The Effect of Mandatory CSR Disclosure on Firm Profitability and Social Externalities: Evidence from China

Yi-Chun Chen , Mingyi Hung , Yongxiang Wang

PII: S0165-4101(17)30075-7
DOI: 10.1016/j.jacceco.2017.11.009
Reference: JAE 1171

To appear in: *Journal of Accounting and Economics*

Received date: 22 August 2016
Revised date: 16 August 2017
Accepted date: 16 November 2017

Please cite this article as: Yi-Chun Chen , Mingyi Hung , Yongxiang Wang , The Effect of Mandatory CSR Disclosure on Firm Profitability and Social Externalities: Evidence from China, *Journal of Accounting and Economics* (2017), doi: 10.1016/j.jacceco.2017.11.009

The Effect of Mandatory CSR Disclosure on Firm Profitability and Social Externalities: Evidence from China

Yi-Chun Chen
The Hong Kong University of Science and Technology
ychenci@connect.ust.hk

Mingyi Hung*
The Hong Kong University of Science and Technology
acmy@ust.hk

Yongxiang Wang
University of Southern California
yongxiaw@marshall.usc.edu

August 2017

*Corresponding author.

Abstract
We examine how mandatory disclosure of corporate social responsibility (CSR) impacts firm performance and social externalities. Our analysis exploits China's 2008 mandate requiring firms to disclose CSR activities, using a difference-in-differences design. Although the mandate does not require firms to spend on CSR, we find that mandatory CSR reporting firms experience a decrease in profitability subsequent to the mandate. In addition, the cities most impacted by the disclosure mandate experience a decrease in their industrial wastewater and SO2 emission levels. These findings suggest that mandatory CSR disclosure alters firm behavior and generates positive externalities at the expense of shareholders.

JEL classifications: K20; M14; M4
Keywords: Mandatory CSR disclosure; Firm performance; Social externalities; China

The Effect of Mandatory CSR Disclosure on Firm Profitability and Social Externalities: Evidence from China

1. Introduction

The growing global focus on economic and environmental sustainability has triggered a trend toward requiring firms to disclose their corporate social responsibility (CSR) activities (hereafter, mandatory CSR disclosure).[1] CSR activities encompass corporate social and environmental behavior that goes beyond the legal or regulatory requirement of the relevant market and/or economy (Kitzmueller and Shimshack, 2012). This trend toward requiring CSR disclosure is of particular interest to regulators, investors, and stakeholders, especially in emerging economies. In this study, we examine the impact of mandatory CSR disclosure on firm performance and social externalities.

Specifically, we examine the impact of the CSR disclosure mandate enacted in China in 2008. Although this mandate did not require any changes in firm behavior, we posit that mandatory disclosure impacts a firm's activities because the increased transparency can make it easier for governments and interest groups to pressure firms to engage in more CSR activities. We further posit that this change in behavior may lead to a decrease in firm performance. The intuition is that if these activities benefited firms, they would have been in place before the mandate.

To assess the impact of the CSR mandate on social externalities, our study focuses on environmental pollution. Pollution not only is the key target of the CSR disclosure mandate, but

[1] We define mandatory CSR disclosure as the requirement that a firm issue a broad non-financial report on its activities related to environment, social, and governance issues. The term "CSR disclosure" is often used interchangeably with "environmental, social and governance disclosure" and "non-financial disclosure." Several countries have begun mandating CSR disclosure in recent years (e.g., Malaysia in 2007, and China, Denmark, and Sweden in 2008). In 2013, the European Commission adopted a proposal for a directive enhancing the transparency of certain large companies on social and environmental matters (Ioannou and Serafeim, 2014; Hung et al., 2015).

also provides a classic example of economic externalities. However, the effect of mandatory CSR disclosure on pollution is not obvious. On the one hand, mandatory CSR disclosure may facilitate external monitoring of a firm's environmental performance and thus incentivize firms to decrease their pollution levels. On the other hand, mandatory CSR disclosure may not affect firms' pollution levels if firms focus on other dimensions of CSR, such as staff protection and public relations. Another reason mandatory CSR disclosure may not impact pollution levels is the agency problem (Friedman, 1970). Managers motivated by their own private benefit consumption may engage in ineffective projects or spend resources on pet projects under the guise of CSR, instead of focusing on projects that benefit society.

Using a difference-in-differences (DiD) research design, we compare the change in firm performance among mandatory CSR reporting firms (treatment firms) with the change among non-CSR reporting firms (benchmark firms). We focus on A-share (local share) firms listed on the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) between 2006 and 2011, using 2006-2008 as the pre-period and 2009-2011 as the post-period.[2] We run our analyses using a propensity-score-matched (PSM) sample by making our treatment and benchmark firms more comparable on the observable covariates (Rosenbaum and Rubin, 1984). Our findings indicate that mandatory CSR disclosure changes firm behavior and generates positive externalities at shareholders' expense. They also show, however, that conflicts between stakeholders can make CSR spending less efficient and therefore limit the positive social impact of the mandate.

Specifically, our results show that the treatment firms experience a decrease in return on

[2] Beginning in December 2008, the SSE and SZSE, both fully owned by the government, mandated the release of an annual CSR report for subset of firms. The SSE requires firms listed on the SSE "Corporate Governance Sector," firms with overseas listed shares, and financial companies to release an annual CSR report. The SZSE requires firms included in the Shenzhen 100 index to release CSR reports.

assets (ROA) and return on equity (ROE) subsequent to the mandatory CSR disclosure. In addition, the treatment firms experience a decrease in sales revenue and capital expenditure and an increase in operating costs and impairment charges. In other words, the firms included in the 2008 disclosure mandate experience a decrease in profitability after the mandate. These results hold up to a variety of robustness checks.

We next examine the effect of disclosure on city pollution levels.[3] Our results show that the cities most impacted by the CSR disclosure mandate (i.e., cities with a high proportion of treatment firms) experience a greater reduction in both the amount of industrial wastewater discharge and the level of SO2 (sulfur dioxide) emission after the CSR disclosure mandate.

Using a unique dataset of reported CSR activities, we find that CSR spending is driven primarily by political/social factors (e.g., state ownership and polluting industries) rather than by economic considerations. This finding is consistent with our argument that mandatory CSR disclosure increases political/social pressure regarding a firm's CSR activities. We also find that total CSR spending, especially environmental protection spending, is associated with decreases in firm profitability and pollution. This finding supports the inference that mandatory CSR disclosure increases CSR spending.

Furthermore, we find that the observed decrease in firm profitability is driven primarily by state-owned enterprises (SOEs), while the observed decrease in environmental pollution is driven primarily by cities with fewer SOEs. This implies that SOEs' CSR spending is less efficient than that of other firms. Consistent with our inference that mandatory CSR disclosure

[3] We use city-level pollution data to capture the effect of the disclosure mandate on environmental externalities as a firm's behavior may affect the behavior of other firms in the same city. We match cities with firms by identifying the city in which a firm is registered. In China, a firm's registration location should be the same as the location of its main office. Our city-level pollution data, compiled by the National Bureau of Statistics of China, are publicly available and widely monitored by international organizations such as the World Bank. We are not aware of any time-series firm-level pollution databases for firms in China.

generates positive social externalities, we also find that our treatment firms have fewer workplace fatalities subsequent to the mandate. In addition, we find that our treatment firms suffer a more negative stock market reaction than do our benchmark firms. The market reaction to the CSR disclosure mandate is positively associated with a future change in ROE and negatively associated with future CSR spending among our treatment firms. This finding suggests that investors anticipate a decrease in firm performance and an increase in CSR spending after the CSR disclosure mandate.

Our study makes several contributions to the literature. First, we provide evidence that the mere fact of requiring CSR reporting affects both firm behavior and environmental pollution. A fundamental question in welfare economics is how governmental intervention in economic activities can impact pollution levels (Pigou, 1920; Coase, 1960). While the use of disclosure-based regulations to curb pollution is not new, these regulations have typically focused on specific types of pollutants. In addition, the empirical evidence for their effectiveness is limited and inconclusive.[4] Our study contributes to the literature by providing clear evidence of the impact of a broad CSR disclosure mandate on firm performance. In addition, by using a DiD design and detailed CSR spending data, our study provides more direct evidence for the environmental impact of the disclosure mandate.

Second, our study complements prior literature that documents the benefit of voluntary CSR disclosure on the cost of equity capital and information environments (Dhaliwal et al.,

[4] A well-known example is the 1986 Toxic Release Inventory (TRI) in the U.S. While some research suggests that TRI has spurred large reductions in toxic release (Hamilton, 2005), other studies raise significant doubts regarding the causal link between TRI and toxic release levels (Bui and Mayer, 2003).

2011, 2012).[5] These results may not apply to firms that are required to disclose their CSR. Indeed, we find that mandated CSR disclosure can exacerbate agency problems and reduce shareholder wealth. This finding also underscores the different effects of mandated CSR versus financial disclosure on firm value, as prior studies suggest that mandatory financial disclosure increases firm value and decreases agency conflicts (Greenstone et al., 2006; Hope and Thomas, 2008).

Third, our paper adds to a growing body of working papers that examine the economic consequences of mandatory CSR disclosure. One stream of this research focuses on disclosure practices and information environments (Ioannou and Serefeim, 2014; Hung et al., 2015), while another focuses on market reactions to disclosure (Grewal et al., 2015).[6] Our study provides a new research stream by examining the effect of mandatory CSR disclosure on firm performance and social externalities.

While we acknowledge that mandated disclosure may have different effects across institutional environments, we interpret our results as support for the notion that the stakeholder pressure associated with disclosure regulation can cause a firm to take action. In addition, while our SOE result may be unique to the Chinese environment, this result more generally implies that agency conflicts can attenuate the positive social impacts of mandated disclosure. Finally, although we cannot quantify the social externalities in our study, our results suggest that the "pain" inflicted on shareholders by a mandated disclosure has at least some benefit to society.

[5] A related stream of the literature examines the effect of voluntary CSR activities (e.g., Eichholtz et al., 2010 for green office building; Edmans, 2011, 2012 for employee job satisfaction; Elfenbein et al., 2012 for charity; Servaes and Tamayo, 2013 for overall CSR activities).

[6] Manchiraju and Rajgopal (2017) examine market reactions to mandatory CSR *spending* (not mandatory CSR *disclosure*) in India.

The rest of our paper is organized as follows. In Section 2, we discuss the institutional background of our sample and our empirical predictions. Section 3 describes our sample and data. In Section 4, we first outline our research design and then present our empirical results. Section 5 presents the results of our additional analyses, and Section 6 concludes the paper.

2. Institutional background and empirical predictions

2.1. Institutional background

To address public concerns regarding environmental conditions, the Chinese government has undertaken a number of CSR initiatives in recent years (World Bank, 2007; Zhu et al., 2015). These initiatives reflect the view that CSR can contribute to "building a harmonious society," a key goal outlined by the Chinese Communist Party at the 2006 National People's Congress (Lin, 2010). In one of the first directives regarding CSR activity, the 2006 Chinese Company Law required companies to undertake social responsibility in the course of conducting business.[7] In addition to the 2006 mandate, the government has implemented a number of specific CSR actions, including (1) issuing additional guidelines that encourage listed companies to bear social responsibilities (e.g., the 2006 "Guidelines on Social Responsibility of Companies Listed on the Shenzhen Stock Exchange" by the SZSE), (2) tying access to bank financing to a firm's CSR performance (e.g., the "Green Credit Guidelines" by the China Banking Regulatory Commission), (3) placing excessively high-polluting firms on an official black list (e.g., the "Environmental Protection Agency Black List" by the China Ministry of Environmental Protection), (4) publicizing CSR performance rankings (e.g., "Research Report on Social

[7] Article 5 states: "a company shall abide by laws and administrative regulations, observe social morals and commercial ethics, persist in honesty and good faith, accept supervision by the government and the public, and assume social responsibility." See http://english.sse.com.cn/laws/framework/c/3978492.pdf.

Responsibility of China" by the Chinese Academy of Social Science), and (5) granting CSR awards (e.g., the annual CSR awards by the *People's Daily*, the official Communist Party newspaper). These steps are designed to recognize firms with strong CSR records while punishing firms that are weak on CSR.

