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Earnings Management and Access to Green Capital: ESG Ratings, Financial Reporting Credibility, and Firm Heterogeneity

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ABSTRACT

The credibility of corporate accounts may influence whether investors allocate capital to firms pursuing environmental objectives. This study reexamines the empirical association between earnings management and green financing using the reported evidence for 29,971 firm-year observations of Chinese nonfinancial A-share companies during 2014–2023. Green financing is operationalized as the ownership share held by environmentally oriented investors, earnings management as the absolute magnitude of discretionary accruals, and environmental, social, and governance performance through Huazheng ratings. Firm and year fixed-effects regressions, alternative specifications, instrumental-variable estimation, and ownership, technology, and pollution subsamples are interpreted jointly. The principal adjusted coefficient for earnings management is −0.0128, and the instrumental-variable estimate is −0.1043; both are statistically significant. Differences between state and private ownership, high-technology and other businesses, and pollution-intensive and less-polluting sectors are supported by reported cross-group tests. ESG ratings are positively associated with green financing in the moderation models, but the published interaction coefficient is negative (−0.0019), contrary to the source article's verbal characterization of a buffering effect. The analysis therefore separates the observed estimate from the intended hypothesis rather than treating the contradiction as resolved. The evidence points to a meaningful relationship between accounting credibility and the allocation of sustainability-oriented equity, while highlighting limits arising from proxy construction, the exclusion restriction of the instrument, and the observational research design. The study contributes a cautious interpretation of how reporting practices and firm characteristics jointly shape green-capital access.

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1. INTRODUCTION

The expansion of sustainable finance has changed the information that investors expect corporations to provide. Environmental commitments increasingly sit alongside conventional indicators of profitability, liquidity, and financial resilience in investment screening. This development does not eliminate the traditional problems of

corporate reporting; it makes them more consequential. A company seeking environmentally oriented funding must persuade capital providers that its underlying operations are financially viable and that its sustainability claims can withstand scrutiny. When reported profits are shaped by managerial discretion, those assessments become more difficult. The relationship between accounting credibility and green-capital allocation is therefore an important intersection of corporate finance, governance, and sustainable investment [1], [2].

China provides a particularly relevant institutional setting because its green-finance architecture developed alongside a rapid expansion of sustainability reporting. The original article reports that outstanding green credit exceeded CNY 36.6 trillion at the end of 2024 and that the green bond market reached CNY 2.2 trillion [1]. These aggregate figures indicate the scale of financing associated with the transition agenda, although they cannot by themselves establish that individual firms obtain capital on equitable terms. Regulatory requirements concerning environmental risks and corporate sustainability disclosures may improve the information available to investors, yet they also increase the value of appearing compliant. The tension between genuine improvement and strategic presentation creates a reason to examine the accounting practices of firms receiving environmentally oriented investment.

Earnings management occupies an ambiguous position in financial reporting. Accounting standards necessarily permit judgments about estimates, recognition, and timing, and not every exercise of discretion implies wrongdoing. Nevertheless, a large magnitude of discretionary accruals can be consistent with opportunistic presentation, particularly when managerial incentives favor meeting earnings targets or influencing financing decisions. For outside investors, the difficulty lies in distinguishing legitimate discretion from actions that obscure underlying performance. Where capital is explicitly allocated under environmental or governance mandates, that ambiguity may affect not only credit-risk evaluation but also confidence in the firm’s capacity to implement promised environmental investments [3], [4].

The underlying study addresses this issue using Chinese listed-firm observations from 2014 to 2023. Its central outcome is not the value of all environmentally labeled borrowing or the proceeds of a particular green bond. Instead, the financing variable records the fraction of outstanding equity owned by ESG-oriented and socially responsible investors. That distinction matters: the measure captures a particular form of sustainable-investor participation, and conclusions about bank green credit or total green funding require caution. Within this measurement framework, the question is whether firms with higher absolute discretionary accruals receive less participation from environmentally oriented shareholders [1].

The study also asks whether favorable environmental, social, and governance assessments alter this association. ESG ratings can provide an additional source of information about environmental practices, treatment of stakeholders, and internal oversight. A credible rating may reassure investors when financial accounts are difficult to interpret. Yet ESG assessments may themselves reflect imperfect disclosures, variation in rating methodologies, and managerial incentives to manage perceptions. A positive direct association between ESG ratings and green-investor participation does not automatically establish that ESG ratings reduce the penalty associated with earnings management. That latter proposition requires careful interpretation of the interaction coefficient, including its sign and the scale of the variables [5], [6].

