Assessing the Influence of China's Pre-IPO Environmental Inspection Policy on Firm Environmental Performance and Green Securities

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Abstract
With sometimes contradictory outcomes, China has tried various regulations to encourage businesses to improve their environmental performance. This study examines the efficacy of merging two distinct policies at the same time new regulations governing the public disclosure of policy compliance for companies wishing to conduct an initial public offering (IPO) and a more centralized environmental inspection procedure. According to a theoretical paradigm, a firm's environmental performance and profitability should be enhanced by a more centralized inspection and public disclosure. Although the beneficial impact on profitability only lasts for two years after compliance with the IPO criteria, the findings of instrumental variable calculations for 536 listed Chinese enterprises from 2009 to 2019 corroborate the theoretical expectations. A study of potential processes reveals that the joint strategy increases demand for the company's goods while encouraging investment in environmentally friendly initiatives. The results show that more sophisticated regulations could be required if a nation wants to influence business conduct in a way compatible with resolving environmental issues.

Keywords: Pre-IPO Environmental, Inspection Policy, Firm Environmental Performance, Green Securities

1.Introduction
Chinese environmental policy has been heavily tweaked during the previous two decades to address the country's complex environmental problems. The government had high hopes for the results of these many programs, but they have often been disappointed (Cai & Li, 2018). In whatever shape they took, previous policies may have needed to be more strictly enforced, which might explain why they did not seem successful. One probable explanation is that polluting operations went unnoticed because local government officials have historically been motivated to focus on economic expansion rather than pollution prevention (Wen et al., 2022). Secondly, since the regulation cost is higher than the predicted net benefit of internalizing the pollution externality, polluting enterprises often have little incentive to decrease their emissions (Shittu et al., 2021). Finally, pollution externalities are associated with non-environmental variables like managerial quality, technological spillovers, information asymmetry, and productivity. In that case, getting funding for initiatives that enhance a company's environmental performance may be more accessible.

Due to the seriousness of China's environmental problems and the widespread belief that existing policies were ineffective, the government took a two-pronged strategy. To address some issues with decentralized practices, the government began strengthening its role in enforcing environmental policies. This included initiatives such as the National Specially Monitored Firms program in 2007 (Albort-Morant et al., 2016) and vertical reform in environmental jurisdictions starting in 1994 (Shinwari et al., 2022). The government has implemented ecological rules and other measures to tackle non-environmental market failures. For example, enterprises' environmental performance ratings are published (Bhandari, 2013), and there is a relationship between environmental performance and access to finance. This is the first study to examine whether or not this kind of policy combination prompted companies to cut emissions without affecting their ability to compete. Green securities policies (GSPs) combine centralized environmental inspections with public access to policy compliance information and fundraising. This paper's contribution is to analyze the effects of one such GSP. It aspires to lessen pollution by assisting businesses in funding new environmentally conscious investments. In 2008, the GSP was established as the "pre-IPO environmental inspection policy" (hence referred to as the pre-IPO policy) by the Securities Regulatory Commission (SRC) and the Ministry of Ecology and Environment (MEE) of China. Using publicly available data on initiatives to lessen environmental impact, save energy, and improve environmental management, this article establishes a quantifiable metric for corporate environmental performance (CEP). This new index incorporates all environmentally friendly actions to achieve the pre-IPO policy aims of lowering pollution levels and funding green investment.

Companies looking to file for an IPO or refinancing on the Chinese stock market are the focus of the pre-IPO policy. To comply, businesses must be transparent about their investment plans, provide reports detailing their environmental performance over the last three years, undertake on-site ecological inspections, and have any planned funding for environmental impact assessments. State and federal environmental agencies publish their compliance reports and inspection findings publicly on their websites. The requirement for environmental disclosure in annual reports is one of the more recent regulations imposed on listed companies in China. This policy was the first green finance initiative to affect a company's ability to raise capital and list on the stock market (or refinance if already listed). We provide a theoretical framework to shed light on the potential effects of this GSP on environmental performance and how the availability of compliance information to the public may alter consumer demand. Theoretical predictions are tested, and the underlying processes of the short-term and long-term findings are investigated. The estimates cover the period from 2009 to 2019 and are based on data from 536 publicly traded Chinese companies. An instrumental variable method is used to combat the possibility of endogeneity in policy compliance and self-selection bias.

This work is connected to four distinct bodies of literature regarding previous research. To begin, a survey by summarizes the empirical evidence primarily from industrialized nations and regions like the US and the EU, which has led to extensive discussion in the literature on environmental regulatory federalism regarding the pros and cons of centralized and decentralized enforcement. China has begun to "bring the center back" in recent years, and several researches has shown that more centralization improved environmental quality in Chinese cities and provinces. Except for two studies that looked at the effects of more centralized efforts before 2010, there needs to be more research at the corporate level. Secondly, this research contributes to the existing body of knowledge by expanding our understanding of how public disclosure impacts business activity and enterprises' environmental and economic performance. There are three ways in which environmental information is made public: first, through eco-labeling or certification by third-party agencies; second, through the disclosure of data showing whether or not companies are following current regulations; and third, through voluntary or mandatory self-reporting by

companies. Two, the disclosure of data about regulatory compliance is the main point of this article.

Research studies have shown that enterprises are motivated to improve their pollution control efforts when they are provided with information about regulatory compliance. These studies include are among the works that investigate the connection between environmental disclosure and the signals it sends to the capital market which in turn affects stock prices and market returns. While some research has shown that firms can boost demand and profits by signaling the environmental attributes of their production technology through price, only takes a more theoretical approach by looking at how consumers react to product market information. On the other hand, price signaling may not be effective in situations where regulations could be more robust. This study updates Sengupta's model to account for a less stringent regulatory environment and shows that signaling is effective when regulatory compliance is made public.

Third, this paper adds to the growing body of literature arguing that environmental regulations, when coupled with other policies, can effectively address environmental concerns while simultaneously overcoming the various externalities and constraints contend that centralization of policies is not "a silver bullet" in and of itself. Argue that strategies for disclosure of information should not be seen as a replacement for conventional environmental policies but rather as an adjunct to or replacement for command-and-control and market-based tools.

The fourth body of research concerns environmentally responsible financing. In particular, are among the few studies that have examined green securities policies; this article adds to the body of knowledge on green finance that has mostly focused on green credit. A more centralized inspection process, publicly available information on policy compliance, and a green finance initiative all worked together to encourage firms to improve their environmental performance without sacrificing competitiveness, as summarized in this paper's theoretical and empirical evidence. Empirical evidence suggests that enterprises that complied with the pre-IPO policy had better short-term economic and environmental outcomes and remained competitive for at least two years after the regulation was in place.

