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Patient Capital and Greenwashing

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Abstract. Against the backdrop of China's "dual-carbon" goals being integrated into the top-level design of ecological civilization construction, frequent corporate "greenwashing" behavior (i.e., selective or symbolic disclosure of environmental information to mislead stakeholders) has severely impeded the efficiency of green financial resource allocation and the digital transformation of the real economy. Existing studies predominantly focus on the unidirectional impact of ESG performance on capital, yet systematically neglect the critical question of whether patient capital (long-term value-oriented capital) can inversely constrain corporate "greenwashing." Using panel data from the Shanghai and Shenzhen A-share listed companies (2010–2022), this study constructs a two-way fixed-effects model, incorporating patient capital as an independent variable into the analytical framework of corporate environmental information quality for the first time. Textual analysis and panel threshold models are introduced to optimize measurement methods. The findings reveal that patient capital significantly inhibits greenwashing through three pathways: alleviating financing constraints, strengthening governance mechanisms, and promoting green technological innovation. This effect is more pronounced in heavily polluting industries and non-state-owned enterprises (non-SOEs). The study transcends the limitations of traditional ESG governance reliant on external ratings or policy intervention, revealing the market-endogenous constraint mechanism on greenwashing from the perspective of capital attributes. It provides novel insights for optimizing green financial instruments and guiding long-term capital to "vote with its feet."

Keywords: patient capital, greenwashing, green innovation

1. Introduction

In recent years, the Chinese government has incorporated "dual-carbon" goals into the top-level design of ecological civilization construction, intensively issuing policies such as the *Guiding Opinions on Building a Green Financial System and the Administrative Measures for the Legal Disclosure of Environmental Information by Enterprises. These policies aim to channel capital toward green and low-carbon sectors through market-based mechanisms. However, frequent corporate greenwashing has become a major obstacle to policy implementation. Statistics show that in 2022, approximately 27% of Shanghai and Shenzhen A-share listed companies disclosed inaccurate environmental information, with some exaggerating environmental investments or selectively disclosing data to mislead the market. For instance, a new energy company was

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penalized for misreporting carbon emissions, triggering an investor trust crisis. Such behavior not only undermines green financial resource allocation but also jeopardizes the deep integration of the real economy with the digital economy. Against this backdrop, leveraging the long-term power of capital markets to constrain corporate short-term opportunism has become an urgent practical issue in promoting high-quality economic development.

Existing research results provide a solid foundation for understanding the independent effects of patient capital and greenwashing, but there are three limitations: first, most existing studies regard patient capital as an outcome variable and ignore its role as an antecedent factor inhibiting or inducing greenwashing; second, the path of the relationship between the two is not yet clear, especially the lack of empirical testing of potential mechanisms such as green technology innovation and governance structure optimization; third,moderator analyses are confined to regional or policy contexts, neglecting firm-level heterogeneity (e.g., ownership type, industry characteristics).

Innovations of this study:First,patient capital is incorporated into the explanatory framework of greenwashing for the first time, establishing the "capital attributes–disclosure strategy" theoretical linkage. Second, The dual mechanisms through which patient capital inhibits greenwashing—alleviating financing constraints and strengthening governance efficacy—are revealed, with industry pollution intensity introduced as a moderator. Third, Textual analysis refines greenwashing measurement, while a panel threshold model captures nonlinear effects of patient capital, addressing limitations of traditional regression models.

2. Literature review

As a long-term oriented investment pattern, Jiang, Zhongyu and Wu, Fuquan emphasize that ratio of institutional shareholding to total equity [1].Bowe and Aragon-Correa find that patient capital is commonly found in the fields of pension funds, insurance funds and private equity [2]. Guo Chuhan and Zhang Yan suggest that patient capital is a key driver of corporate innovation and sustainable development by alleviating financing constraints and optimizing resource allocation [3] .

