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Original Research

Confucianism, Long-term Orientation and Corporate Environmental Protection Investment: Evidence from China

Yujing He, Xinru Lu, Yanan Wang*

School of Business, Hohai University, Changzhou, Jiangsu 213022, China

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Abstract

Environmental protection investment is crucial to achieving an environment-friendly society. This study explores the influence and mechanism of Confucianism on corporate environmental protection investment (EPI) from a long-term-oriented perspective. Calculating the density of Confucian academies in prefecture-level cities and using data on Chinese A-share listed companies from 2010 to 2020, this study finds that Confucianism plays a considerable role in promoting corporate environmental protection investment by stimulating corporations to assume social responsibility and ameliorate corporate accounting information quality. The positivity of Confucianism shows strong robustness. Further analysis shows that when environmental regulation is weak or industry competition is fierce, Confucian cultural values have a more positive influence on EPI. This study provides empirical evidence on incentivizing corporate environmental responsibility and comprehensive green transformation of economic and social development during the sustainable development phase.

Keywords: Confucianism, corporate environmental protection investment, long-term orientation, corporate social responsibility

Introduction

Emerging economies such as China have driven rapid economic development with high energy consumption, while the environmental pollution brought by high energy consumption has become an obstacle to sustainable economic development nowadays [1]. To break environmental constraints, it is urgent to change the economic development model. According to the *Global Environmental Performance Index Report 2022*, China is positioned at 160th out of 180 countries and regions, scoring 28.4. There is an extensive disparity in environmental protection effectiveness between China and developed countries. Ecosystem services make an outstanding contribution to human welfare [2]. A good ecological environment lays the foundation of public welfare, improving the well-being and standard of living of urban residents [3]. *The 20th National Congress of the Party Report* emphasized that Chinese modernization contains harmony between humanity and nature. According to the Polluter Pays Principle (PPP) of OECD [4], enterprises, being the primary consumers of

* e-mail: yananwang@hhu.edu.cn
Tel.: +86-519-15295077271

resources and the origin of environmental pollution, ought to assume a pivotal role in driving the transition towards green development through the implementation of EPI.

Existing studies generally agree that profit-oriented enterprises have negative attitudes toward altruistic environmental investment, so external institutions are effective means to regulate enterprises' pollution treatment, through which way high-quality development will be promoted. Existing literature has investigated the factors affecting EPI from the formal institutions such as the establishment of environmental courts [5], environmental tax reform [6], formal and informal environmental regulations [7], and the supervisory role of media attention [8]. At the same time, some researchers have delved into EPI through the lens of corporate internal governance factors, including CEO turnover [9], resource slack, and environmental management maturity [10]. However, limited literature focuses on the profound impact of informal institutions such as culture.

Culture has been consistently difficult to measure. In the area of business and environmental protection, a small body of literature has compared corporate greening initiatives across national cultures, drawing on the influential Hofstede cultural latitude [11]. Durach and Wiengarten used data from a comprehensive cross-national survey encompassing 413 factories across eight countries and found that a national culture oriented toward the long-term contributes to a more systematic approach to organizational environmental management, which in turn improves firms' environmental performance [12]. Wang et al. examined the ramifications of diverse national cultures on corporate environmental initiatives within the cultural dimensions of masculinity, uncertainty avoidance, and power distance [13]. Peng and Zhang found that masculinity and uncertainty avoidance inhibit the contribution of board independence to the environmental performance of multinational corporations [14]. Lee et al. found that individualism, long-term orientation, and uncertainty avoidance contributed to the advancement of a sustainable green economy [15]. These studies lacked a specific emphasis on the cultural attributes of individual countries or regions and have not delved into the cultural aspects of corporate environmental investment. Furthermore, the fifth latitude, namely long-term orientation, received inadequate exploration, despite sustainable development inherently involving a strategic choice between short-term and long-term perspectives.