2.Theoretical framework

GSP has two distinct objectives. There are two main goals here: first, to get businesses to cut down on their greenhouse gases, then moment, to get money for novel "more sustainable" investments that can cut toxins even more in the years to come. The marginal benefit (MB) of abatement remains consistent at $\tau 1$ for every kilogramme of attenuation when just one environmental regulation, such an emission tax, is implemented, as shown in Figure 1. At point E1, the marginal cost of mitigation (MAC) = MB, marking the equilibrium level of abated emissions as $Z1\prod$. Firms who comply with the pre-IPO rule may profit directly from it since it allows them to obtain money in the stock market, which is the same as boosting MB to $\tau 2$ at abatement level $Z1\prod$. Benefiting from the arrangement, conforming businesses will be able to draw upon environmentally friendly sources of funding. As a result, environmental investment causes attenuation to increase until the new equilibrium point E2, where the marginal cost of mitigation is larger, is achieved at $Z2\prod$ (Dai et al., 2021).
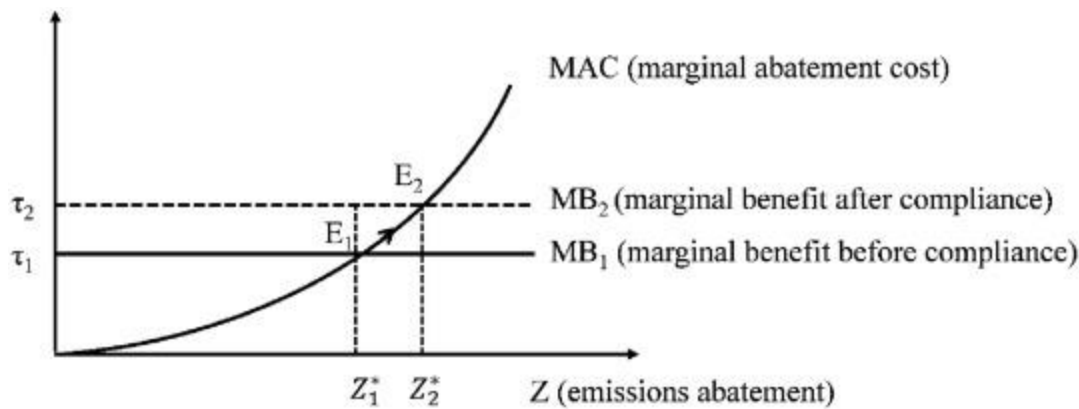
Fig. 1. The impact of policy compliance on firms' emission abatement.
Source: constructed by the authors.

Conversely, given that knowledge regarding conformance with the pre-IPO policies is publicly available, customer interest in the products and amenities of the complying business grows. Companies' efforts to make sure their new development is "sustainable" and meets environmental standards are communicated to environmentally concerned customers in a straightforward and transparent way via open communication. People are willing to give a premium for a company's product if it complies with environmental standards, thanks to the pre-IPO strategy that tackles the issue of unequal knowledge about the firm's environmental features. In the past, customers had to take a wild guess as to the likelihood of a company's cleanliness before determining whether or not to buy the company's items. Following The woman (Le & Park, 2021), we will presume for the sake of convenience that one company provides an item or commodity that causes an environmentally outside influences, and we will presume that there is an annual average of pollutants attenuation. There is no danger to the buyers. Disclosure of knowledge on complying with policies is possible in Marketplace A. A customer's quasi-linear utility relationship for an eco-friendly, conforming business is provided by:

$$U^{A1}(q) = d - \frac{1}{2\rho}(a - q)^2 \qquad (1)$$

The quantities q, d, and a represent non-zero numbers, according to the statement, and c is also a positive number. The standard manufacturing cost is denoted by c. The ecological consciousness index, denoted by the parameter ρ, exhibits a distribution that is typical over the interval $[\rho\_,1]$ and may take on quantities between 0 and 1. The minimal positive impact of consuming the item, denoted as $MU_{A1} = \frac{1}{\rho}a - Y$, determines its market their worth, p, and the individual request functioning, $q_{A1} = a - \rho p$, is defined. As a result, the general consumption is (Giannarakis et al., 2017):

$$Q^{A1} = \frac{1}{1-\rho}\int_{\rho}^{1}(a - \rho p)d\rho = a - \frac{1+\rho}{2}p = a - \frac{p}{\gamma} \qquad (2)$$

In where $\gamma = \frac{2}{1+\rho} > 1$. A smaller number of ρ indicates that the distribution of preferences appears more ecologically aware, while an elevated number of γ indicates the opposite. let's pretend that the marginal expenditure (c) is the same:

$$p^*_{A1} = \frac{a\gamma + c}{2} \qquad (3)$$

$$Q^*_{A1} = \frac{a\gamma - c}{2\gamma} \qquad (4)$$

If a company doesn't follow the rules, it's safe to conclude they don't care about the state of the planet. What happens to the utility function of the particular customer is:

$$U^{A2}(q) = d - \frac{1}{2}(a-q)^2 \qquad (5)$$

Compared to A makeup artist1, the marginal utility of using the product is lower, denoted as MUA2 = a − q. Consequently, quality assurance 2 = a – p represents the individual demand function and correspondingly, the collective request is:

$$Q^{A2} = a - p. \qquad (6)$$

Next, in Market B, customers have to take a wild guess as to the company's exterior characteristics as legal information isn't visible. The firm's cleanliness is assumed to have a probability $\mu \in (0, 1)$ by customers before anything else. This changes the total consumption of the product to:

$$Q^B = \mu Q^{A1} + (1 - \mu)Q^{A2} = a - \left(\frac{\mu}{\gamma} + 1 - \mu\right)p = a - \delta p \qquad (7)$$

In at which $\mathbf{v}=\mu\gamma+1-v$. We may deduce that $0 < \delta < 1$ because μ is a real number between 0 and 1 and γ is at least 1. It makes no difference whether the business has hygiene issues or not; in Market B, the demand for it is the identical as in Eq. (7). We also find the balance between the amount required along with the cost in Markets B, but this time it's as follows:

$$p_B^* = \frac{a+\delta c}{2\delta} \qquad (8)$$

$$Q_B^* = \frac{a-\delta c}{2} \qquad (9)$$

Using equations (3), (4), (8), and (9), we get the monetary disparity ($\Delta\pi$) generated by the policy-compliant company across both market circumstances (Deng et al., 2022).

$$\Delta\pi = \pi^{A1} - \pi^B = (p_{A1}^* - c)Q_{A1}^* - (p_B^* - c)Q_B^* = \frac{1}{4\delta\gamma}(\delta\gamma - 1)(\gamma a^2 - \delta c^2) > 0$$

(10)

The equation $(\delta\gamma - 1) = (\gamma - 1)(1 - \mu) > 0$ and $(\gamma a2 - \delta c2) > 0$, thus $\Delta\pi > 0$, may be rewritten as $(a > c > 0, \mathbf{v}=\mu\gamma+1-\mu > 0, \gamma > 1$, and $0 < \zeta < 1$.

