

# Research on Corporate Greenwashing Behavior: Drivers and Consequences

Deng Jinghan<sup>1,a,\*</sup>, Zhang Yaowu<sup>2,b</sup>

<sup>1</sup>Optics Valley Ulink School, Wuhan, China

<sup>2</sup>Wuhan Tongkang Century Runwu Technology Co., Ltd., Wuhan, China

<sup>a</sup>33562711@qq.com, <sup>b</sup>ZhangYW@163.com

\*Corresponding author: Deng Jinhang

**Abstract:** With the advancement of sustainable development concepts, ESG (Environmental, Social and Governance) disclosure has become a key standard for measuring corporate social responsibility. However, some companies engage in “greenwashing” by exaggerating or selectively presenting information in order to create a false eco-friendly image, drawing widespread attention from regulators and academia. Based on data from listed companies in China’s home appliance industry from 2014 to 2021, this study explores the driving factors and economic consequences of corporate greenwashing. The empirical results show that strong size and age significantly promote greenwashing behavior, while SOEs are less likely to engage in greenwashing than non-SOEs. Further analysis reveals that greenwashing not only significantly reduces financial performance but also harms market performance. This research enriches the theoretical understanding of greenwashing, uncovering the underlying logic of how companies selectively adopt symbolic coping strategies when facing legitimate pressures and disclosure constraints. It also provides practical insights for regulators to refine ESG policies and improve the quality of environmental disclosure.

**Keywords:** Greenwashing; Firm size; Firm age; Ownership nature

## 1. Introduction

In recent years, the rise of environmental, social and governance (ESG) principles and the advancement of the global sustainable development agenda have made corporate environmental disclosure a key indicator for assessing the fulfillment of social responsibility and sustainable competitiveness. Regulatory bodies, investors and the public are increasingly demanding greater environmental transparency from companies, driving a significant increase in the number of corporate environmental disclosures. However, behind this growth in disclosure volume, “disparities in disclosure quality” have become a growing concern. Some companies, responding to external regulatory pressures and societal expectations, do not really improve their environmental performance. Instead, they create a misleading “green image” through exaggerated or deceptive claims—a practice known as “greenwashing” (Walker & Wan, 2012; Xiao et al., 2013)<sup>[1,2]</sup>. Greenwashing not only distorts market assessments of corporate environmental responsibility, misleads investors and consumers, and undermines fair competition, but also erodes public trust in sustainability commitments and hinders genuine sustainable transformation. Therefore, identifying greenwashing, understanding its drivers and consequences, has become a critical issue in corporate social responsibility (CSR) and sustainability research.

However, while recent academic research has explored the theoretical definition, identification methods, and regulatory responses to greenwashing, systematic studies on the influencing factors and consequences of greenwashing remain insufficient. Specifically, existing literature on the drivers of greenwashing focuses primarily on external institutional pressures, regulatory environments, or industry characteristics (Delmas & Burbano, 2011; Boiral, 2007)<sup>[3,4]</sup>, with limited in-depth investigation into how internal corporate attributes influence greenwashing behavior. Firms of varying sizes, ages, and types of ownership exhibit significant differences in resource endowments, governance structures, external pressures, and strategic objectives (Liu et al., 2024; Li & Liu, 2025)<sup>[5,6]</sup>. These heterogeneous characteristics may lead firms to adopt different response strategies when faced with environmental disclosure pressures, but their effects remain underexamined. On the other hand, research on the consequences of greenwashing is also lacking. While some studies suggest that greenwashing may yield short-term reputational benefits (Li & Bi, 2025)<sup>[7]</sup>, increasing regulatory scrutiny and public environmental awareness have increased the risk of greenwashing exposure, potentially harming firms’

capital market performance and long-term financial results. Therefore, a deeper analysis of the impact of greenwashing on corporate financial performance has significant theoretical and practical value.

