Research Article

The Level of Regional Economic Development, Green Image, and Enterprise Environmental Protection Investment: Empirical Evidence from China

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Does green image impact enterprise environmental protection investment? How does the green image affect enterprise environmental protection investment? In order to solve the above problems, this paper uses an empirical analysis to explore the relationship among regional economic development level, green image, and enterprise environmental protection investment based on the empirical data of A-share manufacturing listed companies from 2007 to 2015 in China. The research results show that good green image has a positive role to promote enterprise environmental protection investment, and regional economic development level partially mediates green image and enterprise environmental protection investment. The article confirms that a good green image can send positive signals to stakeholders and increase their loyalty and satisfaction with the enterprise’s products or services. The level of regional economic development provides opportunities for the green development of enterprises. With the improvement in the level of regional economic development, stakeholders’ awareness of environmental protection has increased, and they have become more sensitive to enterprise environmental protection investment behaviors. The research results also show that the environmental awareness of corporate stakeholders plays an important role in actively fulfilling, and it provides new ideas for companies to conduct production and management in a green-oriented model.

1. Introduction

According to the data of “China’s green GDP (green GDP = total GDP – (environmental resources cost + environmental resources protection service fee); the Chinese government has issued the first green GDP accounting research report since 2006) performance evaluation report” in 2018, China’s green GDP is growing continuously, and its growth rate has begun to exceed the GDP growth rate of the same period. In 2016, the average growth rate of China’s green GDP economic aggregate reached 7.58%, exceeding the GDP growth rate of the same period by 0.08%. In addition, the average growth rate of per capita green GDP of China’s 31 provinces/regions has reached 6.79%. With the advent of the era of green economy, the government, public, and society pay more attention to environmental issues. The environmental awareness of enterprise stakeholders, including consumers, investors, suppliers, and employees, is increasing. Stakeholders exert pressure on enterprises to carry out green production and
management and reduce the impact of enterprises on the environment, which urges enterprises to start integration resources for environmental protection investment to meet the requirements of legitimacy and green demands of stakeholders. Therefore, if an enterprise wants to survive and develop, it needs not only to be successful in finance but also to have an outstanding performance in sustainable development. Only in this way can it obtain competitive advantage and survive and develop. In addition, with the implementation of China's environmental protection strategy, the Chinese government continues to increase its investment in environmental protection. According to the National Bureau of Statistics, from 2001 to 2017, China's investment in environmental pollution control increased by 14% annually, reaching 952.9 billion yuan. However, the average proportion of China's environmental pollution control investment in GDP from 2015 to 2018 is about 1.33%, which is still lower than the international level. It is urgent for enterprises to participate in environmental protection investment. As the emitters of pollutants and consumers of resources, they should take the initiative to undertake the responsibility of environmental protection investment and reduce the degree of environmental pollution. As an investment, enterprise environmental protection investment can successfully eliminate or reduce the negative impact of corporate production and management on the environment [1]. However, because the managers think that the cost and income of environmental protection investment do not match, the enterprises lack the initiative of environmental protection investment.

Most studies believe that enterprises need to carry out environmental protection investment behaviors under strict environmental regulations [2, 3]. For example, Tang et al. [3] take the heavy pollution industry as an example, and the research shows that the scale of enterprise environmental protection investment is seriously insufficient at present. Most enterprises' environmental protection investment is a passive behavior under government regulation, and the relationship between them is U-shaped. Li et al. [4] and Gao and Zhang [5] hold the same view. According to Leiter et al. [6], the relationship between the intensity of environmental regulation and the scale of enterprise environmental protection investment is an inverted U-shaped relationship; when the environmental benefits are greater than the environmental costs, they are positively correlated; if the environmental benefits are less than the environmental costs, they are negatively correlated. From the above research results, we can see that there is a threshold value for the impact of environmental regulation on enterprise environmental protection investment, and environmental regulation is not omnipotent. Therefore, the existing literature also studies the impact of external factors such as consumer behaviors [7–9] and the public [10–12] on enterprise environmental protection investment. Part of the research focuses on the impact of equity concentration [13, 14], environmental management system [15, 16], private benefits of managers [17], and other internal factors [18] on enterprise environmental protection investment. However, there is a lack of research on the mediating effect of combining the internal and external factors of the organization with the environmental protection investment of enterprises. Through the study of intermediary effect, we can strengthen the correlation between the internal and external factors of the organization and the environmental protection investment of enterprises and help to clarify the focus of promoting enterprises’ active environmental protection investment behavior.

