

Executive Green Cognition and Corporate Green Investment

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Abstract. Given the serious ecological problems in the world and the "dual-carbon" goals of China, this paper will empirically study whether and in what way executive green cognition can reduce the traditional "awareness-action gap" to promote enterprises' actual green investment. By taking a sample of Chinese A-share listed companies from 2009 to 2024, textual analysis will be employed in this paper to quantify executive green cognition, and a time fixed-effects model will be built to examine systematically how it affects corporate green investment and under what boundary conditions this effect occurs. Based on the above analysis, it can be concluded that executives' green cognition is positively correlated with the green investment of enterprises, and this result is consistent in all tests, including lagged variable treatment, alternative variable measurement and the addition of other control variables. Based on the analysis of heterogeneity, it can be found that the promotional effect is relatively weak for heavy-polluting industries and asset-intensive enterprises; thus, external regulatory pressure and asset specificity may be the reasons for this. The goal of this paper is to uncover the "black box" of decision-making at the top management level, put forward a new way of research on the micro-level driving forces for corporate green transformation, and provide a reference for strengthening internal corporate governance and formulating targeted emission reduction policies by the government.

Keywords: Executive Green Cognition, Corporate Green Investment, Information Asymmetry, Heterogeneity Analysis

1. Introduction

With the speed of changes in the international climate governance system and China's pursuit of its dual-carbon goals, green investments by enterprises are now one of the main means to tackle ecological problems. However, the actual situation is not good. In recent years, although some highly polluting enterprises have made high-profile statements in their annual reports about adhering to the spirit of green development, they have continuously failed to increase investment in environmental facilities and low-carbon technology research and development; at the same time, there have been frequent cases of false environmental data and excessive emissions. This form of "green formalism" is proactive in rhetoric but reactive in action, and it has caused a loss of public trust, resulting in environmental governance that is disconnected from the high awareness of the public and low investment. In contrast to the general assumption of traditional principal-agent theory and the cost-benefit framework, scholars have conducted studies at other times to find that

there is a positive relationship between executives' green cognition and green investment. According to this theory, a manager with strong green cognition would be more likely to feel the considerable sunken costs and profit-squeezing effects that have occurred due to environmental regulations and be thus aware that green investment is a financial burden that ties up scarce resources. Therefore, they would be more inclined to cut back on these expenses in the short term. The contradiction is that higher cognition results in a lower investment, and thus many enterprises have not been able to escape suspicion of "greenwashing" even though management is aware of environmental protection.

The contradiction is not well-documented in the present research. Most research has concentrated on the external coercive force of environmental regulations from the perspective of institutional theory or on the rigid restraint of financial limits in the resource-dependence approach; generally speaking, the top management team has been treated as a homogeneous black box and has failed to carry out an in-depth analysis of the internal cognitive structure of the decision-makers. There have been a relatively small number of studies on cognitive factors so far, and most of them have only examined the direct effect of cognition on performance; few scholars have used the method of cognitive-behavioural theory to investigate how green cognition is translated into specific capital allocation decisions through different transmission paths. In the event of an asset lock-in effect or a substantial change in the market of the enterprise, it is unknown whether the executive cognition can reduce financing constraints and enable them to perceive market fluctuations according to existing theories at this time. The division of theoretical views restricts our grasp of the reasons for the considerable difference in green investment among enterprises facing the same external conditions, and it is also difficult to propose targeted solutions to address the gap between awareness and action.

Based on the theory of upper echelon, this paper will be expanded upon in the study of green management; it will introduce a new cognitive model from psychology and examine its use in the system of corporate environmental decision-making by means of cognitive-behavioural theory for green finance. By breaking down the black-box mechanism of how executive cognition is converted into investment behaviour, this paper will address the academic problem of the gap between cognition and behaviour and also provide micro-level evidence for building an original Chinese theory of corporate green governance. The above results can help practice in our lives. Based on the above research, managers at enterprises should be inspired to stop viewing environmental protection as a necessary expense and instead, with a strengthened green awareness, discover and utilise the differences in competition provided by green innovation. Based on the above, this paper has found that differential governance can be implemented to varying degrees; therefore, relevant authorities should provide various supporting policies for green finance to help high-polluting, asset-intensive enterprises align with the new concept rather than imposing the same rules on all. This will help to address the problem of green formalism at its root, guide social capital towards genuine green development in the real economy, and promote the successful implementation of the national Dual-Carbon goals.