Based on the above analysis, this study examines the influencing factors and consequences of corporate greenwashing using a sample of listed companies in China's home appliance industry from 2014 to 2021. After addressing endogeneity concerns and conducting robustness tests, we find that firm size and age are positively correlated with greenwashing, while state ownership is negatively correlated. Further analysis reveals that greenwashing significantly reduces both financial and market performance. This study contributes to both theory and practice: Theoretically, it broadens the research perspective on greenwashing by uncovering how firms strategically manage disclosure under legitimate pressures and regulatory constraints. In practice, it provides policy makers with insights into designing targeted regulatory tools, enhancing the authenticity of environmental disclosures, and motivating companies to actively fulfill their environmental responsibilities.

## 2. Theoretical Analysis and Research Hypotheses

### 2.1 Corporate Greenwashing

Greenwashing refers to corporate practices in environmental disclosure where firms exaggerate, selectively present, obscure, or misrepresent information to deliberately create a more favorable environmental image than reality, thereby gaining legitimacy or reputational advantage (Marquis et al., 2016; Szabo & Webster, 2021)<sup>[8,9]</sup>. The term was first coined by American environmentalist Jay Westerveld in 1986. While staying at a hotel, he observed that the establishment encouraged guests to reuse towels under the guise of water conservation, yet during its construction, the hotel had caused significant deforestation and improper waste disposal, with minimal substantive environmental measures implemented (Fu et al., 2024)<sup>[10]</sup>. As a selective disclosure strategy, greenwashing relies fundamentally on information asymmetry and external trust. Once exposed, it can trigger reputational damage, regulatory penalties, and a crisis of trust, ultimately undermining a firm's competitive advantage (Xie et al., 2024)<sup>[11]</sup>. Although greenwashing in Chinese firms has recently gained attention, its severity remains underappreciated, necessitating stronger governance measures.

### 2.2 Determinants of Corporate Greenwashing Behavior

This study posits that a firm's decision to adopt greenwashing strategies is influenced not only by external institutional pressures and socio-regulatory environments, but also significantly by its internal characteristics. Firm size, age, and ownership structure critically shape how companies respond to environmental disclosure pressures, affecting their propensity to adopt symbolic rather than substantive compliance strategies.

First, large firms, due to their prominent market position and high public visibility, typically become focal points for government regulators, media scrutiny, and public attention (Zhang et al., 2023)<sup>[12]</sup>. Under increasing environmental governance pressures and increasingly stringent ESG disclosure requirements, public sensitivity to corporate environmental responsibility has increased, placing greater demands on industry leaders. This dual pressure from public opinion and institutional expectations compels large firms to demonstrate proactive ESG disclosure positions to meet societal expectations of their "exemplary role." However, real improvements in environmental performance often require systemic reforms in production processes, energy structures, and raw material selection—changes that require substantial capital investments while potentially reducing production efficiency, causing short-term profit fluctuations, and increasing management complexity (Zeng et al., 2025)<sup>[13]</sup>. When weighing costs against benefits, some large firms may prefer seemingly low-cost strategies, such as greenwashing through exaggerated environmental claims or selective disclosure, to quickly meet both regulatory compliance and social legitimacy requirements, thus maintaining market reputation and legal standing.

Second, as firms mature, they typically accumulate operational experience, institutional routines, and stakeholder networks, gradually developing strong path dependence and organizational inertia (Gilbert, 2005)<sup>[14]</sup>, which increases greenwashing incentives. On the one hand, substantial environmental improvements often require technological upgrades, optimization of energy structures, or production line modifications—costly changes that can disrupt existing internal coordination mechanisms, increase management complexity, and volatility in short-term performance (Niu et al., 2025)<sup>[15]</sup>. On the other hand, older firms tend to have a deeper familiarity with regulatory policies and disclosure rules, along with sophisticated communication strategies (He & Xiong, 2025)<sup>[16]</sup>, enabling them to strategically employ

ambiguous language or selective reporting to construct a misleading green image that meets regulatory and market expectations. Consequently, firm age is positively associated with greenwashing propensity.

