandatory CSR disclosure on Tobin's Q. Column 3 reflects the yearly effect of mandatory CSR disclosure on ROE. The standard errors are clustered. However, the year fixed effect and the industry fixed effect have been absorbed within the regression instead of explicitly exhibiting output values for α_y and δ_g.

In the short run, the regression results align with previous literature, that the mandatory CSR disclosure leads to an adverse effect on the firm financial performances as measured by metrics such as Tobin's Q (Chen 2018). In other words, relative to non-CSR reporting firms, the treatment firms experience a decrease in profitability and return subsequent to the disclosure shock. Such change is statistically and economically significant. However, in the long run, the dynamic effect of mandatory CSR disclosure reveals additional findings that generally support the hypothesis.

(1) Stock Return as the Financial Performance Measure:

The result reports estimated coefficients from the following regression:

$$StockReturn_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=-3, k\neq 0}^{K} \beta_k D_{iy}^k + \gamma_t totalassets_{iy} + \gamma_m marketcap_{iy} + \gamma_l leverageratio_{iy}$$
$$+ \gamma_o ownershipstatus_{iy} + \gamma_c completeness_{iy} + \epsilon_{iy}$$

Table 2: Effect of Mandatory CSR Disclosure on Firm Performance

	Firm Performance		
	Stock Return	Tobin's Q	ROE
1 Year After Mandate	-0.364^{***}	-0.665^{***}	-0.0384^{***}
	(0.0585)	(0.209)	(0.0177)
2 Year After Mandate	-0.124^{***}	-0.789^{***}	-0.0591^{***}
	(0.0576)	(0.208)	(0.0178)
3 Year After Mandate	0.0431	-0.146	-0.0515^{***}
	(0.0576)	(0.207)	(0.0177)
4 Year After Mandate	0.0279	0.0438	-0.0547^{***}
	(0.0573)	(0.206)	(0.0176)
5 Year After Mandate	-0.209^{***}	-0.425^{**}	-0.0553^{***}
	(0.0574)	(0.206)	(0.0176)
6 Year After Mandate	-0.183^{***}	-0.532^{***}	-0.0643^{***}
	(0.0576)	(0.205)	(0.0175)
7 Year After Mandate	-0.538^{***}	-1.856^{***}	-0.0671^{***}
	(0.0578)	(0.205)	(0.0174)
8 Year After Mandate	-0.00709	-1.276^{***}	-0.0752^{***}
	(0.0571)	(0.206)	(0.0175)
9 Year After Mandate	0.232^{***}	-0.612^{***}	-0.0691^{***}
	(0.0576)	(0.206)	(0.0175)
10 Year After Mandate	0.1471^{***}	-0.137	-0.0543^{***}
	(0.0571)	(0.206)	(0.0174)
11 Year After Mandate	-0.0374	-0.458^{***}	-0.0534^{***}
	(0.0571)	(0.206)	(0.0175)
Always Mandate	-0.00176	0.114	0.0808^{***}
	(0.0407)	(0.145)	(0.0124)
Free-float Market Capitalization	$1.54 \times 10^{-8***}$	$2.51 \times 10^{-9***}$	$1.23 \times 10^{-9***}$
	(2.73×10^{-10})	(9.73×10^{-10})	(8.28×10^{-11})
Total Asset	$-3.91 \times 10^{-13***}$	$-6.61 \times 10^{-12***}$	$-4.35 \times 10^{-14***}$
	(-1.11×10^{-13})	(3.96×10^{-13})	(3.37×10^{-15})
State Owned	-0.0561^{***}	-0.579^{***}	-0.00396
	(0.00733)	(0.0261)	(0.00223)
Leverage	0.000897	-2.573^{***}	-0.122^{***}
	(0.0174)	(0.0623)	(0.00530)
Constant	0.239^{***}	4.09^{***}	0.109^{***}
	(0.00828)	(0.0295)	(0.00252)
Year Fixed Effect	Y	Y	Y
Industry Fixed Effect	Y	Y	Y
Observations	23165	23165	23165
R^2	0.588	0.295	0.296

$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$
Note: Robust standard errors in parentheses

where k $<$ 0 represents the year before the mandate, while k $>$ 0 represents the year after the mandate.

Although the regression result table focuses on exhibiting the post-treatment coefficients for the years after the mandate, the regression also includes the pre-treatment coefficients to compare the change in trend associated with the treatment. The year of mandate (when k = 0) is excluded to prevent perfect multicollinearity. Thus, the regression estimates the dynamic effect of the 2008 mandate on firms' stock returns relative to the year of the mandate.