This paper will first study the impact of green image on environmental protection investment from the internal perspective. Green image is closely related to the perception of enterprise stakeholders. It can not only transmit the information of enterprise environmental management and decision-making to the public but also provide convenience for the public to evaluate the performance of enterprise environmental responsibility. While striving to create a green image, enterprises also provide the public with information on pollution prevention and control of enterprises, thus affecting the public's cognition of environmental behavior of enterprises [19]. Can green image promote enterprises’ positive environmental protection investment behavior to meet the public's environmental protection needs? However, the impact of corporate green image on enterprise environmental protection investment is not necessarily direct. If the stakeholders cannot capture the information of enterprise environmental responsibility performance and put it into action to recognize enterprise environmental protection behaviors, then the enterprise will lack the motivation to carry out environmental protection investment. Therefore, this paper further studies the mediating effect of regional economic development level as a macroeconomic factor between green image and enterprise environmental protection investment from an external perspective.

The contributions of this paper are as follows: firstly, based on the resource-based view, green image is regarded as a scarce and valuable and difficult-to-copy important resource. This paper studies the impact mechanism of corporate voluntary environmental management performance on enterprise environmental protection investment and enriches the research results of resource-based view applied to green investment. Secondly, this paper combines the internal and external factors, emphasizes that the green image plays an indirect role in the enterprise environmental protection investment through the level of regional economic development, which helps to enrich and deepen the research on the motivation of enterprise environmental protection investment, provides new ideas for promoting enterprises to fulfill the accountability of environmental protection, and also provides a better basis for the government to formulate relevant environmental protection policies. Thirdly, in order to promote enterprises to actively invest in environmental protection, the government should improve environmental laws and regulations, and the government ought to enact various policies conducive to enhancing environmental innovation capacity and optimizing industry structure. Finally, the government should further issue specific guidance documents based
2. Theoretical Background and Hypotheses

2.1. The Influence of Green Image on the Scale of Enterprise Environmental Protection Investment

When this era based on green economy comes, companies must explore development directions, such as strengthening corporate green brand building, so as to achieve a green image. The green image of an enterprise is an intangible asset of an enterprise. Most scholars believe that the green image of an enterprise is related to the perception of corporate stakeholders [20]. For example, Chen [21] and Chang and Fong [22] believe that green image is a series of consumer perceptions of corporate environmental commitments and environmental issues. Therefore, the corporate green image is also called "corporate green reputation" [23]. From the scholars’ definition of the enterprise’s green image, the green image is closely related to stakeholders, and stakeholders attention to corporate environmental behavior can effectively promote the enterprise to carry out ISO14001 certification [24], establishing a good green image can be a signal for enterprises to convey environmental commitments to stakeholders [25]. From the perspective of signal transmission, an enterprise can predict the attitude and demand of stakeholders towards its products or services by comparing the changes in product sales before and after the establishment of a green image. In addition, the green image can promote the matching of environmental protection demands of corporate stakeholders with corporate environmental behaviors, increase consumer loyalty and satisfaction with the brand, and increase the likelihood of consumers buying products [26]. In short, enterprises can reduce the cost of communication with consumers, suppliers, and other stakeholders through the green image, thereby gaining greater market development opportunities and stimulating companies to further invest in environmental protection to achieve the goals of legitimacy and maintaining a green image.