Finally, state-owned enterprises (SOEs) typically have greater policy mandates and social responsibility objectives than private enterprises, facing greater governmental oversight and public scrutiny (Liao & Shen, 2014)<sup>[17]</sup>. To fulfill their public duties and maintain the government reputation, SOEs generally adopt more prudent and standardized environmental disclosures, preferring genuine environmental investments over greenwashing. Their close governmental ties also place them under heightened policy pressure and institutional constraints (Chen et al., 2015)<sup>[27]</sup>, making false or exaggerated disclosures more detectable and punishable. In addition, SOEs' advantages in access to resources and policy support (Feng & Ma, 2025)<sup>[19]</sup> enhance their capacity for substantive environmental improvements, further reducing greenwashing incentives. As a result, SOEs show lower greenwashing tendencies than private firms.

These arguments lead to our hypotheses:

H1: Firm size has a positive effect on greenwashing behavior.

H2: Firm age has a positive effect on greenwashing behavior.

H3: State-owned enterprises are less likely to engage in greenwashing than non-state-owned enterprises.

### **2.3 Economic Consequences of Corporate Greenwashing**

#### **2.3.1 Financial Performance**

Greenwashing, as a selective disclosure strategy, has a significant negative impact on a company's financial performance. First, by engaging in greenwashing, firms divert limited resources to superficial packaging and symbolic compliance activities rather than making substantial investments in environmental technologies, process optimization, or pollution control. Such practices fail to increase operational efficiency while increasing expenditures on advertising, reporting preparation, and third-party certification. These additional costs increase administrative and sales expenses, thus compressing profit margins and weakening financial performance (Shen & Zhou, 2025)<sup>[20]</sup>.

Second, greenwashing carries high risks of exposure and inherent unsustainability. Once identified by regulators, media, or the public for false or misleading disclosures, firms face severe reputational crises (Liu et al., 2024; Zou & Xiao, 2024)<sup>[5,21]</sup>. Consumers who are environmentally conscious may shift to more transparent and genuinely responsible competitors, leading to lower sales. Moreover, when management misleads external stakeholders through exaggerated environmental claims, internal employees perceive organizational hypocrisy in corporate values. This erosion of trust may encourage counterproductive behaviors (e.g., cheating or cutting corners), fostering a culture of declining norms that ultimately undermines operational efficiency and quality—further exacerbating financial deterioration (Marquis et al., 2016)<sup>[8]</sup>.

Therefore, we hypothesize:

H4: Greenwashing negatively impacts financial performance.

#### **2.3.2 Market Performance**

Greenwashing not only worsens financial performance, but also significantly impairs business market performance through multiple mechanisms. First, while firms attract environmentally conscious consumers through exaggerated or false environmental claims, their products or services often lack genuine sustainable attributes, failing to deliver the promised value proposition (Chen et al., 2020; De Jong et al., 2020)<sup>[18,22]</sup>. When consumer experience falls short of their green expectations, satisfaction and brand loyalty decline, leading to lower repurchase rates, increased customer churn, and ultimately reduced market share and revenue.

Second, greenwashing typically diverts limited resources to image management and promotional activities rather than genuine improvements in green technology (Zhou, 2024)<sup>[23]</sup>. This misallocation of resources prevents firms from developing genuine environmental competitive advantages. In an increasingly sustainability-driven market, such firms struggle to achieve meaningful differentiation, resulting in weaker market appeal and lower customer conversion efficiency (Xu et al., 2025)<sup>[24]</sup>, ultimately constraining market expansion capabilities.

Third, greenwashing undermines the stability of supply chain relationships. With the rise of green supply chain management, leading firms are increasingly considering environmental performance in procurement decisions. A firm exposed to greenwashing risks losing major clients, damaging partner engagement, and potentially facing exclusion from industry sustainability certification systems, leading to lost high-value contracts and critical market access (Liu et al., 2021)<sup>[25]</sup>.

