

The Impact of Analyst Earnings Forecast Pressure on Corporate ESG greenwashing

Chen Dai *

School of Economics and Management, Nanjing University of Science and Technology, Nanjing, China

* Corresponding Author Email: daichenaaa@126.com

Abstract. Against the backdrop of the deepening ESG investment philosophy and the advancement of China's "dual carbon" strategy, the scale of ESG information disclosure by Chinese listed companies has expanded rapidly. However, strategic disclosure practices such as ESG greenwashing have also emerged as a prominent issue constraining the high-quality development of the ESG market. Using a sample of Chinese A-share listed companies from 2012 to 2024, this paper empirically examines the effect, functioning mechanism, and heterogeneity characteristics of analyst earnings forecast pressure on corporate ESG greenwashing behavior. The study finds that analyst earnings forecast pressure significantly exacerbates the degree of corporate ESG greenwashing. Mechanism tests show that analyst earnings forecast pressure intensifies corporate financing constraints, driving firms to polish their external image through ESG greenwashing. Heterogeneity analysis reveals that this promoting effect is more pronounced in smaller firms and firms not audited by Big 4 accounting firms. This paper extends the research on the economic consequences of external analyst earnings forecast pressure and the drivers of ESG greenwashing, providing insights for regulators to improve the ESG information disclosure assurance mechanism and promote substantive ESG development among enterprises.

Keywords: Analyst Forecasts, Earnings Forecast Pressure, Greenwashing.

1. Introduction

With the widespread dissemination of the ESG (environmental, social, and governance) concept, ESG investment has gradually gained traction in China's capital market. Nevertheless, a report released by S&P Global indicates that investors still hold concerns when making ESG investments, with over 44% identifying ESG greenwashing as their primary worry. ESG greenwashing refers to the practice where companies engage in selective or false disclosure in their publicly released ESG reports for opportunistic purposes, resulting in a mismatch between disclosed ESG performance and actual performance. This in turn aggravates information asymmetry between firms and the capital market and undermines the sustained and sound development of ESG investment [1, 2]. Therefore, systematically exploring the driving factors and governance pathways of corporate ESG greenwashing carries important theoretical value and practical significance.

As a key information intermediary and external governance force in the capital market, securities analysts alleviate information asymmetry between listed companies and investors by issuing earnings forecasts and investment ratings, while also imposing significant external constraints on management's operational decisions. Extant research shows that the greater the analyst earnings forecast pressure faced by a firm, the stronger the incentive for management to engage in short-sighted behaviors such as earnings management, cutting long-term R&D investment, and reducing discretionary expenditures to meet short-term earnings targets. Such behaviors are adopted to avoid consequences including stock price declines and reputational damage triggered by missed earnings expectations [3, 4, 5]. Existing literature has focused heavily on the impact of analyst forecast pressure on corporate financial decisions and accounting behaviors, but no systematic conclusion has been reached regarding how such pressure shapes non-financial strategic choices such as ESG, and especially ESG greenwashing behavior.

Theoretically, ESG investment embodies the dual attributes of long-term value creation and short-term cost consumption. Substantive ESG development requires substantial input of capital, human

resources, and technology, which squeezes short-term profit margins, but it can deliver value appreciation over time by reducing compliance risks, enhancing brand reputation, and strengthening long-term competitiveness. ESG greenwashing, by contrast, is a low-cost symbolic practice that enables firms to gain recognition from external stakeholders and sustain positive capital market expectations without significantly increasing costs. Therefore, under the short-term performance pressure imposed by analyst earnings forecasts, will management cut overall ESG spending to boost profits, or will it shift to a greenwashing strategy that prioritizes disclosure over substance to balance short-term performance targets and external legitimacy demands?

Building on the above practical context and theoretical gaps, this paper empirically investigates the effect, mechanism, and heterogeneity of analyst earnings forecast pressure on corporate ESG greenwashing behavior, using Chinese A-share listed companies from 2012 to 2024 as the research sample. The results show that analyst earnings forecast pressure significantly increases the degree of corporate ESG greenwashing. Mechanism analysis reveals that earnings shortfalls relative to analyst forecasts intensify corporate financing constraints, making firms more motivated to maintain a green image, attract investors, and defuse external scrutiny through ESG greenwashing. Further heterogeneity analysis demonstrates that the promoting effect of analyst earnings forecast pressure on ESG greenwashing is more salient in smaller firms and firms not audited by Big 4 accounting firms.