The scholars of the resource-based view (BRT) and the advocates of the natural resource-based view (NRBV) all believe that the green image is of strategic significance to the enterprise, and a good green image is an effective way to implement the enterprise’s differentiation strategy. The green image forms the uniqueness of the enterprise’s products or services from other enterprises and increases the brand recognition, degree of specialization, and the reputation of leading product quality and technology. The differentiation strategy enables companies to gain consumer loyalty to the brand and reduces consumers’ sensitivity to product prices, which makes enterprises not need to have low-cost competitive advantages to make profits. An enterprise’s green image can only be formed in a relatively long period of time, so it is difficult to imitate [27], which helps companies gain competitive and sustainable development advantages. For example, Chen [21] and Robinson et al. [28] believe that a green image can create new markets for companies to gain a competitive advantage and protect the natural environment. Porter and Van der Linde [29] believe that a good green image of an enterprise is conducive to gaining the “first-mover advantage,” which not only increases the correlation between the green image of an enterprise and its business performance and environmental performance [30] but also increases the correlation between the green image and its core green competitiveness [31]. López-Gamero et al. [32] found that the differentiated competitive advantage of the hotel industry more significantly comes from the marketing of green image shaping; green image increases the competitiveness of the enterprise in the international market and has a positive impact on the financial performance of the enterprise, and thus, environmental protection investment cost of the enterprise can be transformed through operating performance, to further promote enterprise environmental protection investment. Fortune et al. [33] use data from 100 South African listed companies (JSE) from 2010 to 2014 to empirically test the impact of green image on enterprise environmental protection investment. Research shows that green image can stimulate enterprise environmental protection investment, and green image is the driving force for enterprise environmental protection investment. Both BRT theory and NRBV theory believe that enterprises generate competitive advantages through resource bundles [34]. As intangible assets, green image forms a complementary relationship with tangible assets of enterprises, which helps enterprises to implement pollution prevention and control behaviors and achieve the goal of reducing environmental pollution and improving economic performance.

A corporate green image can be used as a means to achieve corporate legitimacy, reputation, and profitability. Establishing a good green image can increase product sales or product prices, improve the enterprise’s ability to obtain new resources needed for development, and improve the overall enterprise value, thereby stimulating enterprise environmental protection investment. Based on the above analysis, this article proposes Hypothesis 1.

Hypothesis 1. Green image is positively correlated with the scale of environmental protection investment.

2.2. The Influence of Corporate Green Image on Regional Economic Development Level

The green image of an enterprise can convey environmental commitments and environmental concerns to stakeholders, including consumers, shareholders, competitors, and government departments. The establishment of a green image by an enterprise can release a green signal to the government. The government uses microlevel green signals to judge the implementation of market-based regulatory tools in environmental regulations, such as emission trading [35], environmental tax [36, 37], subsidy policy [38], green credit, and other environmental and economic policy measures to determine the degree of influence and operational efficiency of enterprises’ environmental protection behaviors. The government knows the environmental intentions of enterprises through their
commitment to green image construction and gives the
government insights into the differences in environmental
behavior of companies in different regions, which plays an
important role in improving environmental regulations.
Environmental regulation is an important tool to effectively
promote the coordinated development of regional economy
and environment [39]; environmental regulations are an
important tool to effectively promote the coordinated
development of regional economy and environment. Im-
proving environmental regulations can promote
environmental performance in different regions while
promoting economic transformation and economic growth.
In addition, a good green image is a prerequisite for an
enterprise and its products to enter the international market.
For example, the green environmental logo representing the
enterprise’s green image not only indicates that the product
quality meets the standards but also that the product’s entire
life cycle meets the requirements of environmental pro-
tection. Another example is the ISO14001 environmental
management system certification, which represents the
enterprise’s green image [21]. The certification is formulated
in accordance with international standards. After the cer-
tification, it can obtain international recognition, obtain a
“green pass” for international trade [40], and integrate into
the international market will promote regional economic
development. Based on the above analysis, this article
proposes Hypothesis 2.

Hypothesis 2. The green image is positively correlated with
the level of local economic development.