Column 1 demonstrates the yearly effect of CSR disclosure on firms' stock return with coefficients of CSR dummies among the 11 years after the mandate. It reveals a negative yearly effect of mandatory CSR disclosure on the stock return until 9 years after the mandate. After the 9th year, the yearly effect of mandatory CSR disclosure on the stock return starts to turn positive. The coefficients are statistically significant at a 1% significance level during most of the years after the mandate except for the year 3, year 4, year 8, and year 11. The breakeven point when the benefits of CSR dominates its cost is the 9th year after the mandate when the financial performance is measured by stock return. The coefficient for the mandatory CSR indicator during the 9th year after the mandate is 0.232 with a standard error of 0.0576, which means that relative to the year of the mandate, the mandatory CSR disclosure on average increases the firm stock return by 0.232% per stock during the 9th year after the mandate. Moreover, the "treated firm" fixed effect is not statistically significant. In terms of the control variables, the free-float market capitalization has a positive correlation with the stock return while the total assets and the state ownership of the firms estimate a negative relationship with the stock return. The coefficients for the 3 control variables are statistically significant at a 1% level. However, the leverage does not have a significant correlation with the stock return.

Figure 5 plots the impact of the CSR mandate on the coefficient of stock return. It demonstrates a 14-year window, spanning from 3 years before the mandate (from 2005 to 2007) until 11 years after the mandate (from 2009 to 2019). The horizontal axis indicates the

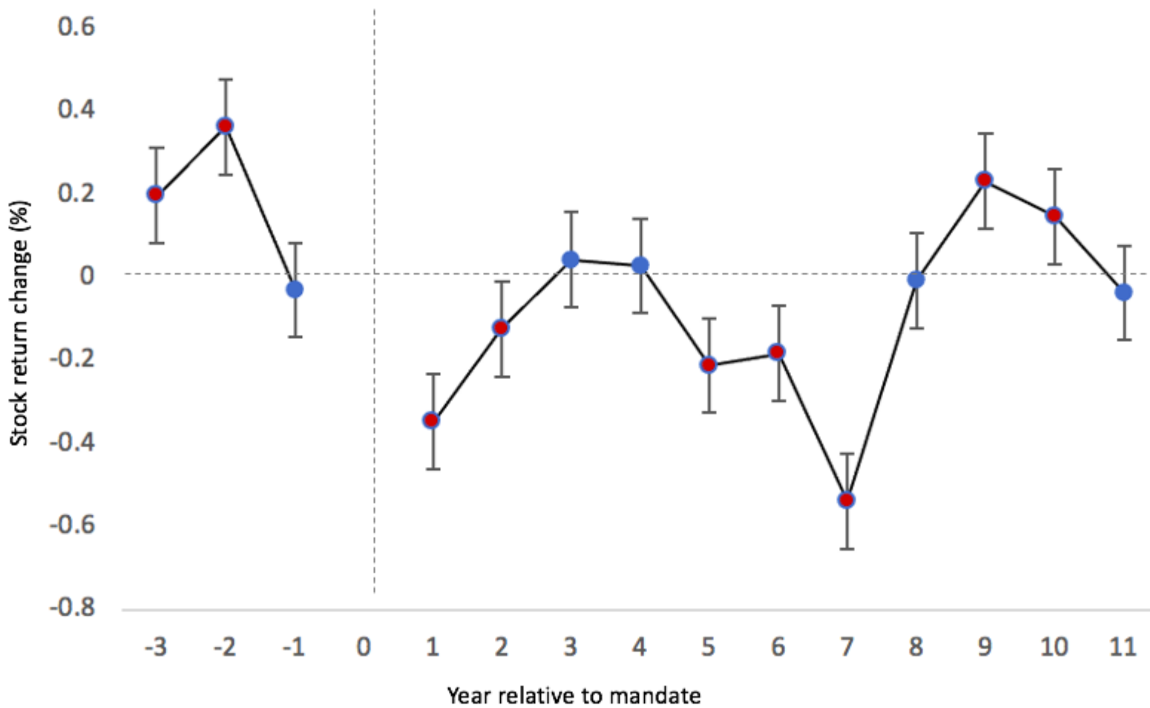

Figure 5: The dynamic impact of the 2008 mandate on the stock return

year relative to the mandate, where negative values represent the years before the mandate and positive values represent the years after the mandate. The vertical axis indicates the coefficients of the stock return, which represents the change in stock return after the treatment. The vertical lines around the coefficients represent 95% confidence intervals for the coefficients. The red dot indicates that the coefficient is statistically significant at a 5% significance level. The blue dot indicates that the coefficient is not statistically significant at a 5% significance level. The plot setup is the same for Figure 5, Figure 6, and Figure 7.