2. Literature review

Research on the green cognition of executives and corporate green investment has laid the foundation theoretically in recent years, but the internal link between the two is still unclear. In terms of antecedents, executive green cognition has been identified as one of the main reasons for the sustainable development of enterprises. It will directly impact a company's selection of an environmental strategy and thus promote the greening of the enterprise. Zou and others have conducted empirical studies on Shandong's light industry enterprises to find that the green cognition of executives positively affects the green behaviour and green performance of the company [1]. Li

and others have found that this cognition can increase the operating capacity of highly polluting enterprises, and they have also developed a model of moderated mediation [2]. Dong and others have also found that, at the level of micro-cognition, executive green cognition can reduce the spread of ESG rating divergence, and thus cognitive consistency may help reduce external information asymmetry [3]. With the acceleration of digitalisation, both Lin and Zhang have pointed out that in the background of artificial intelligence, executive green cognition is an essential cognitive foundation to unlock new technological dividends and drive the leap in corporate new quality productivity; therefore, it can be concluded that cognitive factors need to adapt to changes in technology [4, 5].

Research on the drivers of corporate green investment has taken various forms in the past and, at present, includes many different types, such as macro-policy pressure, meso-industry environment and micro-financial constraints. From the perspective of external institutional pressure, the carbon emission trading system and changes in the price of carbon will increase enterprises' costs and reduce their profits, as well as increase the risk of default [6, 7]. At the same time, as a micro-transmission channel for macro-fiscal policy, local government debt has had different effects of "crowding out" or "crowding in" on green investment [8]. The Soft Social Norms and Information Environment are also relatively lenient to the rules. Media attention is considered an external factor that can motivate enterprises to increase their level of green investment; Qian and others put forward the concept of peer effect to show that positive environmental narratives spread among industries through imitation, and when peer enterprises carry out such activities, it will encourage other enterprises to increase their own investment in this area [9]. Chen and Meng believe that in the era of the digital economy, the combination of environmental awareness and digital technology will be a new force promoting green investment [10].

Based on current studies, it has not been determined whether the top management's green cognition is linked to a company's green investments. Although some previous studies have investigated the effect of cognition on performance and other factors affecting investment decisions, very little attention has been paid to how cognition is changed under the influence of the outside world. It is not known whether cognition is a moderator of financial constraints or a mediator of policy signals. In light of the problems mentioned above, this paper will use cognitive psychology and institutional theory to examine how the green cognition of managers dynamically influences the efficiency of green investment under external shocks, such as the development of artificial intelligence and local government debt, and thus propose a new system of research on corporate green transformation.

3. Mechanism analysis and hypothesis development

Green cognition at the top management level can reduce information asymmetry between the company and outside investors to help fund the construction of green facilities by enterprises. Due to a lack of inside information on environmental risks within the company, more financial market resources will need to be used by external investors for due diligence. Therefore, there is a lack of funds for the green projects and they may not be carried out. Leaders with strong green awareness can feel through their intuition that complete environmental disclosure will be good for the company and will take the initiative to construct an open non-financial reporting system and count up the results of the company's understated environmental operation. The above provision of information can lower the adverse selection risk in the external market for the quality of green assets and help investors better evaluate the long-term cash flow stability of green projects. With the reduction in information asymmetry, the risk premium for environmental risk of creditors will fall; at the same

time, because of improved governance transparency, equity investors will be more willing to invest in the long-term value of the company. A lower cost of financing and easier access to funds will directly increase the amount of capital available for enterprises' green investments in all kinds of projects, and more eco-friendly but capital-intensive projects that could not be realised earlier due to lack of funds will also be realised. Cognition-driven improvement of the information environment has made managers' private information outside the company publicly observable and thus credible; it has also broadened the channel through which this information can be used to make better investment decisions.