2.3. The Influence of Regional Economic Development Level on
Enterprise Environmental Protection Investment. Market
stimulus is particularly important for enterprise environ-
mental protection investment [41]. The level of regional
economic development reflects the driving force of the
market to a certain extent, among which the level of regional
economic development can effectively reflect the level of
environmental protection awareness of enterprise stake-
holders, and environmental protection awareness is one of
the influencing factors for the market to play a pulling role.
The green image releases the signal of environmental pro-
tection commitment to stakeholders, and the continuous
growth of the enterprise needs to be promoted under the
awareness of green environmental protection of the stake-
holders. Fortune [33] found that only when stakeholders
have environmental awareness, can they respond more fully
to the enterprise’s green demands. When the environmental
awareness of stakeholders increases, the demand for cor-
porate products or services can be increased through the
green image [42]. With the enhancement of environmental
protection awareness, consumers are more willing to buy
products with low environmental pollution, and manufac-
turers are more willing to purchase environmentally friendly
raw materials or green products from suppliers at high
prices. The environmental protection awareness of stake-
holders motivates enterprises to change from traditional
models to sustainable development models to create a brand
value [43]. Tang and Li [44], using the K-W test and median
test, it is found that, under different economic development
levels, the scale of enterprise environmental protection in-
vestment is significantly different. Wei et al. [45] show that
the level of local economic development is positively related
to corporate environmental management, and corporate
environmental commitments have a positive regulatory
effect on environmental management. Therefore, the higher
the level of local economic development, the stronger the
environmental awareness of stakeholders, and the more
sensitive they are to green images, thereby increasing
consumers’ loyalty and satisfaction in purchasing environ-
mental-friendly products, increasing the possibility of green
supply chains, and promoting the intention of pollution
prevention and increase enterprise environmental protec-
tion investment. At the same time, in areas with a high level
of regional economic development, the stronger the con-
sumption ability of consumers, the more likely to accept the
price of environmental protection products higher than the
general product price and promote companies to realize
environmental investment returns. Based on the above
analysis, the green image exerts a positive influence on the
scale of enterprise environmental protection investment
through the regional economic development level. There-
fore, Hypothesis 3 and Hypothesis 4 are proposed. We
propose the following theoretical model shown in Figure 1.

Hypothesis 3. The level of local economic development is
positively correlated with the scale of enterprise environ-
mental protection investment.

Hypothesis 4. The level of local economic development plays
an intermediary role between the green image and the scale
of enterprise environmental protection investment.

3. Methodology and Data

3.1. Research Samples and Data Sources. This paper selects
A-share manufacturing listed companies in Shanghai and
Shenzhen stock markets that made environmental pro-
tection investments from 2007 to 2015 as the research
sample (because 2007–2015 went through 11th and 12th
Five-Year Plan for National Environmental Protection of
China, forming a complete cycle). The listed companies
that disclose enterprise environmental protection in-
vestment data are screened as follows: (1) exclude sample
companies with ST and *ST; (2) exclude samples with
missing variable indicators. After screening, this article
finally obtained 2544 enterprise environmental invest-
ment data. The sources of data in this article are as fol-
ows: (1) the data on enterprise environmental protection
investment mainly come from balance sheets and social
responsibility reports and are collected manually; (2)
ISO14001 data come from China National Accreditation
Service for Conformity Assessment (http://www.cnas.
org.cn) collected manually; (3) the level of regional
economic development comes from the “China Statistical
Yearbook”; and (4) other research variables come from
the Wind database. In order to overcome the influence of
outliers on the research conclusions, Winsorize processing is performed on continuous variables at 1% and 99% quantiles, and all data processing software is Stata 13.0.

3.2. Model Setting and Variable Selection. In order to test the relationship between the green image and the enterprise’s environmental protection investment scale, as well as the intermediary effect of the regional economic development level on the relationship between the green image and the enterprise’s environmental protection investment scale, the sequential test method is adopted to test, and the model is constructed in (1)–(3) [46]. Also, consider the time interval of one period lagging behind the dependent and independent variables in the model, which can better avoid the endogenous problem in the model:

\[
\begin{align*}
EI_{i,t} &= \beta_0 + \beta_1 \text{GIM}_{i,t-1} + \sum \text{Control}_{var} + \sum \text{YEAR} + \epsilon, \\
EDL_{i,t-1} &= \beta_0 + \beta_1 \text{GIM}_{i,t-1} + \sum \text{Control}_{var} + \sum \text{YEAR} + \epsilon, \\
EI_{i,t} &= \beta_0 + \beta_1 \text{GIM}_{i,t-1} + \beta_2 \text{EDL}_{i,t-1} + \sum \text{Control}_{var} + \sum \text{YEAR} + \epsilon.
\end{align*}
\]

Among them, the scale of enterprise environmental protection investment (EI) ((1) other related expenditures incurred by enterprises for environmental protection are not included, such as environmental monitoring fees, environmental design fees, environmental assessment, and energy assessment fees, plant greening fees, and environmental management fees; (2) indirect expenditure items are not included, such as donating green fund fees; (3) expenditure items that have been expended are not included, such as pollution discharge and preparation of social responsibility reports (environmental reports), environmental taxes, and pollution discharge fees) is based on the content and structure of enterprise environmental protection investment [3], which divides environmental protection investment into environmental protection products and environmental technology research and development and transformation investment, specifically: environmental protection facilities and systems investment and transformation investment; cleaner production investment; pollution control technology research and development and transformation investment; pollution control equipment and system investment and transformation investment. At present, most scholars’ explanations of EI tend to prevent pollution, and for protecting the environment, enterprises carry out special economic activities while taking into account environmental and social benefits. This article uses “total investment/capital stock” to measure the scale of enterprise environmental protection investment [3].