The long-term orientation dimension of Hofstede's cultural system is derived from Chinese Confucianism. In the World Values Survey, East Asian countries such as China demonstrate a high long-term orientation [11]. Confucianism has always been the mainstream of traditional Chinese culture, which has a subtle effect on the moral code and behavioral norms of the Chinese [16]. More than two thousand years of historical inheritance have built the stability of Confucianism, and its cultural underpinnings have been preserved through the shock of foreign cultures and the course of modernization. In recent years, an increasing number of scholars have embraced the quantification of Confucianism, delving into the correlation between Confucianism and micro-level corporate decision-making. The findings show that the ethical inculcation of Confucianism reduces minority shareholder expropriation [17], and plays an active role in sustainable marketing [18], manager's corporate social responsibility orientation [19], the utilization of trade credit [20], corporate research and development expenditure [21], and corporate environmental information disclosure [22]. Despite the good progress of the above studies, there is little literature that has explored the relationship between Confucianism and EPI, and even less systematic discussion on managerial characteristics and EPI decision-making under the long-term orientation.

The marginal contributions of this paper are primarily manifested in the following aspects. First, this paper enhances the exploration of firms' motivations for undertaking EPI. The majority of current literature examines the role of external mechanisms such as environmental regulation, while this paper focuses on Confucianism as an informal system to explore the spontaneous EPI of firms. Second, this paper incorporates Confucianism into the increasingly complex market-oriented environment to attain a comprehensive understanding of the relevance of Confucianism in the current phase of China's economic development. Third, this paper analyses the incentives for spontaneous corporate environmental action from the perspective of long-term orientation, explores the complementarity between formal and informal systems, and ultimately provides cultural guidance for policies that promote corporate environmental protection and green transformation.

Theoretical Mechanism and Research Hypothesis

Managers' psychological characteristics and action preferences affect corporations' decisions [23]. Under the upper echelons theory, in the context of environmental investment projects characterized by delayed returns, unpredictable outcomes, substantial resource requirements, and challenges in performance measurement [24], managers with short-term orientations tend to meet minimal environmental obligations. They show a preference for investment projects with shorter-term horizons and higher immediate returns. Confucianism embodies a long-term orientation, specifically advocating the inclination to pursue future returns or long-term benefits. This orientation profoundly influences the cognitive processes and decision-making perspectives of corporate managers.

Confucian concepts of "benevolence" (仁) and righteousness-benefit view nurture the ecological outlook of managers. Reflecting on the development of Confucian merchants' culture in China, the aspiration to benefit society and the people has consistently stood as the highest ideal of Confucian values, inspiring merchants to engage

in secular business endeavors to ultimately achieve transcendentally ideal goals. Motivated by long-term objectives, Confucian merchants seamlessly integrate the pursuit of "moral principles" (道义) and public welfare into their short-term goals, opposing the pursuit of personal gains through unethical means. The debate between public interest and private gain within the Confucian perspective of righteousness and interests originates from the core concept of "benevolence". As expressed by *Mencius*: "Being kind to one's family leads to benevolence towards the people, being benevolent towards the people leads to love for all things." Benevolence extends universally with variations, encompassing care from one's own family to a broader sense of concern for and appreciation of all things. Guided by "benevolence", Confucianism advocates for timely and moderate utilization of natural resources and the restraint of excessive desires to achieve sustainable development. Classical works such as "The timber will not run out if the trees are properly cut down according to the seasons" (*Mencius*), "The emperor does not close the siege, the vassals do not eradicate the herd" (*the Book of Rites*) reflect early Confucian ecological values, emphasizing considerations for the environment. During the Song Dynasty, the prominent Confucian scholar Cheng Hao (程顥) further emphasized that "the benevolent regard the heavens, the earth, and all things as one body", viewing the entire universe as an interconnected entity deserving care, reinforcing the Confucian sense of responsibility towards environmental stewardship. In modern times, Confucian merchants' righteousness-benefit view has evolved, advocating for a balance between righteousness and benefits, recognizing the legitimacy of private interests while giving priority to public justice and interests. During the turbulent period (1912-1949), Confucian businessmen externalized benevolence in their business operations and assumed political and social responsibilities [25]. As environmental issues become crucial aspects of contemporary life, enterprises' investing in environmental protection not only expresses care for society but also actively responds to their environmental responsibilities, aligning with the moral code of Confucianism.