According to Figure 5, the coefficients on the dummy variables are significantly positive before the mandate. The stock return decreases immediately after the mandate, such that when k = 1, the coefficient is negative and significant at the 1% level. Visually, it shows the break-even point at the 9th year when the negative change turns positive for the first time. The regression result supports the hypothesis that the mandatory disclosure of CSR report undermines firm financial performance in the short run but benefits the firm performance in the long run, when the financial performance is measured by stock return.

(2) TobinQ as the Financial Performance Measure:

$$Tobin'sQ_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=-3,k\neq 0}^{K} \beta_k D_{iy}^k + \gamma_t totalassets_{iy} + \gamma_m marketcap_{iy} + \gamma_l leverageratio_{iy}$$
$$+ \gamma_o ownershipstatus_{iy} + \gamma_c completeness_{iy} + \epsilon_{iy}$$

Column 2 demonstrates the yearly effect of CSR disclosure on firms' Tobin's Q with coefficients of CSR dummies among the 11 years after the mandate. It reveals a negative yearly effect of mandatory CSR disclosure on the stock return throughout the 11 years after the mandate. The coefficients are statistically significant at a 1% (or 5%) significance level during most of the years after the mandate except for the year 3, year 4, and year 10. There is no breakeven point when the benefits of CSR dominates its cost when the financial performance is measured by Tobin's Q. However, the magnitude of the coefficient decreases until the 7th year after the mandate and starts to increase (turning less negative) after the 7th year. Therefore, the 7th year is the turning point when the negative effect of CSR disclosure starts to diminish and gradually approaches positive. Moreover, the "treated firm" fixed effect is not statistically significant. In terms of the control variables, the free-float market capitalization has a positive correlation with the stock return while the total assets, leverage, and state ownership of the firms exhibit a negative relationship with the stock return. The coefficients for the 4 control variables are statistically significant at a 1% level.

Figure 6 plots the impact of the CSR mandate on the coefficient of stock return throughout the 14-year window. The coefficients on the CSR mandate dummy variables are insignificantly different from zero across the 3 years, with no trends in Tobin's Q before the mandate. The Tobin's Q decreases immediately after the mandate, such that when k = 1, the coefficient is negative and significant at the 1% level. Although the coefficients are all negative throughout the 11 years after the mandate. The coefficients start to become less negative after the 7th