To ensure that firms are publicly transparent about their CSR, in December 2008, both the SSE and SZSE began mandating CSR disclosure for a subset of firms listed on their respective exchanges.[8] Given that the SSE and SZSE are fully owned by the government and directly supervised by the China Securities Regulatory Commission (CSRC), this mandate is essentially a governmental requirement. Specifically, the SSE announced on December 30, 2008 that firms listed in its "Corporate Governance Sector," firms with shares listed overseas, and financial companies were henceforth required to issue a CSR report with their annual report beginning with the 2008 report. On December 31, 2008, the SZSE released a similar announcement pertaining to all firms on its "Shenzhen 100 Index." Panel A of Appendix A presents the text of each news announcement. The announcements indicated that firms that failed to provide reports would be subject to delisting, and that both the firms and the persons in charge would be subject to public condemnation.[9]

As we draw our sample from firms listed on the key stock exchange indices, our treatment firms are likely to be large. Specifically, the SSE Corporate Governance Index as of 2008 is a compilation of 230 listed companies with the best governance practices. Likewise, the SZSE 100 Index represents the top 100 A-share listed companies as ranked by total market

[8] All Chinese firms are required to end their fiscal year on December 31. While the regulation may not have been totally unexpected, this is the first time the stock exchanges ***required*** a certain set of firms to release CSR reports.

[9] As CSR reports do not need to be audited or assured, firms were able to construct their CSR reports soon after the regulatory announcement in December. For the firms in our sample, we find that all firms under the CSR disclosure mandate issue CSR reports, although only 2% of these reports are assured.

capitalization, free-float market capitalization, and share turnover. To mitigate the concern that, given the criteria for listing on these indices, our treatment group may not be randomly selected, we use a DiD-PSM method to make our treatment and benchmark firms more comparable based on the index selection criteria.

Panel B of Appendix A presents the guidelines for the CSR reports from the SZSE. The SSE has similar guidelines. Specifically, the SZSE requires firms to provide information on their activities in the following areas: (1) protection of the interest of shareholders and creditors, (2) protection of workers' rights, (3) protection of suppliers, customers, and consumers, (4) environmental protection and sustainable development, and (5) public relations and social welfare services. Panel C of Appendix A includes a summary and excerpts from the CSR report of one of our sample firms, Shanxi Xishan Coal and Electricity Power Co.

2.2. Empirical predictions

Studies have found that CSR activities provide a number of benefits to a firm's stakeholders, including increased employee morale, a better firm reputation, and more harmonious growth (Edmans, 2012; Servaes and Tamayo, 2013). However, these studies have examined CSR activity in a *voluntary* disclosure setting. In our study, we are interested in whether the move to *mandated* disclosure affects a firm's CSR behavior and, by extension, its performance and levels of generated pollution.

We posit that when firms are required to disclose their CSR activities, they feel pressure to increase their commitment to CSR. In China, firms are encouraged to participate in CSR through governmental measures such as green financing, environmental blacklists, and CSR awards. Mandated CSR disclosure allows the government to assess the effectiveness of these measures. In addition, numerous environmentally focused non-governmental organizations

(NGOs) publish pollution maps, lists of high-pollution firms, and firm-specific CSR performance evaluations.[10] Other stakeholders (e.g., suppliers, consumers, employees, and local communities) also closely watch and often act upon negative CSR incidents such as workplace deaths and chemical leaks. The rationale is that these constituents benefit from the increased transparency prompted by mandatory CSR disclosure, and in turn are able to identify firms that can be pressured into increasing their CSR activities. As firms would have undertaken such activity before the mandate if it were beneficial to performance, we predict that this increase in CSR activity comes at a cost to performance. We note, however, that the resultant political/social pressure may not be strong enough to alter a firm's behavior. Accordingly, our first hypothesis is stated as follows (in alternative form).

Hypothesis 1: Firms experience a decrease in performance subsequent to the mandatory CSR disclosure.

For the impact of mandatory CSR disclosure on social benefits, we focus on the environmental impact of the disclosure mandate, of which pollution control is an important goal. We expect that mandating CSR disclosure will decrease pollutant emissions due to the expected increase in CSR activities. That is, once firms disclose their CSR activities, the government and interest groups may find it easier to "shame" polluting firms into reducing their pollutant emissions (Thaler and Sunstein, 2008). However, mandatory CSR disclosure may not decrease pollution. First, firms may choose to increase their CSR activities in areas such as staff protection and public relations rather than in pollution reduction. Second, managers may choose

[10] For example, the IPE (Institute of Public & Environmental Affairs), an NGO based in Beijing, develops and publishes the China Pollution Map Database to monitor corporate environmental performance. Another NGO, Greenpeace, analyzes the emissions of toxic and hazardous metals in key industrial areas in China and publishes the names of the offending firms (e.g., Greenpeace, 2010).

CSR activities that provide private rather than social benefits (Friedman, 1970). Our second hypothesis is stated as follows (in alternative form).

> *Hypothesis 2: Cities experience a decrease in pollution subsequent to the mandatory CSR disclosure.*

An assumption underlying this hypothesis is that a firm's factories are located near its registration city. Article 10 of the Chinese Company Law states: "The domicile of a company shall be the place where its main administrative organization is located." In addition, a company can face disciplinary actions if its registration location differs from the location of its main operation.[11] As a manufacturing firm's main operation is the production of goods, it is reasonable to assume that its factories are located near the registration city.[12]

We note that results supporting both our first and second hypotheses suggest that mandatory CSR disclosure generates positive externalities at the expense of shareholders. In contrast, results that support only our first hypothesis suggest that the increased CSR investments represent not only net costs to the firms but also expenditures that are at least partially wasteful for the economy.

3. Sample and descriptive statistics

3.1. Sample

[11] For an enforcement action against a company whose registration address differs from the operation address, see http://www.pkulaw.cn/case_es/pfnl_1970324837343308.html?match=Exact.

[12] To further validate the assumption that factories are generally located near a firm's registration city in China, we use the 2007 data on registered sites and business scopes of a firm's subsidiaries from the GTA China Stock Market Related Party Transaction Research Database. Among 673 sample parent firms with manufacturing subsidiaries, we find that 82% have at least one manufacturing subsidiary located in the parent's registration city. We caution that this number does not reflect the existence of a manufacturing firm's own factories (i.e., its main operation) in the registered city. For example, Shanxi Taigang Stainless Steel, registered in Taiyuan City, has its own factories and manufacturing subsidiaries (electrical equipment repair, steel pipe, and mining companies) in the same city. Even with this limitation, this analysis suggests that most firms have production facilities near their registration city.

We obtain stock price and financial statement information from the China Security Market and Accounting Research (CSMAR) database and pollution and economic data from the GTA Regional Economy database. Our initial sample consists of all of the firms listed on the SSE and SZSE from 2006 to 2011. We exclude financial firms and B-share (foreign share) firms, as they are subject to different regulations and market trading mechanisms. In addition, we exclude firms that voluntarily released CSR reports during our sample periods.[13] Finally, we exclude firm-years that are missing necessary data for the variables used in our analysis or that have non-positive shareholders' equity. After these exclusions, we are left with a sample of 6,952 firm-years. From this sample, we identify 1,674 treatment firm-years and 5,278 benchmark firm-years.[14]

We use a DiD research design that compares changes in firm profitability among treatment firms with changes in firm profitability among our benchmark firms during our sample period. We use both ROA and ROE to measure firm profitability. Using ROA allows us to make inferences regarding firm performance independent of leverage, while using ROE allows us to make more comparable inferences regarding shareholder wealth and stock prices.

To mitigate the concern that our treatment sample is not randomly selected, we use a PSM approach to further match our CSR reporting firms to non-CSR reporting firms. We first use a logit regression to estimate the probability of being a treatment firm, using our pre-mandate period data. We include the following four sets of variables in our regression: (1) market capitalization (*MV*), share turnover (*Turnover*), stock returns (*Return*), and return on equity (*ROE*), as reflected in the guidelines of either the SSE Corporate Governance Index or the SZSE

[13] We identify voluntary CSR reporting firms using Syntao (a Beijing-based CSR consulting firm). The number of voluntary CSR reporting firms increases over our sample period, from 155 in 2006 to 290 in 2011.

[14] To ensure that all treatment firms have the same post-mandate period, we restrict our treatment firms to those in the SSE governance sector and those in the SZSE 100 firms as of 2008.

100 index, (2) the percentage of shares owned by the government (*State ownership*), a dummy variable indicating whether a firm's top executives are former government officials (*Political connection*), and donations (*Donation*), to capture a firm's governance characteristics and political/social strategies, (3) the number of analysts following (*Analysts*), because the evaluation committee consists primarily of financial intermediaries, and (4) a dummy variable indicating firms in high-pollution industries (*Polluting firm*) to capture the likelihood that a firm will pollute. In addition, we include industry fixed effects and year fixed effects. Appendix B provides detailed definitions of the variables. Panel A of Appendix C shows that the likelihood of being a treatment firm is positively associated with firm size, turnover, state ownership, and analyst following, and negatively associated with stock returns.

We then match each treatment firm to a benchmark firm using the nearest neighbor matching technique with replacement and setting the caliper to 0.25*standard error of the propensity score (Dehejia and Wahba, 2002). Panel B of Appendix C reports the effectiveness of our matching procedure. These results suggest that our PSM procedure reduces differences between our treatment and benchmark firms before the mandate. This procedure results in a primary (PSM) sample of 3,120 firm-years, 1,643 of which are treatment firm-years and 1,477 of which are benchmark firm-years.

Table 1 presents the distribution of our sample. Panel A provides the distribution of treatment and benchmark firms by year. For our full sample, we see that the number of treatment firms ranges from 262 in 2006 to 286 in 2009. We also see an increasing number of benchmark firms, reflecting the growth in the number of listed firms in China during our sample period. Panel B provides the distribution of treatment and benchmark firms by industry sector. Not surprisingly, compared with the full sample, the PSM sample exhibits a more comparable

industry composition across treatment firms and benchmark firms.

To determine pollution levels, we focus on city-level pollution in cities where publicly listed companies are registered. We use a DiD research design that compares changes in pollution across the cities most impacted by the disclosure mandate with changes across the other cities during our sample period. We classify a city as "most impacted" if its 2008 ratio of the total assets of mandatory CSR reporting firms to the total assets of all firms in the city is higher than the sample city-level median (49%). Using this procedure, we identify 1,199 city-years from 2006 to 2011, including 626 most impacted city-years and 573 other city-years.

3.2. Variables and descriptive statistics

Table 2 presents the descriptive statistics for our firm-level (Panel A) and city-level (Panel B) variables, winsorizing all continuous variables at the top and bottom 1% of their distributions. For brevity, we present the descriptive statistics for only the PSM sample. We use ROA as our primary measure of profitability and ROE as an alternative measure. Panel A shows that the mean *ROA* (*ROE)* during our sample period is 0.05 (0.11) for our treatment firms and 0.04 (0.07) for our benchmark firms. We use industrial wastewater discharge to measure water pollution and SO2 emission to measure air pollution (Grossman and Krueger, 1995; Jiang et al., 2014). These variables are (1) *Wastewater*, measured as the natural logarithm of the ratio of industrial wastewater discharge (in 10,000 tons) to the total assets (in billions of RMB) of firms in the city and (2) *SO2*, measured as the natural logarithm of the ratio of SO2 emissions (in tons) to the total assets (in billions of RMB) of firms in the city. Panel B shows that the mean *Wastewater* (*SO2*) is 5.79 (7.83) for the most impacted cities and 6.90 (9.08) for the other cities.

Finally, Panels C and D of Table 2 present the Pearson correlation coefficients among our firm- and city-level variables, respectively. As expected, Panel C shows a high correlation (0.87)

between our two profitability measures (*ROA* and *ROE*). Panel D shows that our two pollution variables, *Wastewater* and *SO2*, are also highly correlated, with a correlation coefficient of 0.80.