The green image (GIM) is measured by the ISO14001 environmental management system certification. ISO14001 environmental management system has the characteristics of legality, prevention, sustainability, systematicness, voluntariness, certifiability, and applicability. The certification is formulated in accordance with international standards and has been internationally recognized, which can better measure the enterprise’s green image [21]. If the enterprise has passed the ISO14001 system certification, it is 1; otherwise, it is 0.

The regional economic development level (EDL) is measured by the regional GDP per capita. Scholars mainly use the absolute value of regional GDP, the growth rate of regional GDP, and regional per capita GDP [47] to measure the level of regional economic development when studying regional economic development issues. In comparison, regional GDP per capita reflects not only the economic development of the region but also the living and consumption level of local residents, so this article uses this indicator as a substitute variable for the level of regional economic development [48]; therefore, this article uses this indicator as a substitute variable for the level of regional economic development.

Following the conventional practice of the existing literature [49–53], this study considered the internal characteristics of the enterprise and external environmental indicators. The corporate profitability (EPS), corporate debt level (LEV), operating cash flow (FLOW), cash holdings (CASH), opportunity cost (OPP), enterprise size (SIZE), equity checks and balances (BALANCE), agency cost (COST), and annual dummy variables (YEAR) were used as control variables. The variable description is shown in Table 1.

Secondly, test model (2) and model (3) in turn. If \(\beta_1\) in the model (2) is positive and significant and \(\beta_2\) in the model (3) is positive and significant, it means that the quality of internal control is a significant way to achieve financial performance through corporate environmental investment.

Finally, make further judgments based on the test results of model (3). If \(\beta_1\) is not significant and \(\beta_2\) is significant in model

![Figure 1: Theoretical model.](image-url)
(3), it means that the impact of internal control quality on financial performance is completely achieved through the enterprise's environmental protection investment transmission; if $\beta_1$ is significant and $\beta_2$ is significant, it indicates that the impact of internal control quality on financial performance is partially passed implementation of corporate environmental protection investment transmission.

### 4. Empirical Results and Analysis

#### 4.1. Descriptive Statistics
Table 2 lists the descriptive statistical results of the research variables. The maximum value of enterprise environmental protection investment is 0.20989, and the minimum value is 0.00001. There is a large gap between the two, and the scale of enterprise environmental protection investment is relatively small; the average value of green image is 0.52516, which reflects a certain extent that most sample companies are willing to establish a good corporate green image; the mean of the regional economic development level is higher than the minimum value, and the standard deviation is 2.12003, indicating that there are large differences in the economic development level of the regions where listed companies belong to my country. In terms of other variables, the gap between the maximum and minimum values of asset-liability ratio, operating cash flow, cash holdings, degree of equity balance, and agency costs is large, and the standard deviation is also large.

#### 4.2. Correlation Analysis
It can be seen from Table 3 that GIM and EI are correlated at the 1% significance level, indicating that green image has a good explanatory power for the scale of enterprise environmental protection investment; EDL is correlated with GIM and EI at the 1% significance level, indicating that there is a good explanatory power between the green image, the level of regional economic development, and the scale of enterprise environmental protection investment. The correlation coefficients among other variables in the model are all lower than 0.5, which indicates that the multiple regression model constructed in this paper will not produce serious multicollinearity problems.

#### 4.3. Multiple Regression Analysis
In the establishment of the multiple regression model, the independent variable lags by one period and the robust standard error method is used in the model estimation to solve the
Table 3: Research variable correlation analysis.