Thus, the dominant company boosts its bottom line by letting buyers know it's following the green securities policy. On behalf of the Chinese government, CRS oversees the regulatory procedure of every initial public offering (IPO), in contrast to the registration-based system used in the United States, the continent of Europe, and Hong Kong to date. The goal of the permits procedure is to safeguard investors by weeding out low-quality businesses (Zheng & Tang, 2023). But because of this, the Chinese government is heavily involved in deciding on whether or not a company can have a successful initial public offering.

H1: Relying entirely on the pre-IPO policy leads to better environmental results. We may put H1's supporting technology to the test by using:

H2: Pre-IPO policy-compliant companies are more likely to put money into green initiatives. Compared to price signals or self-reported knowledge about the pre-IPO approach appears to be more legitimate, translucent and trustworthy when it comes to determining if enterprises are in compliance with regulations, especially considering China's traditionally poor environment compliance. All levels of the Chinese government are now required by law passed in 2007 to make decisions in public documents (Hsu et al., 2021). Government data, particularly environmental data, may have been deliberately altered, according to a number of studies, even if people are more likely to believe data disclosed by higher-level government departments. This is why it is thought that a more centralized sustainable securities strategy would be more effective in shifting customers' utility functions and willingness to pay, leading to more demand and ultimately greater income for the corporation. Profits should rise in the resulting equilibrium as a result of the boost in revenue offsetting the increase in abatement expenses. So, we may deduce hypothesis 3 and 4 as follows:

H3: A higher income is generated by companies who adhere to the pre-IPO strategy (H4).

3. Technical Approach
3.1. Information and factors
To determine whether or not complying enterprises enhance their commitment to the environment (H1) while maintaining their ability to compete (H3), a difference-in-difference characterization is used as the methodology technique. Using this method, we can see how different groups of companies fared economically and environmentally over the course of a comparable period in time, before as well as once they cooperated in implementing legislation.

$$CEP_{it} = \beta_0 + \beta_1 COMPLIANCE_{it} + X_{it}\delta + u_t + v_i + \varepsilon_{it} \qquad (11)$$

$$Profit\ Margin_{it} = \beta_0 + \beta_2 COMPLIANCE_{it} + X_{it}\gamma + u_t + v_i + \varepsilon_{it} \qquad (12)$$

Where CEPit is a metric that measures how well company i took care of our surroundings in year t; There are a number of manageable elements in the vector machine Xit, such as the size of the company (a position), several decades since it was a publicly traded company, share number of standalone managers, instruction of executives, capital expenditures, and argument rates of reaction. Profitable Marginit is an indication of competitiveness for the business that uses this ratio. The time fixed consequence is denoted by ut, the firm fixed effect by vi, and the inaccurate term is denoted by εit (Liu et al., 2022).

The information provided at the company level originates from CSMAR. CEP is an environmentalist statistic that is built using data from the CSMAR's "Business relationships Community Engagement (CSR)" report. Though there is some standardization in the format, just approximately 10-15% within listed corporations are required to submit information on corporate social responsibility annually. Of that, 60-70% included data about the environment. Following cleaning, data on 536 companies operating in the pre-IPO policy enforcement era (2009–2014) is accessible, with 214 of those companies being involved in industries with high pollution levels. Since data on these companies is accessible all the way through 2019, we can evaluate the pre-IPO policy's effects over the long haul. In the end, 2208 samples spanning 2009–2019 make up the group of data, which is imbalanced. Making a sustainability performance indicator for individual firms that measures how effectively the pre-IPO strategy achieves its goal of bettering environmentally management is the main focus of this article. So that we may measure how well a company did in three areas. Following the two-phase procedure used to build the index called the Human Development Index. In order to get the final CEP measure, each indicator is categorized along the three dimensions and then the indications from each category are added together. The MEE and provincial environmental authority website were carefully combed through for data on the implementation of policies. Firms are required to make their records publicly accessible on official websites after they apply for pre-IPO examination in year t. Therefore, companies are classified as compliant businesses and assigned the code COMPLIANCE it = 1 within the first-year t and 0 otherwise. Companies in the study without application details are treated as not complying and assigned the code COMPLIANCE it = 0. A total of 68 businesses (12.7%) out of 528 were found to be in compliance. The pre-IPO regulation was not strictly enforced, nevertheless, unlike many other Chinese policy tools. Lack of coordination across federal and state regulatory agencies, inconsistent technical requirements, and clear instructions on how to pinpoint polluting

businesses were the primary worries from the beginning. It is possible that businesses in industries that do not produce a lot of damage were more inclined to willingly comply with the regulations, where as polluting enterprises were more inclined to evade inspection due to these unpredictability.2 Additional detailed information are included in Table 1. The two-sample test comparing the approaches of complying and non-compliant enterprises is reported in the last two rows of data. Compliant businesses are younger, much less heavy on capital, and have fewer managers with higher education. On the other hand, they have directors who are more autonomous and better environmental ratings on average. There is little to no difference in the typical efficiency levels (Omer, 2009).

Table 1. Demographic data among complying versus incompatible enterprises.

	All firms		Compliant firms		Non-compliant firms		Difference	
	Mean	s.d.	Mean	s.d.	Mean	s.d.	t	p-value
CEP Index	0.132	0.245	0.178	0.370	0.321	0.326	4.810***	0.00
Profit Margin	0.140	0.285	0.146	0.170	0.128	0.284	0.454	0.73
ROA	0.038	0.062	0.044	0.060	0.049	0.062	0.984	0.33
Employment	3.443	6.830	3.932	5.851	3.374	7.031	-2.027	0.40
Director	0.373	0.057	0.372	0.066	0.381	0.067	3.436**	0.02
Education	0.358	0.272	0.324	0.365	0.463	0.361	-3.497**	0.02
Age	12.474	5.144	12.638	7.228	12.545	5.134	-2.970**	0.04
Capital intensity	0.496	0.703	0.420	0.433	0.414	0.736	-3.647***	0.00
Leverage	0.092	0.121	0.098	0.203	0.080	0.201	2.187	0.34
Obs.	2207		198		2012			

Notice: "s.d." stands for deviation from the mean. The profit from operations before taxes divided by the total income is the revenue percentage. Chairman measures the percentage of directors who are not shareholders on the board; Educational indicates a percentage of the management team with a college degree or higher; The length of time a firm has been trading on a stock exchange is its "age"; A company's financial intensity may be measured by comparing its total fixed assets to its total revenue. A measure of tension is its rate. A two-sample test of means is presented using t statistic. Built by the writers using CSMAR.