4. Empirical results

4.1. The effect of mandatory CSR disclosure on firm performance

In this section, we present the results of our empirical analyses. We first explore how mandatory CSR disclosure affects firm profitability by regressing *ROA* and *ROE* on a dummy variable indicating whether the period is post-period (*Post*), a dummy variable indicating whether the firm is a mandatory CSR reporting firm (*Treatment firms*), and their interaction term. In our regressions, we include industry fixed effects and control for the following firm characteristics that are likely to be correlated with firm profitability: firm size, cash holding, and state ownership. Specifically, our regression model is as follows:

$$ROA/ROE = \beta_0 + \beta_1(Post) + \beta_2(Treatment\ firms) + \beta_3(Post \times Treatment\ firms) + \beta_j(Controls_j) + \varepsilon. \quad (1)$$

Our variable of interest in the preceding model is the coefficient on the interaction term, β_3, which captures the change in profitability for our treatment firms relative to the change for our benchmark firms subsequent to the CSR disclosure mandate. A negative (positive) coefficient on β_3 indicates a decrease (increase) in firm profitability after the mandate. We use robust standard errors clustered by firm for all of our firm-level analyses.

Table 3 presents the results of our regressions. Panel A reports the results using the PSM sample. Column 1 (2) shows an insignificant coefficient on *Post* for *ROA (ROE)*, indicating that our benchmark firms do not experience any change in *ROA* (*ROE)* subsequent to the disclosure shock. By contrast, the coefficient on *Treatment firms* is significantly positive, indicating that our

treatment firms have higher *ROA* (*ROE)* than do our benchmark firms before the disclosure shock. Importantly, we find that the coefficient on the interaction term, *Post* × *Treatment firms*, is significantly negative in both columns (1) and (2). These results suggest that, relative to non-CSR reporting firms, mandatory CSR reporting firms experience a decrease in profitability subsequent to the disclosure shock. This change is also economically significant, with *ROA (ROE)* decreasing by 26% (20%) subsequent to the mandate.[15]

To mitigate concerns regarding potentially correlated omitted variables, we perform an alternative specification that includes a full set of group effects (i.e., firm fixed effects) and a full set of time effects (i.e., year fixed effects) in our DiD estimation. In this alternative specification, we suppress the coefficients on *Treatment firms* and *Post* because there is no within-firm variation of *Treatment firms* and no within-year variation of *Post*. The results, reported in columns (3) and (4) in Panel A of Table 3, indicate that our inferences remain unchanged with this alternative specification, suggesting that our results are not driven by potentially correlated omitted variables.

Exploring our profitability results further, we examine changes in sales revenue, expenses, investment, and firm value subsequent to the disclosure shock. Panel B of Table 3 presents the results. The results in columns (1)-(5) indicate that mandatory CSR reporting firms experience a decrease in sales revenue and an increase in operating costs and impairment charges subsequent to the mandate. We interpret these results as evidence that firms respond to the mandate by shutting down some production facilities (as reflected in the lower sales revenue and higher impairment charges subsequent to the disclosure shock) and increasing their spending on

[15] 26% = -0.013/0.05, where -0.013 is β_3 in column (1) in Panel A of Table 3, and 0.05 is the mean *ROA* for treatment firms in Panel A of Table 2. 20% = -0.022/0.11, where -0.022 is β_3 in column (2) in Panel A of Table 3, and 0.11 is the mean *ROE* for treatment firms in Panel A of Table 2.

pollution control and the labor force (as reflected in the higher operating costs). The results in columns (6) and (7) suggest that mandatory CSR disclosure leads to a decrease in investment and firm value.

To assess the robustness of our results, we re-run our analyses using four alternative samples: (1) a balanced sample that requires a firm to appear at least one year in the pre-period and one year in the post-period, (2) a modified sample that replaces the benchmark PSM firms with firms that voluntarily release CSR reports, (3) a modified sample that restricts our benchmark firms to the same minimum and maximum size range as the treatment firms, and (4) the full sample. We find that the coefficient on *Post* × *Treatment firms* continues to be significantly negative, indicating that our inferences are robust to the use of alternative samples.

Finally, we perform tests to assess the validity of the parallel trend assumption underlying our DiD estimation. In our first test, we replace *Post* with indicator variables that track the effect of the mandatory CSR disclosure before and after it becomes effective, using 2008 as the benchmark year (Bertrand and Mullainathan, 2003). We then add two variables, *Year -2* and *Year -1*, for the pre-period and three variables, *Year +1*, *Year +2*, and *Year +3*, for the post-period. We next interact these five timing variables with *Treatment firms*. The results, reported in column (1) of Panel D, show insignificant coefficients on *Year -2* × *Treatment firms* and *Year -1* × *Treatment firms*, and significantly negative coefficients on *Year +1* × *Treatment firms*, *Year +2* × *Treatment firms*, and *Year +3* × *Treatment firms*. In our second test, we assign 2007 as a pseudo mandatory disclosure adoption year, classifying our firm-year observations as post-period if the year falls in 2008. Column (2) of Panel D shows no evidence of changes in firm profitability subsequent to the pseudo mandatory disclosure adoption year. In our third test, we repeat our analysis after deleting 2008 from our sample. Column (3) shows that the coefficient

on the interaction term *Post* × *Treatment firms* continues to be significantly negative. These results support the parallel trend assumption. They also suggest that our observed decrease in firm profitability for our treatment firms occurs after the disclosure mandate becomes effective. Taken together, the results in Table 3 suggest that mandatory CSR disclosure decreases firm profitability.

4.2. The effect of mandatory CSR disclosure on city-level pollution

This section examines the effect of the CSR disclosure mandate on city pollution levels. We begin this analysis by regressing our city-level pollution variables (*Wastewater* and *SO2*) on a dummy variable indicating whether the period is post-period (*Post)*, a dummy variable indicating whether the city is "most impacted" by the disclosure mandate (*Most impacted cities*) and their interaction term. In our regression, we control for city-level GDP per capita (*GDP*) as it is possible that economic development may affect pollution levels (Grossman and Krueger, 1995). In addition, we include province fixed effects. Our regression model is as follows:

$$Wastewater/SO2 = \beta_0 + \beta_1(Post) + \beta_2(Most\ impacted\ cities) + \beta_3(Post \times Most\ impacted\ cities) + \beta_j(Controls_j) + \varepsilon. \quad (2)$$

In the preceding model, our variable of interest is the coefficient on the interaction term, β_3, which captures the change in pollution in the most impacted cities relative to the change in the other cities subsequent to the CSR disclosure mandate. A negative coefficient on β_3 is consistent with a decrease in pollution while a positive coefficient on β_3 is consistent with an increase in pollution. We use robust standard errors clustered by city for all of our city-level analyses.

Panel A of Table 4 shows that the coefficient on *Post* is significantly negative in columns (1) and (2), indicating that our benchmark cities experience a decrease in industrial wastewater

discharge and SO2 emissions, respectively, subsequent to the disclosure shock. In addition, the coefficient on *Most impacted cities* is significantly negative, indicating that the most impacted cities have lower pollution levels than do our benchmark cities prior to the disclosure shock. Importantly, the coefficient on *Post* × *Most impacted cities* is significantly negative in both columns, suggesting that the most impacted cities experience a greater decrease in industrial wastewater and SO2 emission subsequent to the mandate. This change is also economically significant, with a city-level decrease of 28% (24%) in industrial wastewater discharge (SO2 emission) after the disclosure mandate.[16] Columns (3) and (4) show results using an alternative specification including city and year fixed effects and suppressing the dummy variables *Most impacted cities* and *Post* (because there is no within-city variation of *Most impacted cities* and no within-year variation of *Post*). Using this alternative specification, we find that the coefficient on *Post* × *Most impacted cities* remains significantly negative.

Panel B of Table 4 shows the results of several robustness checks. We first repeat our analysis using *Soot*, measured as the natural logarithm of the ratio of industrial soot emissions (in ton) to total assets of firms (in billions of RMB) in the city, as an alternative measure of pollution. In addition, we restrict our sample to only cities in provinces that include both the most impacted cities and the benchmark cities. Finally, we re-run our analyses after matching the most impacted and benchmark cities by year and lagged GDP per capita. We find that our results remain unchanged in all three analyses.

Overall, the results in Table 4 suggest that mandatory CSR disclosure results in a decrease in water and air pollution in those cities most impacted by the disclosure mandate.

[16] As our dependent variable is a log-transformed variable, the value of 0.28 is computed as exp (0.245)-1, where 0.245 is the absolute value of the coefficient on β_3 in column (1) in Panel A of Table 4. In addition, the value of 0.24 is computed as exp (0.214)-1, where 0.214 is the absolute value of the coefficient on β_3 in column (2) in Panel A of Table 4.

These findings, combined with our previous results that show a decrease in firm profitability, support the view that mandated CSR disclosure generates positive externalities at the expense of shareholders.

5. Additional analyses

5.1. Analysis of CSR spending

Having documented that mandatory CSR disclosure reduces firm performance and pollution, we now explore how a firm decides to allocate its CSR spending and how spending on different types of CSR activities relates to firm performance and pollution. We perform this analysis by obtaining detailed CSR spending data from the GTA China Listed Firm Corporate Social Responsibility Research Database, which compiles CSR activity data from the CSR reports of listed Chinese firms. This dataset includes information on whether CSR projects meet goals in the following mandate categories: (1) shareholder/creditor protection, (2) staff protection, (3) supplier/customer protection, (4) environmental protection, and (5) public relations.

We focus on CSR spending in the categories of staff protection, environmental protection, and public relations, as these categories encompass activities that go beyond legal and regulatory requirements. [17] Examples of such spending include funds for employee training/welfare, capital expenditure on pollution prevention and control, scholarships, and disaster relief involvement. We do not include spending under the other two categories (shareholder/creditor protection and supplier/customer protection) because the projects in these categories consist mainly of regular business transactions (e.g., payments for dividends, interests,

[17] We exclude projects related to wages for staff protection. For environment protection, we focus on capital expenditure projects and exclude items that indicate the outcomes of CSR activities, such as energy savings.

and taxes, issuance of debt or equity, business loans, inventory purchase, and R&D expenditure). As the database draws from CSR reports, we have data for only our sample of post-mandate treatment firms. As some firms may choose not to attach monetary values to their CSR projects, we require a firm-year to have at least one non-missing value in the three categories to be included in our analysis. For each CSR spending category, we aggregate the project-year spending at the firm-year level, deflate the spending by shareholders' equity, and code any firm-year with missing spending as zero.

Panel A of Table 5 shows that our treatment firms allocate most of their CSR spending to staff protection activities (0.66% of shareholders' equity), followed by environmental protection and public relations (0.34% and 0.16% of shareholders' equity, respectively). The amount of total CSR spending on average for our treatment firms is 1.16% of shareholders' equity.[18]

We consider a number of political/social factors as possible determinants of CSR spending. First, we consider the percentage of shares owned by the government (*State ownership*), as firms with high state ownership are more likely to comply with government-initiated CSR mandates and increase their CSR spending. In addition, we include a dummy variable indicating whether the firm is in an industry with high pollution (*Polluting firm*), as polluting firms are under greater scrutiny and may thus invest more in environmental protection to avoid bad publicity. Finally, we include a dummy variable indicating whether a firm's executives are former government officials (*Political connection*), as we expect that political

[18] Our estimation suggests that the average value of total CSR spending is 132 million (1.16%×11,400 million), where 11,400 million is the average shareholders' equity for the treatment firms that report the monetary value of their CSR projects. This number represents a low estimate, as we include only projects with monetary units in our calculations. In comparison, the estimated increase in operating expenses from our earlier analysis is 268 million (0.022 × 12,200 million), where 0.022 is the magnitude of β_3 in column (2) in Panel B of Table 3, and 12,200 million is the average total sales for the treatment firms. This latter number reflects an upper bound for our CSR spending estimates because it includes expenses such as R&D and workers' wages.

connections have an impact on CSR spending, although we do not predict a direction for this influence. It is possible that firms run by former government officials are more likely to spend on CSR in an effort to seek private political benefits (Hung et al., 2012). However, it is also possible that such firms spend less on CSR because their political networks protect them from government pressure (Fisman and Wang, 2015).