<table>
<thead>
<tr>
<th>Variables</th>
<th>EI</th>
<th>GIM</th>
<th>EDL</th>
<th>EPS</th>
<th>LEV</th>
<th>FLOW</th>
<th>CASH</th>
<th>OPP</th>
<th>SIZE</th>
<th>BALANCE</th>
<th>COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIM</td>
<td>0.0619***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDL</td>
<td>0.0658***</td>
<td>0.2259***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>0.0818***</td>
<td>0.0918***</td>
<td>0.0037</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEV</td>
<td>-0.0663***</td>
<td>-0.0907**</td>
<td>-0.1782***</td>
<td>-0.2641***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLOW</td>
<td>-0.0083</td>
<td>0.0201</td>
<td>-0.0991***</td>
<td>0.2659***</td>
<td>-0.0954***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CASH</td>
<td>0.0895***</td>
<td>0.0442**</td>
<td>0.0667***</td>
<td>0.3471***</td>
<td>-0.4444***</td>
<td>0.0609***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPP</td>
<td>0.1026***</td>
<td>-0.0785***</td>
<td>-0.0324</td>
<td>0.2103***</td>
<td>-0.4437***</td>
<td>0.1143***</td>
<td>0.2784***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.0536***</td>
<td>0.1469***</td>
<td>0.0532***</td>
<td>0.1388***</td>
<td>0.4210***</td>
<td>0.0520***</td>
<td>-0.1741***</td>
<td>-0.4599***</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BALANCE</td>
<td>-0.0252</td>
<td>-0.0977***</td>
<td>-0.2461***</td>
<td>0.1132***</td>
<td>0.0471**</td>
<td>0.0253</td>
<td>0.0751***</td>
<td>-0.0329*</td>
<td>0.0439**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>COST</td>
<td>0.0776***</td>
<td>-0.0351*</td>
<td>0.1819***</td>
<td>-0.1267***</td>
<td>-0.2090***</td>
<td>-0.1001***</td>
<td>0.087***</td>
<td>0.2435***</td>
<td>-0.3278***</td>
<td>-0.1730***</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes. *, **, and *** represent the significance level of 1%, 5%, and 10%, respectively.
heteroscedasticity problem. Table 4 shows the regression results of models (1)–(3). From the regression results of model (1), the green image is positively correlated with the scale of enterprise environmental protection investment at a significant level of 1%, indicating that a good green image can promote the scale of enterprise environmental protection investment, which supports Hypothesis 1 of this article. Except for corporate performance indicator (ROE), opportunity cost (OPP), and agency cost (COST), other control variables have no significant relationship with EI. From the regression results of model (2), the green image is positively correlated with the level of regional economic development at the 1% significance level, which supports the Hypothesis 2 of this article. Except EPS, LEV, FLOW, OPP, BALANCE, and COST, other control variables have no significant relationship with EDL. In model (3), the level of regional economic development is positively correlated with the scale of enterprises’ environmental protection investment at the significance level of 1%, which supports Hypothesis 3 of this paper. It also indicates that the level of local economic development has an intermediate effect in the positive influence of green image on the scale of enterprise environmental protection investment and supports Hypothesis 4 of this article. Except EPS, OPP, and COST, other control variables have no significant relationship with EI.

In model (3), the green image is positively correlated with the scale of enterprise environmental protection investment at the significance level of 1%, indicating that the positive influence of green image on the scale of enterprise environmental protection investment is partly influenced by the level of local economic development.

The proportion of the indirect effect of local economic development level in the total effect is $0.262 \times 0.001/0.005 = 5.24\%$.