Corporate heterogeneity introduces another layer. State-owned enterprises operate under different financing and policy conditions from privately controlled firms; technology-intensive businesses have distinct growth opportunities and accounting profiles; and pollution-intensive sectors face closer environmental scrutiny. Such differences may alter how investors interpret discretionary accruals. An identical accounting signal may be regarded as especially troubling in a heavily regulated polluting industry, while its implications may be less clear for a technology firm undertaking uncertain research expenditure. These mechanisms are plausible but should not be confused with directly observed investor motives [7], [8].

The empirical record presents a consistent negative baseline association between earnings management and the study’s green-financing measure. The negative sign survives reported robustness exercises and an instrumental-variable specification. Subsample estimates further suggest larger negative coefficients for private firms, non-high-technology firms, and highly polluting businesses. The interpretation of ESG moderation is less straightforward: although the original discussion describes ESG as mitigating the earnings-management penalty, its reported interaction estimate is negative rather than positive. Preserving the evidence requires acknowledging that discrepancy rather than reproducing an unsupported interpretation.

The present manuscript reorganizes the reported research into a coherent account of reporting credibility, investor selection, and institutional differences. It retains the original sample, variable definitions, reported coefficients, tests, and reference base without claiming to have reestimated the underlying models. It distinguishes associations from causal effects and evaluates the extent to which robustness checks resolve alternative explanations. The resulting analysis emphasizes what the reported evidence can establish, what remains uncertain, and why the distinction matters for the design of sustainable-finance policy.

A central interpretive premise is that access to green capital depends on more than a firm's environmental intentions. Investors must evaluate both the proposed use of funds and the credibility of the organization making those proposals. If accounting discretion weakens the informational foundation of investment screening, a

company may find it difficult to attract investors even when it announces environmentally desirable projects. The possibility of this interaction explains why green-finance research benefits from considering financial reporting and sustainability governance together rather than treating them as independent corporate characteristics.

The policy relevance extends beyond the interpretation of one regression coefficient. Financial institutions and asset managers increasingly depend on standardized indicators to process large numbers of investment opportunities. Standardization can improve comparability, but it may also encourage excessive reliance on summary scores. A careful examination of earnings management alongside ESG ratings illustrates why sustainable-finance allocation requires multiple sources of verification. Neither accounting ratios nor sustainability ratings can fully represent corporate conduct, and the consequences of measurement error are likely to differ across firm types.

The empirical analysis also raises questions about the boundaries of the concept of green financing. Equity ownership by sustainability-oriented investors is a meaningful market outcome, but it differs from credit granted for a specified environmental project. The two forms of finance may respond differently to accounting discretion because equity investors, banks, and bondholders face distinct payoff structures and information requirements. Recognizing this boundary prevents the evidence from being generalized beyond the financing channel actually measured in the data.

2. LITERATURE REVIEW

Research on sustainable finance has documented a widening set of financial instruments and institutional arrangements intended to direct investment toward environmental objectives. Reviews emphasize that green finance encompasses banking, debt securities, investment funds, and other mechanisms whose eligibility criteria and reporting standards are not identical [2]. This diversity matters for empirical measurement. A firm may receive green lending while attracting relatively little sustainability-oriented equity, or it may have a large environmentally focused shareholder base without issuing project-specific green debt. Studies of corporate green financing therefore need to align the outcome variable with the type of capital allocation under examination.

The informational foundations of financing are especially relevant where environmental outcomes are difficult to observe in real time. Capital providers can review past financial performance, but the benefits of decarbonization investments, cleaner technology, and environmental risk mitigation may materialize over longer horizons. The quality of corporate disclosure influences the investor's ability to assess those expected benefits and the resources required to achieve them. The literature on sustainability disclosure and financing costs suggests that reporting quality can be economically consequential, while also identifying the risk that disclosures are strategically designed to satisfy external expectations [9], [10].

Earnings management refers to the exercise of managerial discretion over reported financial results. It can occur through accounting accruals or operational decisions that shift revenue, expenses, and cash flows between reporting periods. The original empirical design focuses on the absolute value of discretionary accruals, which is intended to capture the intensity rather than the direction of accounting discretion. This operational choice is common in empirical accounting research, but it does not identify a manager's motivation. An unusually large accrual may reflect opportunism, unusual transactions, growth-related accounting complexity, or model misspecification. Any interpretation that equates the proxy with proven manipulation is therefore stronger than the measure warrants [3], [11].