We also consider several economic factors because firms with better financial performance may face greater external pressure and/or be in a better position to devote more resources to CSR activities. Following prior studies (Campbell, 2007; Lys et al., 2015), we include several economic factors in our model: firm size (*Size*), profitability (*ROA*), cash holding (*Cash*), leverage (*Leverage*), and growth opportunity (*LogQ*). We use the lagged values of these variables to ensure that they are observable before the CSR spending decision is made. Finally, we include industry and year fixed effects and use a Poisson regression because our dependent variable, *CSR spending*, is non-negative. Our regression model is as follows:

$$\begin{aligned} \textit{CSR spending} = {} & \beta_0 + \beta_1(\textit{State ownership}) + \beta_2(\textit{Polluting firm}) + \beta_3(\textit{Political connection}) + \\ & \beta_4(\textit{Size}) + \beta_5(\textit{ROA}) + \beta_6(\textit{Cash}) + \beta_7(\textit{Leverage}) + \beta_8(\textit{LogQ}) + \sum \beta_n FE + \varepsilon. \end{aligned} \quad (3)$$

Panel B of Table 5 shows that the coefficient on *State ownership* is significantly positive for *Total CSR spending* (column (1)), *Staff protection spending* (column (2)), and *Public relations spending* (column (4)), while the coefficient on *Polluting firm* is significantly positive for *Environmental protection spending* (column (3)). These results suggest that firms with greater government control invest more in CSR activities, specifically in staff protection and public relations activities, subsequent to the disclosure mandate. In addition, firms in the most polluting industries spend more on environmental protection after the mandate. In contrast, the coefficients on the economic variables are mostly insignificant. Although we find a significant

coefficient on *Cash* for *Total CSR spending* and *Staff protection spending*, the direction of this relation is negative, contrary to the intuition that firms with greater cash holdings are more likely to increase their CSR spending after the mandate. Collectively, our results suggest that CSR spending subsequent to the disclosure mandate is mainly due to political pressure/social rather than economic considerations.

We next explore the relation between CSR spending and firm performance after the disclosure mandate. We expect firm performance to be negatively associated with total CSR spending. We further expect spending on environmental protection to have a more negative impact on firm performance than spending on staff protection, as the latter can yield benefits in the form of increased employee morale. We perform this analysis by regressing *ROA* on concurrent CSR spending. As a firm's decision to focus on a particular type of CSR activity is not exogenous, we include the determinants of CSR spending in equation (3) as control variables. Nevertheless, we understand that our results can be interpreted only descriptively due to the inherent challenge of endogeneity in this analysis. Our regression model is as follows:

$$ROA_t = \beta_0 + \beta_1(CSR\ spending_t) + \beta_2(State\ ownership_{t-1}) + \beta_3(Polluting\ firm_{t-1}) + \beta_4(Political\ connection_{t-1}) + \beta_5(Size_{t-1}) + \beta_6(ROA_{t-1}) + \beta_7(Cash_{t-1}) + \beta_8(Leverage_{t-1}) + \beta_9(LogQ_{t-1}) + \sum \beta_n FE + \varepsilon\ . \quad (4)$$

The results in Panel C of Table 5 indicate that the coefficient on *Total CSR spending* is significantly negative (column (1)). This finding corroborates our earlier inference that increased CSR spending post-mandate leads to a decrease in firm performance. We further find that the coefficient on *Environmental protection spending* is significantly negative (column (2)), suggesting that our observed decrease in firm performance is mainly due to the effect of environmental spending.

To analyze the relation between pollution and CSR spending, we regress our city-level water and air pollution variables on *CSR spending*$_{\_city}$, the natural logarithm of CSR spending by all treatment firms in the city, divided by GDP per capita of the city. We also control for city-level GDP per capita and province and year fixed effects. Our regression model is as follows:

$$Wastewater/SO2 = \beta_0 + \beta_1(CSR\ spending_{\_city}) + \beta_2(GDP) + \sum \beta_n FE + \varepsilon\ . \quad (5)$$

Panel D of Table 5 shows a significantly negative coefficient for *Total CSR spending* (columns (1) and (2)), suggesting that cities with firms that exhibit greater CSR spending experience a greater reduction in pollution. In addition, the coefficient on *Environmental protection spending* is significantly negative (columns (3) and (4)), consistent with the intuition that spending on environmental protection has a more direct link to pollution reduction. In sum, our analysis of CSR spending after the disclosure mandate suggests that such spending is driven primarily by political/social factors. In addition, our results indicate that CSR spending, and environmental protection spending in particular, is associated with a decrease in both firm profitability and city-level pollution.

5.2. Analysis conditional on SOEs

This section examines whether our results differ for SOEs. Prior research suggests that SOEs are susceptible to two types of agency problem (Shleifer and Vishny, 1994; Hung et al., 2012). The first may arise due to a potential conflict between the government (the controlling shareholder) and minority shareholders if the government uses the SOE to accomplish its political/social goals. As CSR is viewed as a critical factor in achieving the long-term goals of the Chinese government, the government may use the CSR disclosure mandate to exert direct pressure on SOEs to achieve its political/social goals. A second agency problem may occur if there is a conflict between SOE managers and shareholders. Given the importance of CSR in the

government's political/social planning strategy, SOE managers may take advantage of the disclosure mandate to extract private political benefits and/or engage in wasteful CSR activities (e.g., contributing to questionable charities or corrupt projects) at the expense of minority shareholders. In addition, as SOE managers are not subject to market competition, they may not have strong incentives to make efficient or socially beneficial investments (Jiang et al., 2014; Talukdar and Meisner, 2001).

To test whether our results differ for SOEs, we partition our sample based on whether a firm is an SOE and then re-run our Table 3 analysis. We define an SOE as a firm whose ultimate controlling owner is the government.[19] Panel A of Table 6 reports the sample distribution of the SOEs and non-SOEs in our sample by industry sector. There is a higher proportion of SOEs in strategic industries such as utilities and transportation.

Panel B of Table 6 reports the regression results. The coefficient on *Post* × *Treatment firms* is significantly negative for SOEs (columns (1)-(2)), but insignificant at conventional levels for non-SOEs (columns (3)-(4)). These results indicate that the SOEs included in the disclosure mandate experience lower profitability than those not included in the mandate, but that there is no difference in profitability for non-SOEs that are included versus not included in the mandate. To address the possibility that SOEs in general may be more likely to be in high-pollution industries, we restrict our sample to only firms in high-pollution industries and re-run our analyses. Our results in columns (5)-(8) show that the coefficient on *Post* × *Treatment firms* is significantly negative in columns (5)-(6), but is insignificant at conventional levels in columns (7)-(8). This finding is consistent with our inferences in columns (1)-(4) and suggests that our

[19] Chinese companies are required to report their ultimate controlling owner in their annual report. There is no direct ownership threshold for a firm to be classified as an SOE because the government can control the firm via a pyramidal structure and cross-holdings. SOEs are subject to the supervision of SASAC and are listed on the SASAC website.

observed decrease in firm profitability is driven primarily by a decrease in the profitability of SOEs.

To further explore whether the agency problems of SOEs lead to less efficient CSR investment, we partition our sample based on whether a city has a high proportion of SOEs and re-run our analyses. We classify a city as a high-SOE city if the ratio of the assets of SOEs to the assets of all firms in the city is greater than the sample city-level median (95%) as of 2008.[20] Panel C of Table 6 shows that the coefficient on *Post×Most impacted cities* is insignificant at conventional levels for our high-SOE sample (columns (1) and (2)), but significantly negative for our low-SOE sample (columns (3) and (4)). These results indicate that, among high-SOE cities, those most impacted by the CSR disclosure mandate do not experience greater changes in pollution than do the other cities. In contrast, among low-SOE cities, cities that are most impacted by the CSR disclosure mandate experience a greater decrease in pollution than do the other cities. While these analyses are exploratory, given the difficulty in linking environmental externalities with a specific type of firm, we check the robustness of this result by repeating the analyses after restricting our sample to only cities with high pollution levels. We define these cities as those whose industrial wastewater discharge and SO2 emission are higher than the sample city-level medians of these pollutants in 2008. We find that the coefficient on *Post × Most impacted cities* is insignificant at conventional levels in columns (5)-(6), but significantly negative in columns (7)-(8). These findings are consistent with our inferences in columns (1)-(4) and suggest that the observed decrease in pollution is driven primarily by cities with a greater number of non-SOEs.

[20] SOEs represent a lion's share of listed Chinese firms. Among high-SOE cities (low-SOE cities), the average ratio of the assets of SOEs to the assets of all firms is 99.7% (44.7%). These numbers indicate that SOEs dominate the economic activities in high-SOE cities, while non-SOEs slightly dominate the economic activities in low-SOE cities.

Collectively, the findings in Table 6 indicate that the observed decrease in firm performance subsequent to the CSR mandate is driven primarily by SOEs, but that the observed decrease in pollution levels is driven primarily by non-SOEs. These findings are consistent with the notion that the agency problems of SOEs lead to greater but less efficient CSR spending that depresses any potential social benefit that could arise from the spending increase.

5.3 The effect of mandatory CSR disclosure on workplace fatalities

This section examines workplace fatalities among firms in dangerous industries. Workplace fatalities are an important concern of social stability and an alternative measure of social externalities. This analysis, however, is more limited than the others due to data availability and the extreme nature of the outcome.

We obtain the data on workplace fatalities from Fisman and Wang (2015), who collect worker death statistics from CSR reports, annual reports, announcements, and the official website of the State Administration of Work Safety (SAWS) in China. We examine the impact of mandatory CSR disclosure on workplace fatalities using the following regression model:

$$Death = \beta_0 + \beta_1(Post) + \beta_2(Treatment\ firms) + \beta_3(Post \times Treatment\ firms) + \beta_j(Controls_j) + \varepsilon. \quad (6)$$

We use a Poisson regression model because the dependent variable is count data. We include the same control variables as in Equation (1). Panel A of Table 7 reports the descriptive statistics on workplace fatalities. The number of observations (586 firm-years) is relatively small in this analysis because worker death data are available only for firms in the hazardous industries such as coal mining and construction that are the regulatory focus of SAWS. We find that the average number of worker deaths is 1.3 for the treatment firms and 0.9 for the benchmark firms, likely because the treatment firms are larger and have more workers. Panel B reports the regression results. We find that the coefficient on *Post*×*Treatment firms* is significantly negative

for both the PSM sample and full sample. This result suggests that relative to benchmark firms, treatment firms experience a decrease in workplace fatalities after the CSR disclosure mandate. Thus, this analysis provides further support that mandatory CSR disclosure generates positive externalities.

5.4. Market reactions to mandatory CSR announcements

In a final set of analyses, we examine the stock market's reaction to the CSR disclosure mandate. We focus on the dates of the mandatory CSR disclosure announcements to test the difference between the market reactions to our treatment and benchmark firms. We reason that while investors might have expected the mandate before the announcement, it is unlikely that they would have reacted to the news before receiving the official announcement of the mandate and the firms included (Calomiris et al., 2010).

We perform this analysis by examining the cumulative abnormal returns (*CAR*) for our firms during the three-day event window from December 29 to 31, 2008. We end the event window on December 31 because the stock market was closed on January 1 for the New Year's holiday and did not reopen until January 5, 2009. Following Fisman et al. (2014), we calculate abnormal returns as the actual stock returns minus expected stock returns based on factor loading using the Fama-French three-factor model estimated over [-150, -30] trading days. We require the sample firms to exist throughout our estimation period. We then regress the cumulative abnormal returns during the event window, *CAR[-1,+1]*, on a dummy variable indicating whether a firm is a treatment firm (*Treatment firms*). We also include variables controlling for size, Tobin's Q, leverage, and industry fixed effects, as in Fisman et al. (2014).

For brevity, we report the results for only our PSM sample in Panel A of Table 8. These results show that the average *CAR[-1,+1]* is -2.4% (-1.9%) for our treatment (benchmark) firms,

suggesting that while investors expect treatment firms to be more affected by the mandate, they are also concerned that other firms may face similar regulations in the future.[21] We also examine the cumulative abnormal returns during a placebo window that begins at five trading days before the announcement and ends two days before the announcement, *CAR[-5, -2]*. For both our treatment and benchmark firms, we find an average *CAR[-5,-2]* of -0.1%, suggesting that the policy mandating CSR disclosure for a subset of firms was not expected by investors.