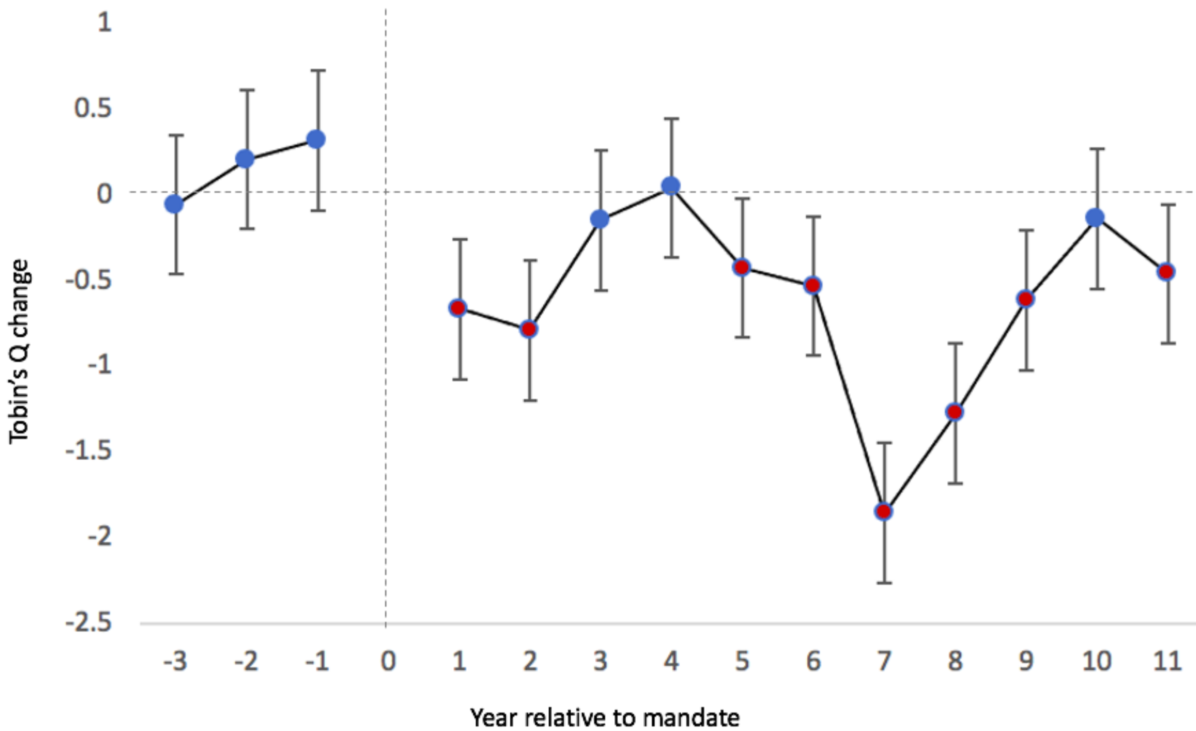

Figure 6: The dynamic impact of the 2008 mandate on the Tobin's Q

year. Thus, the regression result supports the updated version of the hypothesis – while the mandatory disclosure of CSR report undermines firm financial performance in the short run, the adverse influence keeps diminishing in the long run, when the financial performance is measured by Tobin's Q.

(3) ROE as the Financial Performance Measure:

$$ROE_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=-3, k\neq 0}^{K} \beta_k D_{iy}^k + \gamma_t totalassets_{iy} + \gamma_m marketcap_{iy} + \gamma_l leverageratio_{iy}$$
$$+ \gamma_o ownershipstatus_{iy} + \gamma_c completeness_{iy} + \epsilon_{iy}$$

Column 3 demonstrates the yearly effect of CSR disclosure on firms' ROE with coefficients of CSR dummies among the 11 years after the mandate. There is a positive "treated firm"

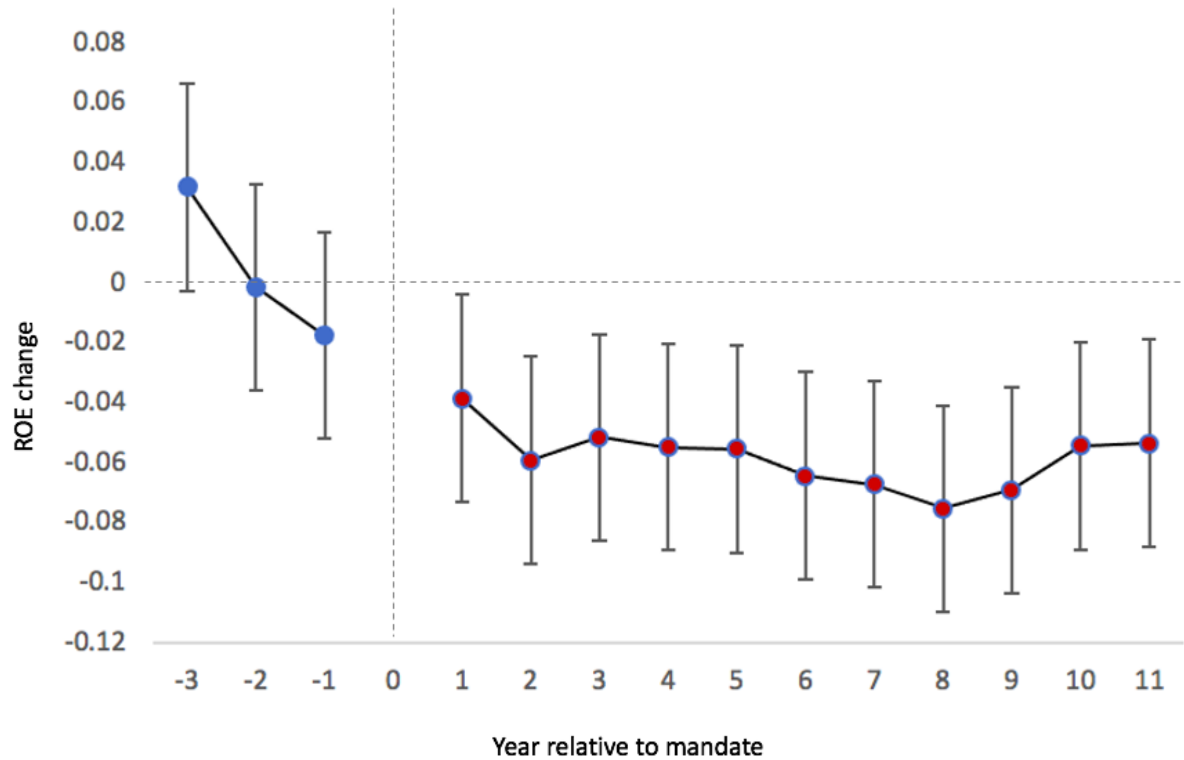

Figure 7: The dynamic impact of the 2008 mandate on the ROE

fixed effect, which demonstrates that the treated firms systematically have higher ROE than the untreated firms. After controlling the "treated firm" fixed effect, the result reveals a negative yearly effect of mandatory CSR disclosure on the ROE throughout the 11 years after the mandate. The coefficients are statistically significant at a 1% significance level during the years after the mandate. The increasing magnitude of the coefficients starts to decrease after the 9th year after the mandate. Therefore, the 9th year is the turning point when the increasing trend of the negative effect of CSR disclosure decreases for the first time. Moreover, in terms of the control variables, the free-float market capitalization has a positive correlation with the stock return while the total assets and the leverage of the firms exhibit a negative relationship with the ROE. The coefficients for the 3 control variables are statistically significant at a 1% level. However, the state ownership does not have a significant correlation with the ROE.