In addition, the green cognition of managers in this company will help them distribute funds towards new green technologies according to changes in the demand structure of green consumers and obtain a competitive advantage. Frontier thinkers in the company and those with strong green awareness can feel changes in the public's attitude towards the environment and predict how these will affect demand for green products. Now, environmental protection is no longer seen as a cost but is now a main way to add value to the products. Therefore, the enterprises will boost investment in research and development for low-carbon materials, optimize energy-saving processes, manage the environmental footprint of the product's life cycle, add a green label to the final product, etc. Green Positioning in Marketing can be employed to set a company apart from others and to attract consumers who pay attention to the environment; at the same time, it can develop a large number of enthusiastic consumers. As more consumers are becoming aware of and willing to pay for green products, marketing will be more popular, and consequently, both the company's market share and marginal returns will rise. Therefore, there is an economic reason for the green investment shown in the market. As a result of better cash flow and strengthened brand value for green products, management has been more inclined to invest in green production facilities, environmentally friendly supply chains, low-carbon logistics systems, etc., thereby forming a virtuous circle of market-pulled investment.

As the fundamental cognitive system and value orientation of executives, executive green cognition directly affects how much attention they pay to environmental problems in their work, how well they comprehend the long-term values and risks of green investment, and where they choose to invest resources for green causes. According to the theory of upper echelons and the attention-based view, top management teams with a high level of green cognition are likely to perceive development opportunities rather than costs in the environment; thus, they will place greater emphasis on green projects in their strategic decision-making and allocate more resources to these projects to raise the level of strategic corporate green investment.

Based on the above mechanism analysis, we put forward the following research hypothesis: Executive green cognition positively and significantly affects the amount of green investment in a company.

4. Variable definition and model specification

4.1. Data sources

This paper takes the data from Chinese A-share listed companies between 2009 and 2024. The following are the steps for the data processing: (1) Companies that are ST or *ST marked have been excluded; (2) Samples with serious anomalies in the financial data have been deleted; (3) Observations lacking data for a specific statistical year have been removed; (4) To reduce the impact of extreme values on the results, all continuous variables have been winsorised at the 1% upper and

lower tails. Variable Data are obtained from the Wind and CSMAR databases. Stata 18.0 was used to carry out data preparation and econometrics in this paper.

4.2. Variable definition

Executive Green Cognition (EGC) is the main independent variable. Based on previous studies, we have conducted textual analysis of the annual reports of listed companies. The three chosen keywords are the sense of green competitive advantage, the consciousness of corporate social responsibility and the pressure from the external environment. Note that "executive environmental cognition" and "executive green cognition" are the same construct and can be used interchangeably. EGC is defined as: (Frequency of green cognition keywords in the MD&A section / Total word count of the annual report) $\times$ 100.

Corporate Green Investment (Green) is the dependent variable. Based on Pan et al.'s measurement method, we collected the data ourselves from the annual reports. Capitalised green investment was the sum of direct environmental protection expenditures extracted from the notes on construction in progress. Expensed green investment is the sum of environmental protection expenses in the administrative expense breakdown, such as greening fees and environmental impact assessment fees. The total green investment of the company is the sum of capitalised and expensed components of green investment.

Control variables are: Firm Size (Size), Leverage (Lev), Return on Assets (ROA), Ownership Concentration (TOP1) and Tobin's Q (TobinQ).

4.3. Data sources

To study the effect of executives' green cognition on the amount of green investment by a company, a fixed-effects regression model in time is employed to control for changes in macro-environmental factors that fluctuate with time but are the same for all companies. The simple regression equation is as follows:

$$GreenInv_{it} = \beta_0 + \beta_1 * EGC_{it} + \sum \alpha_k controls_{it} + \lambda_t + \varepsilon_{it} \quad (1)$$

Where $GreenInv_{it}$ represents the green investment amount of firm i in year t ; EGC_{it} denotes the core independent variable, i.e., the level of executive green cognition of firm i in year t ; $\sum \alpha_k controls_{it}$ represents the set of all control variables, with α_k being the coefficient for the corresponding control variable; λ_t captures year fixed effects; ε_{it} is the random error term; i and t index firm and year, respectively; β_0 is the constant term; and β_1 is the coefficient estimating the effect of the independent variable on the dependent variable.