These arguments lead to our final hypothesis:

H5: Greenwashing negatively affects market performance.

In summary, the conceptual framework of this study is illustrated in Figure 1:



Fig. 1 The conception model

### 3. Research Design

#### 3.1 Sample Selection and Data Sources

##### 3.1.1 Sample Selection

This study examines listed companies in China’s home appliance industry (excluding component manufacturers) from 2014 to 2021. The sample was processed as follows: (1) Excluded firms with incomplete data; (2) Eliminated extreme outliers. The final dataset includes 3,332 firm-year observations.

##### 3.1.2 Data Sources

Data on corporate greenwashing is calculated based on ESG performance ratings published by Shanghai HuaZheng Index Information Service Co., Ltd. and ESG disclosure transparency scores published by Bloomberg Database. Data related to business characteristics, financial indicators, and governance structures are all sourced from the CSMAR database.

#### 3.2. Variable Definitions and Measurement

##### 3.2.1 Core Variables

Greenwashing (GW). Based on existing research (Yu et al., 2020; Zhang, 2023)<sup>[26,12]</sup>, we measure GW as the difference between a firm’s ESG actions and disclosures using Equation (1):

$$GW = ESGD\_std - ESGP\_std \tag{1}$$

Specifically, in Equation (1), ESGD\_std represents the standardized Bloomberg disclosure score, and ESGP\_std represents the standardized HuaZheng ESG performance score. A higher GW value indicates a greater degree of corporate greenwashing.

Firm Size (Size). Measured as the natural logarithm of total assets at year-end.

Firm Age (Age). Calculated as the number of years from establishment to observation.

Ownership Nature (EN). A dummy variable where: 1 = State-owned enterprises; 0 = Non-state-owned enterprises.

Financial Performance (ROA). Return on assets, calculated as net profit divided by average total assets.

Market Performance (Market). Market share, measured as the firm’s operating revenue divided by total industry revenue.

##### 3.2.2 Control Variables

Control variables in this study include:

- (1) Firm growth (Growth), measured as the difference between current-period operating income and prior-period operating income, divided by prior-period operating income;
- (2) Concentration of ownership (Top1), measured as the shareholding ratio of the largest shareholder;
- (3) Board size (Board), measured by the number of directors on the Board;
- (4) Proportion of independent directors (Ind), calculated as the number of independent directors divided by the total number of board members;
- (5) Fixed-year effects.

#### 4. Empirical Analysis

##### 4.1 Descriptive Statistics and Correlation Analysis

The descriptive statistics of the variables in this study are presented in Table 1. As shown in the table, the means and standard deviations for all variables are at reasonable levels. The mean value of greenwashing (GW) is 0.168, with a standard deviation of 1.387, a minimum value of -2.697, and a maximum value of 3.777, indicating significant variation in greenwashing practices across different firms.

Table 1 Descriptive Statistics

Variables	Samples	Average Value	Standard Deviation	Minimum Value	Maximum Value
GW	3332	0.168	1.387	-2.697	3.777
Size	3332	23.499	1.317	21.693	26.684
Age	3332	21.37	5.777	7	33
EN	3332	0.244	0.429	0	1
Growth	3332	0.081	0.237	-0.484	1.023
Top1	3332	39.168	18.625	13.72	82.44
Board	3332	8.706	1.299	6	13
Ind	3332	0.365	0.050	0.308	0.571

Correlation analysis results for key variables are presented in Table 2. The correlation coefficients between greenwashing and firm size, firm age, and ownership nature were 0.210, 0.222, and -0.271, respectively, all statistically significant at the 1% level. These results provide preliminary evidence of significant associations between these variables and greenwashing behavior. To address potential multicollinearity concerns, we conducted variance inflation factor (VIF) tests. All VIF values were below the 5 thresholds, indicating that the selected variables are appropriately specified, no serious multicollinearity problems exist in our model, and regression estimates can be reliably interpreted.