Visually, Figure 7 plots the impact of the CSR mandate on the coefficient of ROE throughout the 14-year window. The coefficients on the dummy variables are significantly negative across the 3 years before the mandate. The ROE decreases with an increasing rate after the mandate. Although the coefficients are all negative throughout the 11 years after the mandate, the increasing magnitude of the negative coefficients starts to decrease after the 9th year. Thus, the regression result supports the updated version of the hypothesis – the mandatory disclosure of CSR report decelerates the decrease of firm financial performance in the short run but turns to a positive rate in the long run, when the financial performance is measured by ROE.

7.2 Robustness Check

(1) Parallel-trend Assumption

The parallel trend assumption is a critical assumption to ensure the internal validity of the difference-in-difference models, which requires the difference between the 'treatment' and 'control' group to be constant over time in the absence of treatment conditional on covariates. Although the common trend assumption is untestable, the following mean plots of the dependent variables by CSR disclosure status across the 15 years from 2005 to 2019 provide an approximate visual inspection of the trend between the mandatory disclosure firms and non-disclosure firms over the yearly time points. Also, the significance of the estimated coefficients across the pre-treatment (when $k < 0$) in the 3 regression models is used to explore the parallel-trend assumption.

The mean plot of the annualized stock return by CSR disclosure status reflects that the non-disclosure firms' average stock return has been around the same level as the mandatory disclosure firms' average stock return before the mandate. The visual inspection of stock return trend between the mandatory disclosure firms and non-disclosure firms seems to support the assumption that the difference between the treatment and control group is approximately constant over time. However, the more precise pre-trends reflected from the regression plot (Figure 5) indicates that the coefficients are significantly positive throughout