5. Empirical analysis

5.1. Descriptive statistics

Table 1 is the distribution table. GreenInv1 has a small mean, is skewed by outliers, and has a high dispersion. EGC is 6.377; it is moderate-to-high cognition with variance. The distribution of the controls is close to that of a normal distribution.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
GreenInv1	8523	7.997	47.098	-0.402	1649.6
EGC	8523	6.377	5.304	1	22
Size	8523	22.562	1.276	19.596	26.452
Lev	8523	0.448	0.194	0.027	0.935
ROA	8523	0.038	0.062	-0.375	0.255
ATO	8523	0.664	0.407	0.056	2.918
ListAge	8523	2.264	0.873	0	3.466

5.2. Baseline regression

Table 2 is the baseline regression results of the effect of EGC on GreenInv1. Column (1) shows that without adding any control variables, the coefficient of EGC is 0.8659 and is statistically significant at the 1% level. Subsequently, as shown in Columns (2) and (3), after the gradual addition of control variables and the control for year fixed effects, the coefficient of EGC is slightly fluctuating but still positive and highly significant at the 1% level, between 0.5753 and 0.8659. The above has good statistical significance. As shown in Column (3), after controlling for firm size, leverage, return on assets, asset turnover, listing age and year fixed effects, the coefficient of EGC is 0.5753. Therefore, it can be concluded that for every 1% increase in EGC, the amount of green investment by enterprises (GreenInv1) is expected to increase by about 0.58%. The above shows that Hypothesis H1 is correct. Among the control variables, Size, Lev and ListAge have a statistically significant effect on GreenInv1, but ROA and ATO are not significant. Based on the above results, it is believed that the model specification is appropriate and the estimation results are reliable.

Table 2. Baseline regression

	(1)	(2)	(3)
	GreenInv1	GreenInv1	GreenInv1
EGC	0.8659*** (0.10)	0.5963*** (0.10)	0.5753*** (0.10)
Size		6.4046*** (0.49)	6.3209*** (0.50)
Lev		7.1667** (3.31)	8.1019** (3.39)
ROA		-0.8810 (9.52)	-2.8594 (9.66)
ATO		-6.5169*** (1.28)	-6.7069*** (1.30)

Table 2. (continued)

ListAge		-1.2942**	-1.3489**
		(0.66)	(0.66)
_cons	2.4750***	-1.4e+02***	-1.3e+02***
	(0.79)	(9.97)	(28.17)
<i>N</i>	8523	8523	8523
<i>R</i> ²	0.010	0.041	0.045
adj. <i>R</i> ²	0.009	0.041	0.042
year	No	No	Yes

Parenthetical Standard Errors.

$p < 0.1$, *** $p < 0.05$, ** $p < 0.01$

5.3. Robustness tests

To verify the reliability of the results of the first regression analysis, four kinds of systematic robustness tests were carried out: substitute the dependent variable with other indicators, adjust for the time effect of the independent variable, change the sample, and modify the model structure. Table 3 is the specific test results.

To address the problem of endogeneity, that is, that an increase in corporate green investment may also lead to an increase in executives' green cognition, we used the lagged independent variable EGC (L1.EGC) for testing. As shown in Column (1) of Table 3, the coefficient of lagged EGC is still positive and statistically significant; thus, it can be concluded that past levels of executive green cognition promote current corporate green investment and are consistent with the direction of causality.

Column (2) is the result of rerunning the baseline model with winsorisation. The coefficient of EGC is 0.5753, which is very close to the baseline result and still at the 1% significance level; thus, it can be determined that there are no outliers or heteroskedasticity issues. To rule out the problem of omitted variable bias, we added some financial indicator variables of the firm, such as Return on Equity (ROE), Cash Flow (Cashflow) and Investment Expenditure (Inv), to the original control variables. As shown in Column (3), even under a stricter set of controls, the coefficient of EGC is still significantly positive at 0.5388; therefore, it can be concluded that this is the case.

Given that the green investment data has many zeros and extreme values, we took the logarithm to address heteroscedasticity and the impact of outliers. Specifically, we used the natural logarithm of capitalized green investment plus one (GreenInv2) and the natural logarithm of expensed green investment plus one (GreenInv3) as the alternative dependent variables. As shown in Columns (4) and (5) of Table 3, the coefficients of EGC are 0.0491 and 0.0343, respectively, and both are highly significant at the 1% level. It shows that all kinds of quantification methods have found a positive driving effect of executive green cognition on a company's green investment; it is reliable.