The theoretical connection between discretionary reporting and green-capital access rests on the credibility of information. An investor evaluating a sustainable project needs confidence that the firm can fund its contribution, implement the proposed technology, and report results reliably. If financial statements are difficult to trust, the perceived probability of project underperformance may increase. Investors can respond by declining an investment, reducing their exposure, requiring additional information, or seeking stronger governance safeguards. These reactions are consistent with a negative association between earnings management and environmentally oriented investor ownership, although the available firm-level regressions do not observe the screening decisions directly.

A competing interpretation emphasizes the possibility that financing conditions influence reporting choices. Firms experiencing restricted access to capital may face greater pressure to report favorable earnings. In that case, a negative correlation between discretionary accruals and green-investor participation could partly reflect reverse causation. A third explanation is that an omitted firm characteristic, such as managerial quality, governance culture, or unobserved environmental risk, affects both accounting choices and investor interest. These possibilities motivate fixed effects, robustness checks, and instrumental-variable estimation, but they cannot be eliminated solely by adding more control variables [4], [12].

The ESG literature provides a potential explanation for variation in investor responses to accounting signals. ESG assessments combine information about environmental practices, social relationships, and corporate governance. Firms receiving favorable evaluations may be more attractive to investors with sustainability

mandates, independently of their financial reporting choices. Prior research connects corporate responsibility with earnings-management behavior, while other studies examine how ESG performance and financial distress or financing conditions interact [5], [6], [13]. These findings suggest that financial reporting and ESG assessments may carry overlapping yet distinct information.

A moderation argument requires more than the observation that firms with stronger ESG ratings attract more green investment. If ESG performance genuinely cushions the adverse association between earnings management and financing, the marginal relationship between earnings management and the outcome should become less negative as ESG performance rises. In a linear model with an earnings-management-by-ESG interaction, that expectation corresponds to a positive interaction coefficient when the baseline earnings-management effect is negative. A negative interaction instead implies that the marginal association becomes more negative as ESG increases, assuming the model is correctly specified and the variables are coded in the reported direction. This elementary distinction is decisive when interpreting the published results.

There are several substantive reasons why a negative interaction could arise. Sustainability-oriented investors may impose especially demanding reporting standards on firms that otherwise advertise strong ESG performance. Alternatively, high ESG scores may create expectations that make accounting anomalies more salient. Ratings might also capture dimensions of corporate visibility, analyst coverage, or institutional ownership that change the association between accruals and financing. These interpretations are hypotheses, not findings established by the reported models, because the original analysis does not separately estimate investor beliefs or screening mechanisms.

Ownership structure can influence both financing opportunities and perceptions of accounting quality. State-owned firms may have policy-related advantages, greater access to state-linked financial resources, and institutional relationships that distinguish them from private enterprises. Those characteristics could lessen the sensitivity of sustainable investors to an accounting signal, although they could also create agency problems or reduce market discipline. Privately controlled firms may face stronger demands to demonstrate the credibility of their accounts because investors cannot rely on the same institutional support. Prior work on corporate social responsibility and earnings management offers reasons to expect ownership-sensitive relationships, without guaranteeing the direction in every institutional setting [7], [14].

Technological intensity provides another source of variation. Research-intensive firms face uncertain returns and may report accounting outcomes shaped by intangible investment, development cycles, and rapidly changing business models. Investors may evaluate such firms partly on growth prospects and innovation capabilities rather than current profitability alone. The same discretionary-accrual measure may therefore have different informational content in high-technology and traditional sectors. Research on ESG rating divergence and accounting behavior in China reinforces the need to account for differences in how corporate information is interpreted [15].

Environmental exposure is equally important. Pollution-intensive businesses face heightened scrutiny because the social costs of their operations are substantial and their transition plans can require expensive changes in technology. Where investors already perceive elevated environmental risk, aggressive financial reporting may compound doubts about the credibility of environmental commitments. Conversely, less-polluting sectors may face fewer regulatory and reputational concerns. Studies of environmental performance, carbon-related pressures, and earnings management suggest that the relationship between financial reporting and sustainability governance is sensitive to environmental context [16], [17].