This paper makes two main contributions. First, it expands research on the economic consequences of analyst earnings forecast pressure. Most existing studies focus on opportunistic behaviors in the financial domain; this paper extends the perspective to non-financial information disclosure strategies, reveals firms' strategic responses in the ESG domain under performance pressure, and enriches the literature on analysts' external governance effects. Second, it deepens research on the drivers of ESG greenwashing. Prior studies have mostly explored the causes of greenwashing from the perspectives of internal corporate governance, industry characteristics, and regulatory environments. This paper approaches the issue from the external perspective of information intermediary pressure in the capital market, identifies analyst earnings forecast pressure as an important external driver, and provides new empirical evidence for understanding corporate ESG disclosure strategy choices.

2. Literature review and research hypothesis

2.1. ESG greenwashing

ESG greenwashing mainly takes two forms: one is exaggerating ESG performance by manipulating the volume of information disclosure [6]; the other is selective disclosure, whereby firms selectively report positive ESG information while withholding negative information [7]. Existing empirical studies have explored the influencing factors of ESG greenwashing primarily from the perspectives of regulatory pressure, financing constraints, and corporate governance factors [6, 8, 9]. Research finds that factors such as the proportion of independent directors and institutional shareholdings can curb corporate greenwashing, while executive pay gaps exacerbate ESG greenwashing [6, 10].

Overall, existing research has formed a preliminary understanding of the connotation, measurement, and determinants of ESG greenwashing. However, most studies focus on internal firm characteristics and macro-institutional environments, and there remains insufficient discussion of how pressure from specific actors in the capital market shapes corporate ESG strategy choices.

2.2. Analyst earnings forecast pressure

As information intermediaries in the capital market, securities analysts reduce information asymmetry and perform an external governance function by mining firm information and issuing earnings forecasts and investment ratings. However, when analyst earnings forecasts converge into a consensus market expectation, they also generate substantial performance pressure on corporate management, referred to as analyst earnings forecast pressure.

It is widely acknowledged in the literature that to avoid stock price declines, reputational damage, and compensation losses from missed earnings targets, management adopts a range of strategic behaviors to meet market expectations [3, 11, 12]. In the financial domain, analyst earnings forecast pressure aggravates earnings management; management manipulates accounting policies, cuts discretionary expenses, and delays R&D investment to window-dress short-term performance [3, 4, 13]. In the domain of long-term investment, such pressure induces managerial short-termism, prompting firms to reduce long-term value-enhancing investments such as R&D innovation, discretionary spending, and employee training to secure current earnings targets [14, 15]. In the domain of social responsibility, relevant studies find that analyst earnings forecast pressure inhibits corporate environmental governance investment and leads to higher pollutant emissions [15, 16, 17]. Most existing research focuses on the financial impacts of analyst earnings forecast pressure, with less attention paid to whether firms resort to ESG greenwashing when confronted with such pressure.

2.3. Research hypothesis

According to financing constraint theory, analyst earnings forecast pressure amplifies corporate financing risks. When earnings fall short of expectations, it may trigger stock price volatility and credit rating downgrades, further tightening financing constraints [17]. If a firm's earnings miss analyst forecasts, capital markets and financial institutions may interpret this as a signal of poor financial health. Lenders and creditors become more cautious, tightening loan underwriting standards or raising financing costs, which increases the difficulty of corporate financing. Meanwhile, the high expectations embedded in analyst forecasts lead investors to demand higher returns, also driving up financing costs. Under heightened financing constraints, firms can ill afford the high costs of substantive ESG investment and have stronger incentives to maintain a green image, attract investors, and mitigate external scrutiny through ESG greenwashing.

Meanwhile, based on principal-agent theory, management and shareholders have divergent objectives. As analyst earnings forecast pressure rises, short-term performance targets gain greater weight, and management becomes more willing to sacrifice long-term interests to protect near-term earnings. Substantive ESG development requires sustained capital, human, and technical inputs that directly erode short-term profits, and its value returns materialize over a long cycle, making them difficult to realize in the short run. ESG greenwashing, in essence, is a low-cost image-building strategy. Through selective disclosure and symbolic corporate social initiatives, firms can send positive ESG signals to the market, preserve legitimacy and investor favor, and avoid materially raising operating costs or jeopardizing short-term earnings targets [18]. Therefore, under earnings forecast pressure, management is more likely to engage in ESG greenwashing to reconcile short-term performance constraints with external image demands.