4.4. Robustness Tests. Firstly, use the natural logarithm (NEI) of the total environmental protection investment to measure the scale of enterprise environmental protection investment and use the market index (market) constructed by Fan et al. and Wang et al. [54, 55] to measure the level of regional economic development. However, considering that the data from 2008 to 2014 are based on 2008, the data calculation and scoring of all aspects of the changes in the marketization of all provinces since 2008 are reperformed. As a result, there is a big difference between the data before 2008 and the data after 2008. Therefore, the ranking of provinces in the market-oriented index is adopted to measure the level of regional economic development. Secondly, in the regression model, replace and increase the control variables that affect the enterprise’s environmental investment. For the measurement method of the shareholding structure, replace “shareholding ratio of the second largest shareholder to the fifth largest shareholder (BALANCE)” with “shareholding ratio of the largest shareholder to the fifth largest shareholder (SHARE).” At the same time, we add the corporate performance indicator (ROE) into it. The specific results are shown in Table 5. It can be seen from Table 5 that the green image is significantly positively correlated with the scale of enterprise environmental protection investment, the green image is significantly positively correlated with the market, and both the green image and the market are significantly positively correlated.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIM</td>
<td>0.005***</td>
<td>0.262***</td>
<td>0.004***</td>
</tr>
<tr>
<td>EDL</td>
<td>0.001***</td>
<td>0.005***</td>
<td>0.004***</td>
</tr>
<tr>
<td>EPS</td>
<td>0.005**</td>
<td>0.166*</td>
<td>0.001***</td>
</tr>
<tr>
<td>LEV</td>
<td>0.000 (0.92)</td>
<td>−0.011*** (4.87)</td>
<td>0.000 (1.16)</td>
</tr>
<tr>
<td>FLOW</td>
<td>−0.000 (−1.42)</td>
<td>−0.009* (−1.85)</td>
<td>−0.000 (−1.32)</td>
</tr>
<tr>
<td>CASH</td>
<td>0.000 (1.40)</td>
<td>0.002 (0.86)</td>
<td>0.000 (1.36)</td>
</tr>
<tr>
<td>OPP</td>
<td>0.002* (1.94)</td>
<td>−0.066* (−1.94)</td>
<td>0.002* (2.02)</td>
</tr>
<tr>
<td>SIZE</td>
<td>−0.001 (−0.72)</td>
<td>0.020 (0.47)</td>
<td>−0.001 (−0.75)</td>
</tr>
<tr>
<td>BALANCE</td>
<td>−0.000 (−0.92)</td>
<td>0.002** (2.51)</td>
<td>−0.000 (−1.06)</td>
</tr>
<tr>
<td>COST</td>
<td>0.000** (2.29)</td>
<td>0.035*** (3.99)</td>
<td>0.000** (2.08)</td>
</tr>
<tr>
<td>YEAR</td>
<td>Control</td>
<td>Control</td>
<td>Control</td>
</tr>
<tr>
<td>Constant</td>
<td>0.015 (0.95)</td>
<td>1.732* (1.87)</td>
<td>0.013 (0.83)</td>
</tr>
<tr>
<td>N</td>
<td>2,544</td>
<td>2,544</td>
<td>2,544</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.031</td>
<td>0.377</td>
<td>0.034</td>
</tr>
<tr>
<td>Adj.$R^2$</td>
<td>0.0243</td>
<td>0.373</td>
<td>0.0271</td>
</tr>
<tr>
<td>F</td>
<td>3.782</td>
<td>110.3</td>
<td>4.202</td>
</tr>
<tr>
<td>F (p value)</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
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</tbody>
</table>

Notes. *, **, and *** represent the significance level of 1%, 5%, and 10%, respectively; t value is in parentheses, and results are subject to standard error handling.
correlated with enterprise environmental protection investment. It shows that the level of regional economic development plays an intermediary role between the green image and the scale of enterprise environmental protection investment. The above robustness test results show that the hypothesis in this article has been statistically verified, so the research conclusions are more reliable.

5. Conclusions

Based on the resource-based view, stakeholder theory, and signal transmission theory, this article, based on the sample data of A-share manufacturing listed companies from 2007 to 2015, found that a green image can significantly promote the scale of enterprise environmental protection investment. Further research found that the level of regional economic development played a part of the intermediary role in the positive impact of the green image on the scale of enterprise environmental protection investment.

This article studies the driving factors of enterprise environmental protection investment at the microlevel from the internal perspective and also studies the intermediary effect of macroeconomic factors on the relationship between green image and the scale of enterprise environmental protection investment from the external perspective. The results show that a good green image is one of the driving factors of enterprise environmental protection investment scale. Firstly, the green image conveys signals to stakeholders to make their green demands match the environmental protection behaviors of the enterprise, thus increasing the loyalty and satisfaction of stakeholders towards the products or services of the enterprise. Second, the green image is conducive to the formation of the uniqueness of products or services different from other enterprises and the implementation of differentiation strategy, promote companies to improve competitiveness from the differentiation strategy, gain new market share, and promote the sustainable development of companies. In a word, improving and maintaining a good green image is very important for the sustainable development of companies. Green image is conducive to the legitimacy of companies and the improvement of economic performance, and it is the driving force for companies to make various kinds of environmental investment. Therefore, enterprises should take the initiative to obtain ISO14001 environmental management system certification, green product logo, or actively obtain international and domestic awards related to environmental protection, so as to establish a good green image.