The existing evidence thus points toward a joint rather than isolated analysis of accounting practices, ESG performance, and organizational characteristics. The main empirical proposition is that higher discretionary-accrual intensity is associated with less participation by environmentally oriented shareholders. A second proposition concerns whether ESG ratings alter that relationship, with the predicted sign requiring direct examination. Further propositions anticipate different slopes by ownership, technology classification, and pollution intensity. These propositions provide a conceptual structure for interpreting the original estimates while leaving open the possibility that observed differences arise from institutional selection or measurement rather than investor tolerance alone.

The distinction between environmental performance and environmental disclosure is also central. A favorable sustainability rating may reflect improvements in operations, stronger reporting practices, or both. If ratings depend partly on corporate communications, they may not supply wholly independent verification of environmental outcomes. This concern is particularly relevant when examining earnings management because the same managerial incentives that shape accounting disclosures may influence sustainability narratives. Empirical work on ESG greenwashing and rating divergence illustrates why ratings should be treated as informative but imperfect proxies [10], [15], [18].

A related strand of research studies whether responsible corporate behavior constrains opportunistic reporting. Some studies identify associations between CSR engagement and lower earnings management, whereas others emphasize institutional differences and the possibility of symbolic compliance [9], [13], [19]. These perspectives do not establish that ESG quality always mitigates the financing consequences of earnings

management. Rather, they suggest that the relationship may depend on the credibility of the ESG assessment, the intensity of external monitoring, and the type of investor evaluating the firm.

Studies of green-credit policies also show that environmental regulation can change incentives for firms and capital providers. Where lending is conditioned on environmental performance, firms may improve operations, alter disclosure practices, or seek ways to meet eligibility criteria without making equivalent substantive changes. This creates an empirical challenge: a correlation between ESG performance and financing can reflect genuine environmental improvement, selection into funding programs, or adaptation to disclosure rules. The study considered here addresses one part of that broader problem by focusing on discretionary accruals, but it does not observe the entire chain linking policy incentives, managerial decisions, investor beliefs, and realized environmental outcomes [20].

Financial reporting quality is especially difficult to isolate from broader corporate governance. Boards, audit committees, external auditors, managerial incentives, and ownership concentration may influence both discretionary accruals and the credibility of sustainability initiatives. Firm fixed effects absorb persistent differences, yet changes in these governance characteristics over time may remain correlated with both the explanatory and outcome variables. This limitation suggests that the observed association is compatible with several channels. The strongest defensible contribution is to document the relationship and assess its stability across specifications rather than to claim that one particular behavioral mechanism has been identified.

The literature on financing constraints further suggests that the cost of capital and the quantity of available funding need not move together. Investors can respond to uncertainty by demanding higher returns rather than withdrawing entirely. The present outcome, a proportion of equity held by sustainability-oriented investors, does not reveal the price at which shares were purchased or the financing terms offered to the firm. Consequently, the results speak directly to ownership allocation and only indirectly to financing costs, borrowing restrictions, or investment implementation. This distinction becomes important when considering the policy implications of the findings.

3. METHODS

The empirical material consists of a panel of nonfinancial companies listed on China's A-share markets between 2014 and 2023. Firms carrying special-treatment designations were excluded, as were observations outside the financial-data requirements of the study. The reported descriptive and principal regression tables contain 29,971 firm-year observations. The selection of the period corresponds to the development of Chinese green-finance policies and improving coverage of ESG information. The design is observational: it uses naturally occurring differences among firms and years rather than randomized assignment of accounting practices or financing opportunities [1].

The dependent variable, GF, is defined as the proportion of a firm's issued equity owned by investors classified as environmentally conscious, including ESG investment funds and socially responsible institutions. This variable is bounded by the observed ownership distribution and captures participation by a particular investor constituency. It should not be interpreted as the aggregate monetary value of green bank loans, green bonds, or environmental capital expenditure. The source reports an alternative outcome, GF1, based on green credit outstanding relative to total debt for one robustness exercise. Because the two measures represent different financing channels, agreement in coefficient signs provides useful but not definitive cross-measure validation.

The principal explanatory variable, EM, is the absolute value of discretionary accruals. Absolute values combine income-increasing and income-decreasing accrual discretion into a single measure of reporting intensity. This approach avoids treating only upward adjustments as potentially informative, but it also discards information about direction and cannot distinguish deliberate manipulation from accounting responses to legitimate business conditions. The analysis accordingly uses the expression earnings-management proxy when discussing empirical interpretation. The moderating variable, ESGP, is the Huazheng ESG rating score assigned to each firm.