Based on the above analysis, the following research hypothesis is proposed:

H1: *Ceteris paribus*, the greater the analyst earnings forecast pressure, the higher the degree of corporate ESG greenwashing.

3. Research design

3.1. Data and sample

This paper selects A-share listed companies on the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2012 to 2024 as the initial research sample. Analyst earnings forecast data and financial data are obtained from the China Stock Market & Accounting Research Database (CSMAR). After collecting raw sample data, the following cleaning and processing procedures are applied: (1) Excluding listed companies placed under special treatment or given delisting warnings due to financial abnormalities or sustained losses; (2) Excluding listed companies in the financial industry; (3) Removing samples with abnormal asset-liability ratios; (4) Excluding samples with missing core research variables. The final sample consists of 10,638 firm-year observations. In addition, to mitigate the influence of extreme values, all continuous variables are winsorized at the 1% and 99% levels.

3.2. Variables

Following the mainstream literature, this paper measures ESG greenwashing using the difference method, based on the core logic that greenwashing is essentially the deviation between ESG disclosure levels and actual performance—disclosure significantly exceeding actual performance indicates greenwashing [6]. Specifically, ESG greenwashing (GW) is calculated as the difference between industry-standardized ESG disclosure scores and ESG performance scores. The Bloomberg ESG disclosure score is used to measure ESG information disclosure, and the Huazheng ESG rating is used to measure actual ESG performance.

Following Zhang and Gimeno (2016) and Currim et al. (2018), this study measures analyst earnings forecast pressure as the difference between analysts' consensus earnings forecast and the firm's potential earnings per share at the start of the year [5, 19].

This paper selects the following control variables that may affect corporate greenwashing: firm size (Size), leverage (Lev), return on total assets (Roa), corporate growth (TobinQ), sales growth rate (Salesg), firm age (Age), cash ratio (CashR), CEO duality (Dual), board size (Boardsize), and proportion of independent directors (Indep). Detailed definitions are provided in Table 1.

Table 1. Variable definitions

Variable	Definition
GW	Difference between industry-standardized ESG disclosure score and ESG performance score
EP	Difference between analysts' consensus earnings forecast and potential earnings per share
Size	Natural logarithm of total assets at year-end
Lev	Total liabilities / Total assets at year-end
Roa	Net profit / Total assets at year-end
TobinQ	Total market capitalization / Total assets at year-end
Salesg	(Operating revenue in year t – Operating revenue in year t–1) / Operating revenue in year t–1
Age	ln(1 + number of years since firm establishment)
CashR	Sum of cash and cash equivalents at year-end / Current liabilities
Dual	Equals 1 if chairman and general manager are the same person, 0 otherwise
Boardsize	Natural logarithm of number of board members
Indep	Number of independent directors / Total number of board members

Table 2 presents descriptive statistics for the explained variable, explanatory variable, and control variables. The mean value of ESG greenwashing (GW) is –0.023, with a median of –0.108 and a standard deviation of 1.104. The mean value of analyst earnings forecast pressure (EP) is 0.040, with a median of 0.027 and a standard deviation of 0.056. The distributions of control variables such as firm size, leverage, and return on assets are broadly consistent with prior studies, confirming the rationality of the sample selection.

Table 2. Descriptive statistics

Variable	N	Mean	Min	Median	Max	SD
GW	10,638	–0.023	–2.321	–0.108	3.152	1.104
EP	10,638	0.04	–0.064	0.027	0.302	0.056
Roa	10,638	0.046	–0.164	0.039	0.217	0.057
Size	10,638	23.45	20.81	23.34	27.21	1.289
TobinQ	10,638	2.16	0.831	1.62	9.567	1.547
CashR	10,638	0.62	0.029	0.339	5.533	0.852
Salesg	10,638	0.139	–0.485	0.093	1.726	0.318
Indep	10,638	0.376	0.333	0.364	0.571	0.055
Dual	10,638	0.22	0	0	1	0.414
Age	10,638	3.015	2.079	3.045	3.638	0.308
Boardsize	10,638	2.282	1.792	2.303	2.773	0.183
Lev	10,638	0.474	0.075	0.485	0.867	0.193

3.3. Empirical model

This paper constructs the following multiple regression model:

$$GW_{i,t} = \alpha_0 + \alpha_1 EP_{i,t} + \alpha_2 Controls_{i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t} \quad (1)$$

Controls represents a vector of control variables, and year and industry fixed effects are included.

