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Institutional Investors' Corporate Site Visits and Firms' Sustainable Development

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Abstract: Institutional investors are essential stakeholders of the firm, and they care about firms' sustainable development. In this study, we focused on a prevalent and essential type of information acquisition activity of institutional investors: corporate site visits, which refers to their trip to the firms' headquarters and factories. We investigated the impact of institutional investors' corporate site visits on firms' likelihood of environmental violation. Using Chinese listed manufacturing firms in the Shenzhen Stock Exchange from 2009 to 2017, the econometric analysis shows that institutional investors' corporate site visits significantly decrease firms' likelihood of environmental violation. Moreover, this effect is more pronounced for firms in heavily polluting industries, firms not owned by the government, and firms with less institutional shareholding. Furthermore, we show that institutional investors' corporate site visits prevent environmental violations by increasing firms' environmental investment. Our study highlights the importance of institutional investors' corporate site visits by showing that they are beneficial to the firms visited.

Keywords: manufacturing firms; environmental violation; institutional investors; corporate site visits; sustainable development

1. Introduction

The manufacturing industry is vital for a country's economic development. However, manufacturing firms may pursue profits at the cost of environmental pollution. Various stakeholders express their concerns about firms' environmental violations. Among them, institutional investors play critical roles as they own and vote the bulk of the world's equity capital. The firms' environmental violations could trigger negative capital market reactions, which hurt institutional investors' interests.

In this study, we focused on a prevalent and essential type of information acquisition activity of institutional investors: corporate site visits [1,2]. Corporate site visits refer to investors' trips to the firms' headquarters and factories. On a visit, investors walk around, talk to the managers and employees, and observe the operations. The literature shows that investors benefit from corporate site visiting as they learn more information. For example, analysts improve their forecast accuracy through corporate site visits [2,3], and hedge funds that make more visits have significantly higher returns [4]. However, investors' corporate site visits could also impact the hosting firms. In this study, we aimed to fill this void by investigating the impact of institutional investors' corporate site visits and firms' likelihood of environmental violations.

We used listed manufacturing firms in China as the sample. The Chinese contexts offer two advantages. First, although corporate site visits become more and more important for institutional investors to gain information worldwide [1,5], the records of visiting are not available in other markets to the best of our knowledge. The Shenzhen Stock Exchange in China has mandated listed firms to

disclose visiting records in the annual report since 2009. Such information provides the opportunity to investigate the economic consequences of institutional investors' corporate site visits. Second, as a developing country that needs economic development and environment protection, empirical evidence from China could offer implications to other emerging economies in the world.

Using manufacturing firms listed in the Shenzhen Stock Exchange during 2009–2017, we investigated the effect of institutional investors' corporate site visits on firms' likelihood of environmental violation. One material effect of corporate site visits is that institutional investors could observe the firm's operations and talk with managers. Therefore, institutional investors learn environmental-related information through visiting. The disclosure of visiting records could trigger an adverse reaction in the capital market if it reveals the firm's environmental concern. Besides, institutional investors could express their concerns and push managers to improve environmental performance on the visit. Therefore, we propose that institutional investors' corporate site visits decrease firms' likelihood of environmental violation.

Empirical analysis shows a significantly negative relation between institutional investors' site visits and firms' likelihood of environmental violation, and the relation is more pronounced for firms in heavy polluting industry and non-state-owned firms. The effect of institutional investors' corporate site visits is significant after controlling institutional ownership. Moreover, we find that site visits and institutional ownership are substitutes for each other in preventing environmental violations. We then examined the mechanisms through which institutional investors' site visits influence firms' likelihood of environmental violation. We show that institutional investors' corporate site visits prevent the occurrence of environmental violation by increasing firms' environmental investment.

Our study contributes to the literature in three important ways. First, we bring new evidence to the literature that firms' environmental performance is critical to shareholders. The literature mainly focuses on the impact of institutional ownership on environmental performance [6,7]. It finds that institutional ownership enhances environmental performance and argues that institutional investors are motivated by financial and social returns. We provide new evidence on the relationship between institutional investors and environmental performance by looking at institutional investors' corporate site visits.

Second, we use a new and direct measure of firms' environmental performance. Two standard environmental performance measures in the literature are firms' environmental investment and firms' environmental commitments. Violating environmental laws is a more direct measure of a firm's environmental performance.

Third, we shed light on the economic consequence of institutional investors' corporate site visits. Cheng et al. [2] showed that analysts' forecast accuracy increased after corporate site visits. Jiang and Yuan [8] found that institutional investors' corporate site visits could positively affect corporate innovation. Our study adds to this growing body of literature by showing that hosting firms could benefit from institutional investors' corporate site visits through avoiding environmental violations.

The paper proceeds as follows. Section 2 provides the institutional background of corporate site visits and reviews related literature. Section 3 proposes the hypotheses. Section 4 describes our sample, data, and methodology. Section 5 presents the empirical results. Section 6 discusses the results and concludes the paper.