In short, in all the robustness tests, the positive effect of EGC on GreenInv1 is still significant and the coefficient direction is in line with that of the baseline regression. This shows that the conclusions of this study are quite reliable and not easily changed by modifications to the model or different ways of measuring data.

Table 3. Robustness test

	(1)	(2)	(3)	(4)	(5)
	GreenInv1	GreenInv1	GreenInv1	GreenInv2	GreenInv3
EGC	0.7140*** (0.12)	0.5753*** (0.14)	0.5388*** (0.10)	0.0491*** (0.01)	0.0343*** (0.00)
controls	Yes	Yes	Yes	Yes	Yes
_cons	130.0000 (50.57)	130.0000 (17.20)	120.0000 (28.20)	-0.7509 (1.74)	-1.1454 (1.52)
<i>N</i>	6159	8523	8517	3911	5790
<i>R</i> ²	0.054	0.045	0.048	0.182	0.318
adj. <i>R</i> ²	0.050	0.042	0.044	0.176	0.315
year	Yes	Yes	Yes	Yes	Yes

Standard Errors in Parentheses.

$p < 0.1$, *** $p < 0.05$, ** $p < 0.01$

5.4. Heterogeneity analysis

To study the difference in the effects of executive green cognition (EGC) on corporate green investment (GreenInv1) in various situations in more detail, grouped regression analysis was conducted based on the two dimensions of industry pollution intensity and capital intensity. Table 4 is shown below.

First of all, according to the grouping test of industry pollution nature in Columns (1) and (2), it is found that for heavily polluting industries, the regression coefficient of EGC is 0.8497 and significantly positive at the 1% level. On the other hand, in the non-heavily polluting industries, the coefficient of EGC is 0.1480 and does not reach statistical significance. Therefore, it can be concluded that executive green cognition promotes green investment in heavily polluting enterprises; the strength of this effect is relatively stronger in the latter group. Due to the high pollution caused by heavy-polluting industries, the government and the public have raised regulations on this matter and increased the penalty for non-compliance. Due to the strong external environment, the green cognition of managers has driven their companies to actively adjust strategies and invest more funds in green projects to meet regulations and improve environmental performance. On the other hand, non-polluting industries have a weaker sense of urgency about environmental protection and therefore little motivation to go green. Therefore, although the executives have high green cognition, it has not been effectively realised in terms of large-scale green investment.

Second, according to the grouping test of corporate capital intensity, columns (3) and (4) show the heterogeneity results. Based on the data, it can be seen that for asset-intensive enterprises, the regression coefficient of EGC is 0.8873 and significantly positive at the 1% level. The coefficient of EGC in the non-asset-intensive enterprise is 0.2534, and it is significant at the 5% level. Therefore, it can be concluded that the promotion effect of executive green cognition on green investment is relatively stronger in asset-intensive enterprises. Asset-intensive enterprises generally have a large

amount of fixed assets and long-established production lines, so it is difficult for them to change their operating model. Green retrofitting in these companies often needs to invest a large sum of money for new environmental equipment, process upgrades, etc., which have large investment amounts and long payback periods. Therefore, only when the executives have a strong sense of the future and green cognition will they be more willing to make high-risk, long-term strategic investments. Non-asset-intensive enterprises have a relatively flexible asset structure, a lower barrier to entry and sunk costs for green investment, so the investment decision is not affected by the different cognitive levels of the executives.

Table 4. Heterogeneity analysis

	(1)	(2)	(3)	(4)
	GreenInv1	GreenInv1	GreenInv1	GreenInv1
EGC	0.8497*** (0.12)	0.1480 (0.18)	0.8873*** (0.17)	0.2534** (0.12)
controls	Yes	Yes	Yes	Yes
_cons	120.0000 (26.63)	-44.4407 (54.14)	160.0000 (39.85)	100.0000 (43.47)
<i>N</i>	5176	3347	3348	5175
<i>R</i> ²	0.048	0.064	0.056	0.048
adj. <i>R</i> ²	0.043	0.057	0.048	0.043
year	Yes	Yes	Yes	Yes

Standard Errors in Parentheses.