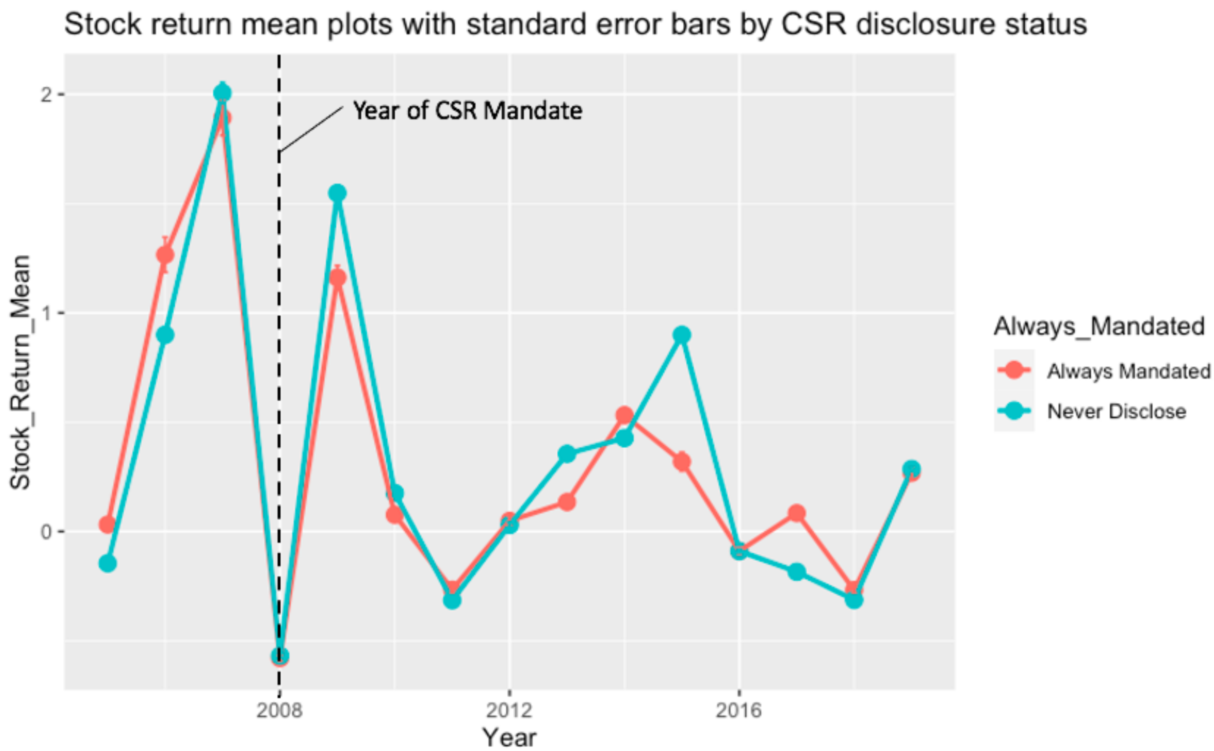

Figure 8: Annualized stock return mean plot by CSR disclosure status

the year 2005 to 2006 (when year relative to mandate equal to -3 and -2) and is insignificant in the year 2007 (when year relative to mandate equal to -1). Thus, the parallel-trend assumption may not be satisfied when stock return is used to measure the financial performance, thus the estimation may be biased. However, since the direction of the stock return change before and after the mandate changes from significantly positive to significantly negative, it is still valid to interpret the effect of mandatory CSR disclosure and learn from its dynamic influence over time.

The mean plot of Tobin's Q by CSR disclosure status demonstrates that the mandatory disclosure firms' average Tobin's Q was approximately equal to non-disclosure firms' average Tobin's Q before the mandate (the year of 2008). After the mandate, the non-disclosure firms' average Tobin's Q start to outperform the mandatory disclosure firms' average Tobin's Q. Thus, the visual inspection of the Tobin's Q trend between the mandatory disclosure firms and non-disclosure firms supports the assumption that the difference between the treatment and control group are constant over time. Also, according to the pre-treatment regression

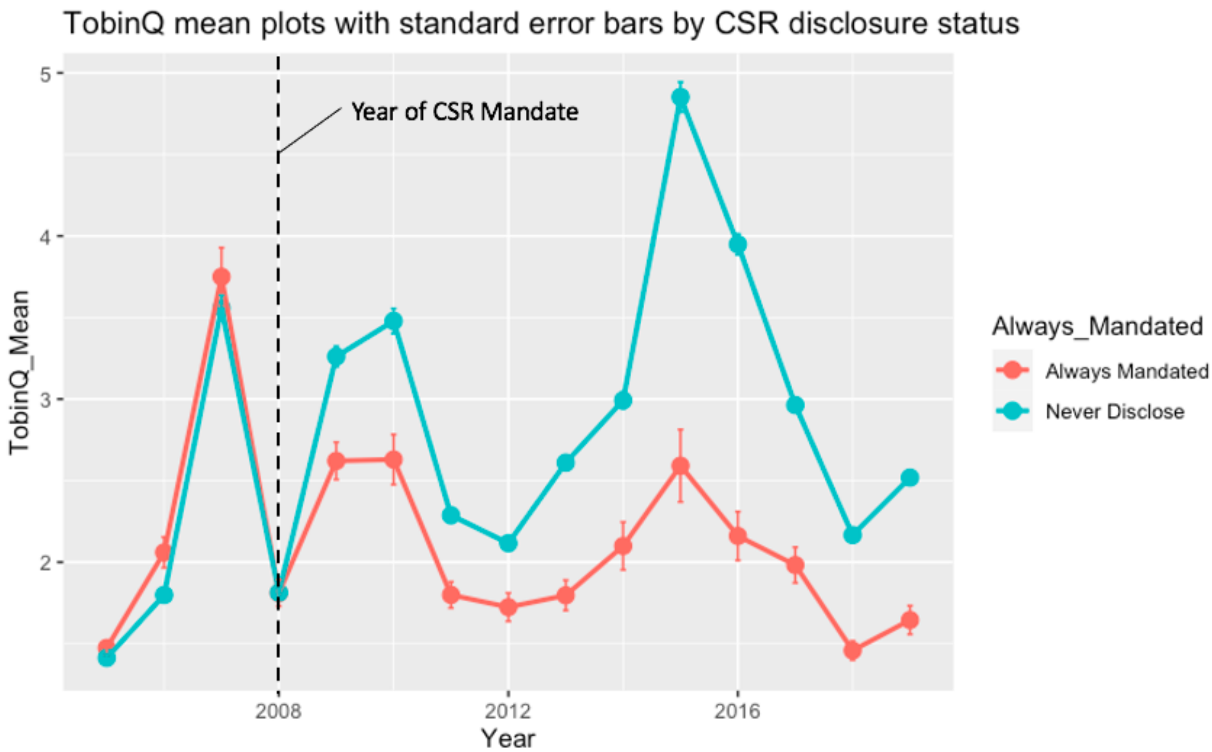

Figure 9: TobinQ mean plot by CSR disclosure status

results reflected from the regression plot (Figure 6), the coefficients are insignificant throughout the year 2005 to 2007 (when the years relative to mandate are negative), indicating that there is no significant difference between the control and treatment group before the mandate. Thus, the parallel-trend assumption is more likely to be satisfied when Tobin's Q is used to measure the financial performance, and the estimation may be less biased.