2. Institutional Background and Literature Review

In this section, we provide the institutional background of corporate site visits in China and review the related literature.

2.1. Institutional Background of Corporate Site Visits in China

Corporate site visits refer to investors' field trips to a firm's headquarter and its operation facilities. According to Article 41 of the "Guidelines of Investor Relationship Management" by the Shenzhen Stock Exchange in China, listed firms should do their best to accommodate the investors' requests to

visit their firm, so that investors could better understand the firm's business and its operation situations. It is worth mentioning that corporate site visits are not restricted to institutional investors; individual investors could also request visiting. Listed firms usually do not say no to visiting requests unless the firm is experiencing a sensitive period. However, due to the time and effort for a trip, corporate site visits are not cost-effective for individual investors; therefore, the majority of visiting investors are institutional investors.

Cheng et al. [2] conducted in-depth interviews with a few investor relations managers and visiting investors, and their investigation helps us understand how and why investors conduct corporate site visits. A typical site visit lasts for three to four hours. Investors are usually accompanied by investor relations managers and other mid-level managers. They will have the first one to two hours of briefing and a Q&A section and a two-hour visit to the operation facilities. Investors could observe the operation and talk with employees during the visit. Site visits help investors learn soft information that is hard to obtain from financial reports, such as the relationship with local governments and banks, future prospects, and the firms' risk exposure.

The Shenzhen Stock Exchange enforced all listed firms to disclose the visiting summary in their annual reports from 2009 onwards. The disclosure rule makes the site visits information only to the visiting investors available to the public.

2.2. Literature on Institutional Investors and Corporate Social Responsibility

Existing literature shows that institutional investors are integrating corporate social responsibility (CSR) into their capital allocation process. Graves and Waddock [9] found a significantly positive relationship between a firm's corporate social performance and the number of institutions holding its shares. Hong and Kacperczyk [10] found that institutions subject to norm pressures, such as pension funds, would not hold stocks in gambling, alcohol, and tobacco. Fernando et al. [11] pointed out that institutional investors would hold fewer shares in toxic firms than in neutral firms. Starks et al. [9] showed that investors with longer investment horizons tend to invest in firms with better corporate social performance since CSR may be viewed as a significant determinant of firm exposure to long-term risk. Cox et al. [12] also found that long-term institutional investors tend to invest in firms with better CSR by using a sample of firms in the UK; they further pointed out that employee-related CSR has a stronger relationship with long-term investment than environment-related CSR. Cox and Wicks [13] further divided institutional investors into dedicated institutions and transient institutions and showed that dedicated institutions are positively associated with CSR.

Literature also shows that institutional investors choose firms with better CSR to invest and monitor sustainability in their portfolio firms. Dimson et al. [14] used proprietary data from a single institutional investor, and they found that the asset manager actively engages in and improves corporate social and environmental policies.

Chen et al. [15] pointed out that institutional investors might monitor firms' CSR for several reasons. First, clients demand sustainability commitment and care about CSR of invested firms in addition to financial return. Second, CSR commitment helps to attract more fund flow. Third, negative corporate social performance exposes firms to risk. Institutional investors could reduce the risk by positively influence portfolio firms' CSR commitment. Chen et al. [15] proposed that reducing risk is the main incentive as they found that higher ownership by institutions specifically reduces specific negative CSR issues that could decrease firm value, such as unsafe workplaces and violations of environmental laws.

Dyck et al. [7] provided global evidence that institutional ownership enhances CSR by building a sample of 3277 non-US firms from 41 countries. Moreover, they studied whether institutional investors drive CSR by selecting firms with good CSR and selling firms with weak CSR, or monitoring CSR of firms they already own. The empirical results show that institutional investors mainly engage with firms they already own, and the engagement is predominantly private. They also show that

institutional investors are motivated by financial returns and a desire to align that performance with their communities' CSR ideals.

Kim et al. [16] showed that local institutional investors are more efficient in decreasing the amount of toxic release by nearby facilities than distant institutional investors since local institutional investors care more about the local environment.

In a nutshell, literature shows that institutional investors are motivated by financial and social returns to drive CSR. Our study would bring the analysis forward by investigating the mechanisms used by institutional investors to drive CSR.

2.3. Literature on Institutional Investors' Corporate Site Visits

Corporate site visits are increasingly crucial for institutional investors to acquire information. There is an increasing amount of literature to investigate the economic consequences of investors' corporate site visits.