The control vector includes the logarithmic size measure, leverage, revenue growth, cash-flow ratio, the proportion of tangible assets, firm age, total asset turnover, and an operating expense ratio. These variables address observable differences in financing capacity, operational performance, asset structure, and corporate maturity. Their inclusion reduces some observable confounding but cannot guarantee that all relevant drivers of sustainable-investor allocation have been measured. The reported analysis includes firm and year fixed effects in the fully adjusted baseline, moderation, instrumental-variable, and subgroup specifications.

The baseline specification can be expressed as $GF_{it} = \alpha + \beta\, EM_{it} + \gamma' X_{it} + \mu_i + \tau_t + \varepsilon_{it}$, where i denotes a firm, t a year, X the controls, μ firm effects, and τ year effects. The coefficient β represents the within-model association between discretionary-accrual intensity and sustainable-investor ownership, conditional on the included covariates and fixed effects. Firm effects remove time-invariant company characteristics, and year effects capture common shocks affecting the sampled firms in a given year. Neither component automatically controls for firm-specific shocks that change over time.

To examine moderation, the study augments the model with ESGP and the product EM × ESGP. The marginal association between EM and GF is then β_EM + β_interaction × ESGP. This derivative provides the correct basis for assessing whether higher ESG ratings strengthen or weaken the negative earnings-management association. If the interaction estimate is negative, the estimated marginal relationship becomes more negative at higher ESG values. Because the published interaction estimate is negative, the manuscript preserves the sign and discusses the inconsistency with the original article's buffering interpretation instead of changing the coefficient or its meaning.

Continuous variables were reportedly winsorized at their upper and lower three percentiles in the main data preparation. The source also reports linear interpolation for limited missing observations in nonessential variables. Both decisions have implications. Winsorization reduces the influence of extreme observations but can alter economically meaningful tail behavior. Interpolation may preserve sample size but can introduce artificial smoothness, especially if missingness is related to firm distress or reporting quality. The article does not provide enough information to evaluate every affected observation or reconstruct the preprocessing choices independently.

The empirical sequence begins with descriptive statistics and nested baseline models, then examines alternative periods, transformations, and outcomes. One robustness model removes 2021–2023, another uses a different winsorization treatment, and a third substitutes the green-credit-based financing measure. There is a reporting discrepancy concerning the winsorization threshold: the accompanying prose refers to a ten-percent treatment, whereas the robustness table labels its second column as one-percent winsorization. The analysis retains the published coefficient while avoiding an unsupported claim about which alternative threshold was actually implemented.

To address endogeneity, the authors instrument firm-level EM with the mean earnings-management measure of other firms in the same industry, denoted AEM. The instrument is associated with the endogenous regressor in the first stage, and the source reports underidentification and weak-instrument diagnostics. Relevance is not equivalent to exogeneity, however. Industry peers may face common financing conditions, regulatory scrutiny, business cycles, or reporting incentives that affect green-investor ownership directly. Without stronger evidence for the exclusion restriction, the instrumental-variable coefficient should be regarded as a sensitivity result rather than definitive proof of a causal effect.

The heterogeneity design estimates comparable models for state-owned and private firms, high-technology and other firms, and heavily polluting and other industries. Reported cross-group Wald tests evaluate whether the earnings-management coefficients differ statistically. These tests are more informative than comparing the significance of two coefficients in isolation: one coefficient may be statistically significant and another not, even when their difference is statistically indistinguishable from zero. The reported Wald results therefore provide the basis for evaluating subgroup contrasts.

All numeric findings in this manuscript are transcribed from the published tables; no access to the underlying microdata is claimed and no independent model estimation has been conducted. The original data-availability statement indicates that the authors do not have permission to share the data. The five results tables below consolidate the original eight empirical tables into descriptive, baseline, robustness/instrumental-variable, moderation, and heterogeneity presentations. This restructuring preserves the reported principal estimates, sample sizes, and cross-group tests while making explicit where the source does not resolve an interpretive question.

The model specifications imply several further interpretive constraints. Because GF is a share rather than a binary funding outcome, the coefficients measure changes in the reported proportion, not changes in the probability of obtaining any financing. Because EM is an absolute accrual measure, a one-unit change is large relative to its observed distribution; economic magnitudes should be evaluated against realistic changes such as its standard deviation. Because ESGP is recorded on a discrete rating scale, linear interaction models assume that differences between successive rating values are comparable for the purpose of the regression. The source does not provide sufficient diagnostics to test this assumption directly.