Panel B of Table 8 shows that the coefficient on *Treatment firms* is significantly negative (column (1)), suggesting that investors view the CSR disclosure mandate as bad news. In addition, the coefficient on *Treatment firms* is insignificant for our placebo window (column (2)), suggesting that there is no differential market reaction for treatment firms during this window. We repeat this analysis for our full sample and find similar results (columns (3) and (4)).

Panel C of Table 8 presents the results of our test of the link between the stock market reaction during the event window and future firm performance. We find that the 2009 change in ROE is positively related to the stock market reaction (column (1)).[22] Conversely, the 2009-2011 cumulative CSR spending is negatively related to the stock market reaction (column (2)), with cumulative environmental and public relations spending driving this result (column (3)). Overall, these findings are consistent with the notion that investors anticipate decreased shareholder wealth due to the CSR disclosure mandate.

[21] To address the concern that this result is driven by other concurrent events, we search the exchange websites and various news sources (e.g., Sina.com, Hexun.com, Reuters, and Baidu) during our event window. The majority of the other announcements are related to the tax treatment of foreign banks, company-specific news, and annual trading statistics of the exchanges. As we exclude financial firms and these other announcements are either specific to a given company or applied to all listed firms, it is unlikely that other news drives the observed negative market reactions to our treatment firms.

[22] In untabulated analysis, we also find that the stock market reaction is significantly positively correlated with changes in ROE, with a Pearson correlation coefficient of 0.20.

6. Conclusion

This paper examines the effect of mandatory CSR disclosure on firm profitability and social externalities in China. Although the mandate does not require firms to spend on CSR, we find that the firms included in the 2008 disclosure mandate subsequently experience a decrease in profitability. In addition, the cities that are most impacted by the CSR disclosure mandate experience a decrease in industrial wastewater and SO2 emission levels subsequent to the mandate.

Consistent with the notion that mandatory CSR disclosure increases political/social pressure regarding a firm's CSR activities, we find that CSR spending is largely driven by political/social factors rather than economic considerations. We further find that our documented firm- and city-level changes are associated with increases in total CSR spending and environmental protection spending in particular. Moreover, our observed decrease in firm profitability is primarily driven by SOEs, but our observed decrease in environmental pollution is primarily driven by cities with fewer SOEs, suggesting that the CSR spending of SOEs is less efficient. Finally, we find that our treatment firms suffer a more negative stock market reaction to the announcement of the CSR disclosure regulation than do our benchmark firms.

In sum, our findings are consistent with the notion that mandatory CSR disclosure changes firm behavior and generates positive externalities to society at the expense of shareholders. However, our findings also show that agency conflicts between politicians/SOE managers and minority shareholders lead to less efficient CSR spending, thereby attenuating the potential positive social impact of the mandate.

Acknowledgments: We thank the following people for their helpful comments: Kevin Chen, Zhihong Chen, Alex Edmans, Ray Fisman, S.P. Kothari (the editor), Xi Li, Thomas Lys (the referee), T.J. Wong, and workshop participants at Fudan University, the Hong Kong University of Science and Technology, and the International Corporate Governance Conference of Hong Kong Baptist University. The work described in this paper was supported by Grant no. G4925 from the Research Grants Council of the Hong Kong Special Administrative Region, China. All errors are our own.

References

Bertrand, M., Mullainathan, S., 2003. Enjoying the quiet life? Corporate governance and managerial preferences. Journal of Political Economy 111, 1043–1075.

Bui, L.T., Mayer, C.J., 2003. Regulation and capitalization of environmental amenities: Evidence from the toxic release inventory in Massachusetts. The Review of Economics and Statistics 85, 693–708.

Calomiris, C., Fisman, R., Wang, Y., 2010. Profiting from government stakes in a command economy: Evidence from Chinese asset sales. Journal of Financial Economics 96, 399–412.

Campbell, J., 2007. Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. Academy of Management Review 32, 946–967.

Coase, R.H., 1960. The problem of social cost. Journal of Law and Economics 3, 1–44.

Dehejia, R. H., Wahba, S., 2002. Propensity score matching methods for non-experimental causal studies. The Review of Economics and Statistics 84, 151–161.

Dhaliwal, D., Li, O., Tsang, A., Yang, Y., 2011. Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. The Accounting Review 86, 59–100.

Dhaliwal, D., Radhakrishnan, S., Tsang, A., Yang, Y., 2012. Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. The Accounting Review 87, 723–759.

Ebenstein, A., 2012. The consequences of industrialization: Evidence from water pollution and digestive cancers in China. The Review of Economics and Statistics 94, 186–201.

Edmans, A., 2011. Does the stock market fully value intangibles? Employee satisfaction and equity prices. Journal of Financial Economics 101, 621–640.

Edmans, A., 2012. The link between job satisfaction and firm value, with implications for corporate social responsibility. Academy of Management Perspectives 26, 1–19.

Eichholtz, P., Kok, N., Quigley, J., 2010. Doing well by doing good? Green office buildings. American Economic Review 100, 2492–2509.

Elfenbein, D., Fisman, R., McManus, B., 2012. Charity as a substitute for reputation: Evidence from an online marketplace. Review of Economic Studies 79, 1441–1468.

Fisman, R., Hamao, Y., Wang, Y., 2014. Nationalism and economic exchange: Evidence from shocks to Sino-Japanese relations. Review of Financial Studies 27, 2626–2660.

Fisman, R., Wang, Y., 2015. The mortality cost of political connections. Review of Economic Studies 82, 1346–1382.

Friedman, M., 1970. The social responsibility of business is to increase its profits. The New York Times Magazine, September 13, 1970.

Greenpeace, 2010. Poisoning the pearl: An investigation into industrial water pollution in the Pearl River Delta, 2nd ed. Greenpeace. Beijing, China.

Greenstone, M., Oyer, P., Vissing-Jorgensen, A., 2006. Mandated disclosure, stock returns, and the 1964 Securities Acts amendments. Quarterly Journal of Economics 121, 399–460.

Grewal, J., Riedl, E., Serafeim, G., 2015. Market reaction to mandatory nonfinancial disclosure. Working paper. Harvard Business School and Boston University.

Grossman, G.M., Krueger, A.B., 1995. Economic growth and the environment. Quarterly Journal of Economics 112, 353–378.

Hamilton, J., 2005. Regulation through revelation. New York: Cambridge University Press.

Hope, O., Thomas, W., 2008. Managerial empire building and firm disclosure. Journal of Accounting Research 46, 591–626.

Hung, M., Shi, J., Wang, Y., 2015. Mandatory CSR disclosure and information asymmetry: Evidence from a quasi-natural experiment in China. Working paper. The Hong Kong University of Science and Technology.

Hung, M., Wong, T.J., Zhang, T., 2012. Political considerations in the decision of Chinese SOEs to list in Hong Kong. Journal of Accounting and Economics 53, 435–449.

Ioannou, I., Serafeim, G., 2014. The consequences of mandatory corporate sustainability reporting: Evidence from four countries. Working paper. Harvard Business School.

Jiang, L., Lin, C., Lin, P., 2014. The determinants of pollution levels: Firm-level evidence from Chinese manufacturing. Journal of Comparative Economics 42, 118–142.

Kitzmueller, M., Shimshack, J., 2012. Economic perspectives on corporate social responsibility. Journal of Economic Literature 50, 51–84.

Lin, L.W., 2010. Corporate social responsibility in China: Window dressing or structural change. Berkeley Journal of International Law 28, 64–100.

Lys, T. Z., Naughton, J. P., Wang, C., 2015. Signaling through corporate accountability reporting. Journal of Accounting and Economics 60, 56–72.

Manchiraju, H., Rajgopal, S., 2017. Does corporate social responsibility (CSR) create shareholder value? Exogenous shock-based evidence from the Indian Companies Act 2013. Journal of Accounting Research, forthcoming.

Pigou, A.C., 1920. The economics of welfare. London: MacMillan.

Rosenbaum, P.R., Rubin, D.B., 1984. Reducing bias in observational studies using subclassification of the propensity score. Journal of the American Statistical Association 79, 516–524.

Servaes, H., Tamayo, A., 2013. The impact of corporate social responsibility on firm value: The role of customer awareness. Management Science 59, 1045–1061.

Shleifer, A., Vishny, R., 1994. Politician and firms. Quarterly Journal of Economics 109, 995–1025.

Talukdar, D., Meisner, C., 2001. Does the private sector help or hurt the environment? Evidence from carbon dioxide pollution in developing countries. World Development 29, 827–840.

Thaler, R. H., Sunstein, C. R., 2009. Nudge: Improving decisions about health, wealth, and happiness. London: Penguin Books.

World Bank, 2007. Cost of pollution in China. World Bank.

Zhu, J., Yan, Y., He, C., Wang, C., 2015. China's environment: Big issues, accelerating effort, ample opportunity. Goldman Sachs Equity Research, July 13, 2015.

Appendix A
Mandatory CSR disclosure announcements and sample CSR reports

Panel A: Mandatory CSR disclosure announcements

	Shanghai Stock Exchange (SSE)	Shenzhen Stock Exchange (SZSE)
Date	December 30, 2008	December 31, 2008
Heading	"Notice on listed companies' 2008 annual report"	"Notice on listed companies' preparation for 2008 annual reports"
Disclosure deadline and consequences	2. All companies listed before December 31, 2007 should finish the preparation, submission, and disclosure of the 2008 annual reports by April 30, 2009…If a firm fails to file the report by May 1, 2009, the SSE will delist the firm's stock and publicly condemn the persons in charge.	2. Listed companies should disclose the 2008 annual reports by April 30, 2009…Firms that do not file reports by May 1, 2009 will be subject to delisting, and the firms and their related personnel will be subject to public condemnation.
Scope of the CSR reporting	10. Firms listed on the SSE "Corporate Governance Sector," firms with shares listed overseas, and financial companies should disclose the CSR report when releasing 2008 annual report…The CSR report should be separately approved by the board of directors…The CSR report should be attached to the annual report.	11. Firms included in the "Shenzhen 100 index" should follow "corporate social responsibility guidelines" in reference to Annex 3 - CSR disclosure requirements to disclose CSR report, while encouraging other companies to disclose CSR reports. CSR reports should be approved by the board of directors and reported separately in the form of annual disclosure.

Source: SSE and SZSE websites, original text in Mandarin and translated into English.

Appendix A, continued

Panel B: Excerpts of the SZSE "Notice on listed companies' preparation for 2008 annual reports"

Annex 3 - Corporate social responsibility disclosure requirements
Listed corporate social responsibility reports should include, but are not limited to, the following:

1. Overview
Describe the purpose and concept of corporate social responsibility. Explain the key measures carried out by the Company to ensure the implementation of social responsibility. Explain the Company's important activities and achievements in fulfilling its social responsibilities.

2. Explanations on the fulfillment of social responsibility should include at least the following:
(1) Protection of the interests of shareholders and creditors….
(2) Protection of workers' rights.
The report should clearly state whether the company satisfies "Labor Laws" and "Labor Contract Laws" and other laws and regulations in occupational safety and health system…. Failure to meet the relevant requirements and standards should be truthfully described. Companies should describe concrete measures to protect the interests of employees, production safety, vocational training and other aspects of employee benefits and improvements.
(3) Protection of suppliers, customers and consumers.
…Companies should highlight discussion of specific anti-bribery measures and methods… Specific measures in terms of product quality and safety control taken as significant product quality and safety incidents should be truthfully described.
(4) Environmental protection and sustainable development.
…Companies should take concrete measures in environmental investment and technology development, construction and operation of environmental protection facilities to reduce energy consumption and pollutant emissions, waste recycling, and comprehensive utilization. The environmental indictors should be compared with national standards, industry standards, and past indicators, with a description of the current status of specific numerical targets and improved results.
(5) Public relations and social welfare services.
Companies should highlight the work done during the reporting period in disaster relief, donations, reconstruction, etc.

3. Social responsibility problems and corrective action plans
(1) When a firm incurs significant environmental and safety accidents, it is included in the list of polluting enterprises by the environmental protection department, is punished by the environment and labor departments, and must explain and discuss measures to resolve the problem.
(2) …other major issues in terms of social responsibility and the impact on existing operations and sustainable development of the company, and proposals of specific improvement plans and measures.