3.2. Identification strategy

A static impact estimates is used in calculating the initial findings. Compliant and a company's environmental and economic performance can both be impacted by factors that cannot be seen, such as differences in implementation of policies, managerial abilities, and the culture of the business. To combat the possibility of heterogeneity in adherence to policies and individual choice bias, a two-stage residual inclusion (2SRI) technique using instrumental variables (IVs) is used. Compared to a two-phase least-squares method, 2Socially Responsible Investment estimating is better for the categorical environmental component CONFORMITY. According to equations an IV is considered legitimate if it correlates with noncompliance but is not associated with the residuals of CEP and profit margin. Nevertheless, it is difficult to locate such an IV for a corporation. According to recent research, industry-location averaging may be used as operational factors in cases when the endogeneity issue is unique to businesses rather than industries or geographies. According to, there are company-specific variables, such fundamental technology, that affect conformance at the industry level, whereas locale-specific elements, like the efficacy of local bureaucrats in enforcing policies, are associated with conformance at the place of business level. If these hypotheses hold, the two suggested IVs ought to eradicate the bias caused by the unobservable associated with compliance at the company level, rather than at the profession or geographical level.

A first Probit estimate is performed:

$$\Pr(\text{COMPLIANCE}_{it} = 1|X, IV1, IV2) = \Pr\left(X_{it}\lambda + \eta_1 IV1_{ijt} + \eta_2 IV2_{ikt} + e_{it} > 0\right) \qquad (13)$$

when that it stands an inaccurate element corresponding to a conventional normal pattern as well as is mathematically connected to εit in Eqs., but has no influence of the control variables Xit and the IVs. The additional stage estimates of Eqs. use the calculated generalised average () as an extra regressor. the IVs are considered to be external variables (Almeida & Wasim, 2023).

4. Ecological as well as financial results in relation to conformance
4.1. Initial findings
The outcomes derived from the fixed-effects estimate of Equations (Mehmood et al., 2024)are detailed in the following table. When a company goes from being inconsistent to acceptable, their environmental record improves by a typical of 1.3%, and its earnings margin goes up by 0.054, all other variables being equal. Panel (B), composed of contaminating businesses, reveals that the CEP index and profit margin are both affected by policy, although to varying degrees. Our primary hypothesis, that the pre-IPO strategy greatly enhances environmental performance (H1), is supported by the baseline findings. We also discovered that revenues actually went up, proving that there was no reduction of advantage in this regard (H3) (Zeng et al., 2024).

Table 2. Marginal profit and CEP as outcomes of the benchmark assumption.

	(A) All firms		(B) Pollution − intensive firms	
	(1)	(2)	(3)	(4)
	CEP	Profit Margin	CEP	Profit Margin
COMPLIANCE	0.013 ⯑⯑	0.054 ⯑⯑⯑	0.014 ⯑⯑	0.044 ⯑⯑
	(0.017)	(0.030)	(0.206)	(0.031)
Employment	0.005 ⯑⯑	0.007	−0.007	0.016
	(0.022)	(0.034)	(0.025)	(0.031)
Director	0.022	−0.083	0.016	−0.040
	(0.049)	(0.235)	(0.067)	(0.086)
Education	−0.008	0.101 ⯑⯑⯑	−0.037	0.079 ⯑⯑
	(0.037)	(0.031)	(0.043)	(0.232)
Age	−0.003 ⯑⯑⯑	−0.005 ⯑⯑	−0.002	−0.005
	(0.021)	(0.032)	(0.052)	(0.063)
Capital intensity	0.002	−0.023 ⯑⯑⯑	0.000 ⯑⯑⯑	−0.024 ⯑⯑⯑
	(0.000)	(0.002)	(0.000)	(0.003)
Debt − equity ratio	0.057 ⯑⯑⯑	−0.044	−0.005	−0.265
	(0.028)	(0.341)	(0.048)	(0.199)

	(A) All firms		(B) Pollution − intensive firms	
	(1)	(2)	(3)	(4)
	CEP	Profit Margin	CEP	Profit Margin
Constant	0.052 **	0.208 ***	0.073 ***	0.147 **
	(0.035)	(0.071)	(0.031)	(0.067)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Within R2	0.04	0.09	0.04	0.18
F − test statistics	4487.3 ***	896.8 ***	332.0 ***	146,869.9 ***
N	2209	2207	981	971

4.2. Instrumental variable analysis

The outcomes of the 2SRI procedure are shown in Table 3. In the first stages of the regression analysis, both IVs are statistically significant (p values of $\chi 2$ test <0.01).3 According to Wooldridge, who (2013), all of the model specifications have covariance coefficients that are near zero, indicating that the IVs are legitimate. All the regression analyses show a non-zero coefficient for, which means that the legislation variable Compliance is autonomous (Boyaghchi et al., 2018).

Table 3. Second-stage results of 2SRI Estimations with IVs: CEP and profit margin.

	(A) All firms		(B) Pollution-intensive firms	
	(1)	(2)	(3)	(4)
	CEP	Profit Margin	CEP	Profit Margin
COMPLIANCE	0.171***	0.520**	0.144***	0.349**
	(0.068)	(0.220)	(0.087)	(0.165)
$\tilde{e}it$	−0.157***	−0.464**	−0.129***	−0.305*
	(0.065)	(0.235)	(0.084)	(0.171)
Firm controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Cov (ε, IV1)	0.000	0.000	0.000	0.002
Cov (ε, IV2)	0.000	0.003	0.002	0.003
Joint Sig. of IVs χ^2(p-value)	7.64 (0.01)	12.88 (0.00)	23.85 (0.00)	26.80 (0.00)

	(A) All firms		(B) Pollution-intensive firms	
	(1)	(2)	(3)	(4)
	CEP	Profit Margin	CEP	Profit Margin
Within R^2	0.04	0.08	0.04	0.15
F-test statistics	113.8***	2918.1***	790.4***	2774.4***
N	2207	2207	992	981

Details: Eq. (13) is used for calculating the very first the road, and the amount remaining from the previous phase is denoted as IVs. The sectoral proportion of cumulatively complying businesses in year t is measured by IV1, while the region's share is measured by IV2. An entry has been made in the Ep index. *$p < 0.1$, **$p < 0.05$, and ***$p < 0.01$. Parenthesis including Driscoll-Kraay normal deviations. Despite taking any issues with endogeneity into account, the data remains in favor of H1 and H3. Following correction for endogeneity-induced bias, the advantageous and statistically significant coefficients on Conformance show that conforming businesses' environmental and economic performance is enhanced by complying with laws. The legislation's effect can only be estimated by adding the exogenous and endogenous impacts, which are denoted by the combined total of the variables of conformity and. On the average, conforming companies had better environmental performance than not in compliance enterprises by 1.4% in the overall business sample and by 1.5% in the pollution-intensive company samples (these dimensions constitute only slightly higher than the baseline values), everything else being equal. Additionally, it seems that the pre-IPO strategy had no negative impact on the competitiveness of companies, which is consistent with the foundation findings (Columns 2 and 4). The margin of profitability, defined as pre-tax profit as a percentage of total sales, was, on average, 0.056 percentage points greater for conforming businesses in the complete sample compared to not complying enterprises. Policy conformance raises the profitability profit of pollution-intensive enterprises by 0.044 percent, and this impact is still considerable. The coefficients are comparable to those in the baseline regressions once again.