Statistical inference also depends on how standard errors account for dependence within firms and across time. The source tables report t-statistics and significance markers, but the available methodological description does not fully resolve every covariance-estimation detail. Serial correlation and cross-sectional dependence can influence the reliability of reported significance in panel data. Accordingly, the manuscript reports the original significance levels without treating them as independently verified. The presence of firm and year effects is useful, but it does not substitute for transparent reporting of the uncertainty estimator.

The reported instrumental-variable diagnostics require particular care. The Cragg–Donald statistic and LM statistic provide evidence about identification and instrument strength under their maintained assumptions. They do not establish that peer-industry earnings management affects sustainable-investor ownership only through the focal firm's accounting behavior. A common sectoral shock could move both the peer accrual measure and the financing outcome. Strong first-stage relevance can coexist with an invalid exclusion restriction, so the large second-stage coefficient should not be interpreted as automatically more accurate than the fixed-effects estimate.

The subgroup approach is descriptive of conditional differences rather than a direct experiment in institutional protection. State ownership, technological classification, and pollution intensity correlate with many

other characteristics, including regulatory treatment, investment horizons, capital intensity, and investor composition. A significant Wald test establishes a difference between fitted slopes in the specified samples, not the causal mechanism producing that difference. The analysis therefore distinguishes between the empirical pattern and explanations involving government backing, innovation expectations, or environmental scrutiny.

4. RESULTS

The sample distributions establish the scale on which the subsequent coefficients should be interpreted. Green-investor ownership is relatively low on average and is unevenly distributed across firms. The earnings-management proxy also exhibits substantial dispersion relative to its mean, while ESG scores span most of the reported rating range. Table 1 reproduces the complete descriptive values from the original summary table, including the controls used in the regression specifications.

Table 1. Descriptive statistics for the study variables

Variable	N	Mean	SD	Min	Median	Max
GF	29,971	.0171	.0290	.0000	.0025	.1151
EM	29,971	.0438	.0380	.0017	.0328	.1550
ESGP	29,971	4.1611	.9074	1	4	8
Size	29,971	22.3575	1.225	20.3970	22.1732	25.3209
Leverage	29,971	.4173	.1951	.0879	.4101	.8078
Growth	29,971	.1168	.2627	−.3622	.0853	.8611
Cash	29,971	.0504	.0610	−.0831	.0486	.1852
Tangible	29,971	.2029	.1481	.0069	.1738	.5781
Age	29,971	2.2767	.7317	.8628	2.3423	3.3275
ATO	29,971	.6120	.3658	.1297	.5351	1.7439
Fee	29,971	.0803	.0559	.0138	.0657	.2566

The mean GF value of 0.0171 corresponds to a modest ownership fraction, and the median of 0.0025 indicates that at least half of observations lie well below the mean. This asymmetry matters because a small set of firms with substantial sustainability-oriented ownership may contribute disproportionately to overall variation. The EM mean of 0.0438 and standard deviation of 0.0380 indicate that differences in accrual intensity are economically relevant within the sample. ESGP has a mean of 4.1611 on the reported scale, although the table alone does not establish whether its distribution is balanced across industries or ownership groups.

The sequential baseline models test whether the negative EM association survives the inclusion of additional firm characteristics and fixed effects. Table 2 focuses on the main coefficient and model-level statistics; it also retains the fully adjusted coefficients on the control variables. The nested pattern is useful because it reveals how much of the initial association can be explained by observable covariates and persistent firm-level differences.

Table 2. Baseline regressions and fully adjusted covariates

Statistic	Model 1	Model 2	Model 3	Model 4
EM coefficient	−.0226***	−.0185***	−.0165***	−.0128***
EM t-statistic	−5.9742	−4.8693	−4.3356	−3.3675
Size (model 4)				.0031***
Leverage (model 4)				−.0044***
Growth (model 4)				.0083***
Cash (model 4)				.0055**
Tangible (model 4)				−.0079***
Age (model 4)				.0075***
ATO (model 4)				.0036***
Fee (model 4)				.0035
Firm and year effects	No	No	No	Yes
N	29,971	29,971	29,971	29,971
R^2	.1009	.1175	.2186	.2762

The earnings-management coefficient becomes smaller in absolute value as controls are added, falling from −0.0226 to −0.0128, but remains negative and statistically significant. This attenuation suggests that part of the unconditional relationship overlaps with observable firm characteristics and stable differences among companies. It does not negate the remaining association. The fully adjusted model explains 27.62 percent of the reported variation under its R-squared definition. Firm size, growth, cash flow, age, and turnover have positive coefficients in that specification, while leverage and tangible-asset intensity are negatively associated with GF.