p < 0.1, *** p < 0.05, *** p < 0.01

6. Conclusion and policy implications

Based on the data of Chinese A-share listed companies from 2009 to 2024, this paper studies the impact mechanism and boundary conditions of executive green cognition on corporate green investment. Based on the regression analysis, it can be seen that executive green cognition positively and significantly promotes green investment. After controlling for year fixed effects and basic firm attributes, this result is still the same; therefore, it can be concluded that cognitive-level transformation is an endogenous driving force of substantive corporate environmental expenditure. Heterogeneity analysis shows that the promotion effect is not the same in all places; that is to say, compared with non-heavily polluting industries and non-asset-intensive enterprises, the extra effect of executive green cognition in heavily polluting industries and asset-intensive firms is relatively large. Based on the above results, it can be concluded that under the conditions of strong external regulatory pressure or high asset specificity, managers' subjective cognition is more likely to overcome resource rigidity and make actual capital allocation decisions in light of the environment. The two ways to enhance the green cognition of executives are to lower financial constraints by improving the information environment and to gain a competitive advantage through an accurate sense of changes in the green market. Thus, there will be a change in cognitive advantages for investments.

Therefore, the following three general conclusions have been drawn. At the level of the enterprise, major polluting, capital-intensive enterprises should incorporate green awareness into their management education and daily operations, and thus, long-term environmental, social and governance (ESG) indicators should be added to the employee incentive system. At different times, different policies need to be introduced by the government, such as increasing the fine for pollution in the past or providing a tax reduction for green enterprises. Standardisation of Environmental Disclosure will Reduce Information Asymmetry. Finally, investors should take into account the intangible asset of executives' green cognition in their valuation and direct funds to actual green development in line with the "Dual-Carbon" goals.

References

- [1] Zou, Z., Xin, P., Chao, Y., & et al. (2019). The impact of executive green cognition and corporate green behavior on corporate green performance: An empirical analysis based on data from Shandong light industry enterprises. *East China Economic Management*, 33(12), 35-41. DOI:10.19629/j.cnki.34-1014/f.190826007.
- [2] Li, Y., Xia, Y., & Zhao, Z. (2023). The impact of executive green cognition on the performance of heavy pollution industries: A moderated mediation model. *Science & Technology Progress and Policy*, 40(7), 113-123.
- [3] Dong, A., Zhan, J., & Peng, Y. (2025). Research on the impact of executive green cognition on ESG rating divergence. *Journal of Guizhou University of Finance and Economics*(3), 101-110.
- [4] Lin, C., & Huang, W. (2026). The impact mechanism and empirical test of artificial intelligence on corporate ESG performance: Based on financial constraints and executive green cognition perspectives. *Journal of Harbin Commercial University (Social Science Edition)*(1), 113-128.
- [5] Zhang, Y., Wei, Y., Dong, Z., & et al. (2026). Artificial intelligence, executive green cognition, and corporate new quality productivity: Based on the perspective of corporate life cycle. *Humanities & Social Sciences Journal of Hainan University*, 1-12. Advance online publication. <https://doi.org/10.15886/j.cnki.hnus.202507.0394>.
- [6] Zhao, J., Huang, Y., Zhao, Y., & et al. (2025). Local government debt and corporate green investment: Crowding out or crowding in? *Investment Research*, 44(9), 125-140.
- [7] Niu, H., & Cao, L. (2024). How carbon prices affect corporate green investment and credit risk: A trade-off analysis based on expected returns and default costs. *China Industrial Economics*(8), 118-136. DOI:10.19581/j.cnki.ciejjournal.2024.08.006.
- [8] Ding, W., Wu, S., & Huang, P. (2025). Crowding out or crowding in: How does local government debt affect corporate green investment. *Financial Economics Research*, 40(3), 157-176.
- [9] Qian, M., Lyu, M., & Shen, Y. (2023). Spillover effects of peer firms' positive environmental narratives on corporate green investment. *Chinese Journal of Management*, 20(11), 1608-1616.
- [10] Chen, F., & Meng, Y. (2024). Digital economy development, environmental awareness, and corporate green investment: A multi-agent perspective analysis. *On Economic Problems*(8), 60-68. DOI:10.16011/j.cnki.jjwt.2024.08.008.