Table 2 Correlation Analysis

	GW	Size	Age	EN	Growth	Top1	Board	Ind
GW	1							
Size	0.210***	1						
Age	0.222***	0.371***	1					
EN	-0.271***	0.343***	0.242***	1				
Growth	-0.216***	-0.351***	-0.118***	-0.033*	1			
Top1	0.319***	-0.371***	-0.408***	-0.415***	0.093***	1		
Board	0.156***	-0.003	-0.029*	-0.173***	-0.116***	0.150***	1	
Ind	-0.231***	-0.088***	-0.115***	-0.032*	0.115***	-0.052***	-0.624***	1

##### 4.2 Regression Results Analysis

Table 3 presents the empirical results of the influencing factors and economic consequences of greenwashing. Models 1 to 3 examine the impact of firm size, firm age, and ownership nature on greenwashing, respectively. The regression results show that the coefficient for firm size is significantly positive ( $\beta=0.2423$ ,  $p<0.01$ ). This is because larger firms face greater market scrutiny and competitive pressure, leading them to increase environmental publicity to shape their corporate image. Hypothesis 1 is supported. The regression coefficient for firm age is significantly positive ( $\beta=0.0390$ ,  $p<0.01$ ), supporting Hypothesis 2. This indicates that the path dependence formed through long-term operations may lead to a lag in environmental practices compared to promotional commitments, particularly among

traditional firms that are more prone to a mismatch between words and actions during green transitions.

In contrast, the regression coefficient for ownership nature is significantly negative ( $\beta = -0.447$ ,  $p < 0.01$ ), suggesting that state-owned enterprises (SOEs) exhibit stronger self-discipline in environmental information disclosure. This is closely linked to their social responsibilities, stricter government oversight, and decision-making mechanisms that prioritize societal benefits, thus validating Hypothesis 3.

Model 4 examines the impact of greenwashing on financial performance. The regression coefficient for greenwashing is significantly negative ( $\beta = -0.0085$ ,  $p < 0.01$ ), indicating that firms adopting greenwashing strategies experience a significant decline in financial performance. Hypothesis 4 is therefore supported. Model 5 further investigates the effect of greenwashing on market performance. The regression coefficient for greenwashing remains significantly negative ( $\beta = -0.0099$ ,  $p < 0.01$ ), suggesting that greenwashing not only harms corporate profitability but also weakens market competitiveness and operational outcomes, leading to a loss of market share. These results validate Hypothesis 5, confirming that greenwashing has a significant negative impact on firms' market performance.

Table 3 Baseline Regression Results

Variables	GW (1)	GW (2)	GW (3)	ROA (4)	Market (5)
Size	0.2423*** (16.13)				
Age		0.0390*** (10.52)			
EN			-0.5200*** (-11.47)		
GW				-0.0085*** (-5.75)	-0.0099*** (-9.61)
Growth	-0.6202*** (-7.98)	-0.9976*** (-13.27)	-1.0376*** (-13.86)	-0.0174*** (-2.59)	-0.0233*** (-5.00)
Top1	0.0272*** (26.99)	0.0264*** (24.49)	0.0165*** (16.00)	0.0018*** (20.40)	0.0015*** (24.45)
Boardsize	0.0247 (1.43)	0.0236 (1.34)	-0.0254 (-1.41)	-0.0136*** (-8.82)	-0.0176*** (-16.48)
Ind	-6.8589*** (-15.50)	-6.5697*** (-14.31)	-8.4337*** (-18.51)	0.0275 (0.68)	-0.0665** (-2.36)
Constant	-4.2532*** (-8.90)	0.5720* (1.81)	3.0286*** (10.18)	0.0964*** (3.86)	0.2128*** (12.29)
Year	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.505	0.484	0.487	0.166	0.263