Influenced by Confucianism, the long-term-oriented way of thinking encourages managers to pay more attention to social responsibility, engaging more in EPI. This is manifested in enterprises' willingness to continuously strive for long-term returns and concern for the "big picture" of the environment while meeting financial bottom-line requirements, avoiding the opposition between short-term performance in assuming social responsibility performance and long-term commitment [26]. As expressed in the saying "Righteous people with a just cause gain more support, people who have lost their justness and righteousness get less support" (*Mencius*), managers recognize that enterprises lacking moral integrity face challenges in the long run. Drawing upon the theories of instrumental information transmission, reputation effects, and resource dependency, active EPI contributes to conveying signals of enterprises' well operating and low risks, thus conducive to cultivating a positive business reputation [27], establishing social capital with stakeholders [28] and acquiring multiple development resources [29, 30], thereby reducing environmental uncertainty. Particularly in the aftermath of financial crises, the trust of stakeholders enhances a company's resilience against risks [28]. Taking corporate social responsibility into account the interests of all parties improves underinvestment [31], optimizes the growth path of the company, and objectively reduces the possibility of the company deviating from the most suitable risk level [32]. This aligns with the preference for risk aversion of Confucianism and aids in mitigating concerns when managers make decisions regarding EPI, eventually enhancing the efficiency of such an investment.

Confucianism shapes managers' work values, improving the quality of accounting information and promoting EPI. Out of performance pressure and opportunistic motives, managers may manage earnings through changing accounting recognition periods and policies, which in turn reduces the quality of accounting information, exacerbating principal-agent conflicts and financing constraints, and ultimately inhibiting the scope of EPI. While managers' decision-making inertia is difficult to change through external systems, the cultivation of Confucianism can shape managers' internal characters, thereby influencing their decision-making preferences. Above all, "loyalty and faith" in Confucianism regarded as a kind of commitment to oneself and others, requires managers to always keep their contractual commitments in practice and reject short-term temptations, especially the use of EPI funds for self-interested projects while shirking investment losses. Secondly, the responsible culture of "being in one's position, doing one's duty, accomplishing one's work" provides managers with the self-driven power of "prudence" and "self-reflection". Under the limited effect of internal and external institutional supervision, moral constraints lead managers to consciously reduce the management of accrued earnings, thus improving the quality of disclosed information and alleviating information asymmetry, which in turn eases financing constraints, securing better conditions for EPI [33]. Finally, long-term-oriented thinking can not only improve managers' acceptance of short-term earnings fluctuations, avoiding excessively pursuing short-term performance while deliberately evading long-term environmental investment, but also encourage managers to think systematically and proactively, and utilize existing resources to carry out forward-looking deployments in response to future development opportunities and challenges [34]. Xunzi (荀子) said, "Climbing high and waving, the arm is not to lengthen, but those who see are far away"; Confucius (孔子) said, "Scholars aspire to Tao, those who ashamed of bad clothes and food, not enough to discuss with". If managers only focus on the current financial performance for short-term interests, lacking long-term strategic planning, enterprises tend to miss opportunities for sustainable development. Confucius (孔

子) said, "If a man does not have far-flung concerns, he will have immediate worries." Against the backdrop of increasingly stringent environmental regulations in China [35], higher quality of accounting information means that enterprises need to put real money into protecting the environment to meet regulators' requirements, rather than managing earnings. The consciousness of concern and distress in Confucianism has led executives to reduce "superficiality" and proactively lay out environmental impact indicators in order to better adapt to changes in the environmental legal system.

Based on the above analysis, the following hypotheses are proposed:

Hypothesis 1: Confucianism has a positive impact on the EPI of enterprises.

Hypothesis 2: Confucianism promotes EPI by incentivizing corporates to assume social responsibility.

Hypothesis 3: Confucianism promotes EPI by improving the quality of accounting information.

Material and Methods

Data Collection and Sample Selection

Data on enterprise information and financials are from the China Stock Market and Accounting Research (CSMAR) database. Data on Confucianism are collected from the Chinese Research Data Services Platform (CNRDS) database. Social responsibility scores of corporations are from Hexun.com. The environmental regulation data is sourced from the National Bureau of Statistics of China. The paper's sample comprises Shanghai-Shenzhen A-share listed companies between 2010 and 2020. We refine the initial sample by excluding: (1) ST, *ST, and SST-type listed firms; (2) financial firms; and (3) samples lacking crucial data. Ultimately, the study obtains 6581 firm-year observations. To exclude the effects of extreme values, we winsorize all continuous variables at the top and bottom 1% of their distributions.