On the contrary, the impact of green image on enterprise environmental protection investment is partly realized through the transmission of regional economic development. Research results show the following: first, the environmental awareness of stakeholders is very important to promote the enterprise take the initiative to perform environmental responsibility. Improving the level of regional economic development is conducive to enhancing the environmental awareness of stakeholders and affecting their consumption concepts, thereby increasing the stakeholders' demand and purchasing power for green goods and services and demand stimulating enterprise environmental protection investment. Second, in the market competition environment, stakeholders are sensitive to the green image established by the enterprise. It is necessary to coordinate environmental regulations and market-based environmental regulatory tools to make up for the shortcomings. Under the premise of ensuring the regional economic development, it

Table 5: Robustness test.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Use marketization index to measure regional economic development level</th>
<th>Add control variables to the model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NEI</td>
<td>EI</td>
</tr>
<tr>
<td></td>
<td>Market</td>
<td>Market</td>
</tr>
<tr>
<td>GIM</td>
<td>0.279*** (3.25)</td>
<td>0.317*** (3.55)</td>
</tr>
<tr>
<td>Market</td>
<td>0.061** (2.46)</td>
<td>0.584*** (8.12)</td>
</tr>
<tr>
<td>EPS</td>
<td>−0.161 (−0.98)</td>
<td>−0.802*** (−3.61)</td>
</tr>
<tr>
<td>LEV</td>
<td>−0.001 (−0.41)</td>
<td>−0.001 (−0.19)</td>
</tr>
<tr>
<td>FLOW</td>
<td>0.552 (1.05)</td>
<td>0.010 (0.18)</td>
</tr>
<tr>
<td>CASH</td>
<td>0.147 (0.44)</td>
<td>0.096 (0.29)</td>
</tr>
<tr>
<td>Tobin</td>
<td>−0.009 (−0.21)</td>
<td>0.022 (0.44)</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.870*** (23.29)</td>
<td>0.884*** (23.47)</td>
</tr>
<tr>
<td>AGE</td>
<td>−0.064*** (−6.53)</td>
<td>−0.065*** (−6.62)</td>
</tr>
<tr>
<td>COST</td>
<td>−0.002 (−0.21)</td>
<td>0.006 (0.68)</td>
</tr>
<tr>
<td>SHARE</td>
<td>−0.106 (−1.41)</td>
<td>0.063 (1.06)</td>
</tr>
<tr>
<td>ROE</td>
<td>−0.187 (−1.45)</td>
<td>0.011*** (2.82)</td>
</tr>
<tr>
<td>YEAR</td>
<td>Constant 0.218*** (1.04)</td>
<td>Control 0.018*** (3.84)</td>
</tr>
<tr>
<td></td>
<td>n=2728</td>
<td>n=13,001*** (20.04)</td>
</tr>
<tr>
<td></td>
<td>R² 0.218</td>
<td>Control 0.018*** (23.29)</td>
</tr>
<tr>
<td></td>
<td>Adj. R² 0.213</td>
<td>Control 0.018*** (23.29)</td>
</tr>
<tr>
<td></td>
<td>F 56.30</td>
<td>Control 0.018*** (23.29)</td>
</tr>
<tr>
<td></td>
<td>p-value 0.0000</td>
<td>Control 0.018*** (23.29)</td>
</tr>
</tbody>
</table>

Notes. *, **, and *** represent the significance level of 1%, 5%, and 10% respectively; t value is in parentheses, and results are subject to standard error handling.
is used as a restraint means to force enterprises to fulfill their environmental fiduciary responsibilities and as an incentive means to encourage enterprises develop and adopt clean energy, clean technology, produce green products, and provide green services.

There are also some limitations to this study. First, this study only explores the mediating roles between the green image and the scale of enterprise environmental protection investment, without considering the moderators. Future research can continue to explore the boundary conditions for the current model. Second, this study only used China’s A-share manufacturing listed companies as a sample; thus, the conclusions of the study may not be fully applicable to all companies, and caution should be exercised in the promotion of the conclusions. Future studies can further select samples of other industries to explore. Third, although the research data in this article are sufficient to support the research conclusions, the latest data can still be added to future research to further enhance the representativeness of the conclusions.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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References


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