Throughout the year in question (t) to the future years (t+1 to t+3), Table 4 shows the longer-term policy influence on revenue margins (Abdi et al., 2022). Panel A found that in the two decades following compliance with policy, the profit margin increased by an amount of significance ranging from 0.023 to 0.044. Panel B shows a comparable trend for polluting businesses. The substantial influence on the profit margin, however, fades away after twelve months of compliance (t + 3). Figure 2 shows that these findings are in accord with the conclusions of the foundation model-based dynamic analysis of the policy effect (Ringov & Zollo, 2007).

Table 4. *Long − term effects on profit margin,* 2*SRI estimations with IVs.*

	(1)	(2)	(3)	(4)
Profit Margin	t	$t + 1$	$t + 2$	$t + 3$
		(A) All firms		
COMPLIANCE	0.520 ⍰⍰	0.597 ⍰⍰⍰	0.617 ⍰⍰	0.449
	(0.210)	(0.117)	(0.248)	(0.326)
êit	−0.464 ⍰⍰	−0.574 ⍰⍰⍰	−0.573 ⍰⍰	−0.465
	(0.215)	(0.122)	(0.247)	(0.322)

Profit Margin	(1) t	(2) $t+1$	(3) $t+2$	(4) $t+3$
$Cov(\varepsilon, IV1)$	0.000	0.000	0.000	0.000
$Cov(\varepsilon, IV2)$	0.002	0.002	0.003	0.003
$Within\ R2$	0.07	0.04	0.03	0.03
$F-test\ statistics$	2918.1 ***	56,392.5 ***	420,559.7 ***	189,070.4 ***
N	2208	1476	1198	999
$(B)\ Pollution-$intensive firms				
COMPLIANCE	0.349 **	0.574 **	0.824 ***	0.203
	(0.155)	(0.251)	(0.261)	(0.291)
êit	−0.305 *	−0.581 **	−0.805 ***	−0.199
	(0.161)	(0.258)	(0.253)	(0.283)
$Cov(\varepsilon, IV1)$	0.001	0.000	0.000	0.000
$Cov(\varepsilon, IV2)$	0.001	0.004	0.004	0.003
Within R2	0.14	0.08	0.07	0.04
F−test statistics	2774.4 ***	365,956.5 ***	1125.0 ***	483.3 ***
N	991	693	587	497
Firm controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Take notice that the earning percentage at moment t, t Plus 1,..., t + 3 comprises the variable that depends. The projected remnant form this initial iteration is denoted by êit. The correlations involving the remaining variables calculated from the baseline model and the instrumental variable are denoted as $Cov(\zeta, IV1)$ and $Cov(\varepsilon, IV2)$. *$p < 0.1$, **$p < 0.05$, and ***$p < 0.01$. The common mistakes with numerals represent the Driscoll-Kraay type..

4.3. Investment in green projects and the shift in demand

The next step is to look at the ways compliance-driven businesses become more eco-friendly on ventures before an initial public offering (IPO) (Hai et al., 2023). Following the guidelines makes organizations more likely to engage in green projects, as stated by H2. By examining the data given by CSR reports, we can calculate the aggregate number of projects which correspond to every single of the seventeen factors that formed the Center for Environmental Performance index. You can see the outcomes of combining OLS wit two different number simulations, Poisson modeling and Inverse binomial reasoning analysis of regression, in Table 5. According to the findings, policies that are observed cause expenditures in green projects to be reallocated, lending credence to proposition 2. Comply has an encouraging and analytically significant correlation of performance across all three requirements. For the average company, adhering increased spending on green initiatives by 10%.4 Polluting businesses are encouraged to make purchases in green projects by the legislation, but only on a smaller scale (the columns 4-6). This sheds light on the

reason these businesses are less affected by the regulations effect on Ceu than the average (Table 3) (Tost et al., 2018).

Table 5. Influence method via means of funding green initiatives.

No. of Env-friendly investment projects	(A) All firms			(B) Pollution-intensive firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	Poisson	Negative binomial	OLS	Poisson	Negative binomial
COMPLIANCE	5.916***	1.740***	1.739***	4.087***	1.375***	1.378***
	(0.586)	(0.400)	(0.404)	(0.662)	(0.262)	(0.268)
$\tilde{e}$it	−5.721***	−1.647***	−1.653***	−3.986***	−1.327***	−1.343***
	(0.602)	(0.324)	(0.408)	(0.548)	(0.254)	(0.153)
Cov (ε, IV1)	−0.002	0.000	0.000	−0.003	−0.002	−0.003
Cov (ε, IV2)	0.002	0.003	0.000	0.002	0.000	0.000
F or wald χ^2 statistics	176.2***	627.4***	602.4***	87.2***	423.1***	388.3***
N	2207	2207	2206	992	992	993
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	No	No	No
Year fixed effects	No	No	No	No	No	No

Additionally, it would be interesting to understand whether or not the margins of earnings are boosted by higher income from changing overall consumption (H4) as a result of public information on complying with policies (Ashraf et al., 2021). Calculating operational income on compliance with regulations, with all operational costs (COST) controlled for, yielded the findings shown in the table below. With all other factors held unchanged, complying with regulations boosts earnings (as shown by the positive and statistically significant relationship on Concordance in Column 1). Table 4 shows the rule's influence on margins of profit for a period of two years, and this favorable effect on earnings continues for a subsequent period as well (the columns 2 and 3).

Table 6. Accounting for expenses, the mechanism impact manifests as income.