The literature mainly shows that corporate site visits benefit visitors. Cheng et al. [2] showed that corporate site visits could improve analysts' forecast accuracy. The effect is more substantial for manufacturing firms and firms with more tangible assets, as analysts could observe firms' operations through visiting. Corporate site visits decrease nonlocal analysts' information disadvantage. Han et al. [3] proposed that corporate site visits may assist analysts through a "mosaic" approach, as information gained from visiting could be combined with information from other sources, therefore providing new insights for analysts; the study shows that analysts' earnings forecast accuracy increases 30 percent after visiting. Moreover, analysts' preparation for the trip rather than information gained during the trip could explain the improved forecast. Han et al. [3] also found that the improvement in forecast accuracy cannot be fully explained by preparation. Also, Hong et al. [4] showed that hedge funds that make more visits have significantly higher returns.

To further understand the information role of corporate site visits, Cheng et al. [17] studied the stock market impact of corporate site visits. They found that the stock market reaction around corporate site visits is statistically and economically significant, and stock market reaction could predict firms' future performance.

Institutional investors' corporate site visits could also impact the hosting firms. Gao et al. [18] documented the positive relationship between institutional investors' corporate site visits and hosting firms' stock price crash risk. Once institutional investors learn negative information during site visits, they will sell stocks of hosting firms, and potential investors will not buy them. Managers may withhold bad news, and this may result in bad-news hoarding intensifying, therefore increasing the stock price crash risk. Jiang et al. [8] showed the positive impact of institutional investors' corporate site visits on corporate innovation, as more information from corporate site visits makes investors more tolerant of corporate short-term innovation failures.

Zhao et al. [19] pointed out that institutional investors' corporate site visits would improve hosting firms' environmental investment. It shows that institutional investors care about firms' environmental performance. However, we do not know whether firms benefit from institutional investors' environmental pressure since environmental investment could be a burden to firms. Our investigation of the relationship between site visits and the likelihood of environmental violations could shed light on this issue.

3. Hypothesis Development

There are two main reasons why institutional investors' corporate site visits may decrease firms' likelihood of environmental violation.

First, institutional investors' could learn bad environmental-related news and also disclose bad news to the market. Environmental information disclosure of listed firms is in its infancy in China [20]. Liu and Anbumozhi [21] showed that 40 percent of listed firms opened up no substantial environmental data to the public. Luo et al. [22] pointed out that the overall level of environmental information

disclosure of Chinese listed firms is low, and firms have very different disclosure quality due to disunity in forms and contents of the disclosure. Corporate site visits may provide investors the opportunity to acquire environmental information, especially negative information. By visiting the facility and observing the operations, investors could gain preliminary impressions of the firm's environmental performance by evaluating the surrounding irritating odor, dust, and wastewater. Institutional investors could also acquire more information by discussing the pollution disposal scheme with managers and employees. Therefore, corporate site visits decrease environmental information asymmetry. The terrible environmental performance disclosed by institutional investors' corporate site visits will trigger a stock market reaction. Both institutional investors and individual investors in the market could "vote with their feet," as suggested by Admati and Pfleiderer [23], Edmans [24], and Edmans et al. [25]. To prevent stock prices from falling, managers would pay more attention to their environmental performance.

Second, institutional investors' corporate site visits enable institutions to exert pressure on managers to improve environmental performance directly. The negative financial impact of environmental violation motivates institutional investors to monitor firms' environmental performance [15]. Literature has verified the role of institutional investors in corporate governance [26]. Cao et al. [27] also pointed out that the positive role of institutional investors' corporate site visits on corporate governance goes beyond information. Corporate site visits enable institutional investors to have informal meetings and discussions with managers as a voice out and exit is costly.

The above analyses led to our first hypothesis, as follows.

Hypothesis 1 (H1). *Institutional investors' corporate site visits are negatively associated with firms' likelihood of environmental violation.*

Firms in heavily polluting industries are more likely to face environmental risks. Heavy-polluting industries indicate steel, chemical, building materials, paper, brewing, pharmaceutical, fermentation, textile, tanning, and mining-related industries. For firms in heavily polluting industries, the environmental issue is a critical component of operations management. Under the growing pressure of environmental policies in China, some firms in heavily polluting industries even relocate the factory to regions with weaker government regulations [28]. For firms in heavily polluting industries, the environmental issues could become an essential topic in institutional investors' corporate site visits. Therefore, we expect that the association between institutional investors' corporate site visits and firms' likelihood of environmental violation is more pronounced for firms in heavily polluting industries. We then have our second hypothesis.

Hypothesis 2 (H2). *The negative association between institutional investors' corporate site visits and the firm's likelihood of environmental violation is more pronounced for firms in heavily polluting industries.*

In China, state-owned firms are usually large, and they are essential in increasing employment and the economy; therefore, they always enjoy superior resource allocation, more excellent protection of assets, and more favorable tax rates [29]. Lo et al. [30] documented that the firm value of state-owned firms tends to be less affected by environmental violations; it reflects that investors have greater confidence in the environmental risk management of state-owned firms. In China, non-state-owned firms do not compete with their state-owned counterparts on a level playing field [31]. Consistent with the view that institutional investors manage firms' environmental performance to reduce the risk [15], we proposed that environmental topic is more important for institutional investors' corporate site visits. The arguments led to our following hypothesis.