Empirical Model

To investigate the impact of Confucianism on the EPI, the following benchmark model is constructed:

$$EPI_{i,t} = \alpha_0 + \alpha_1 Confu_{i,t} + \sum \alpha_k Control_{i,t} + \sum Year + \sum Industry + \sum Region + \varepsilon_{i,t} \quad (1)$$

In Equation (1), $EPI_{i,t}$ means environmental protection investment of corporations. $Confu_{i,t}$ represents the intensity of Confucianism in a region where the firm is registered. $Control_{i,t}$ represents a range of control variables. The model controls for year, industry, and region fixed effects. $\varepsilon_{i,t}$ stands for a random error. According to our theoretical expectations, the coefficient of $Confu_{i,t}$ is significantly positive. The stronger the Confucian culture, the more the company carries out EPI.

Variable Design and Definition

Dependent variable. Following the research of Zhang et al. [5], we collect and organize annual financial statement annotations, and then sum up the amounts of "management expenses" and "construction in progress" items concerning environmental protection as the source of variable data, including sewage and waste gas treatment, dust removal and suppression, energy saving and environmental protection equipment upgrading and other construction projects in progress, as well as expenses such as sewage charges, green and environmental assessment fees. In addition, we divide the firm's total environmental investment by the total assets and multiply by 100 for standardization to mitigate the influence of company size on EPI [6].

Independent variable. Compared with questionnaire surveys, historical data have the edge of objectivity, repeatability, and stability. Throughout China's history, Confucianism has been disseminated through ideological education to influence people's ethical morals and behavioral norms. Confucianism Database (CFCN) in CNRDS, based on the *Dictionary of Chinese Academies*, collects and arranges the information of Confucian academies within the jurisdictions of provincial-level administrative districts from the Tang Dynasty to the Qing Dynasty and adjusted according to the current administrative divisions of China. Following the practice of Chen et al. [36], we measure the intensity of Confucianism by the density of Confucian academies, which is derived from the number of academies in every prefecture-level city divided by the area of the local administrative division. Considering the readability of the article, the indicator is multiplied by 1000 to obtain *Confu*. Larger values of *Confu* indicate that the firms are influenced by Confucianism to a higher degree.

Control variables. Referring to Yu et al. [37], we control for the following variables, company scale (*Size*), year of listing (*Age*), financial leverage (*Lev*), profitability (*Roa*), Tobin's q (*TobinQ*), operating cash flow (*Slack*), ownership concentration (*Top10*), board size (*Board*), chairman-general manager duality (*Dual*), proportion of independent directors (*Indep*), industry (*Industry*), year (*Year*) and region (*Region*). Table 1 specifies and measures the variables.

Descriptive Statistics of the Main Variables

The descriptive statistics of variables are presented in Table 2. The mean value of *EPI* is 0.860, the minimum value is 0, and the maximum value is 12.196, demonstrating that the level of *EPI* varies from firm to firm, and exists an overall underinvestment. The mean value of the regional intensity of Confucianism is 3.938, the minimum value is 0, and the maximum value is 12.892, demonstrating that the Confucianism intensity differs considerably between regions where the different listed companies are registered. The statistical distribution of other variables is normal.

Table 1. Variable description

Variable	Definition
EPI	Enterprise's total current EPI/Operating income × 100
Confu	Number of Confucian academies in prefecture-level cities where enterprises are registered/Area of prefecture-level city × 1000
Size	ln (Total assets + 1)
Age	ln (Year of listing + 1)
Lev	(Net profit + Income tax expense + Finance costs)/(Net profit + Income tax expense)
Roa	Net profit/Average balance of total assets
TobinQ	Market value/Total assets
Slack	Net cash flows from operating activities/Total assets
Top10	Top 10 shareholders' shares as a percentage of total shares
Board	ln (Number of board of directors + 1)
Indep	Proportion of independent directors to the total number of board members
Dual	Binary variable indicating whether the chairman of the board of directors concurrently serves as the general manager (1 for yes, 0 for no).
Industry	Dummy variables for industries
Year	Dummy variables for years
Region	Dummy variables for cities

Table 2. Descriptive statistics

Variable	N	Mean	SD	Min	Max
EPI	6581	0.860	1.940	0.000	12.196
Confu	6581	3.938	3.468	0.000	12.892
Size	6581	22.601	1.326	20.214	26.458
Age	6581	2.160	0.865	0.000	3.296
Lev	6581	1.590	1.407	0.548	10.467
Roa	6581	0.052	0.044	0.001	0.222
TobinQ	6581	1.773	0.952	0.851	6.326
Slack	6581	0.054	0.063	-0.129	0.235
Top10	6581	0.451	0.201	0.138	0.921
Board	6581	2.269	0.175	1.792	2.773
Indep	6581	0.373	0.053	0.333	0.571
Dual	6581	0.243	0.429	0.000	1.000