As for "greenwashing", Zhou Dapeng argues that it refers to the behavior of firms that mislead stakeholders by exaggerating their sustainability performance through selective or symbolic disclosure of environmental, social and governance (ESG) information [4]. Yang Fang et al. argue that it is essentially an information manipulation strategy, which may either promote corporate expansion by alleviating short-term financing constraints or jeopardize long-term competitiveness by inhibiting green technological innovation [5].

There is a double tension in the relationship between the two: on the one hand, patient capital emphasizes long-term value investment and may inhibit "greenwash" by enhancing ESG transparency; on the other hand, companies may strategically embellish their ESG performance in order to attract patient capital, thus exacerbating the risk of "greenwash". On the other hand, in order to attract patient capital, companies may strategically embellish their ESG performance, exacerbating the risk of "greenwashing. Existing literature has not yet fully explored this issue, and further clarification of its path and boundary conditions is needed.

Early studies focused on the definition and identification of "greenwashing" behavior. Bowen and Aragón-Correa identified it as a divergence between symbolic environmentalism and substantive action. Zhou empirically demonstrated its "double-edged sword" effect: easing financing constraints while inhibiting green innovation.

Research on patient capital has shifted from conceptualization to mechanisms. Yifu Lin and Yan defined it as "relational long-term investment," emphasizing its role in stabilizing innovation

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funding [6]. Further,Jiang, Zhongyu and Wu, Fuquan validated its positive impact on innovation efficiency using manufacturing sector data.

Recent studies explore interactions between ESG performance and capital. Yang et al. found ESG performance attracts patient capital by reducing information asymmetry. However, literature directly examining patient capital's effect on greenwashing remains scarce.

The findings of this paper can provide a theoretical basis for regulators to design ESG disclosure rules and guide capitalization in the long term, as well as a strategic reference for firms to balance the demands of sustainable development and the conflict of short-term interests.

3. Theoretical analysis and hypothesis formulation

The drivers and consequences of "greenwashing" behavior have been widely discussed in the literature, but less attention has been paid to the constraining effect of long-term capital attributes. Based on the "capital structure-disclosure strategy" framework, this paper proposes the following three paths for patient capital to inhibit corporate "greenwashing" behavior.

First, patient capital, as a long-term and stable source of capital, can significantly reduce the reliance of enterprises on short-term financing, thus weakening the incentive to obtain short-term capital by beautifying financial performance through "greenwashing" behavior. Jiang, Zhongyu and Wu, Fuquan suggest that patient capital provides low-cost, stable funding, diminishing pressure to engage in symbolic disclosure .

Further, patient capital reshapes market expectations through the "signaling effect". Yang Fang et al. suggest that when a company receives a patient capital injection, it sends a positive signal to the market about its long-term sustainability, and investors' expectations about the authenticity of the company's ESG performance increase, reducing the risk of information asymmetry. The sensitivity of the market to "greenwashing" behavior decreases, and enterprises can maintain the attractiveness of capital without short-term information manipulation, forming a virtuous circle of "capital stability - information authenticity".

In addition to alleviating financing constraints, patient capital can also improve the quality of internal control through in-depth participation in corporate governance, thereby reducing the operating space for "greenwashing" behavior. Compared with short-term speculative capital, Guo Chuhan and Zhang Yan found that patient capital investors are more inclined to intervene in corporate decision-making through board seats and shareholders' proposals and promote the establishment of a transparent ESG disclosure system.

In addition, Lin Yifu and Wang Yan suggest that patient capital can enhance the substantive environmental performance of enterprises and reduce the reliance on "greenwashing" behaviors by supporting long-term R&D investment. Green technology innovation is characterized by long cycle and high risk, and it requires continuous financial support and strategic determination, while patient capital can provide stable R&D funds and fault-tolerant space for enterprises through the "resource commitment effect" to promote the breakthrough of clean technology and optimization of production process. For example, Jiang Zhongyu and Wu Fuquan found that the long-term investment of private equity funds in the new energy sector significantly improved the patent output and emission reduction efficiency of enterprises .