Hypothesis 3 (H3). *The negative association between institutional investors' corporate site visits and the firm's likelihood of environmental violation is more pronounced for non-state-owned firms.*

Chen et al. [15] found that institutional ownership drives environmental performance; Dyck et al. [7] provided global evidence that institutional ownership is positively associated with environmental performance. We further analyzed the relationship between institutional investors' corporate site visits and institutional ownership.

On the one hand, they may complement each other, as institutional investors with higher ownership also use corporate site visits to acquire more information and pressure managers on environmental issues. If it is the case, we will find that the effect of corporate site visits on the likelihood of environment violation is more pronounced in firms with higher institutional ownership.

On the other hand, they may substitute each other, as institutional investors may use corporate site visits to substitute ownership on firms' governance. If it is the case, we will find that the effect of corporate site visits on the likelihood of environmental violation is more pronounced in firms with less institutional ownership. We propose the following competing hypothesis to test this question.

Hypothesis 4a (H4a). *The negative association between institutional investors' corporate site visits and the firm's likelihood of environmental violation is more pronounced for firms with higher institutional ownership.*

Hypothesis 4b (H4b). *The negative association between institutional investors' corporate site visits and the firm's likelihood of environmental violation is more pronounced for firms with less institutional ownership.*

4. Sample, Data, and Methodology

4.1. Sample and Data

Our sample includes manufacturing firms listed in the Shenzhen Stock Exchange from 2009 to 2017. The sample starts in 2009, because it is the first year that the Shenzhen Stock Exchange mandated that all listed firms disclose records about investors' corporate site visits in the annual reports. We chose manufacturing firms for three reasons. First, the manufacturing sector is an extremely important sector in the economy. As the world's manufacturing hub, manufacturing firms account for 60 percent of listed firms. Second, environmental concern is more prevalent in manufacturing firms. Third, site visits facilitate investors' information acquisition through observing firms' operations; therefore, the economic consequences of site visits are more substantial in manufacturing firms [2]. Many studies have used only the manufacturing industry in their analysis [32,33].

We obtained the data of this study from several sources. The environmental violation data of manufacturing firms were manually collected from the Institute of Public and Environmental Affairs (IPE, website: www.ipe.org.cn). Although the Chinese government manages environmental violation data, it is disclosed by local governments at all levels or by various local media. For researchers, the collection of these scattered data was challenging until 2006, when a nongovernmental organization—the IPE—was established in Beijing. The IPE collects environmental violation information about Chinese firms from various local governments or news media and releases them on its website. As a result of the IPE's efforts and impact, the founder of the IPE, Mr. Ma Jun, received the Goldman Environmental Prize in 2012 [34]. IPE is a relatively new data source. Lee and Tang [34] introduced IPE in their seminal paper. Lo, Tang, Zhou, Yeung and Fan [30] collected listed firms' violation data from the IPE, and examined the stock market reaction to firms' environmental violations. Our research follows their data collecting strategy.

We obtained the corporate site visits data from the Wind Financial Database (WindDB). WindDB is a prestigious data source in China. Its functions are similar to Bloomberg. Other studies using WindDB could refer to Hung et al. [35] and Jiang et al. [36]. All other data are from China Stock Market and Accounting Research (CSMAR).

4.2. Variable Definition

To construct the measure of manufacturers' environmental violations, we adopted the same strategy of Lo, Tang, Zhou, Yeung and Fan [30] in collecting firms' environmental violation data from the IPE. We divided the environmental violations recorded in the IPE database into four categories:

1. Exhaust gas: Violation of the Law of the People's Republic of China on Prevention and Control of Atmospheric Pollution;
2. Wastewater: Violation of the Law of the People's Republic of China on the Prevention and Control of Water Pollution;
3. Solid waste: Violation of the Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste;
4. Operate without the required environmental impact assessments.

For each manufacturer, we manually searched its name in the IPE database and recorded whether a violation had occurred and the time of each violation announcement. We use $Violation_{it}$ to denote environmental violation of firm i in year t ; it is equal to 1 if firm i has a violation in year t , and otherwise, it is 0.

We use SV_{it} to denote the frequency of institutional investors' corporate site visits for firm i in year t . For firms that do not receive any visits from institutional investors in year t , we set SV to zero. We then take the logarithm of one plus the number of site visits to construct the measure of institutional investors' site visits, $\ln(1 + SV)$.