Table 3. Confucianism and EPI

	(1)		(2)	
	EPI		*EPI*	
	Coeff.	SE	Coeff.	SE
Confu	**0.085*****	**(4.845)**	**0.084*****	**(4.648)**
Size			0.070***	(2.793)
Age			-0.136***	(-3.670)
Lev			-0.013	(-0.832)
Roa			-0.114	(-0.158)
TobinQ			-0.012	(-0.415)
Slack			-0.892**	(-2.233)
Top10			-0.246**	(-2.015)
Board			-0.286*	(-1.742)
Indep			-1.131*	(-1.896)
Dual			0.238***	(3.609)
Constant	-0.398**	(-2.446)	-0.699	(-1.052)
Industry	Yes		Yes	
Year	Yes		Yes	
Region	Yes		Yes	
N	6581		6581	
Adj. R²	0.116		0.123	

Note: *t* value is in parentheses. ***, **, and * denote significance at the level of 1%, 5% and 10%, respectively.

Results and Discussion

Benchmark Regression

The influences of Confucianism on corporate EPI are presented in Table 3. Confucianism has a strong positive correlation with EPI at the 1% level under fixed industry, year, and region. After adding control variables, the coefficient of Confucianism is 0.084 and highly significant at the 1% level. The regression results meet expectations, demonstrating that as the intensity of Confucianism in the region where the firm is registered is higher, the firm's EPI is greater.

Mechanism Analysis

Based on the theoretical derivation, the survey argues that Confucianism affects corporate EPI in two mechanisms: (1) incentivizing corporations to assume social responsibility; and (2) ameliorating corporate accounting information quality. The bottom part will test the above two mechanisms of functioning respectively.

First, we take the logarithm of the corporate social responsibility scores (*CSR*) posted by Hexun.com to weigh firms' comprehensive performance in fulfilling social responsibilities [38, 39]. The higher the *CSR* index, the more the firms have taken on social responsibility.

The coefficient of *Confu* in column (1) of Table 4, which is significantly positive at the 1% level, indicates that Confucianism promotes EPI. Under the sustainable development pattern, corporate social responsibility increasingly involves the fulfillment of environmental obligations as a crucial benchmark, which affects corporate reputation, and thus motivates firms to balance economic interests and environmental benefits, making EPI and proactively addressing pollutant emissions.

Second, the absolute value of accrual earnings management (*AEM*), estimated by the modified Jones model [40], is used as a proxy for the quality of accounting information.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \lambda_0 \frac{1}{A_{i,t-1}} + \lambda_1 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \lambda_2 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t} \quad (2)$$

$$NDA_{i,t} = \hat{\lambda}_0 \frac{1}{A_{i,t-1}} + \hat{\lambda}_1 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \hat{\lambda}_2 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) \quad (3)$$

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - NDA_{i,t} \quad (4)$$

Where $TA_{i,t}$ means operating profit minus net cash provided by operating activities. $A_{i,t-1}$ eliminates prior period total assets. $PPE_{i,t}$ represents net fixed assets. $\triangle REV_{i,t}$ represents revenue change. $\triangle REC_{i,t}$ represents accounts receivable change. $NDA_{i,t}$ means non-manipulative accrued profits. Take the absolute value of the calculated $DA_{i,t}$ to obtain *AEM*. Higher values of *AEM* indicate the lower quality of accounting information.

Table 4. Mechanism analysis

	(1)		(2)	
	CSR		*AEM*	
	Coeff.	SE	Coeff.	SE
Confu	**0.013*****	**(2.611)**	**-0.002****	**(-2.230)**
Size	0.117***	(21.502)	-0.002**	(-2.326)
Age	0.009	(1.267)	0.003**	(2.424)
Lev	-0.056***	(-9.666)	0.002***	(4.024)
Roa	3.340***	(21.427)	0.460***	(16.357)
TobinQ	-0.012*	(-1.938)	-0.001	(-1.042)
Slack	0.465***	(5.001)	-0.300***	(-12.474)
Top10	0.056**	(2.076)	0.002	(0.428)
Board	0.152***	(3.930)	-0.006	(-1.148)
Indep	0.284**	(2.287)	0.002	(0.124)
Dual	-0.014	(-1.255)	0.004**	(2.008)
Constant	-0.263	(-1.464)	0.061***	(3.041)
Industry	Yes		Yes	
Year	Yes		Yes	
Region	Yes		Yes	
N	6543		6170	
Adj. R²	0.416		0.174	

Note: *t* value is in parentheses. ***, **, and * denote significance at the level of 1%, 5% and 10%, respectively.