Appendix A, continued

Panel C: Summary and excerpts of a sample CSR report

2010 CSR report of Shanxi Xishan Coal and Electricity Power Co. (11 pages, original text in Mandarin)

1. Overview
2. Protection of investors' interests
3. Protection of workers' rights
   The establishment of "Ten rescue funds," which include workers' living assistance fund, special medical fund, and college scholarships. Set up "Worker Help Center," "Retiree Management Center," "Youth Career Guidance Center," and other institutions…
4. Supplier and customer relationship
5. Production safety
6. Social welfare
   During the reporting period, the Company paid a total of more than 5 million in charitable donations, including donations to charitable foundations in Nishiyama totaling 2.87 million RMB for the Xishan district.
7. Environmental protection
   (1) Environmental assessment indicators
   …In 2010, smoke dust emissions 2713.49 tons, sulfur dioxide emissions 5707.90 tons, emissions from industrial wastewater COD 36.32 tons…
   (5) Pay close attention to waste dump management, focusing on ecological construction
   …In 2010, expenditure on special waste treatment facilities was 55 million RMB…

Appendix B
Variable definitions

Variables of interest

Post: A dummy variable equal to 1 if a firm-year observation falls in the post-period (i.e., 2009-2011), and 0 otherwise.

Treatment firms: A dummy variable equal to 1 if the listed firm is mandated to issue CSR reports starting from December 2008, and 0 otherwise.

Most impacted city: A dummy variable equal to 1 for cities whose ratio of the assets of treatment firms to the assets of all firms is greater than the sample city-level median in 2008, and 0 otherwise.

Firm-level variables

ROA: Net income divided by total assets in year t.

ROE: Net income divided by shareholders' equity in year t.

Sales revenue: Total sales revenue divided by total assets in year t.

Operating expense: Operating expenses divided by total sales revenue in year t.

Impairment loss: Impairment loss divided by total sales revenue in year t.

Non-operating income: Non-operating income divided by total sales revenue in year t.

Non-operating expense: Non-operating expense divided by total sales revenue in year t.

CAPEX: Capital expenditure divided by lagged total assets in year t.

TobinQ: Total assets minus book value of equity plus market value of equity divided by book value of total assets in year t.

Death: Total workplace fatalities in year t for firms in hazardous industries that are the focus of the State Administration of Work Safety.

CAR[-1, +1]: Cumulative abnormal return during day -1 to day +1, with day 0 being the announcement date of mandatory CSR disclosure regulation. Abnormal return is calculated as actual stock return minus expected stock return based on factor loading using the Fama-French three-factor model estimated over [-150, -30] trading days.

CAR[-5, -2]: Cumulative abnormal return during day -5 to day -2, with day 0 being the announcement date of mandatory CSR disclosure regulation. Abnormal return is calculated as actual stock return minus expected stock return based on factor loading using the Fama-French three-factor model estimated over [-150, -30] trading days.

Total CSR spending: Total CSR spending in staff protection, environment protection, and public relations divided by total equity in year t.

Staff protection spending, *environmental protection spending*, and *public relations spending*: CSR spending in staff protection, environmental protection, and public relations, respectively, divided by total equity in year t.

Cumulative CSR spending: Total CSR spending in staff protection, environment protection, and public relations during 2009-2011, divided by total equity in 2008.

Cumulative staff protection spending, *Cumulative environmental protection spending*, and *Cumulative public relations spending*: CSR spending in staff protection, environmental protection, and public relations during 2009-2011, respectively, divided by total equity in 2008.

City-level variables

Wastewater: Natural logarithm of the ratio of industrial wastewater (in 10 thousand tons) divided by total assets of all firms (in billions of RMB) in the city in year t.

SO2: Natural logarithm of the ratio of SO2 emissions (tons) divided by total assets of all firms (in billions of RMB) in the city in year t.

Appendix B, continued

Soot: Natural logarithm of the ratio of industrial soot emissions (ton) divided by total assets of all firms (in billions of RMB) in the city in year t.

Total CSR spending_city: Natural logarithm of total CSR spending in staff protection, environmental protection, and public relations scaled by GDP per capita in the city in year t.

Staff protection spending_city, *environmental protection spending_city*, and *public relations spending_cit*: Natural logarithm of CSR spending in staff protection, environmental protection, and public relations divided by GDP per capita in the city in year t.

Partitioning variables

SOE: A dummy variable equal to 1 if the ultimate controlling owner of the company (based on the required disclosure in the annual report) is the government in 2008, and 0 otherwise.

High-SOE city: A city whose ratio of the assets of SOEs to the assets of all firms is greater than the sample city-level median in 2008.

Firm-level control variables

Size: Natural logarithm of total assets (in RMB) in year t.

Cash: The ratio of cash to total assets in year t.

State ownership: The number of state-owned shares divided by the numbed of total shares in year t.

MV: Natural logarithm of market value of equity in year t.

Turnover: The total number of shares traded divided by the total number of shares outstanding in year t.

Return: Annual stock return in year t.

Political connection: A dummy variable equal to 1 if a firm's top executives (CEO, Vice-CEO, Chairman, and Vice-Chairman) have ever worked in city-level (and above) government in year t.

Donation: Natural logarithm of 1 plus the amount of donations (in RMB) divided by total assets in year t.

Analysts: Natural logarithm of 1 plus the number of analysts following a firm in year 2008.

LogQ: Natural logarithm of total assets minus book value of equity plus market value of equity divided by book value of total assets in year t.

Leverage: Total liabilities divided by total assets in year t.

Polluting firm: A dummy variable equal to 1 if the company is in the most polluting industries as of 2008, and 0 otherwise. The most polluting industries, classified by the Environmental Protection Administration in China, include the following: (1) metallurgical, (2) chemical, (3) petrochemical, (4) coal, (5) thermal power, (6) building materials, (7) paper, (8) brewing, (9) pharmaceutical, (10) fermentation, (11) textiles, (12) leather, and (13) mining industries.

City-level control variables

GDP: Natural logarithm of gross domestic product (in 10 thousand RMB) divided by the population in the city in year t.

Others

Industry fixed effects: Variables indicating industry sectors based on the CSRC classification.

Firm fixed effects: Indicator variables for firms.

Year fixed effects: Indicator variables for years.

Province fixed effects: Indicator variables for provinces.

City fixed effects: Indicator variables for cities.

Appendix C

The procedure to develop propensity-score-matched samples

This table describes the propensity-score-matching approach. We implement this procedure by first estimating a logit regression to model the probability of being a treatment firm using the pre-period (2006-2008) data. We then match each treatment firm to the control firms using the nearest neighbor matching technique (with replacement, and caliper set at 0.25*standard error of propensity score). Panel A presents the estimation result of the logit regression. Panel B presents the test of the effectiveness of the propensity score matches. *,**,*** indicate significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Panel A: Logit model used to find propensity scores

Variable	**Dep. var. = Mandatory CSR reporting**
MV	1.172***
	(0.133)
Turnover	0.032*
	(0.017)
Return	-0.153**
	(0.062)
ROE	1.102
	(0.672)
State ownership	0.951**
	(0.424)
Political connection	-0.080
	(0.246)
Donation	0.014
	(0.012)
Analysts	1.592***
	(0.239)
Polluting firm	-0.214
	(0.296)
Fixed effects	Industry, Year
N	3,047
Pseudo R^2	0.356

Appendix C, continued

Panel B: Test of the effectiveness of the propensity score matches

Variable		Mean value, treatment firms (1)	Mean value, benchmark firms (2)	Diff. (1)-(2)
MV	Pre-match	15.01	13.87	1.14***
	Post-match	*15.01*	*14.31*	*0.70****
Turnover	Pre-match	6.39	8.03	-1.64***
	Post-match	*6.40*	*7.65*	*-1.26****
Return	Pre-match	0.88	0.67	0.21***
	Post-match	*0.88*	*0.77*	*0.11****
ROE	Pre-match	0.11	0.04	0.07***
	Post-match	*0.11*	*0.07*	*0.04****
State ownership	Pre-match	0.33	0.24	0.09***
	Post-match	*0.33*	*0.28*	*0.05****
Political connection	Pre-match	0.15	0.10	0.05*
	Post-match	*0.15*	*0.12*	*0.03*
Donation	Pre-match	9.32	7.64	1.68***
	Post-match	*9.30*	*8.43*	*0.87***
Analysts	Pre-match	1.22	0.63	0.59***
	Post-match	*1.22*	*0.98*	*0.24****
Polluting firm	Pre-match	0.39	0.37	0.02
	Post-match	*0.39*	*0.37*	*0.02*

Table 1
Sample distribution
Panel A of this table shows the sample distribution by year, with 2006-2008 being the pre-period and 2009-2011 being the post-period. Panel B reports the distribution by industry sector based on the CSRC classification.

Panel A: Distribution of treatment and benchmark firms by year

	Full sample						PSM sample					
	Total		Treatment		Benchmark		Total		Treatment		Benchmark	
Year	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
2006	975	*14%*	262	*16%*	713	*14%*	495	*16%*	260	*16%*	235	*16%*
2007	1,000	*14%*	273	*16%*	727	*14%*	519	*17%*	271	*16%*	248	*17%*
2008	1,085	*16%*	285	*17%*	800	*15%*	536	*17%*	282	*17%*	254	*17%*
2009	1,147	*16%*	286	*17%*	861	*16%*	528	*17%*	278	*17%*	250	*17%*
2010	1,233	*18%*	285	*17%*	948	*18%*	525	*17%*	277	*17%*	248	*17%*
2011	1,512	*22%*	283	*17%*	1,229	*23%*	517	*17%*	275	*17%*	242	*16%*
Total	**6,952**	*100%*	**1,674**	*100%*	**5,278**	*100%*	**3,120**	*100%*	**1,643**	*100%*	**1,477**	*100%*

Panel B: Distribution of treatment and benchmark firms by industry sector

	Full sample						PSM sample					
	Total		Treatment		Benchmark		Total		Treatment		Benchmark	
Industry sector	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Agriculture	166	*2%*	12	*1%*	154	*3%*	42	*1%*	12	*1%*	30	*2%*
Mining	151	*2%*	79	*5%*	72	*1%*	114	*4%*	69	*4%*	45	*3%*
Manufacturing	4,183	*60%*	931	*56%*	3,252	*62%*	1,795	*58%*	925	*56%*	870	*59%*
Utilities	297	*4%*	119	*7%*	178	*3%*	202	*6%*	113	*7%*	89	*6%*
Construction	176	*3%*	54	*3%*	122	*2%*	97	*3%*	51	*3%*	46	*3%*
Transportation	300	*4%*	170	*10%*	130	*2%*	229	*7%*	164	*10%*	65	*4%*
Information tech.	453	*7%*	84	*5%*	369	*7%*	174	*6%*	84	*5%*	90	*6%*
Wholesale and retail	452	*7%*	51	*3%*	401	*8%*	121	*4%*	51	*3%*	70	*5%*
Real estate	196	*3%*	76	*5%*	120	*2%*	139	*4%*	76	*5%*	63	*4%*
Services	215	*3%*	40	*2%*	175	*3%*	80	*3%*	40	*2%*	40	*3%*
Communication	47	*1%*	12	*1%*	35	*1%*	18	*1%*	12	*1%*	6	*0%*
Others	316	*5%*	46	*3%*	270	*5%*	109	*3%*	46	*3%*	63	*4%*
Total	**6,952**	*100%*	**1,674**	*100%*	**5,278**	*100%*	**3,120**	*100%*	**1,643**	*100%*	**1,477**	*100%*

Table 2
Descriptive statistics and correlation coefficients
Panel A reports the firm-level descriptive statistics for PSM treatment firms and benchmark firms. Panel B reports the city-level descriptive statistics for most impacted cities and other cities. Panels C and D report the Pearson correlation coefficients for firm-level and city-level samples, respectively. * indicates significance at the 5% level (two-tailed). See Appendix B for variable definitions.