We include a set of control variables: *Assets*, the natural logarithm of the book value of total assets; *Tangibility*, defined as the ratio of property, plant, and equipment to total assets; *Leverage*, the ratio of total debts to total assets; *ROE*, return on equity, defined as the ratio of income to shareholder equity; *Institution*, shares held by the institutional investor; *Env_Invest*, the natural logarithm of environmental-related investment; *Cash*, the ratio of cash to total assets; *TobinQ*, the ratio of the market value of equity to total assets. We include dummy variables for each province of the firm to rule out the impact of the difference in law enforcement at the province level. Firms in a province with higher enforcement may have a higher likelihood of environmental violation. We also include industry and year fixed effect in the regression model, to rule out the impact of industry difference and year difference on the likelihood of environmental violation. Variable definitions are summarized in Table 1. Considering the impact of outliers, we winsorize all the continuous variables at the 1 percent level on both tails of the distribution.

Table 1. Definitions of variables.

Variable	Definition
$Violation_{it}$	An indicator variable that equals 1 if firm i has environmental violations in year t , and 0 otherwise.
$\ln(1 + SV)_{it}$	The natural logarithm of one plus the number of site visits to a firm by all institutional investors in year t .
$Assets_{it}$	The natural logarithm of book value of total assets.
$Tangibility_{it}$	Defined as the ratio of property, plant, and equipment to total assets.
$Leverage_{it}$	Debt ratio, defined as the ratio of total debts to total assets.
ROE_{it}	Return on equity, defined as the ratio of income to shareholder equity.
$Institution_{it}$	Shares hold by institutional investors.
Env_Invest_{it}	The natural logarithm of environmental-related investment.
$Cash$	The ratio of cash to total assets.
$TobinQ$	The ratio of market value of equity to total assets.

4.3. Empirical Models

To test Hypothesis 1, since *Violation* is a dummy variable, we use the following probit regression model to perform an empirical test on the impact of institutional investors' corporate site visits on the likelihood of environmental violation:

$$Violation_{it} = \alpha_0 + \beta_1 \ln(1 + SV_{it}) + \sum \beta_1 Control_{it} + \sum Province + \sum Industry + \sum Year + \epsilon, \quad (1)$$

In model (1), β_1 is the coefficient we are interested in, and the predicted sign is negative. For the control variables, we include firm size (*Assets*), Tangibility (*Tangibility*), debt ratio (*Leverage*), the return on equity (*ROE*), institutional ownership (*Institution*), and environmental investment (*Env_Invest*).

To test Hypothesis 2, we divide the whole sample into heavy pollution groups and non-heavy pollution groups according to whether the firm is in heavily polluting industries. According to "Listed company environmental protection industry classification management directory," heavily polluting industries indicate steel, chemical, building materials, paper, brewing, pharmaceutical, fermentation, textile, tanning, and mining-related industries. We apply the probit regression model (1) separately for the two groups. We predict that the coefficient of $\ln(1 + SV)$ in heavily polluting industry is more significantly negative.

To test Hypothesis 3, we divide the whole sample into a group of state-owned firms and another group of non-state-owned firms. We apply the probit regression model (1) separately for the two groups. We predict that the $\ln(1 + SV)$ coefficient in the group of non-state-owned firms is more significantly negative than it is in the group of state-owned firms.

To test Hypothesis 4, we partition the whole sample into lower institutional ownership and higher institutional ownership groups along with the median industry institutional ownership (*Institution*). We apply the probit regression model (1) separately for the two groups. Hypothesis 4a and 4b are competing hypotheses. If the $\ln(1 + SV)$ coefficient is more significantly negative in the group of higher institutional ownership, H4a is verified; if it is more significantly negative in the group of less institutional ownership, H4b is verified.

5. Empirical Results

5.1. Descriptive Statistics

The final sample consists of 9216 observations. Table 2 reports that the proportion of firms visited by institutional investors is 70% in 2009 and 80% in 2017. It shows that institutional investors' corporate site visits are frequent in China. Table 3 indicates that firms experience more and more visits over time, from an average of 10 times in 2009 to an average of 38 times in 2017. Figure 1 documents that the frequency of institutional investors' corporate site visits is increasing. The increasing trend is consistent with the notion that corporate site visits are increasingly essential communication channels for institutional investors and firms.

Table 2. Sample distribution from 2009 to 2017.

Year	Obs.	Obs. with at Least One Institutional Investor Site Visit	Proportion
2009	529	372	70.32%
2010	778	613	78.79%
2011	935	795	85.03%
2012	1010	860	85.15%
2013	1041	796	76.46%
2014	1087	956	87.95%
2015	1177	1061	90.14%
2016	1287	1133	88.03%
2017	1372	1107	80.69%
Total	9216	7693	83.47%

Table 3. Site visits by institutional investors.

Year	Obs.	Mean Value of Site Visits
2009	529	10.19
2010	778	12.08
2011	935	13.74
2012	1010	9.129
2013	1041	25.28
2014	1087	32.77
2015	1177	27.46
2016	1287	35.83
2017	1372	38.16
Total	9216	24.91

Figure 1. The mean value of institutional investors' corporate site visits.