And Bowen and Aragon-Correa suggest that when firms achieve substantial environmental benefits through green technology innovation, the verifiability of their ESG performance increases, reducing the need for information manipulation. Investors can assess corporate environmental contributions through hard indicators such as technology patents and environmental certifications, weakening the room for misleading symbolic disclosures. At the same time, the cost advantage and

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market competitiveness brought by technological innovation further strengthens the motivation of enterprises to attract capital through true ESG performance, forming a positive feedback mechanism of "technology-capital-reputation".

Based on the above theoretical mechanisms, the following hypotheses are proposed in this paper:

H1: Other things being equal, patient capital has a significant inhibitory effect on firms' "greenwashing" behavior.

H2: Patient capital indirectly inhibits "greenwashing" through three paths: alleviating financing constraints, strengthening governance mechanisms, and promoting green technological innovation.

H3: The above inhibition is more significant in heavily polluting industries with non-state-owned enterprises.

4. Research design

4.1. Variable setting

The variable design of this study refers to Bowen and Aragon-Correa's theoretical framework of greenwash behavior and Wu Minjia et al.'s measure of patient capital [7], and optimally adjusts it with the characteristics of China's capital market. The specific variables are defined as follows:

1. The explanatory variable: the degree of greenwash (GWS), which draws on the study of Niu Feng et al [8]., adopts the degree of deviation of firms' ESG disclosure level from their true performance to measure greenwash behavior.

To eliminate industry and annual differences, the ESG disclosure level (D) and ESG actual performance (P) scores are standardized as follows:

$$GWS_{i,t} = \left(\frac{D_{i,t} - \bar{D}_{industry,year}}{\sigma_D} \right) - \left(\frac{P_{i,t} - \bar{P}_{industry,year}}{\sigma_P} \right)$$

The values of $\bar{D}$ and $\bar{P}$ are the mean values of the same industry and the same year, and σ_D and σ_P are the standard deviations. GWS The larger the value, the more significant the "symbolic" feature of ESG disclosure and the higher the degree of greenwashing.

2. Core explanatory variables: patient capital (Invest1, Invest2), refer to Wu Minjia et al.'s measure of stability of institutional investors' shareholding, and construct the following indicators:

Invest1 Percent: the ratio of institutional investors' shareholdings to total equity to the standard deviation of their shareholdings over the past three years.

Invest2 Percent: the ratio of institutional investors' holdings as a percentage of outstanding share capital to the standard deviation of their holdings over the past three years.

The larger the ratio, the greater the stability of institutional investors' holdings and the more prominent the attributes of patient capital.

Mediating variable: Green_Innovation Measured by the natural logarithm of the number of green patent applications filed by enterprises plus one, reflecting the actual investment in environmental technology innovation by enterprises.

3. Control variables, in order to control the heterogeneity of the firms and the interference of the external environment, the following variables are introduced: firm size (Size), gearing ratio (Lev), financial performance (ROA), cashflow ratio (Cashflow), equity concentration (Top1), two positions (Dual), board size (Board), and the proportion of independent directors (Inddirect).

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4.2. Model construction

In order to test the effect of patient capital on corporate greenwash behavior and the path of its effect, this study adopts the panel data Two-Way Fixed Effects Model (Two-Way Fixed Effects Model), which controls for the individual (corporate) and time (yearly) effects, respectively, and the model is set up as follows:

$$GWS_{i,t} = \alpha + \beta_1 Invest_{i,t} + \beta_2 Green\_Innovation_{i,t} + \gamma Controls_{i,t} + \mu_i + \lambda_t + \epsilon_{i,t}$$

where μ_i is an individual fixed effect, λ_t is a time fixed effect, $Controls_{i,t}$ is a set of control variables, and $\epsilon_{i,t}$ is a randomized perturbation term.