Robustness tests and the instrumental-variable exercise probe whether the baseline finding depends on particular periods, variable definitions, or the potential endogeneity of EM. Table 3 brings these estimates together without implying that the exercises address the same statistical problem. Sample restrictions, alternative transformations, outcome substitution, and instrumentation each test a different source of sensitivity.

Table 3. Robustness specifications and instrumental-variable diagnostics

Specification	EM estimate	t-statistic	N	R^2 / diagnostic
Exclude 2021–2023	−.0083*	−1.9296	17,911	.1477

Alternative winsorization	−.0113***	−3.0679	29,971	.1779
Alternative outcome GF1	−.01084***	−3.5238	29,971	.2649
IV first stage: AEM → EM	.0386***	5.7323	24,755	LM 1093.1561
IV second stage: EM → GF	−.1043***	−4.5122	24,755	Cragg–Donald F 1142.8270

All three robustness specifications retain a negative earnings-management coefficient. The result is weaker when the later observations are removed, with statistical significance at the ten-percent threshold, but it is more precisely estimated in the alternative winsorization and GF1 models. The instrumental-variable coefficient is substantially larger in magnitude than the fixed-effects baseline estimate. That difference may reflect endogeneity, measurement error, changes in sample composition, or failure of the instrument's exclusion restriction. The available evidence does not allow those explanations to be separated conclusively.

The moderation model is the most interpretively delicate part of the published analysis. ESGP enters positively, whereas the interaction between EM and ESGP is reported as negative and significant at the ten-percent level. Table 4 preserves both coefficients and their t-statistics. The sign of the interaction must be interpreted through the model's marginal effect, not through the desired direction of the research hypothesis.

Table 4. ESG moderation regressions

Variable	Without interaction	With interaction
EM	−.0128*** (−3.3742)	−.0112*** (−2.7038)
ESGP	.0006* (1.9023)	.0004* (1.8636)
EM × ESGP	Not included	−.0019* (−1.8873)
Size	.0031***	.0031***
Leverage	−.0042***	−.0042***
Growth	.0084***	.0084***
Cash	.0056**	.0056**
Tangible	−.0078***	−.0078***
Age	.0075***	.0075***
ATO	.0036***	.0036***
Fee	.0039	.0039
Firm and year effects	Yes	Yes
N	29,971	29,971
R^2	.1763	.1771

The positive ESGP coefficient is consistent with greater green-investor participation among firms with stronger ESG ratings, conditional on the model covariates. However, the interaction estimate of −0.0019 implies a more negative, not a less negative, fitted marginal EM association as ESGP rises. The source's narrative conclusion that ESG performance buffers the harmful relationship is therefore inconsistent with the published sign, absent an unreported recoding or specification detail. The interaction is also only significant at the ten-percent level. This manuscript does not resolve the discrepancy by assuming a typographical error, since doing so would alter a reported result without supporting evidence.

The final empirical dimension concerns differences across institutional and sectoral categories. Table 5 consolidates the earnings-management slopes for each subgroup, the number of observations, and the reported cross-group Wald tests. This format highlights both the magnitude of the differences and the fact that they were evaluated statistically rather than inferred from contrasting p-values alone.

Table 5. Heterogeneous associations across firm categories

Contrast	Group	M estimate	N	Wald test / p
Ownership	State-owned	−.0057 (ns)	10,759	7.8260 / .0051
Ownership	Private	−.0159***	19,212	
Technology	High-tech	−.0041 (ns)	6,431	4.2710 / .0388
Technology	Non-high-tech	−.0202***	23,540	
Pollution	Heavily polluting	−.0137***	6,146	3.9470 / .0469
Pollution	Other sectors	−.0111*	23,825	
Full sample	All firms	−.0128***	29,971	

Private enterprises show a substantially more negative fitted association than state-owned firms, and the difference is supported by a Wald p-value of 0.0051. Non-high-technology firms likewise exhibit a larger negative coefficient than high-technology firms, with a cross-group p-value of 0.0388. The pollution comparison is narrower in coefficient magnitude, yet the reported Wald p-value of 0.0469 indicates a statistically distinguishable difference at the five-percent threshold. These results support heterogeneity in the fitted relationship. They do not, by themselves, establish that government guarantees, innovation prospects, or regulatory vigilance are the mechanisms responsible for the observed differences.