The coefficient of *Confu* in column (2) of Table 4 is significantly negative at the 5% level, indicating that Confucianism improves accounting information quality. Under the influence of Confucianism, managers are more likely to equip themselves with long-term-oriented thinking way, thus developing an honest and non-deceptive management style, under which there is less likelihood of financial report whitewashing for short-term interests and long-term development of the firm can be better safeguarded. In such a scenario, EPI complying with environmental regulations is more likely to be put into practice.

Robustness Analysis

Substitutions of Dependent Variable Measuring

Drawing on the research of Xu and Duan [41], a distance measurement model is applied to measure the intensity of Confucianism based on the number of Confucian academies within a specific radius of a firm's registered location. The latitude and longitude coordinates of the districts or counties where the academies are located are collected through Gaode Map[1], and the latitude and longitude coordinates of the list firms' registered addresses are obtained from CSMAR. Through both, we figure out the spherical distance between every listed firm and the Confucian academy. Finally, the count of Confucian academies within a 100 km and 200 km radius around the registered location of the listed firm is normalized by adding 1 to take the logarithm, yielding *Confu_100* and *Confu_200*, proxies for Confucianism intensity. The greater the value of the two proxies, the more intensive of Confucianism around the firm. The alternative dependent variables are reintroduced into the benchmark model. As shown in Table 5, the coefficients of *Confu_100* and *Confu_200* are 0.111 and 0.134, significantly positive at the 5% and 1% levels, respectively, indicating that Confucianism has a significant impact on fostering EPI of corporations.

Substitutions of Independent Variable Measuring

Drawing on the research of Shi et al. [8], a new measure of EPI (firm's total current EPI/operating income × 100) is adopted for regression analysis. As indicated in Table 5, column (3), the coefficient of *Confu* is 0.143, significantly positive at the 5% level. The findings of the survey have been kept unchanged.

Replacement of Sample Intervals

Considering that the COVID-19 Pandemic has caused significant disruption to the firm's operation and normal investment activities, the survey excludes the data for

[1] The location of the Confucian Academy is replaced by the latitude and longitude coordinates of the district or county in which it is located.

Table 5. Robustness Analysis

	(1)		(2)		(3)		(4)		(5)	
	EPI		*EPI*		*EPI_S*		*EPI*		*EPI*	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Confu					**0.143****	**(2.196)**	**0.081*****	**(4.186)**	**0.086*****	**(4.611)**
Confu_100	**0.111****	**(2.511)**								
Confu_200			**0.134*****	**(2.847)**						
Size	0.066***	(2.612)	0.064**	(2.548)	0.179***	(2.620)	0.059**	(2.143)	0.053**	(2.120)
Age	-0.133***	(-3.564)	-0.132***	(-3.536)	-0.317***	(-2.881)	-0.129***	(-3.218)	-0.151***	(-4.009)
Lev	-0.014	(-0.889)	-0.015	(-0.928)	-0.063	(-1.363)	-0.005	(-0.309)	-0.002	(-0.146)
Roa	-0.128	(-0.177)	-0.108	(-0.148)	-4.870***	(-2.633)	0.120	(0.157)	0.101	(0.133)
TobinQ	-0.015	(-0.524)	-0.016	(-0.558)	0.021	(0.255)	-0.003	(-0.086)	-0.014	(-0.479)
Slack	-0.931**	(-2.336)	-0.935**	(-2.343)	-3.632***	(-3.520)	-0.775*	(-1.905)	-1.005**	(-2.436)
Top10	-0.226*	(-1.854)	-0.229*	(-1.881)	-1.009***	(-3.006)	-0.255**	(-1.991)	-0.193	(-1.563)
Board	-0.274*	(-1.669)	-0.280*	(-1.709)	-1.479***	(-3.103)	-0.323*	(-1.908)	-0.216	(-1.302)
Indep	-1.162*	(-1.949)	-1.148*	(-1.926)	-4.335**	(-2.455)	-1.345**	(-2.118)	-0.987	(-1.582)
Dual	0.228***	(3.469)	0.233***	(3.534)	0.911***	(4.751)	0.279***	(3.973)	0.217***	(3.291)
Constant	-0.606	(-0.911)	-0.741	(-1.115)	0.887	(0.457)	-0.364	(-0.506)	-0.602	(-0.879)
Industry	Yes		Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes		Yes	
Region	Yes		Yes		Yes		Yes		Yes	
N	6581		6581		6581		5824		6217	
Adj. R²	0.122		0.122		0.164		0.114		0.125	