The mean plots of ROE by CSR disclosure status reveals that the average ROE between the mandated firms and non-mandated firms are not parallel before the mandate. The pre-treatment regression results reflected from the regression plot (Figure 6) also suggest a violation of parallel trend assumption, which leads to biased estimation of the effect. Nevertheless, there may be omitted control variables that could capture the remaining differences between the control and treatment groups before the mandate. To reduce such bias, the study could further consider add other firm-level controls such as cash holding and firm size or add an instrumental variable.

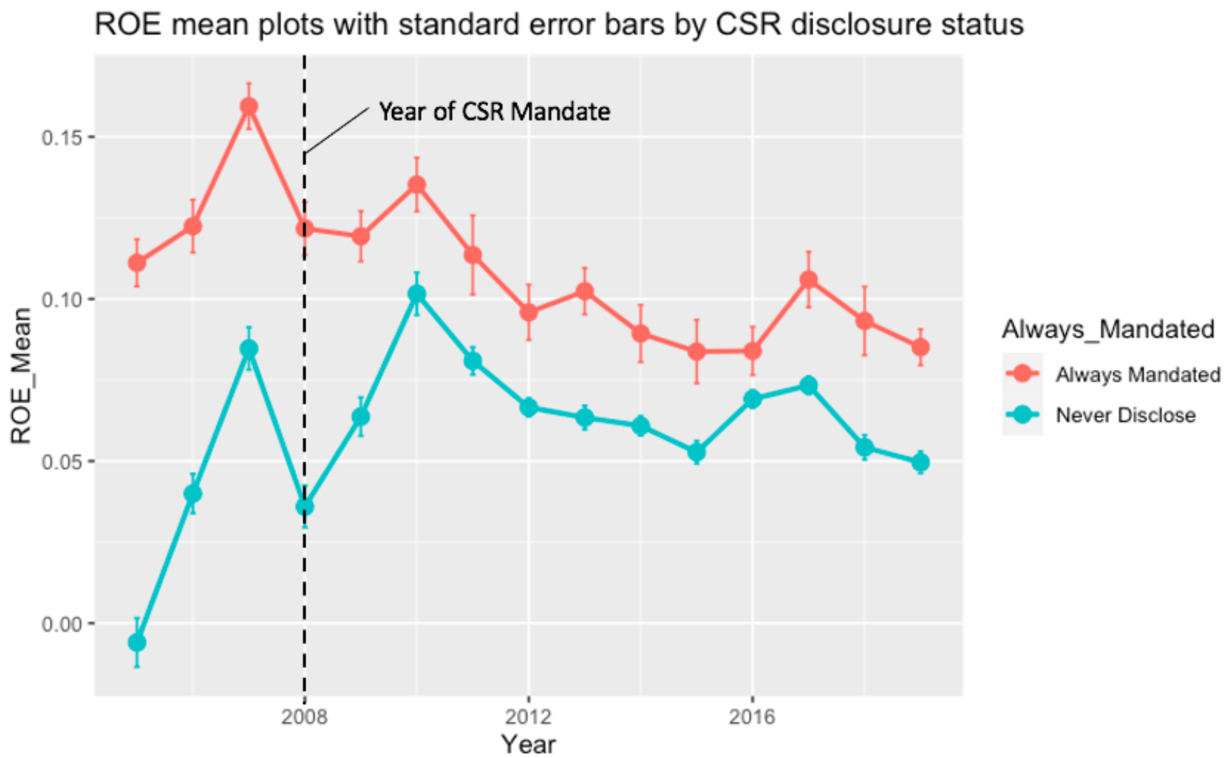

Figure 10: ROE mean plot by CSR disclosure status

7.3 Theoretical Implications

While adopting and disclosing corporate social responsibility attracts investors and clients, drives operation efficiency, and generates long-term benefits with social goodwill, the effort of increasing CSR activities and preparing for CSR reporting could nevertheless be costly. The empirical results of the CSR impact on the annualized stock return, Tobin's Q, and ROE support the hypothesis that firms' mandatory disclosure of CSR activities undermines their financial performance in the short run but benefits their financial performance in the long run. Theoretically, although more and more investors are more inclined to increase their portfolio value by investing in stocks of corporations with CSR disclosure, it takes time for investors and the market to react and for the effect to emerge. On the other hand, there is an initial fixed cost associated with CSR implementation and disclosure such as purchasing energy-efficient appliances and preparing CSR documentation (Sahm 2020). The fixed cost as well as other operating and non-operating expenses would create burdens on the firms and negatively affect their performance in the short run. However, in the long run, the average and marginal cost would decrease and be exceeded by the benefits of CSR.