Table 4 lists descriptive statistics for the sample observation of all the variables. The mean value of the indicator variable *Violation* shows that 5.6% of the full sample is associated with environmental violations. Only a small portion of firms have environmental violations, consistent with the fact that violating environmental laws is severe, and the stock market reacts negatively to the announcement of environmental violations [30]. The mean value of $\ln(1 + SV)$ is 1.862, which corresponds to a value of 24.911 for *SV*. On average, a firm is visited by institutional investors 24.911 times a year, with significant variations in the number of site visits across firms. The average institutional ownership (*Institution*) is 4%, consistent with the findings in existing studies [8]. The variance inflation factor (VIF) value is 1, which is smaller than the suggested threshold of 10. It suggests that the regression does not suffer from multicollinearity issues.

Table 4. Summary statistics of the variables.

Variable	Mean	Std.	Min	p25	p50	p75	Max	N
<i>Violation</i>	0.06	0.23	0	0	0	0	1	9216
$\ln(1 + SV)$	1.86	1.75	0	0	1.79	3.40	7.80	9216
<i>Assets</i>	21.59	1.05	19.59	20.83	21.45	22.17	25.01	9216
<i>Tangibility</i>	0.23	0.14	0.01	0.12	0.20	0.31	0.63	9216
<i>Leverage</i>	0.36	0.20	0.04	0.20	0.34	0.51	0.85	9216
<i>ROE</i>	0.07	0.10	−0.46	0.03	0.07	0.11	0.32	9216
<i>Institution</i>	0.04	0.04	0	0.01	0.03	0.06	0.18	9216
<i>Env_Invest</i>	1.51	4.58	0	0	0	0	18.08	9216
<i>Cash</i>	0.19	0.16	0.01	0.08	0.14	0.26	0.72	9216
<i>TobinQ</i>	2.73	2.06	0.30	1.33	2.14	3.51	11.18	8734

5.2. Corporate Site Visits and Environmental Violations

Table 5 reports results from probit regressions of the likelihood of environmental violation on corporate site visits based on model (1). We find a negative association between the likelihood of environmental violation and corporate site visits after controlling for a wide array of firm characteristics, including firm size, tangibility, debt ratio, return on equity, institutional ownership, environmental investment, and province, industry, and year fixed effects.

Table 5. Corporate site visits and environmental violations.

	<i>Violation</i>
<i>Ln(1 + SV)</i>	−0.033 ** (−2.12)
<i>Assets</i>	0.151 *** (5.16)
<i>Tangibility</i>	0.794 *** (4.06)
<i>Leverage</i>	0.282 * (1.83)
<i>ROE</i>	0.023 (0.09)
<i>Institution</i>	0.510 (0.86)
<i>Env_Invest</i>	0.003 (0.57)
<i>Province</i>	Yes
<i>Industry</i>	Yes
<i>Year</i>	Yes
<i>_cons</i>	−5.818 *** (−9.23)
N	9216.000
Pseudo R ²	0.1694

Note: T value in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results in Table 5 provide support for our first hypothesis that institutional investors' corporate site visits are negatively associated with firms' likelihood of environmental violation. On a visit, institutional investors observe firms' operations and talk with managers, they could find the clues of environmental concerns, and they also exert pressure to managers directly in improving firms' environmental performance.

5.3. The Effect of Heavy-Polluting Industries

Table 6 reports the results from probit regressions of the likelihood of environmental violation on institutional investors' corporate site visits for firms in heavily polluting industries and non-heavy-polluting industries. The coefficients of $Ln(1 + SV)$ in both groups are negative, while the coefficient is significant in the heavy-polluting group, but not significant in the non-heavy-polluting group, and the coefficient is more negative in the heavy-polluting group. The results indicate that the negative relation between $Ln(1 + SV)$ and *Violation* is much stronger for firms in heavily polluting industries, which supports hypothesis 2.

5.4. The Effect of Government Ownership

We divide the sample into a state-owned group and a non-state-owned group. The coefficients of $Ln(1 + SV)$ in both groups are negative, while the coefficient is significant for non-state-owned firms, but not significant for state-owned firms, and the coefficient is more negative for non-state-owned

firms. The results reported in Table 7 indicate that the impact of institutional investors' corporate site visits is much stronger for non-state-owned firms. The results are supportive of hypothesis 3.

Table 6. The Effect of Heavy-Polluting Industries.

	<i>Violation</i>	
	Heavy-Polluting	Non-Heavy-Polluting
	(1)	(2)
<i>Ln(1 + SV)</i>	−0.059 ** (−2.29)	−0.018 (−0.90)
<i>Assets</i>	0.258 *** (5.10)	0.074 * (1.95)
<i>Tangibility</i>	0.958 *** (3.07)	0.644 ** (2.37)
<i>Leverage</i>	−0.273 (−1.08)	0.617 *** (2.99)
<i>ROE</i>	−0.441 (−1.17)	0.368 (1.01)
<i>Institution</i>	1.719 * (1.84)	−0.217 (−0.27)
<i>Env_Invest</i>	0.002 (0.32)	0.003 (0.38)
<i>Province</i>	Yes	Yes
<i>Industry</i>	Yes	Yes
<i>Year</i>	Yes	Yes
<i>_cons</i>	−8.153 *** (−7.53)	−4.266 *** (−5.29)
N	2836.000	6068.000
Pseudo R ²	0.1783	0.1741

Note: T value in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7. The effect of government ownership.