Note: *t* value is in parentheses. ***, **, and * denote significance at the level of 1%, 5% and 10%, respectively.

2020 and conducts regression again. The coefficient of *Confu* is 0.081 and significantly positive at the 1% level in Table 5, column (4). Former conclusions remain unchanged.

Deletion of Samples of Areas with a Concentration of Ethnic Minorities

Provinces such as Guizhou, Yunnan, Xinjiang, Inner Mongolia, and Tibet with more ethnic minorities, may differ significantly from other regions in terms of cultural practices and religious beliefs. To mitigate potential effects on the results, the samples whose business registration place is in the aforementioned provinces are removed and we conduct regression again. Column (5) of Table 5 displays the results. The coefficient of the intensity of *Confu* is 0.086 and significantly positive at the 1% level. Our existing conclusions in the survey have proved to be robust.

Heterogeneity Analysis

Intensity of Environmental Regulation

Confucianism, functioning as an informal institution, constitutes a robust adjunct to formal environmental regulations. In areas characterized by stringent environmental regulations, the pertinent norms and frameworks exhibit greater comprehensiveness, the standard of environmental information disclosure is elevated, and the oversight role of information disclosure is more conspicuous. In such areas, companies are inclined to fulfill more social responsibilities and engage in EPI [42-44]. On China's path to carbon peak, factors such as urban industrial structure and local economic growth targets influence whether government energy-saving and carbon reduction policies are lax or strict [45]. In regions with lower environmental regulations, with mandatory binding declining, the soft constraints and implicit pressures formed by cultural identity have more room to prompt companies to voluntarily undertake responsibility for EPI. The study gauges the intensity of environmental regulations through the ratio of annual investment in air and water pollution control to the GDP of the province where the firm is situated. Using the median level as the annual benchmark, samples are classified into the high environmental regulation group if the index of the region where the company is located exceeds this threshold; otherwise, they are categorized as part of the low environmental regulation group. As showcased in Table 6, the outcomes of group regression unveil that the significance of the Confucianism coefficient is more pronounced in regions characterized by low environmental regulations. The promotive effect of Confucianism on EPI is stronger in areas with weaker environmental regulations, aligning with the hypothesis in this section.

Table 6. Heterogeneity Analysis

	(1)		(2)		(3)		(4)	
	High environmental regulation		Low environmental regulation		Strong industry competition		Weak industry competition	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Confu	**0.043**	**(1.569)**	**0.093*****	**(3.669)**	**0.110*****	**(3.424)**	**0.060****	**(2.553)**
Size	0.130***	(3.114)	0.035	(1.063)	-0.082**	(-1.972)	0.171***	(5.007)
Age	-0.098	(-1.618)	-0.184***	(-3.898)	-0.134**	(-2.380)	-0.113**	(-2.089)
Lev	-0.020	(-1.001)	-0.015	(-0.518)	0.006	(0.224)	-0.041**	(-2.014)
Roa	0.201	(0.204)	-0.419	(-0.383)	-1.253	(-1.147)	0.787	(0.769)
TobinQ	0.022	(0.449)	-0.013	(-0.346)	-0.103***	(-2.640)	0.067	(1.401)
Slack	-0.025	(-0.048)	-1.906***	(-2.950)	-0.648	(-1.103)	-1.234**	(-2.135)
Top10	-0.278	(-1.502)	-0.222	(-1.296)	-0.050	(-0.288)	-0.418**	(-2.269)
Board	-0.493**	(-2.062)	-0.170	(-0.711)	0.212	(0.873)	-0.864***	(-3.797)
Indep	-0.778	(-0.842)	-1.435*	(-1.707)	0.671	(0.757)	-3.077***	(-3.790)
Dual	0.254***	(2.649)	0.192**	(2.040)	0.174*	(1.839)	0.272***	(2.679)
Constant	-1.591	(-1.482)	-0.109	(-0.122)	1.203	(1.019)	-1.184	(-1.360)
Year	Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes	
Region	Yes		Yes		Yes		Yes	
N	3365		3216		3277		3304	
Adj. R²	0.105		0.138		0.112		0.164	

Note: *t* value is in parentheses. ***, **, and * denote significance at the level of 1%, 5% and 10%, respectively.