4. Results

4.1. Baseline regression results

Table 3 reports the baseline regression results. Column (1) presents OLS estimates without control variables, and Column (2) adds all control variables. Both columns control for year and industry fixed effects. The coefficients of analyst earnings forecast pressure (EP) are 1.329 and 0.854 respectively, both significant at the 1% level. The results indicate that analyst earnings forecast pressure drives corporate ESG greenwashing, providing preliminary support for the research hypothesis.

Table 3. Baseline regression

Variable	(1)	(2)
	GW	GW
EP	1.329*** (5.584)	0.854*** (3.554)
Roa		-0.916*** (-2.746)
Size		0.171*** (7.379)
TobinQ		0.039*** (3.091)
CashR		-0.032 (-1.547)
Salesg		0.189*** (4.694)
Indep		-1.338*** (-3.696)
Dual		0.072* (1.749)
Age		0.155** (2.072)
Boardsize		0.002 (0.016)
Lev		0.368** (2.54)
Constant	-0.077*** (-3.434)	-4.282*** (-6.739)
Observations	10,638	10,638
Adjusted R2	0.032	0.079
Industry FE	YES	YES
Year FE	YES	YES

Note: Constant is the intercept term. T-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). Standard errors are clustered at the firm level.

4.2. Robustness tests

4.2.1. Alternative measures for analyst earnings forecast pressure

First, the gap between the median analyst forecast from the previous year and the firm's actual earnings (Stress) is used as an alternative measure of analyst earnings forecast pressure [14]. A larger gap implies greater earnings forecast pressure in the current year.

Second, for the consensus earnings forecast used to calculate EP, the median of analysts' latest forecasts for year t issued before the end of year $t-1$ is replaced with the mean value, denoted as EP2.

Table 4 reports the regression results using alternative explanatory variables. The coefficients of analyst earnings forecast pressure remain significant at the 1% level across both specifications.

Table 4. Alternative measures for analyst earnings forecast pressure

Variable	(1)	(2)
	GW	GW
Stress	2.029***	
	(4.356)	
EP2		0.807***
		(3.324)
Controls	YES	YES
Observations	9,735	10,638
Adjusted R2	0.083	0.079
Industry FE	YES	YES
Year FE	YES	YES

Note: Constant is the intercept term. T-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). Standard errors are clustered at the firm level.

4.2.2. Propensity score matching (PSM)

To address observable characteristic bias arising from differences in analyst earnings forecast pressure, propensity score matching (PSM) is employed. Specifically, firms are divided into high-pressure and low-pressure groups based on the annual-industry median of EP. Using 1:1 nearest neighbor matching within the same year and industry, each high-pressure firm is matched with a low-pressure firm with similar characteristics. Balance tests confirm no significant differences in main characteristics between the treatment and control groups after matching. Regression on the matched sample is reported in Column (1) of Table 5. The coefficient of EP remains significantly positive at the 1% level, further corroborating the robustness of the baseline findings.

4.2.3. Instrumental variable approach

This paper uses the natural logarithm of annual stock trading volume (Volume) as an instrumental variable and estimates a two-stage least squares model. The results are presented in Columns (2) and (3) of Table 5. The Kleibergen-Paap rk LM statistic is 29.983 ($p = 0.000$), rejecting the null hypothesis of underidentification. The Kleibergen-Paap rk Wald F statistic is 31.651, which exceeds the 10% critical value of 16.38, rejecting the weak instrument hypothesis. Column (2) shows the first-stage results: annual trading volume is significantly positively associated with EP, satisfying the relevance condition. Column (3) shows that the coefficient of EP remains significantly positive, consistent with the baseline regression, confirming the robustness of the conclusion.