Revenue	(1) t	(2) t + 1	(3) t + 2	(4) t + 3
(A) All firms				
COMPLIANCE	2.130***	2.157***	2.231***	0.275
	(0.189)	(0.175)	(0.254)	(0.362)
$\tilde{e}$it	−1.131***	−1.074***	−1.158***	−0.264
	(0.178)	(0.241)	(0.259)	(0.377)
COST	0.978***	0.564***	0.147**	−0.004
	(0.032)	(0.066)	(0.076)	(0.061)

Revenue	(1) t	(2) t + 1	(3) t + 2	(4) t + 3
Cov(ε, IV1)	0.000	0.003	0.004	0.003
Cov(ε, IV2)	0.002	−0.003	−0.002	0.005
Within R^2	0.88	0.35	0.07	0.09
F-test statistics	7419.6***	5074.7***	650.1***	1365.3***
N	2203	1477	1197	998
(B) Pollution-intensive firms				
COMPLIANCE	0.686***	1.187***	1.021**	−0.450
	(0.075)	(0.455)	(0.605)	(0.540)
$\hat{e}_{it}$	−0.708***	−1.147***	−0.981*	0.367
	(0.088)	(0.458)	(0.547)	(0.350)
COST	0.910***	0.446***	0.095*	0.030
	(0.063)	(0.071)	(0.850)	(0.038)
Cov(ε, IV1)	0.002	0.003	0.005	0.004
Cov(ε, IV2)	−0.0004	−0.003	0.0008	−0.003
Within R2	0.88	0.34	0.08	0.20
F-test statistics	10,057.8***	1627.3***	3620.7***	357.3***
N	992	6932	586	496
Firm controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

5. Robustness checks

By using a comparable set of seventeen indications, two distinct metrics measuring the ecological sustainability of corporations are developed. Two types of factor evaluations may be acquired using EFA as well as Cpa. while the latter is derived employing empirical factor analysis (EFA) (Gorsuch, the same year). The findings of the EFA and CFA factor scores are shown in Table 7. All requirements have a favorable and statistically important correlation on REGULATION, which is consistent with the primary findings in Table 3 and lends credence to H1.

Table 7. Sustainability and adaptability testing employing element evaluations, 2SRI, or the

CEP: Factor Scores	(A) All firms		(B) Pollution-intensive firms	
	(1)	(2)	(3)	(4)
	EFA Scores	CFA Scores	EFA Scores	CFA Scores
COMPLIANCE	0.010***	0.034***	0.009**	0.053***
	(0.004)	(0.012)	(0.004)	(0.014)
$\tilde{e}_{it}$	−0.009***	−0.029**	−0.007*	−0.044***
	(0.003)	(0.012)	(0.004)	(0.014)
Firm controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Cov(ε, IV1)	0.000	0.000	0.000	0.000
Cov(ε, IV2)	0.000	0.000	0.000	0.000
Within R^2	0.01	0.04	0.05	0.04
F-test statistics	2239.6***	83,991.2***	7614.9***	39,051.6***
N	2208	2208	991	991

Investigators employ aspect evaluations generated by Petroleum-based products and Cfd to estimate an organization's environmental performance (CEP). This is what was predicted leftover from the first step. The residuals obtained from the first model and the variable of interest are represented by the covariance coefficients Cov(ε, IV1) and Cov(ε, IV2). the significance levels are *$p < 0.1$, **$p < 0.05$, and ***$p < 0.01$. The Driscoll-Kraay averages are included in the parenthetical.

Return on assets (ROA) provides an alternative metric for evaluating economic health. You can see the results in Table 8. Businesses who adhere to the rules enjoy significant and positive performance for the two years after conformance.[6]

Table 8. Validity checks on both the present as well as future ROA, or return 2SRI estimates.

ROA	(1)	(2)	(3)	(4)
	t	t + 1	t + 2	t + 3
(A) All firms				
COMPLIANCE	0.381***	0.147***	0.170**	0.047
	(0.036)	(0.024)	(0.062)	(0.060)
$\tilde{e}_{it}$	−0.278***	−0.148***	−0.145**	−0.058
	(0.036)	(0.028)	(0.061)	(0.058)
Cov(ε, IV1)	0.000	0.000	0.000	0.000
Cov(ε, IV2)	0.000	0.000	0.000	0.000
Within R^2	0.20	0.08	0.04	0.04
F-test statistics	8762.7***	12,179.9***	656.9***	1592.7***

ROA	(1) t	(2) t + 1	(3) t + 2	(4) t + 3
N	2228	1478	1198	1002
(B) Pollution-intensive firms				
COMPLIANCE	0.256***	0.184***	0.375**	0.078
	(0.031)	(0.026)	(0.069)	(0.060)
$\hat{e}_{it}$	−0.243***	−0.194***	−0.164**	−0.100*
	(0.028)	(0.033)	(0.068)	(0.059)
Cov(ε, IV1)	0.000	0.000	0.000	0.000
Cov(ε, IV2)	0.000	0.002	0.003	0.004
Within R2	0.16	0.12	0.09	0.07
F-test statistics	771,672.1***	6950.0***	940,571.0***	501.4***
N	993	695	587	498
Firm controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Note: Return on assets (ROA) is the metric in question. Both Cov(ε, IV3) and Cov(ε, IV3_sq) represent the coefficients of variation among the instrument parameter and residuals that were obtained from the beginning of the model. *$p < 0.1$, **$p < 0.05$, and ***$p < 0.01$. Parenthesis including Driscoll-Kraay normal deviations. Last but not least, we use a propensity score matching (PSM) strategy to see how the policy's impact on a company's Gdp overall profit margin would have been changed in the absence of compliance. The probability scoring are estimated using control variables, profit margin, and one year and older lags CEP. Using a fixed-effects estimator, we regression CEP, earnings margin, and ROA on the compliance with policies. We produce an unbalanced panel of 389 businesses matching employing 1-to-1 closest neighbor screening approaches employing (Hu et al., 2024) methodology.7 The key findings are largely valid, as shown in Table 9. Even though the pre-IPO strategy improved the company's green credentials, it had no effect on the firm's competitiveness (positive and substantial for the profit margin; negligible for ROA). While the influence on ecological sustainability is less, the influence on business margins is considerable, and the magnitudes of the impacts are often comparable.

Table 9. Fixed-effects results using PSM matched samples...