	<i>Violation</i>	
	State-Owned Firms	Non-State-Owned Firms
	(1)	(2)
<i>Ln(1 + SV)</i>	−0.015 (−0.45)	−0.043 ** (−2.30)
<i>Assets</i>	0.125 ** (2.11)	0.093 ** (2.37)
<i>Tangibility</i>	0.696 * (1.70)	0.760 *** (3.09)
<i>Leverage</i>	0.457 (1.37)	0.217 (1.15)
<i>ROE</i>	0.504 (1.19)	0.139 (0.39)
<i>Institution</i>	0.560 (0.42)	0.986 (1.41)
<i>Env_Invest</i>	0.007 (0.78)	0.001 (0.20)
<i>Province</i>	Yes	Yes
<i>Industry</i>	Yes	Yes
<i>Year</i>	Yes	Yes
<i>_cons</i>	−6.092 *** (−4.71)	−4.705 *** (−5.49)
N	1743.000	7081.000
Pseudo R ²	0.1996	0.1766

Note: T value in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.5. The Relationship between Institutional Ownership and Site Visits

Chen et al. [15] and Dyke et al. [7] found that greater institutional ownership is associated with better environmental performance. Our results reported above show that corporate site visits have a negative effect on the likelihood of environmental violations after institutional ownership (*Institution*) is controlled. The following question naturally arises: whether these two effects are complement or substitutes. One possibility is that institutional ownership and corporate site visits complement each other, since institutions with greater ownership try to obtain more information from the firms for their investment decisions. Hence, the effect will be greater. Alternatively, they substitute each other, since institutional investors may use corporate site visits to replace ownership on firms' governance. The results in Table 8 show that the effect of corporate site visits on the likelihood of environmental violation is much higher in the group of lower institutional ownership, which supports hypothesis 4b, which indicates that institutional ownership and corporate site visits substitute each other.

Table 8. The Relationship between Institutional Ownership and Site Visits.

	<i>Violation</i>	
	Lower Institutional Ownership	Higher Institutional Ownership
	(1)	(2)
<i>Ln(1 + SV)</i>	−0.043 * (−1.74)	−0.022 (−1.02)
<i>Assets</i>	0.172 *** (3.69)	0.156 *** (3.84)
<i>Tangibility</i>	0.728 ** (2.51)	0.821 *** (2.87)
<i>Leverage</i>	0.372 * (1.67)	0.215 (0.96)
<i>ROE</i>	0.449 (1.29)	−0.496 (−1.24)
<i>Institution</i>	2.636 (0.65)	0.203 (0.22)
<i>Env_Invest</i>	−0.005 (−0.69)	0.007 (1.02)
<i>Province</i>	Yes	Yes
<i>Industry</i>	Yes	Yes
<i>Year</i>	Yes	Yes
<i>_cons</i>	−6.655 *** (−6.53)	−5.755 *** (−6.48)
N	4352.000	4612.000
Pseudo R ²	0.1648	0.2060

Note: T value in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.6. Robustness Tests

In the following robustness tests, we further validate the relationship between institutional investors' corporate site visits and the likelihood of environmental violations.

We first re-estimate model (1) and cluster standard errors at the firm level to account for any correlations between firms. Results reported in Table 9, column (1) show very similar results of Table 5.

We also use an alternative measure of institutional investors' corporate site visits. There are concerns about non-normality and measurement error underlying corporate site visits data. To help alleviate concerns, we use a dummy variable (*Dummy_SV*) set to one if institutional investors make at least one site visit and zero otherwise instead of *Ln(1 + SV)* to re-estimate the model (1). Results reported in Table 9, column (2), show a significantly negative association between *Dummy_SV* and *Violation*.

Table 9. Robustness test.