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

### 4.3 Robustness checks

To verify the robustness of the empirical findings, this study carries out several robustness checks. First, we change the measurement of greenwashing by replacing the continuous greenwashing indicator with a dummy variable (*IG*), where *IG* equals 1 if a firm engages in greenwashing and 0 otherwise. For regression with *IG* as the dependent variable, we employ a Probit model while keeping the control variables consistent with the main regression to ensure comparability in model structure. As shown in Table 4, the sign and significance levels of the core explanatory variables (firm size, age, and ownership nature) remain consistent with the main regression results. This suggests that our findings on the determinants of greenwashing are not contingent on a specific measurement approach, demonstrating strong robustness. Second, to mitigate potential distortions caused by outliers, we apply 1% winsorization to the greenwashing variable. The re-estimated regression results show that the direction and significance of the core coefficients remain largely unchanged compared to the baseline regression, further confirming the stability and reliability of our conclusions. Due to space limitations, these additional results are not presented in the paper.

Table 4 Robustness Test

VARIABLES	GW (1)	GW (2)	GW (3)	ROA (4)	Market (5)
Size	0.2529*** (10.86)				
Age		0.0157*** (2.97)			
EN			-0.6502*** (-9.51)		
IG				-0.0178*** (-5.00)	-0.0342*** (-14.05)
Growth	-0.9259*** (-7.52)	-1.3400*** (-11.33)	-1.5381*** (-12.41)	-0.0147** (-2.21)	-0.0250*** (-5.49)
Top1	0.0236*** (13.98)	0.0183*** (10.89)	0.0108*** (6.89)	0.0017*** (20.20)	0.0015*** (25.11)
Boardsize	-0.0323 (-1.26)	-0.0329 (-1.30)	-0.0898*** (-3.46)	-0.0138*** (-8.95)	-0.0179*** (-17.01)
Ind	-9.8386*** (-13.98)	-9.1107*** (-13.34)	-10.7320*** (-15.18)	0.0419 (1.04)	-0.0879*** (-3.18)
Constant	-4.4639*** (-6.31)	1.1313** (2.47)	2.8393*** (6.30)	0.1044*** (4.13)	0.2412*** (13.96)
Year	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup> /Pseudo R <sup>2</sup>	0.277	0.252	0.270	0.164	0.285

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

## 5. Research Conclusions and Prospects

### 5.1 Research Conclusions

Based on a sample of Chinese listed companies in the home appliance industry from 2014 to 2021, this study empirically examines the influencing factors and economic consequences of corporate greenwashing behavior. The findings reveal that firm size and age are significantly positively correlated with greenwashing, indicating that larger and more mature firms are more likely to adopt greenwashing strategies to meet external legitimacy requirements. By contrast, SOEs engage in less greenwashing than non-SOEs, suggesting that SOEs prioritize authentic and compliant disclosure under social responsibility pressures and regulatory constraints, exhibiting weaker greenwashing tendencies.

Further analysis shows that greenwashing significantly impairs both financial and market performance, as evidenced by declines in return on assets (ROA) and market share. This indicates that greenwashing strategies not only fail to deliver sustainable competitive advantages, but also cause substantial harm to operational efficiency and market performance.

### 5.2 Theoretical Contributions and Managerial Implications

This study systematically analyzes the causes and consequences of corporate greenwashing, offering several theoretical extensions to existing research:

First, it enriches the understanding of greenwashing motivations. While previous studies have focused on institutional environments, regulatory pressures, or reputational mechanisms, this paper highlights the role of organizational characteristics-firm size, age, and ownership nature-in shaping greenwashing tendencies. The findings suggest that greenwashing is not only a response to external pressures, but also reflects internal resource allocation logic, deepening insights into strategic disclosure.

Second, it expands ESG-performance literature by revealing the negative economic consequences of greenwashing. The empirical results show that greenwashing significantly undermines financial and market performance, exposing its hidden costs and risks. This challenges the misconception of greenwashing as a low-cost strategy and highlights the economic trade-offs of selective disclosure, providing theoretical support for understanding the authenticity and sustainability of corporate environmental reporting.