	(A) All firms			(B) Pollution-intensive firms		
	CEP	Profit Margin	ROA	CEP	Profit Margin	ROA
COMPLIANCE	0.017	0.016**	0.003	0.016	0.032**	0.006
	(0.008)	(0.007)	(0.007)	(0.010)	(0.009)	(0.009)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes

	(A) All firms			(B) Pollution-intensive firms		
	CEP	Profit Margin	ROA	CEP	Profit Margin	ROA
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.04	0.05	0.02	0.05	0.07	0.12
F-test statistics	42.6***	1967.6***	19,831.4***	225.8***	58,325.8***	3096.6***
N	1446	1446	1448	679	678	678

Firms preparing to go public must complete the pre-IPO environmental assessment procedure as part of their due diligence. This approach will evaluate the company's compliance with environmental standards and laws to reduce risks for the firm and its investors. A thorough evaluation of the business's environmental policies, procedures, and results is usually part of the inspection. Waste management methods, emission controls, resource conservation measures, and hazardous material handling are all essential parts of this study. Inspectors often examine company records of compliance with environmental regulations at the state, federal, and international levels. We thoroughly review past infractions, current lawsuits, or unsolved matters to assess any liabilities. In addition, the organization's sustainability programs and environmental responsibility pledges ofe assessed during the audit. This research includes a look at how the firm incorporates sustainability into its operations, such as by using green technology, cutting down on carbon emissions, and supporting conservation efforts for biodiversity. The results of these audits are vital because they affect the trust of investors and the firm's value in the market. In contrast to the potential benefits to the company's image and interest from eco-conscious investors, the possible downsides include the need for expensive repairs, postponement or cancellation of the initial public offering (IPO), and other related costs as shown in fig 2.
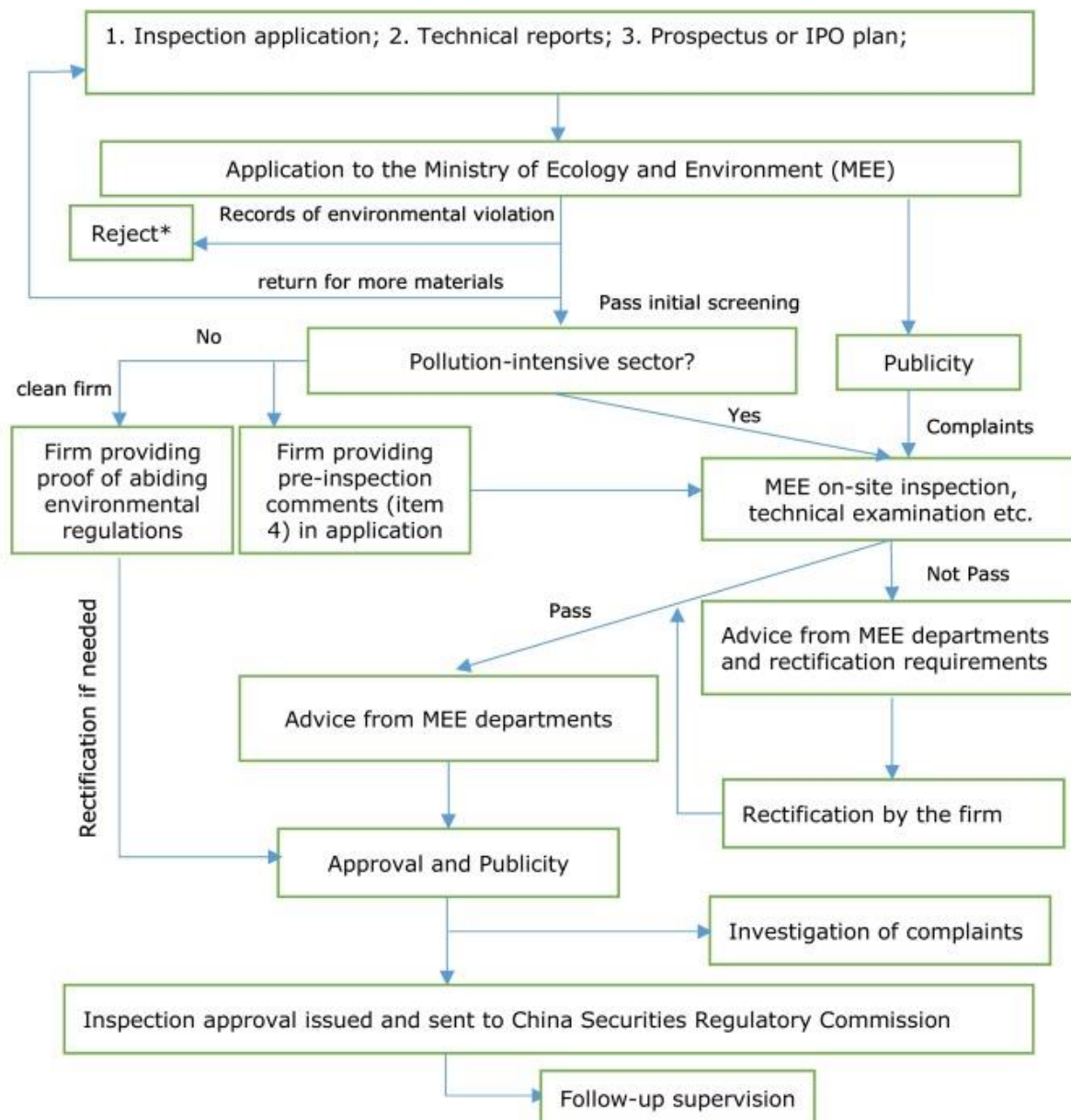
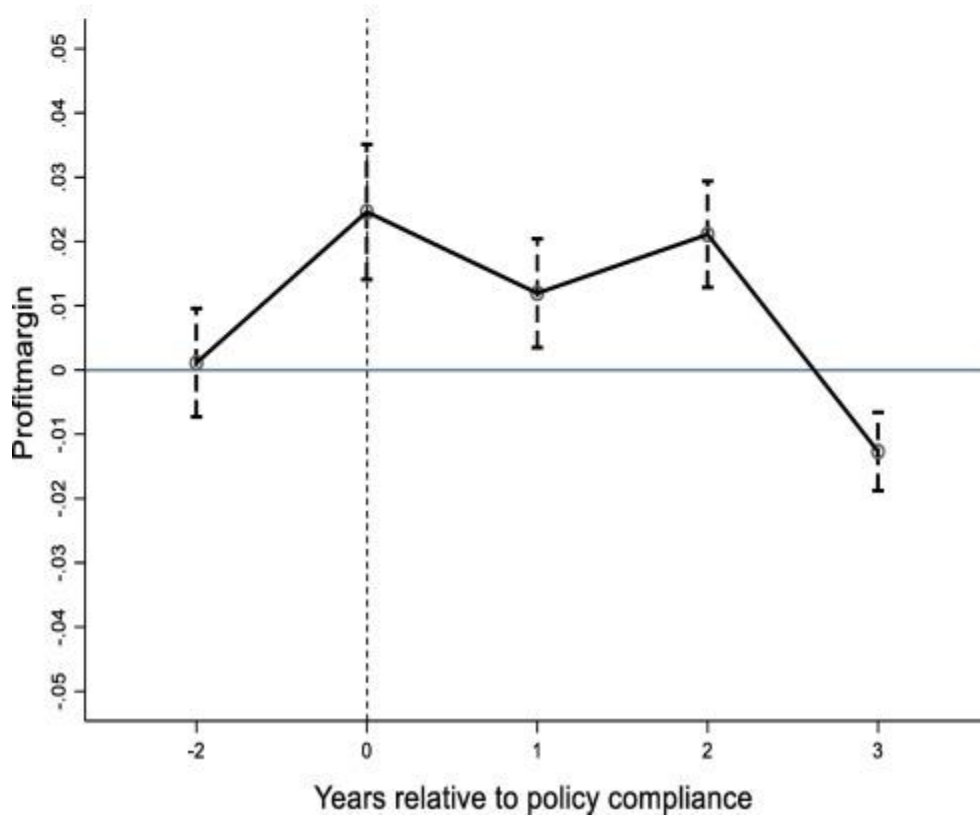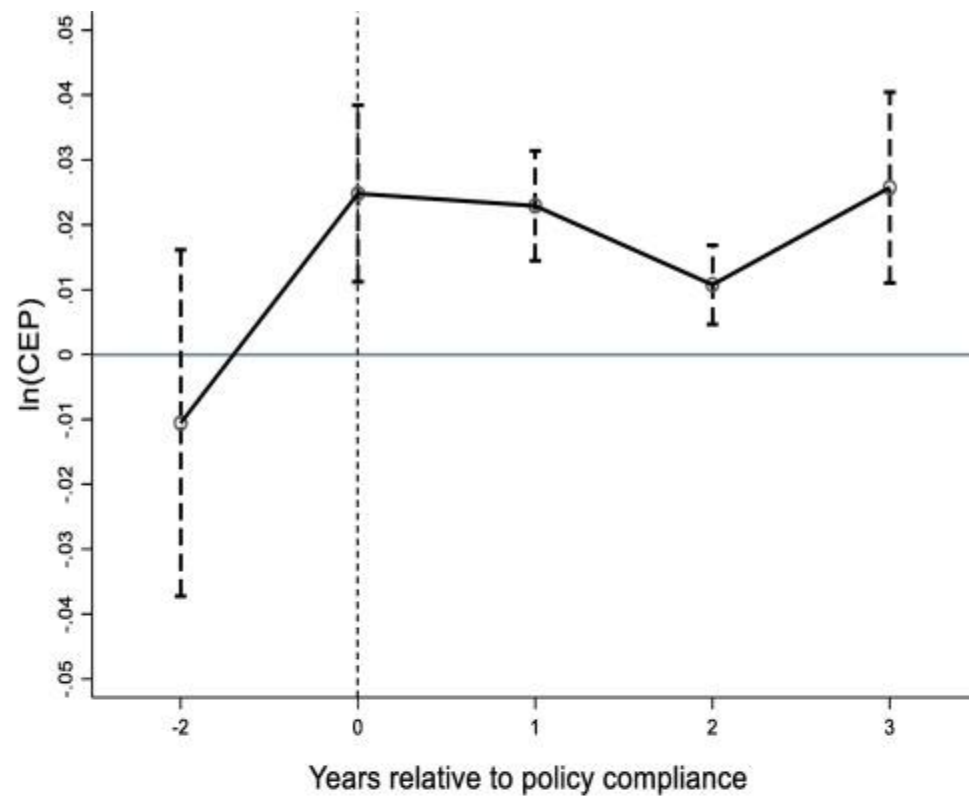Fig. 2. Pre-IPO environmental inspection procedure.