	Violation	
	Cluster id	Dummy Variable for Site Visits
	(1)	(2)
$\ln(1 + SV)$	−0.033 ** (−1.99)	
$Dummy_SV$		−0.088 * (−1.66)
<i>Assets</i>	0.151 *** (4.42)	0.151 *** (5.31)
<i>Tangibility</i>	0.794 *** (3.76)	0.838 *** (4.32)
<i>Leverage</i>	0.282 * (1.73)	0.247 (1.63)
<i>ROE</i>	0.023 (0.10)	0.007 * (1.95)
<i>Institution</i>	0.510 (0.80)	0.378 (0.64)
<i>Env_Invest</i>	0.003 (0.57)	0.002 (0.52)
<i>Province</i>	Yes	Yes
<i>Industry</i>	Yes	Yes
<i>Year</i>	Yes	Yes
<i>_cons</i>	−5.818 *** (−7.99)	−5.826 *** (−9.40)
N	9216.000	9216.000
Pseudo R ²	0.1694	0.1720

Note: T value in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.7. Further Analysis: The Mechanism

In the above analysis, we find that institutional investors' corporate site visits decrease the likelihood of environmental violation. A further question is how institutional investors could decrease firms' likelihood of environmental violation. We propose that institutional investors urge firms to increase environmental investment in order to decrease the likelihood of environmental violation. By increasing environmental investment, firms could adopt new pollution abatement measures and keep the waste gas and waste water within an acceptable volume. The environmental investment would improve firms' environmental performance, which leads to less likelihood of environmental violations [37].

We first use regression model (2) to examine the relationship between institutional investors' site visits and firms' environmental investment. For the control variables in the regression model (2), we include firm size (*Assets*), Tangibility (*Tangibility*), debt ratio (*Leverage*), the return on equity (*ROE*), and institutional ownership (*Institution*), similar to controls variables in the regression model (1). Besides, we include cash (*Cash*) to control for liquidity and Tobin's Q (*TobinQ*) to control for the firm's investment opportunities.

$$Env_Invest_{it} = \alpha_0 + \beta_1 \ln(1 + SV_{it}) + \sum \beta_1 Control_{it} + \sum Province + \sum Industry + \sum Year + \epsilon, \quad (2)$$

Table 10 reports the results; it shows that institutional investors' corporate site visits significantly increase firms' environmental investment. The results are consistent with Zhao, Shen and Zhou [19].

Table 10. Corporate site visits and environmental investment.

	<i>Env_Invest</i>
<i>Ln(1 + SV)</i>	0.051 * (1.66)
<i>Assets</i>	0.246 *** (3.59)
<i>Tangibility</i>	2.490 *** (5.79)
<i>Leverage</i>	−0.261 (−0.78)
<i>ROE</i>	1.107 ** (2.01)
<i>Institution</i>	0.959 (0.81)
<i>Cash</i>	0.262 (0.64)
<i>TobinQ</i>	−0.138 *** (−4.16)
<i>Province</i>	Yes
<i>Industry</i>	Yes
<i>Year</i>	Yes
<i>_cons</i>	−4.592 *** (−3.04)
<i>N</i>	8734.000
<i>R²</i>	0.113
<i>Adjusted R²</i>	0.106

Note: T value in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Discussion and Conclusions

In this study, we examined whether and how institutional investors' corporate site visits affect environmental violations. Unlike previous studies focusing on institutional investors' ownership, we investigated the impact of their corporate site visits.

We propose that institutional investors' corporate site visits could affect firms' likelihood of environmental violation for three reasons. First, institutional investors are motivated to mitigate environmental concerns since environmental concerns may lead to reputational and financial risk. Second, corporate site visits decrease information asymmetry. The disclosure of environmental information is in its infancy in China, and listed firms tend to disclose the positive part of their environmental performance and hide the negative part. Investors visiting the firms could talk with managers and observe the operations; they acquire more information about firms' environmental performance. Third, institutional investors directly put pressure on managers through visiting.

Using manufacturing firms listed in the Shenzhen Stock Exchange from 2009 to 2017, we find that institutional investors' corporate site visits significantly decrease firms' likelihood of environmental violation. The effect is more pronounced for firms in heavily polluting industries and non-state-owned firms. These results validate institutional investors' role in driving environmental performance, and corporate site visits as a useful way to mitigate information asymmetries and push managers to improve environmental performance. We also find that the effects of institutional investors' corporate site visits on environmental performance are substitutes for the effects of institutional ownership. We further find that firms may increase environmental investment to avoid environmental violations.

Our contributions from this study are threefold. First, it enriches the literature about institutional investors and CSR. Existing literature focuses on institutional ownership on CSR. This study investigates the effect of institutional investors' corporate site visits on the likelihood of environmental violation. Second, our research highlights the importance of institutional investors' corporate site visits by showing that they are beneficial to the firms visited. Third, the existing literature about institutional

shareholding used samples from the developed country. By using Chinese data, our study provides new evidence on this stream of literature.

Firms' sustainable development is a critical issue. Based on the results, we next provide some practical suggestions to policymakers. First, our study shows that institutional investors play a positive corporate governance role in driving firms' sustainable development. The government should develop a policy to develop and attract institutional investors. Second, our analysis reveals that institutional investors' corporate site visits can increase environmental performance. The Chinese government should encourage investors to visit manufacturing firms and ask questions about environmental issues actively. Third, the government should require more stringent environmental-related information disclosure. More transparent and accessible public information on firm environmental performance can assist stakeholders in monitoring manufacturers and phasing out polluting firms through a market mechanism.

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