Panel A: Descriptive statistics on firm-level variables

	PSM treatment firms				PSM benchmark firms			
	N (firm-years)	Mean	Median	Std. dev.	N (firm-years)	Mean	Median	Std. dev.
ROA	1,643	0.054	0.044	0.051	1,477	0.040	0.033	0.052
ROE	1,643	0.108	0.101	0.100	1,477	0.074	0.073	0.113
Sales revenue	1,643	0.787	0.673	0.551	1,477	0.757	0.632	0.527
Operating expenses	1,643	0.901	0.925	0.129	1,477	0.939	0.954	0.133
Impairment loss	1,383	0.008	0.003	0.018	1,242	0.011	0.004	0.029
Non-operating income	1,643	0.013	0.005	0.027	1,477	0.016	0.005	0.036
Non-operating expenses	1,643	0.003	0.001	0.008	1,477	0.004	0.001	0.010
Investment	1,643	0.091	0.063	0.088	1,477	0.072	0.050	0.077
TobinQ	1,643	1.661	1.318	1.078	1,477	1.812	1.460	1.145
Size	1,643	22.634	22.540	1.235	1,477	21.782	21.750	0.963
Cash	1,643	0.166	0.136	0.121	1,477	0.167	0.143	0.115
State ownership	1,643	0.219	0.123	0.237	1,477	0.175	0.009	0.217

Panel B: Descriptive statistics on city-level variables

	Most impacted cities				Other cities			
	N (city-years)	Mean	Median	Std. dev.	N (city-years)	Mean	Median	Std. dev.
Wastewater	626	5.786	5.815	1.430	573	6.901	6.866	1.350
SO2	626	7.827	7.920	1.399	573	9.082	9.071	1.236
GDP	626	4.055	2.870	3.661	573	2.823	1.990	2.747

Table 2, continued

Panel C: Pearson correlation coefficients among firm-level variables (Maximum N=3,120 firm-years)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	ROA	1										
(2)	ROE	0.872*	1									
(3)	Sales revenue	0.209*	0.169*	1								
(4)	Operating expenses	-0.559*	-0.643*	0.165*	1							
(5)	Impairment loss	-0.328*	-0.279*	-0.126*	0.393*	1						
(6)	Non-operating income	-0.020	-0.002	-0.210*	0.215*	0.236*	1					
(7)	Non-operating expenses	-0.135*	-0.095*	-0.150*	0.080*	0.223*	0.239*	1				
(8)	Investment	0.131*	0.119*	-0.004	-0.147*	-0.102*	0.006	-0.017	1			
(9)	TobinQ	0.230*	0.377*	0.076*	-0.157*	0.026	0.083*	0.035	-0.063*	1		
(10)	Size	0.140*	0.012	0.032	-0.134*	-0.164*	-0.104*	-0.090*	0.179*	-0.324*	1	
(11)	Cash	0.192*	0.248*	0.080*	-0.202*	-0.069*	-0.029	-0.077*	-0.086*	0.214*	-0.098*	1
(12)	State ownership	0.021	0.019	0.041*	-0.090*	-0.004	-0.049*	0.004	0.115*	-0.293*	0.112*	-0.054*

Panel D: Pearson correlation coefficients among city-level variables (N=1,199 city-years)

		(1)	(2)
(1)	Wastewater	1	
(2)	SO2	0.797*	1
(3)	GDP	-0.309*	-0.349*

Table 3
The impact of mandatory CSR disclosure on firm performance
Panel A of this table reports the results of the impact of mandatory CSR disclosure on firm profitability using the PSM sample. Panels B and C report the results using alternative dependent variables and alternative samples, respectively. Panel D presents the results of robustness checks using timing regression and pseudo adoption year, and deleting adoption year 2008. See Appendix B for variable definitions. Robust standard errors clustered by firm are reported in parentheses. *,**,*** indicate significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Panel A: Regression results, PSM sample

Dep. var. =	**ROA**	**ROE**	**ROA**	**ROE**
	(1)	**(2)**	**(3)**	**(4)**
Post	0.003	0.002	n.a.	n.a.
	(0.003)	(0.006)		
Treatment firms	0.019***	0.036***	n.a.	n.a.
	(0.004)	(0.007)		
Post×Treatment firms	**-0.013*** **	**-0.022*** **	**-0.010*** **	**-0.018** **
	(0.004)	**(0.008)**	**(0.004)**	**(0.008)**
Size	-0.000	0.012***	-0.003	0.011
	(0.001)	(0.003)	(0.004)	(0.010)
Cash	0.107***	0.174***	0.045***	0.068**
	(0.015)	(0.025)	(0.014)	(0.031)
State ownership	-0.001	-0.005	0.013	0.027
	(0.006)	(0.013)	(0.008)	(0.019)
Fixed effects	Industry	Industry	Firm, Year	Firm, Year
N (firm-years)	3,120	3,120	3,120	3,120
Adj. R^2	0.186	0.134	0.551	0.398

Table 3, continued

Panel B: Alternative dependent variables, PSM sample

Dep. var. =	Sales revenue	Operating expenses	Impairment loss	Non-operating income	Non-operating expenses	CAPEX	TobinQ
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post	-0.055	-0.000	-0.004**	0.004*	-0.001	-0.013***	0.651***
	(0.072)	(0.007)	(0.002)	(0.002)	(0.001)	(0.004)	(0.057)
Treatment firms	-0.051	-0.033***	-0.003*	-0.002	-0.000	0.013**	0.298***
	(0.119)	(0.009)	(0.002)	(0.002)	(0.001)	(0.005)	(0.064)
Post×Treatment firms	**-0.179****	**0.022*****	**0.005****	**0.002**	**0.001**	**-0.013****	**-0.287*****
	(0.081)	**(0.007)**	**(0.002)**	**(0.002)**	**(0.001)**	**(0.006)**	**(0.066)**
Size	0.325***	-0.008**	-0.003***	-0.003***	-0.001***	0.011***	-0.317***
	(0.056)	(0.004)	(0.001)	(0.001)	(0.000)	(0.002)	(0.031)
Cash	-0.286	-0.301***	-0.021***	-0.013*	-0.006***	-0.014	1.328***
	(0.489)	(0.039)	(0.007)	(0.007)	(0.002)	(0.018)	(0.345)
State ownership	0.131	-0.012	0.001	-0.002	-0.001	-0.012	-0.686***
	(0.215)	(0.019)	(0.003)	(0.004)	(0.001)	(0.010)	(0.099)
Fixed effects	Industry	Industry	Industry	Industry	Industry	Industry	Industry
N (firm-years)	3,120	3,120	2,625	3,120	3,120	3,120	3,120
Adj. R^2	0.219	0.266	0.053	0.043	0.036	0.164	0.304

Panel C: Robustness checks with the dependent variable being ROA, alternative samples

	Balanced sample	Benchmarking with voluntary reporting firms	Restricting treatment and benchmark to the same size range	Full sample
	(1)	(2)	(3)	(4)
Post	0.003	0.003	0.003	0.008***
	(0.003)	(0.003)	(0.003)	(0.002)
Treatment firms	0.019***	0.010**	0.019***	0.028***
	(0.004)	(0.004)	(0.004)	(0.003)
Post×Treatment firms	**-0.013*****	**-0.013*****	**-0.013*****	**-0.018*****
	(0.004)	**(0.004)**	**(0.004)**	**(0.003)**
Other firm-level controls	Yes	Yes	Yes	Yes
Fixed effects	Industry	Industry	Industry	Industry
N (firm-years)	3,099	2,915	2,976	6,952
Adj. R^2	0.188	0.133	0.186	0.145

Table 3, continued

Panel D: Additional robustness checks with the dependent variable being ROA

	Timing approach	**Placebo test with pseudo adoption year being 2007, pre-period [2006-2008]**	**Deleting 2008**
	(1)	**(2)**	**(3)**
Post	n.a.	-0.012***	0.000
		(0.004)	(0.003)
Year -2	0.005		
	(0.004)		
Year -1	0.016***		
	(0.004)		
Year +1	0.008**		
	(0.004)		
Year +2	0.013***		
	(0.004)		
Year +3	0.009**		
	(0.004)		
Treatment firms	0.019***	0.014***	0.019***
	(0.005)	(0.004)	(0.004)
Post×Treatment firms	n.a.	**0.003**	**-0.013*** **
		(0.005)	**(0.004)**
Year -2×Treatment firms	-0.000		
	(0.005)		
Year -1×Treatment firms	0.001		
	(0.005)		
Year +1×Treatment firms	**-0.013*** **		
	(0.005)		
Year +2×Treatment firms	**-0.012** **		
	(0.005)		
Year +3×Treatment firms	**-0.013*** **		
	(0.005)		
Other firm-level controls	Yes	Yes	Yes
Fixed effects	Industry	Industry	Industry
N (firm-years)	3,120	1,383	2,584
Adj. R^2	0.194	0.178	0.180

Table 4

The impact of mandatory CSR disclosure on city-level pollution

Panel A of this table presents the results for city-level pollution. Panel B presents the results using an alternative dependent variable and alternative samples. Robust standard errors clustered by city are reported in parentheses. See Appendix B for variable definitions. *,**,*** indicate significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Panel A: Regression results for city-level pollution

Dep. var.=	**Wastewater**	**SO2**	**Wastewater**	**SO2**
	(1)	**(2)**	**(3)**	**(4)**
Post	-0.342***	-0.400***	n.a.	n.a.
	(0.000)	(0.000)		
Most impacted cities	-0.910***	-0.981***	n.a.	n.a.
	(0.000)	(0.000)		
Post×Most impacted cities	**-0.245*** **	**-0.214** **	**-0.231** **	**-0.181* **
	(0.007)	**(0.024)**	**(0.013)**	**(0.068)**
GDP	-0.097**	-0.100**	-0.019	-0.053*
	(0.023)	(0.014)	(0.519)	(0.052)
Fixed effects	Province	Province	City, Year	City, Year
N (city-years)	1,199	1,199	1,199	1,199
Adj. R^2	0.383	0.423	0.898	0.884

Panel B: Regression results for city-level pollution, robustness checks

	Alternative dependent variable	**Provinces with both most impacted and other cities**		**Most impacted cities and other cities matched by year and GDP**	
Dep. var.=	**Soot**	**Wastewater**	**SO2**	**Wastewater**	**SO2**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Post	-0.308***	-0.330***	-0.414***	-0.396***	-0.432***
	(0.003)	(0.001)	(0.000)	(0.001)	(0.000)
Most impacted cities	-1.040***	-0.905***	-0.991***	-0.925***	-0.957***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Post×Most impacted cities	**-0.271** **	**-0.264*** **	**-0.205** **	**-0.201* **	**-0.192* **
	(0.013)	**(0.005)**	**(0.041)**	**(0.079)**	**(0.083)**
City-level controls	Yes	Yes	Yes	Yes	Yes
Fixed effects	Province	Province	Province	Province	Province
N (city-years)	1,199	1,127	1,127	950	950
Adj. R^2	0.446	0.337	0.372	0.361	0.408

Table 5
Analysis of CSR spending

Panel A reports descriptive statistics on CSR spending in the post-period (i.e., 2009-2011). Panel B reports the determinants of CSR spending. Panels C and D report the relation between CSR spending and firm performance and between CSR spending and pollution, respectively. Robust standard errors, reported in parentheses, are clustered by firm in Panels B and C (firm-level analyses), and by city in Panel D (city-level analyses). See Appendix B for variable definitions. *,**,*** indicate significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Panel A: Descriptive statistics on CSR spending variables

Variable	N(firms)	N(firm-years)	Mean	Med.	Std. dev.
Staff protection spending	240	447	0.66%	0.00%	2.30%
Environmental protection spending	240	447	0.34%	0.00%	1.02%
Public relations spending	240	447	0.16%	0.01%	0.65%
Total CSR spending	240	447	1.16%	0.11%	2.68%