Fig. 3. The dynamic impacts of policy compliance on firms' CEP and profit.

6. Conclusions

There have been proposals for a more centralized policy and agencies to use various, often interconnected, strategies to mitigate policy compliance's externalities and transaction costs to make environmental regulatory enforcement in China more effective. This research examines how a novel green securities policy incorporating a central environmental inspection, disclosure of policy compliance, and initial public offering (IPO) certification might affect economic and ecological advantages. According to this paper's theoretical framework, complying businesses do better for the environment when the federal government plays a more significant role before and after an IPO. Additionally, in an ideal world, enterprises and consumers would have equal access to information on regulatory compliance, which would change people's utility, increase demand overall, and boost profits. A dataset of Chinese-listed companies from 2009 to 2019 is used to test the theoretical predictions. The results back up the theory that companies that followed the pre-IPO strategy had better environmental performance and were less affected by competition. However, the sound effect on competitiveness wears off after two years of compliance. Compliant businesses are more likely to put money into environmentally friendly initiatives, and more demand means more money coming in, which means higher profit margins.

An increased emphasis on centralized environmental inspections and the simultaneous public disclosure of regulatory compliance as part of the initial public offering (IPO) process constitutes one of the first attempts to assess the efficacy of such a policy strategy. This study adds to the existing body of knowledge on environmental regulation centralization and how integrating environmental policy with information disclosure can boost ecological performance without compromising a company's ability to compete by making its green credentials more widely known and increasing demand for its products. The effectiveness of China's pre-IPO strategy, which this study examines, might lead to the implementation of comparable policies in other countries, thereby contributing to the body of knowledge on green financing.

The outcome is obvious. Sustainable economic operations that don't harm the environment are challenging to fund due to the intricacy of the regulations. Promoting environmental preservation while sustaining economic development is difficult because of the expenses linked with strict environmental rules. Even though policy centralization is not a panacea, this paper's findings demonstrate that environmental performance may be improved via a more centralized inspection procedure, hence avoiding local regulatory capture problems. To reduce the burden of regulatory compliance and encourage more investment in environmentally friendly initiatives, combining a more stringent inspection system with improved information disclosure and easier access to financing is recommended. An example of a policy connected to the stock market is the pre-IPO policy in this article. The results support the claim that several environmental protection-related problems, such as transaction costs and information asymmetry, may be solved by integrating information disclosure regimes and ecological policies into financial processes (such as IPO approval). Continuous information disclosure regimes, including ESG (environmental, social, and governance) grading, obligatory self-reporting, and a frequently publicized list of offenders, are potential expansions of the policy framework. Businesses should be encouraged to maintain their focus on environmental preservation using this method.

Lastly, it is recognized that there are several limits to this study. To start, there is a limited amount of data from our sample. Green securities rules are still in their early stages. Furthermore, compared with other established markets, China's stock market is still in its infancy. In general, Chinese citizens could be better at following official orders. These constraints limit the scope of future investigations into diverse impacts. To add insult to injury, the green securities policy in China is the only policy that this article assesses. Considering the need for firm-level information on policies integrating several functions to address environmental challenges, future research may analyze other policies, such as self-reporting and ESG rating, in more detail.

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