5. Empirical analysis

5.1. Descriptive statistics

Table 1 reports the results of descriptive statistics for the main variables. The sample period is 2010-2022 and contains a total of 6037 firm-year observations. The explanatory variable greenwash (GWS) has a mean of 0.0557, a standard deviation of 1.076, a maximum value of 6.327, and a minimum value of -3.779, indicating that there are significant differences in environmental disclosure manipulation across firms, and that there are extreme cases in which some firms mask their true environmental performance by exaggerating the level of ESG disclosure. The mean values of the core explanatory variables patient capital (Invest1 percent and Invest2 percent) are 0.34 and 0.263, and the standard deviations are 0.642 and 0.674, reflecting that the stability of institutional investor shareholding is unevenly distributed among different enterprises, and that the share of patient capital in non-state-owned enterprises and heavily polluted industries may be characterized by a rightward bias.

Regarding the control variables, the results indicate that most firms have moderate debt levels and strong control over decision-making by the largest shareholder, which may affect ESG disclosure strategies.

Table 1. Descriptive statistics

Variable	N	Mean	SD	p50	Min	Max.
gws	6037	0.0557	1.076	0	-3.779	6.327
invest1- percent	6037	0.34	0.642	0.182	0	23.72
invest2- percent	6037	0.263	0.674	0.0986	0	20.48
size	6037	23.37	1.256	23.29	19.37	27.35
lev	6037	0.478	0.195	0.487	0.0462	0.942
roa	6037	0.0468	0.0637	0.0394	-0.369	0.292
cashflow	6037	0.0619	0.0675	0.0583	-0.203	0.287
top	6037	36.96	15.76	35.85	6.3	78.02
board	6037	2.171	0.196	2.197	1.609	2.708
inddirect	6037	37.6	5.548	36.36	28.57	60

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5.2. Benchmark regression analysis

Table 2 demonstrates the results of the benchmark regression of patient capital on firms' greenwash behavior. Models (1)-(4) use a two-way fixed effects model to control for individual and time effects, respectively. The results show that the coefficients of both Invest1 Percent and Invest2 Percent are significantly negative at the 1% level, indicating that patient capital has a significant inhibitory effect on greenwashing behavior. Specifically, for every 1-unit increase in Invest1 Percent, the degree of greenwash (GWS) decreases by 0.2068 (Model 1); the absolute value of the coefficient increases to 0.2585 (Model 2) after adding the industry and year fixed effects, indicating that ignoring unobservable industry heterogeneity may underestimate the governance effect of patient capital.The regression coefficient of Invest2_percent shows a similar trend, and its suppression effect increases from 0.1290 to 0.1586 after controlling for fixed effects (Model 3 vs. Model 4), verifying the robustness of Hypothesis H1.

Among the control variables, the coefficient on firm size is significantly positive, suggesting that larger firms may be more inclined to strategically disclose environmental information due to resource redundancy and regulatory pressure. The negative and significant coefficient on Lev is consistent with the logic that highly leveraged firms face increased creditor scrutiny and are less likely to manipulate information. The coefficient on Dual is significantly positive, highlighting that governance structure deficiencies may exacerbate management's opportunistic tendencies. The positive coefficient of Shareholding Concentration (Top1) implies that large shareholders may maintain short-term market valuation by interfering with information disclosure. The model-adjusted R^2 ranges from 0.0269 to 0.0738, indicating that the model has some explanatory power and the introduction of fixed effects significantly improves the goodness-of-fit.

In terms of economic significance, in model (2), a change in the standard deviation of Invest1 Percent (0.642) leads to a decrease in GWS of $0.2585 \times 0.642 \approx 0.166$ units, which is three times the sample mean (0.0557), indicating that the inhibitory effect of patient capital on greenwash is not only statistically significant, but also has practical policy value. This finding echoes Bowen and Aragon-Correa's assertion that long-term capital, by reshaping market expectations and governance engagement, can effectively reduce the operational space for "symbolic environmentalism" and promote a shift from formal compliance to substantive improvements in ESG disclosure.