Third, by focusing on China's home appliance industry—a traditional manufacturing sector facing dual-carbon policies, green transition pressures, and shifting consumer preferences—the study broadens the contextual understanding of greenwashing in emerging markets. The findings shed light on strategic environmental disclosures during industrial transformations, extending the boundaries of greenwashing research.

Moreover, the findings of this study provide valuable practical insights for stakeholders such as corporate managers, regulators, and investors.

First, for managers, it is crucial to recognize that while greenwashing may provide short-term legitimacy relief, its long-term consequences—including reputational risks, regulatory compliance costs, and erosion of market trust—can significantly harm firm performance. Therefore, enterprises should adhere to authenticity and transparency in environmental disclosures, avoiding exaggerated or misleading claims to gain public attention. Larger, more mature firms, in particular, should assume industry leadership responsibilities by advancing both green governance and genuine accountability to build long-term, sustainable competitive advantages.

Second, for regulators, there is a need to strengthen substantive oversight of corporate ESG disclosures, implement mechanisms for environmental data verification, third-party certification standards, and punitive systems to prevent greenwashing from undermining market credibility. In addition, regulatory frameworks should reflect strong heterogeneity, with targeted guidance and norms for non-state-owned enterprises to incentivize improvements in environmental governance and green development awareness.

Finally, for investors and the public, enhancing the ability to assess the authenticity of corporate environmental disclosures is essential. A holistic assessment—incorporating third-party ratings, media surveys, actual product performance, and other multidimensional data—can help avoid being misled by superficial green claims.

### 5.3 Research limitations

This study also has several limitations:

First, regarding the identification of greenwashing, constrained by data availability, this paper uses an ESG rating discrepancy metric to measure corporate greenwashing. While this method is somewhat representative, it may still not capture the full spectrum of greenwashing behaviors. Future research could develop a more comprehensive approach to enable finer-grained, multidimensional identification and classification of corporate greenwashing.

Second, the sample in this study focuses on the home appliance industry. Given that industry characteristics and regulatory environments vary across sectors, the generalizability of the findings requires further validation. Future work could extend the applicability of the findings through cross-industry analyses or comparative studies.

Third, in terms of explanatory variables, this paper only examines the influence of three structural factors—firm size, age, and type of ownership—on greenwashing. Additional determinants such as corporate culture, executive characteristics, and industry competition intensity could be incorporated into future studies to further understand the drivers behind corporate greenwashing.

### References

- [1] Walker, K., Wan, F. *The harm of symbolic actions and green-washing: Corporate actions and communications on environmental performance and their financial implications*[J]. *Journal of Business Ethics*, 2012, 109(2):227-242.
- [2] Xiao, H., Zhang, J., Li, W. *A study on corporate pseudo-corporate social responsibility behavior*[J]. *China Industrial Economics*, 2013, (6):109–121.
- [3] Delmas, M.A., Burbano, V.C. *The drivers of greenwashing*[J]. *California Management Review*, 2011, 54(1):64-87.
- [4] Boiral, O. *Corporate greening through ISO 14001: a rational myth?*[J]. *Organization Science*, 2007, 18(1):127-146.
- [5] Liu, X., Sun, L., Shan, X., et al. *Patent transfer and acquisition behavior: Evidence from network effects and actor effects*[J]. *Science & Technology Progress and Policy*, 2024, 41(2):35–45.