4.3. Mechanism test

As argued in the hypothesis development, analyst earnings forecast pressure tightens corporate financing constraints. Deteriorating financing constraints directly reduce firms' ability and willingness to invest in ESG, and instead incentivize ESG greenwashing to maintain legitimacy, stabilize investor sentiment, and improve financing conditions.

Table 5. Regression results of PSM and instrumental variable approach

Variable	(1)	(2)	(3)
	PSM	First-stage	Second-stage
	GW	EP	GW
EP	1.198*** (3.644)		9.104* (1.931)
Volume		0.005*** (5.626)	
Controls	YES	YES	YES
Observations	5773	10,638	10,638
Adjusted R2	0.086	0.21	-0.098
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Note: Constant is the intercept term. T-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). Standard errors are clustered at the firm level.

This study uses the WW index to measure financing constraints (WW), where a larger value indicates tighter constraints [20]. A mediation effect model is estimated, with results reported in Table 6. Column (2) shows that EP has a significantly positive coefficient on WW at the 1% level, indicating that analyst earnings forecast pressure exacerbates financing constraints. Column (3) shows that after including the mediating variable WW, both EP and WW have significantly positive coefficients at the 1% level, suggesting that financing constraints play a partial mediating role.

Table 6. Regression results of the financing constraint mechanism

Variable	(1)	(2)	(3)
	GW	WW	GW
WW			2.093*** (3.734)
EP	0.854*** (3.554)	0.052*** (9.291)	0.745*** (3.130)
Controls	YES	YES	YES
Observations	10,638	10,638	10,638
Adjusted R2	0.079	0.878	0.081
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Note: Constant is the intercept term. T-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). Standard errors are clustered at the firm level.

4.4. Heterogeneity effects

4.4.1. Firm size

Firm size, measured by the natural logarithm of total assets (Size), is used to split the sample into large and small firm groups based on the annual-industry median. Columns (1) and (2) of Table 7 report the grouped regression results. The coefficient of EP is 1.159 (significant at 1%) for small firms and 0.688 (significant at 5%) for large firms. This indicates that the promoting effect of analyst earnings forecast pressure on ESG greenwashing is stronger among smaller firms, which are more likely to adopt greenwashing to reconcile short-term performance pressure and external image demands.

4.4.2. Big 4 audit

The sample is divided into a Big 4 audit group and a non-Big 4 audit group based on whether the firm's annual report is audited by a Big 4 accounting firm. Columns (3) and (4) of Table 7 present the results. The coefficient of EP is 1.196 (significant at 1%) for the non-Big 4 group, while it is

−0.378 and statistically insignificant for the Big 4 group. This finding confirms the governance role of high-quality external auditing in mitigating the effect of analyst earnings forecast pressure on ESG greenwashing.

Table 7. Regression results of heterogeneity effects

Variable	(1)	(2)	(3)	(4)
	GW	WW	GW	GW
	Large Firms	Small Firms	Big 4	Non-Big 4
EP	0.688**	1.159***	-0.378	1.196***
	(1.981)	(3.67)	(-0.623)	(4.736)
Controls	YES	YES	YES	YES
Observations	10,638	10,638	10,638	10,638
Adjusted R2	0.075	0.076	0.234	0.068
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Note: Constant is the intercept term. T-statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). Standard errors are clustered at the firm level.

5. Summary

This paper draws the following main conclusions:

First, analyst earnings forecast pressure significantly exacerbates corporate ESG greenwashing. After controlling for firm characteristics, governance attributes, and other factors, and passing a battery of robustness checks including alternative variable measurements, instrumental variable estimation, and propensity score matching, this conclusion remains valid. This suggests that higher market earnings expectations push firms to beautify their ESG image through low-cost approaches such as selective disclosure of positive information and symbolic ESG actions, rather than undertaking substantive ESG development.

Second, financing constraints constitute the core impact pathway. Analyst earnings forecast pressure intensifies corporate financing constraints, prompting firms to engage in ESG greenwashing to maintain a green image, attract investors, and alleviate external scrutiny.

Third, the promoting effect exhibits significant heterogeneity. It is more pronounced in smaller firms and firms not audited by Big 4 accounting firms. In general, when external governance mechanisms are weaker and financing constraints are tighter, the positive effect of analyst earnings forecast pressure on corporate ESG greenwashing becomes more salient.

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