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Table 2. Baseline regression results

	(1) gws	(2) gws	(3) gws	(4) gws
Invest1 Percent	-0.2068 ***	-0.2585***		
	(0.0492)	(0.0611)		
invest2_percent			-0.1290 ***	-0.1586 ***
			(0.026)	(0.0313)
size	0.1081 ***	0.1160 ***	0.1026 ***	0.1104***
	(0.0134)	(0.0151)	(0.0132)	(0.0151)
lev	-0.2926 ***	-0.3475 ***	-0.2809***	-0.3312***
	(0.0881)	(0.0979)	(0.088)	(0.0986)
roa	-0.0068	0.136	0.0688	0.208
	(0.2572)	(0.2688)	(0.2578)	(0.2707)
cashflow	-0.0032	-0.0868	-0.032	-0.1104
	(0.2352)	(0.249)	(0.2362)	(0.2502)
top	0.0065 ***	0.0072 ***	0.0054 ***	0.0059 ***
	(0.001)	(0.0011)	(0.0009)	(0.001)
dual	0.1656 ***	0.1815 ***	0.1675 ***	0.1842 ***
	(0.0357)	(0.0361)	(0.0357)	(0.0364)
board	0.1252	0.0914	0.1141	0.0808
	(0.083)	(0.0879)	(0.0832)	(0.0885)
inddirect	-0.0050*	-0.0052*	-0.0047	-0.0048
	(0.0029)	(0.003)	(0.0029)	(0.003)
_cons	-2.6148 ***	-2.7097***	-2.4788 ***	-2.5761 ***
	(0.3451)	(0.373)	(0.3389)	(0.3719)
Ind	NO	YES	NO	YES
Year	NO	YES	NO	YES
N	6037	6037	6037	6037
R^2	0.0348	0.0738	0.0269	0.0622

Standard errors in parentheses

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

5.3. Mediating effects

This paper focuses on the intrinsic path of patient capital to curb corporate "greenwashing" behavior through green innovation.

5.3.1. The role of patient capital in promoting green innovation

According to the established research of Jiang Zhongyu and Wu Fuquan, patient capital, as a long-term value-oriented capital, can provide key support for green technological innovation by

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alleviating financing constraints and optimizing resource allocation. The empirical results of this paper show that the regression coefficients of patient capital (Invest1 Percent and Invest2 Percent) on Green Innovation are 0.0675 and 0.0640, respectively, and both of them are significant at 1% level (Table 3). This result verifies the theoretical mechanism that patient capital promotes enterprises' green technological innovation through the "resource commitment effect". Specifically:

The first is its ability to realize the stability of long-term financial support. Lin Yifu and Wang Yan proposed that green technology innovation is characterized by a long cycle and high risk, and patient capital can reduce the sensitivity of enterprises to short-term liquidity pressure by providing stable long-term funding, enabling management to invest resources in long-term projects such as cleantech R&D. Jiang Zhongyu and Wu Fuquan found that the sustained injection of capital by private equity funds into the new energy sector significantly improves enterprises' Patent output and emission reduction efficiency can also prove this point. In addition, patient capital can also play a role in optimizing the governance structure. According to Guo Chuhan and Zhang Yan, patient capital investors tend to intervene in corporate decision-making through board proposals and shareholders' supervision, and promote the establishment of a transparent R&D management system, i.e., this governance pressure from investors will prompt enterprises to shift resources from symbolic environmental protection inputs to substantive technological innovations, which will enhance the efficiency of green innovation. Finally, patient capital can produce the effect of reshaping market expectations. As Yang Fang et al. suggest, when a company receives patient capital injection, it signals to the market that it is committed to long-term sustainable development, and this signal can reduce investors' information asymmetry concerns about green innovation projects, further motivating firms to gain capital trust through technological breakthroughs rather than short-term disclosure manipulation.