- [6] Li, X., Liu, G. Policy effects and breakthrough paths of technology blockade: Evidence from PSM-DID and complex network analysis[J]. *Journal of Shanxi University of Finance and Economics*, 2025, 47(7):45-58.
- [7] Li, J., Bi, Q. Fair competition review system and corporate ESG performance[J]. *Journal of Finance and Economics*, 2025, 51(3):139-153.
- [8] Marquis, C., Toffel, M.W., Zhou, Y. Scrutiny, norms, and selective disclosure: A global study of greenwashing[J]. *Organization Science*, 2016, 27(2):483-504.
- [9] Szabo, S., Webster, J. Perceived greenwashing: the effects of green marketing on environmental and product perceptions[J]. *Journal of Business Ethics*, 2021, 171(4):719-739.
- [10] Fu, J., Cao, J., Li, H. Research on corporate "greenwashing": Development trajectory, literature review and future prospects[J]. *Technology Economics*, 2024, 43(4):100-117.
- [11] Xie, X., Chen, W., Zhang, H. Theoretical framework construction and future research prospects of corporate greenwashing behavior[J]. *Management Review*, 2024, 36(10):9-21.
- [12] Zhang, Y., Wang, M., & Wei, H. Measuring corporate social responsibility in Chinese agricultural enterprises and its determinants[J]. *China Population, Resources and Environment*, 2023, 33(6):161-171.
- [13] Zeng, P., Xiao, J., Li, D. Dual institutional pressures, green innovation and corporate environmental performance: The moderating role of environmental ethics[J]. *Journal of Industrial Engineering and Engineering Management*, 2025, 1-15.
- [14] Gilbert, C.G. Unbundling the structure of inertia: Resource versus routine rigidity[J]. *Academy of Management Journal*, 2005, 48(5):741-763.
- [15] Niu, F., Luo, Z., & Qiu, B. Executive environmental background and corporate greenwashing[J]. *Journal of Nanjing Audit University*, 2025, 22(2):55-66.
- [16] He, Y., Xiong, Z. The impact of AI technology application on innovation performance of manufacturing enterprises[J]. *Science Research Management*, 2025, 46(5):13-22.
- [17] Liao, G., Shen, H. Policy burdens of state-owned enterprises: Motivations, consequences and governance[J]. *China Industrial Economics*, 2014, (6):96-108.
- [18] Chen, Y.-S., Huang, A.-F., Wang, T.-Y., et al. Greenwash and green purchase behaviour: the mediation of green brand image and green brand loyalty[J]. *Total Quality Management & Business Excellence*, 2020, 31(1-2):194-209.
- [19] Feng, L., Ma, Z. ESG practices and corporate value creation: Based on green technology and green management innovation perspectives[J]. *Commercial Research*, 2025, (3):132-141.
- [20] Shen, Y., Zhou, L. Strategic substitution between two layers of corporate greenwashing: Conceptual differentiation and empirical evidence[J]. *Soft Science*, 2025, 39(5):102-108.
- [21] Zou, Y., Xiao, Z. The impact of ESG greenwashing on firm performance[J]. *Contemporary Finance & Economics*, 2024, (11):152-164.
- [22] De Jong, M.D., Huluba, G., Beldad, A.D. Different shades of greenwashing: Consumers' reactions to environmental lies, half-lies, and organizations taking credit for following legal obligations[J]. *Journal of Business and Technical Communication*, 2020, 34(1):38-76.
- [23] Zhou, D. The impact of greenwashing in ESG disclosure on firms' outward foreign direct investment[J]. *World Economy Studies*, 2024, (12):18-31, 133.
- [24] Xu, W, Wu, Y., Li, M. Moon in the water or real effect? ESG ratings and corporate greenwashing risk[J]. *Economic Review*, 2025, (2):132-147.
- [25] Liu, Y., Jia, X., Jia, X., et al. CSR orientation incongruence and supply chain relationship performance—A network perspective[J]. *Journal of Operations Management*, 2021, 67(2):237-260.
- [26] Yu, E.P.Y., Van Luu, B., Chen, C.H. Greenwashing in environmental, social and governance disclosures[J]. *Research in International Business and Finance*, 2020, 52:101192.
- [27] Chen, S., Lu, C., Jiang, G. The impact of political promotion of SOE executives on M&A behavior: An empirical study based on corporate growth pressure theory[J]. *Management World*, 2015, (9):125-136.