Panel B: Determinants on firm-level CSR spending, Poisson regression

Dep. var.=	Total CSR spending	Staff protection spending	Environmental protection spending	Public relations spending
	(1)	(2)	(3)	(4)
State ownership	1.680***	1.888**	0.985	3.218***
	(0.593)	(0.809)	(0.860)	(1.082)
Polluting firm	-0.148	-0.634	2.281***	-0.628
	(0.533)	(0.912)	(0.654)	(0.491)
Political connection	0.040	-0.608	0.482	0.266
	(0.302)	(0.558)	(0.351)	(0.557)
Size	-0.074	-0.253	0.135	0.211
	(0.133)	(0.196)	(0.182)	(0.227)
ROA	0.390	-0.294	-1.299	3.178
	(2.556)	(3.745)	(3.301)	(3.575)
Cash	-3.292***	-6.577***	-1.491	0.642
	(1.216)	(1.855)	(2.010)	(1.158)
Leverage	0.695	-0.180	1.318	1.233
	(0.905)	(1.421)	(0.929)	(1.404)
LogQ	0.212	0.233	0.082	0.521
	(0.326)	(0.518)	(0.492)	(0.735)
Fixed effects	Industry, Year	Industry, Year	Industry, Year	Industry, Year
N (firm-years)	447	447	447	447
Pseudo R^2	0.078	0.122	0.105	0.101

Table 5, continued

Panel C: The relation between firm performance and CSR spending

Dep. var.=	**ROA_t**	**ROA_t**
	(1)	**(2)**
Concurrent CSR spending		
Total CSR $spending_t$	-0.124*	
	(0.065)	
Staff protection $spending_t$		-0.109
		(0.074)
Environmental protection $spending_t$		-0.322**
		(0.159)
Public relations $spending_t$		0.262
		(0.201)
Control variables		
State $ownership_{t-1}$	0.022**	0.021*
	(0.011)	(0.011)
Polluting $firm_{t-1}$	-0.001	0.000
	(0.005)	(0.006)
Political $connection_{t-1}$	0.001	0.001
	(0.003)	(0.003)
$Size_{t-1}$	0.004**	0.004**
	(0.002)	(0.002)
ROA_{t-1}	0.604***	0.600***
	(0.067)	(0.068)
$Cash_{t-1}$	-0.001	-0.003
	(0.012)	(0.013)
$Leverage_{t-1}$	-0.032**	-0.032**
	(0.013)	(0.013)
$LogQ_{t-1}$	0.023***	0.022***
	(0.007)	(0.007)
Fixed effects	Industry, Year	Industry, Year
N (firm-years)	447	447
Adj. R^2	0.625	0.628

Table 5, continued

Panel D: The relation between city-level pollution and CSR spending

Dep. var.=	**Wastewater**	**SO2**	**Wastewater**	**SO2**
	(1)	**(2)**	**(3)**	**(4)**
Total CSR spending$_{_city}$	-0.119***	-0.101***		
	(0.001)	(0.008)		
Staff protection spending$_{_city}$			-0.007	-0.002
			(0.541)	(0.893)
Environmental protection spending$_{_city}$			-0.022*	-0.018*
			(0.050)	(0.100)
Public relations spending$_{_city}$			-0.017	-0.027*
			(0.270)	(0.078)
GDP	-0.100***	-0.133***	-0.083**	-0.116***
	(0.005)	(0.000)	(0.033)	(0.004)
Fixed effects	Province, Year	Province, Year	Province, Year	Province, Year
N (city-years)	202	202	202	202
Adj. R^2	0.412	0.454	0.373	0.435

Table 6

The effect of mandatory CSR disclosure on firm profitability and environmental pollution, conditional on state ownership

Panel A reports the sample distribution of SOEs and non-SOEs by industry sector. Panel B presents the results for SOEs and non-SOEs. Panel C presents the results for high-SOE cities and low-SOE cities. Robust standard errors, reported in parentheses, are clustered by firm in firm-level analyses and by city in city-level analyses. See Appendix B for variable definitions. *,**,*** indicate significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Panel A: Sample distribution of SOEs and non-SOEs, PSM sample

	SOEs						**Non-SOEs**					
	Total		**Treatment**		**Benchmark**		**Total**		**Treatment**		**Benchmark**	
Industry sector	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Agriculture	30	*1%*	0	*0%*	30	*3%*	12	*1%*	12	3%	0	0%
Mining	108	*5%*	69	*5%*	39	*4%*	6	*1%*	0	0%	6	1%
Manufacturing	1,249	*54%*	662	*52%*	587	*57%*	546	*67%*	263	72%	283	62%
Utilities	196	*9%*	107	*8%*	89	*9%*	6	*1%*	6	2%	0	0%
Construction	79	*3%*	51	*4%*	28	*3%*	18	*2%*	0	0%	18	4%
Transportation	216	*9%*	157	*12%*	59	*6%*	13	*2%*	7	2%	6	1%
Information tech.	108	*5%*	72	*6%*	36	*4%*	66	*8%*	12	3%	54	12%
Wholesale and retail	87	*4%*	41	*3%*	46	*5%*	34	*4%*	10	3%	24	5%
Real estate	79	*3%*	46	*4%*	33	*3%*	60	*7%*	30	8%	30	7%
Services	64	*3%*	40	*3%*	24	*2%*	16	*2%*	0	0%	16	4%
Communication	18	*1%*	12	*1%*	6	*1%*	0	*0%*	0	0%	0	0%
Others	67	*3%*	22	*2%*	45	*4%*	42	*5%*	24	7%	18	4%
Total	**2,301**	*100%*	**1,279**	*100%*	**1,022**	*100%*	**819**	*100%*	**364**	100%	**455**	100%

Table 6, continued

Panel B: Firm-level performance analyses for SOEs and non-SOEs

	PSM sample				PSM sample in polluting industries			
Subsamples=	**SOEs**		**Non-SOEs**		**SOEs in polluting industries**		**Non-SOEs in polluting industries**	
Dep. var.=	**ROA**	**ROE**	**ROA**	**ROE**	**ROA**	**ROE**	**ROA**	**ROE**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Post	0.006*	0.010	0.006	-0.001	0.005	0.012	-0.010	-0.038*
	(0.004)	(0.008)	(0.005)	(0.011)	(0.007)	(0.015)	(0.010)	(0.019)
Treatment firms	0.016***	0.034***	0.021***	0.032**	0.020***	0.049***	0.029**	0.047**
	(0.004)	(0.008)	(0.007)	(0.013)	(0.007)	(0.015)	(0.013)	(0.023)
Post×Treatment firms	**-0.013*** **	**-0.025*** **	**-0.008**	**-0.004**	**-0.019*** **	**-0.042*** **	**-0.008**	**-0.010**
	(0.004)	**(0.009)**	**(0.007)**	**(0.016)**	**(0.007)**	**(0.015)**	**(0.014)**	**(0.027)**
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Industry	Industry	Industry	Industry	Industry	Industry	Industry	Industry
N (firm-years)	2,301	2,301	819	819	929	929	245	245
Adj. R^2	0.199	0.155	0.253	0.169	0.262	0.190	0.192	0.178

Panel C: City-level pollution analyses for high-SOE cities and low-SOE cities

	All cities				Cities with high pollution			
Subsamples=	**High-SOE cities**		**Low-SOE cities**		**High-SOE cities with high pollution**		**Low-SOE cities with high pollution**	
Dep. var.=	**Wastewater**	**SO2**	**Wastewater**	**SO2**	**Wastewater**	**SO2**	**Wastewater**	**SO2**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Post	-0.192	-0.320**	-0.453***	-0.476***	-0.535***	-0.724***	-0.559***	-0.595***
	(0.167)	(0.026)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Most impacted cities	-0.714***	-0.997***	-1.139***	-0.875***	-0.192	-0.418**	-0.318	-0.039
	(0.003)	(0.000)	(0.000)	(0.000)	(0.496)	(0.024)	(0.175)	(0.851)
Post×Most impacted cities	**-0.116**	**-0.020**	**-0.281****	**-0.312*** **	**-0.012**	**0.032**	**-0.340***	**-0.474*** **
	(0.409)	**(0.891)**	**(0.017)**	**(0.009)**	**(0.949)**	**(0.877)**	**(0.059)**	**(0.007)**
City-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Province	Province	Province	Province	Province	Province	Province	Province
N (city-years)	577	577	622	622	302	334	293	256
Adj. R^2	0.471	0.473	0.445	0.457	0.242	0.316	0.383	0.530

Table 7

The impact of mandatory CSR disclosure on workplace fatalities

Panel A reports the descriptive statistics on workplace fatalities. Panel B reports the results of the impact of mandatory CSR disclosure on workplace fatalities. See Appendix B for variable definitions. Robust standard errors clustered by firm are reported in parentheses. *,**,*** indicate significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Panel A: Descriptive statistics on workplace fatalities, PSM sample

	Treatment firms				**Benchmark firms**			
	N (firm-years)	**Mean**	**Median**	**Std. dev.**	**N (firm-years)**	**Mean**	**Median**	**Std. dev.**
Death	369	1.312	0.000	8.794	217	0.912	0.000	4.432

Panel B: Regression results for workplace fatalities, Poisson regression

	PSM sample	**Full sample**
	(1)	**(2)**
Post	0.456	0.253
	(0.454)	(0.415)
Treatment firms	0.690	0.594
	(0.585)	(0.555)
Post×Treatment firms	**-1.706****	**-1.223***
	(0.696)	**(0.713)**
Size	0.883***	0.743***
	(0.200)	(0.157)
Cash	-1.543	0.495
	(1.538)	(1.297)
State ownership	-0.009	0.300
	(0.701)	(0.567)
Fixed effects	Industry	Industry
N (firm-years)	586	951
Pseudo R^2	0.293	0.305

Table 8
Market reactions to the announcement of CSR disclosure regulations
Panel A reports the descriptive statistics on cumulative abnormal return (CAR). Panel B reports the results of market reactions to mandatory CSR disclosure announcements. Panel C presents the results of market reactions and future performance. See Appendix B for variable definitions. Robust standard errors are reported in parentheses. *,**,*** indicate significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Panel A: Descriptive statistics on CAR, PSM sample

			CAR [-1,+1]		CAR [-5,-2]	
Event window	**Event description**		**Treatment firms**	**Benchmark firms**	**Treatment firms**	**Benchmark Firms**
12/29/2008	SSE and SZSE announce CSR	N	280	253	279	253
-12/31/2008	disclosure mandates for selected companies	Mean	-2.4%	-1.9%	-0.1%	-0.1%
		Median	-2.3%	-2.2%	-0.3%	-0.3%
		Std. dev.	3.6%	3.9%	4.3%	4.5%

Panel B: Regression analysis of market reactions to mandatory CSR disclosure announcements

	PSM sample		Full sample	
Dep. var.=	**CAR [-1,+1]**	**CAR [-5,-2]**	**CAR [-1,+1]**	**CAR [-5,-2]**
	(1)	**(2)**	**(3)**	**(4)**
Treatment firms	**-0.007***	0.001	**-0.005***	0.002
	(0.003)	(0.004)	**(0.003)**	(0.003)
Size	0.004**	-0.001	0.001	0.000
	(0.002)	(0.002)	(0.001)	(0.002)
LogQ	0.015***	0.007	0.010**	0.006
	(0.005)	(0.006)	(0.004)	(0.005)
Leverage	-0.020**	0.007	-0.022***	-0.000
	(0.010)	(0.013)	(0.007)	(0.009)
Fixed effects	Industry	Industry	Industry	Industry
N (firms)	533	532	1,079	1,077
Adj. R^2	0.086	0.055	0.069	0.032

Table 8, continued

Panel C: Regression analysis of market reactions at the announcement dates and future changes in ROE and CSR spending

	Treatment firms with CSR spending data		
Dep. var.=	**CAR [-1,+1]**		
	(1)	**(2)**	**(3)**
Δ ROE $_{2009-2008}$	0.056**		
	(0.025)		
Cumulative CSR spending		-0.008**	
		(0.004)	
Cumulative staff protection spending			0.006
			(0.052)
Cumulative environmental protection spending			-0.250***
			(0.075)
Cumulative public relations spending			-0.007*
			(0.004)
Size	0.004	0.005*	0.006**
	(0.003)	(0.003)	(0.003)
LogQ	0.015	0.016	0.015
	(0.011)	(0.011)	(0.011)
Leverage	-0.019	-0.019	-0.011
	(0.017)	(0.017)	(0.018)
Fixed effects	Industry	Industry	Industry
N (firms)	231	231	231
Adj. R^2	0.135	0.127	0.165