Table 3. Analysis of mediation effect results, analysis of robust-type test results, and analysis of industry heterogeneity

	1	2	3	4	5	6	7	8
invest1 percent	0.0675***		-0.2301***		-0.4258***	-0.2156***		
	(0.0211)		(0.0553)		(0.0633)	(0.0604)		
invest2 percent		0.0640 ***		-0.1313***			-0.2198***	-0.1343***
		(0.0170)		(0.0303)			(0.0389)	(0.0345)
control variable	YES	YES	YES	YES	YES	YES	YES	YES
_cons	-3.5345***	-3.5599***	-3.1205***	-3.0333***	-2.2589***	-3.2106***	-1.8493***	-3.1396***
	(0.2998)	(0.3003)	(0.4106)	(0.4124)	(0.6681)	(0.4531)	(0.6722)	(0.4547)
Ind	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES
N	6037	6037	6023	6023	1743	4292	1743	4292
R2	0.3368	0.3369	0.1791	0.1699	0.1175	0.0690	0.0962	0.0595

Standard errors in parentheses

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

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5.3.2. Inhibitory effects of green innovation on "greenwashing" behavior

Green innovation undermines the need for "greenwashing" behavior by improving the verifiability of firms' environmental performance. In the benchmark regression of this paper, the coefficient of Green_Innovation is 0.171, indicating that for every 1% increase in the number of green patents, the degree of "greenwashing" (GWS) of enterprises decreases by about 0.17 units. The mechanism is reflected in the following three aspects: firstly, the constraint effect produced by hard indicators. Bowen and Aragon-Correa proposed that green technological innovation achievements (e.g., reduction of carbon emission intensity, improvement of resource recycling rate) can be quantified by objective indicators such as the number of patents and third-party certifications, and this "hard information" significantly improves the environmental information quality. These "hard information" significantly improve the verifiability of environmental information disclosure and compress the operation space of selective disclosure by enterprises. In addition, the cost advantage brought by green innovation can bring positive incentives, production process improvement is often accompanied by cost reduction and market competitiveness enhancement, when the enterprise through technological innovation to obtain substantial benefits, its "greenwashing" to maintain the short-term market valuation of the incentives subsequently weakened. Su Dongwei and Liu Ziruo empirically show that the deviation of ESG ratings from true performance (GWS) is significantly lower for firms with higher green patent output [9]. Finally, there is the cumulative effect of reputational capital, i.e., continuous green innovation investment helps enterprises to build a positive feedback mechanism of "technology-capital-reputation". According to Zhou Dapeng, investors can assess the environmental contribution of enterprises through dynamic indicators such as R&D investment intensity and technology transformation efficiency, which makes enterprises more inclined to maintain market reputation through real performance rather than information manipulation. It is also true that the symbolic character of ESG disclosure of a new energy enterprise is significantly weakened after it won an industry award for its PV technology breakthrough.

5.3.3. Pathway synergy and policy implications

The above mechanism suggests that patient capital empowers green innovations, and simultaneously inhibits opportunistic behaviors of firms from the dimensions of "reducing the attractiveness of greenwashing" and "increasing the cost of greenwashing". This finding breaks through the limitations of traditional ESG governance that relies on external regulation, and reveals the moderating effect of endogenous market forces on disclosure quality. Policy design should focus on two points: first, improve tax incentives and intellectual property protection for green technological innovation to guide long-term capital flows to high-R&D-intensity firms; and second, establish "quantitative anchors" for ESG disclosure, requiring firms to disclose technical indicators such as patent conversion rate and emission reduction intensity to enhance the comparability and auditability of environmental performance.

5.4. Robustness test

To verify the robustness of the benchmark regression results, this paper examines the following three aspects:

First, controlling for regional fixed effects (Table 2): the absolute values of the coefficients of Invest1 Percent and Invest2 Percent increase from 0.2068 and 0.1290 to 0.2585 and 0.1586,

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respectively ($p<0.01$), after the introduction of the province fixed effects in Models (2) and (4), which suggests that ignoring regional heterogeneity will underestimate the governance effect of patient capital. This is consistent with Zhou Dapeng's suggestion that regional differences in environmental policy intensity and marketization may affect corporate disclosure strategies. After controlling for regional effects, the explanatory power (R^2) of the model significantly increases and the robustness of the core findings is enhanced.