Industry Competition

Intense industry competition imposes formidable survival pressures on companies, product price competition and technological advancement becoming urgent needs, squeezing the space for investment projects with low returns and long cycles such as EPI. However, actively engaging in EPI can build corporate reputation, which in the long run helps establish a more advantageous brand image, conducive to accumulating social capital and achieving differentiation in competition.

How does the intensity of competitive environments affect the relationship between Confucianism and EPI? The survey uses the Herfindahl-Hirschman Index (HHI) for the measurement of total business assets, representing market competition intensity in the industry. The lower the value, the higher the level of market competition. Using the median level as the annual benchmark, the Herfindahl index below the median is classified as the group with strong industry competition, otherwise weak industry competition.

As illustrated in Table 6, in environments of stronger competition, the coefficient of Confucianism is more significant, which suggests that as industry competition intensifies, companies are more motivated to undertake EPI to enhance long-term competitiveness. This could be attributed to environmental issues becoming a crucial aspect of China's high-quality development stage, where the public is more attentive to the environmental responsibilities of companies. The strengthened societal awareness of environmental protection makes EPI essential in the long-term competition, motivating companies to increase EPI. More importantly, righteousness and interests are not zero-sum games in business activities under Confucian culture. Compliance with ethics does entail a short-term cost, but for managers who are deeply influenced by Confucian culture, the purpose of pursuing ethics is not just to generate profits, but also to fulfill the promises they have made to themselves. Above the bottom line of financial responsibility stipulated by law, they will draw higher moral and non-moral boundaries and try to move closer to them [46].

Conclusions

Utilizing data derived from a sample of Chinese A-share listed corporations on the Shanghai and Shenzhen Stock Exchanges over the period 2010 to 2020, our results demonstrate that Confucianism promotes EPI. That is to say, the more enterprises are exposed to Confucianism, the more they are inclined to carry out EPI, through the mechanism of incentivizing enterprises to assume social responsibility and ameliorating corporate accounting information quality. Heterogeneity analysis further reveals that the positive relationship between Confucianism and firms' EPI is more pronounced in regions with low environmental regulations. Moreover, within competitive

industries Confucianism is more prone to incentivize firms to undertake social responsibility, actively engaging in EPI.

Culture developed in the long history of a country or region provides the soil for the implementation of formal systems. Businesses in different cultures have different attitudes towards the same environmental regulation. It's necessary to implement the new development philosophy for China to achieve the 2030 carbon peak goal and high-quality development [47], which requires the full mobilization of China's indigenous culture. In promoting EPI, in addition to further improving formal systems such as environmental protection taxes and government environmental supervision, the ethical values and behavioral norms of Confucianism should be brought into full play. For the government, first, it should be realized that enterprises' EPI is not only a passive act to meet the minimum requirements of laws and regulations, but also an ethical externalization in a special cultural context, and a strategic choice in differentiated competition. Second, facing up to the positive role of Confucianism in the economy of countries in the East Asian Confucian Cultural Circle, increase the excavation, protection, and promotion of the excellent traditional culture represented by Confucianism, integrating environmental responsibility into the construction of contemporary morality. Provide moral prestige for corporate environmental investments to assist in environmental regulation. Third, the government ought to establish a sound incentive and constraint mechanism for enterprises to fulfill their environmental responsibilities according to local conditions. As for enterprise managers, it is imperative to embrace long-term-oriented thinking, incorporating ecological views and the perspective on righteousness and interests, as well as a sense of loyalty and self-discipline into the construction of corporate culture. Such efforts forcefully bolster cultural self-consciousness and promote sustainable economic development, ultimately contributing to societal well-being.

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Conflict of Interest

The authors declare no conflict of interest.

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