To empirically investigate the influence mechanism behind the dynamic trend of the mandatory CSR impact, the study focuses on 3 impact channels: the expenditure, the revenue, and the investment. Therefore, the following models are constructed to examine the effect of CSR disclosure on expenditure, revenue, and investment. To confirm the economic implications, the mechanism investigation aims to test the hypothesis that the treatment firms experience a decrease in sales revenue and stock price in the short-run but eventually increase in the long run. On the other hand, treatment firms experience an increase in operating expenses and/or non-operating expenses in the short run but a decrease, or at least a decelerating expenses in the long run.

Expenses:

$$\mathrm{Non-operatingExpenses}_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=1}^{K} \beta_k D_{iy}^k + controls_{iy} + \epsilon_{iy},$$

$$\mathrm{OperatingExpenses}_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=1}^{K} \beta_k D_{iy}^k + controls_{iy} + \epsilon_{iy},$$

Revenue:

$$SalesRevenue_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=1}^{K} \beta_k D_{iy}^k + controls_{iy} + \epsilon_{iy},$$

Investment:

$$\mathrm{StockPrice}_{iy} = \alpha_y + \delta_g + \theta M_i + \sum_{k=1}^{K} \beta_k D_{iy}^k + controls_{iy} + \epsilon_{iy},$$

Furthermore, different measures of firm financial performance focus on different aspects of evaluation standpoints, for example, the ROE focuses on profitability, the Tobin's Q focuses on whether the firm is overvalued or undervalued, while the stock return focuses on the investment return. They have been impacted by firms' CSR-related operations, such as increasing expenses on CSR activities, adjusting firm structure to ensure better CSR performance, and creating associated externalities, in different ways and to different degrees. Hence, it merits further investigation in individually examining the different impact channels.

8 Conclusion

The study investigates the impact of mandatory corporate social responsibility on firm financial performance in both the short and long run. It contributes to the broad field of CSR and its financial impacts with empirical evidence from China using a difference-in-difference approach and provides insight into the dynamic effect of corporate social responsibility practices, especially the cost and benefit of CSR and its progress over time. When the stock return, ROE, and Tobin's Q are adopted to measure the firms' financial performance, the regression results generally support the hypothesis that the mandatory disclosure of CSR report undermines firm financial performance in the short run but benefits the firm performance in the long run. The empirical results indicate that the mandatory CSR disclosure decreases Chinese firms' stock return in the first 9 years but starts to enhance stock return after the 9th year after the mandate. Likewise, when Tobin's Q is used to measure firm performance, the decreasing trend of the negative CSR coefficients starts to increase after the 7th year after the mandate. When ROE is used to measure firm performance, the increasing trend of the negative CSR coefficients also starts to decrease after the 9th year after the mandate. The study provides encouraging results for Chinese firms seeking to adopt CSR disclosure and governance, since it is found that the long-term benefits of being socially responsible and disclosing CSR information exceed the costs, even if the short-term impact may be adverse.

9 Discussion: Further Improvements

This paper explores the dynamic impact of mandatory corporate social responsibility with empirical data in China from 2005 to 2019. It provides valid statistical results and economic inference. To dive deeper into the topic and further improve and polish for the MA thesis, I will make the following improvements for the next step. First, it may be helpful to collect more pre-treatment data to better learn the parallel trend before the 2008 mandate. Second, the study will complete a more comprehensive robustness check, with alternative samples, alternative sample intervals, and alternative dependent variables to check the robustness of the results. In addition, to reduce the bias due to the violation of the parallel trend for ROE, the study could further consider adding other firm-level controls such as cash holding and firm size or instrumental variables. Last but not least, I will further investigate how disclosing corporate social responsibility influences firms' operations and investors' reactions by running regressions for the mechanism models.

Furthermore, this study could further check the robustness of the regression result to ensure the accuracy and validity of the estimation. For example, the regression will be run with alternative samples, such as benchmarking with voluntary reporting firms. Also, it could change sample intervals, such as including more pre-treatment years, to see if the coefficients of the core explanatory variables still demonstrate the same patterns with statistical and economic significance. Moreover, I could use alternative dependent variables such as earnings per share (EPS), price to earnings ratio (P/E ratio), and net income, as financial performance measures to test whether the results are always consistent.

10 Citation

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