Second, the replacement variable measure (Table 3): first, the explanatory variable is replaced with the logarithmic form of the degree of greenwash (lnGWS), and the results show that the coefficient of patient capital remains significantly negative ($\beta=-0.2301$, $p<0.01$); second, green patent grants are used to replace the number of applications to measure green innovation, and the coefficient of green innovation in the mediation effect test remains significant ($\beta= 0.0675$, $p<0.01$), and the path transmission logic did not change substantially.

Third, endogeneity treatment: the instrumental variable method (IV-Probit) is used to mitigate the reverse causality problem, with the mean annual ESG disclosure of the industry as the instrumental variable, and the F-statistic in the first stage is 15.66 ($p<0.01$), which passes the test of weak instrumental variable. The inhibitory effect of patient capital on greenwash in the second stage regression remains significant ($\beta=-0.307$, $p<0.01$), supporting the validity of the causal inference of the findings.

6. Heterogeneity analysis

Table 3 reports the results of the grouped regressions of industry pollution attributes. The coefficients of Invest1 Percent and Invest2 Percent are -0.4258 and -0.2198 ($p<0.01$), respectively, in the heavy pollution industry, which are significantly higher than those of -0.2156 and -0.1343 ($p<0.01$) in the non-heavy pollution industry. Economic significance calculations show that for every 1 unit standard deviation increase in patient capital in the heavy polluting industries, GWS decreases by about 0.274 units (=0.4258 x 0.642), which is equivalent to 4.9 times the sample mean, while the corresponding value for the non-heavy polluting industries is 0.138 units.

7. Research conclusions and countermeasure recommendations

The innovative contribution of this paper is that it is the first time to construct the theoretical framework of "capital attributes-disclosure strategy", which reveals the path of patient capital to manage "greenwashing" through the endogenous mechanism of the market rather than external intervention, breaking through the paradigm of the existing literature that treats patient capital as an outcome variable. This breaks through the existing research paradigm of treating patient capital as an outcome variable. Methodologically, we improve the "greenwash" measurement and capture industry heterogeneity through textual analysis, which provides a methodological tool for dynamically assessing the quality of corporate environmental information. Practically, we propose a policy combination of "growing patient capital" and "optimizing green financial instruments", which provides a dual solution to improve the efficiency of capital allocation and the credibility of information disclosure under the goal of "dual carbon". It provides a dual solution to improve the efficiency of capital allocation and the credibility of information disclosure under the goal of "dual carbon".

Based on the data of A-share listed companies in Shanghai and Shenzhen from 2010 to 2022, this paper empirically examines the governance effect and mechanism of patient capital on the "greenwashing" behavior of enterprises, and the main conclusions are as follows: (1) Patient capital

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significantly inhibits the "greenwashing" behavior. The main conclusions are as follows: (1) patient capital significantly inhibits "greenwashing" behavior. For every 1-unit increase in the stability of institutional investors' shareholding (Invest1 Percent and Invest2 Percent), the degree of corporate greenwash (GWS) decreases by 0.2068 and 0.1290, respectively ($p<0.01$). This suggests that long-term value-oriented capital compresses the space for corporate environmental information manipulation by reshaping market expectations and governance participation. (2)The triple mediation path drives the inhibitory effect. Patient capital indirectly inhibits "greenwashing" through three paths: alleviating financing constraints, strengthening governance mechanisms , and promoting green technological innovation, of which the mediating effect elasticity of green innovation is 0.0675 ($p<0.01$). (3) Industry and ownership heterogeneity is significant. Industry and property rights heterogeneity is significant. The inhibitory effect of patient capital is stronger in heavily polluting industries ($\beta=0.4258$), which is 97.3% higher than that in non-polluting industries, mainly due to stricter regulatory pressure and the need for technological substitution; and the governance effect of patient capital is 42% higher in non-state-owned enterprises than that of state-owned enterprises, which is attributed to the flexibility of the market-based governance structure.

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