Taken together, the tables show a recurring negative association between discretionary-accrual intensity and environmentally oriented investor participation, subject to changes in model specification and sample. The subgroup evidence indicates that this association is not uniform across firms. The moderation evidence requires a more qualified conclusion than the source narrative: higher ESG ratings have a positive direct coefficient, but the negative reported interaction does not demonstrate attenuation of the EM penalty. These distinctions provide the foundation for the discussion that follows.

5. DISCUSSION

The empirical pattern suggests that accounting credibility remains relevant to sustainable-investment allocation even when investors explicitly consider environmental and governance criteria. The negative coefficient on discretionary accruals is consistent with the possibility that investors treat uncertain financial reporting as an additional risk in evaluating corporate sustainability strategies. Environmental ambitions do not remove the need to assess cash-generating capacity, capital allocation discipline, and the reliability of managerial representations. Indeed, long-horizon environmental projects may make these considerations more salient because investors must rely on forecasts and disclosures whose accuracy cannot immediately be observed.

The baseline finding should nevertheless be interpreted as a conditional association. Absolute discretionary accruals are not a direct observation of intentional misrepresentation, and the green-financing outcome does not measure all financing channels. A company may have high accruals because of legitimate accounting complexity and low sustainability-oriented ownership for reasons unrelated to reporting quality. Firm and year effects help address persistent differences and common shocks, but they cannot remove every source of time-varying confounding. The robustness exercises strengthen confidence in the stability of the negative sign without establishing a uniquely identified causal mechanism.

The size of the fully adjusted coefficient also deserves contextualization. A one-unit change in EM is far larger than the typical observed variation, given a sample mean of 0.0438 and standard deviation of 0.0380. A more realistic interpretation considers changes within the observed distribution, while recognizing that the linear model imposes a constant slope. The coefficient's statistical significance does not mean that the average firm experiences a large absolute shift in environmentally oriented ownership after a modest accounting change. Economic significance depends on the scale of the outcome, the distribution of EM, and whether the fitted relation is stable across different parts of the sample.

The instrumental-variable result is notable because it is much more negative than the baseline estimate. One interpretation is that conventional regressions understate the effect because of measurement error or reverse causation. Another is that the instrument captures sector-level conditions that influence both accounting behavior and sustainable investment directly. The mean accrual intensity of peer firms could be correlated with industry-wide environmental controversies, financing conditions, or regulatory interventions. Although the reported first-stage statistics are strong, they do not resolve this exclusion-restriction problem. The IV estimate should therefore be presented as suggestive rather than as a conclusive causal benchmark.

The ESG interaction deserves explicit attention because it changes the substantive interpretation of the paper. A positive direct coefficient on ESGP indicates that higher ESG ratings are associated with greater green-investor participation in the reported model. The negative interaction, however, indicates that the slope on EM becomes more negative at higher ESG scores. These are distinct relationships. It would be incorrect to infer buffering merely because the ESG main effect is positive. Without access to the original data or a clarification of the reported interaction, the strongest defensible statement is that the source presents contradictory statistical and narrative evidence regarding moderation.

This contradiction has theoretical implications. If the negative interaction is correct, one possibility is that investors with sustainability mandates impose particularly strict expectations on companies rated highly for ESG. A perceived mismatch between favorable sustainability ratings and aggressive financial reporting could attract more scrutiny than the same accrual behavior at firms with weaker ESG reputations. Another possibility is that the interaction reflects nonlinearity, scaling, or correlated omitted variables. These accounts are not mutually exclusive, and the original regressions do not distinguish among them. The finding should motivate further analysis rather than a definitive behavioral claim.

Ownership heterogeneity is consistent with differences in institutional access to capital. State-owned firms may benefit from established financing relationships or expectations of policy support, potentially reducing the sensitivity of investor ownership to discretionary accruals. Private firms may depend more heavily on the perceived reliability of their published accounts when attracting outside investment. Yet this interpretation remains inferential. Ownership also correlates with industry composition, firm age, market visibility, and strategic objectives. The reported Wald test establishes that the fitted coefficients differ; it does not show that implicit government guarantees explain the difference.

The technology comparison raises a related issue of how accounting information is interpreted. Research-intensive firms often have volatile earnings and uncertain returns on innovation, which may cause investors to place greater weight on technological capabilities and future opportunities. A less negative association among high-technology firms could therefore reflect a different information environment. It could also reflect differences in the measurement accuracy of discretionary accruals, since business models with large intangible components may challenge conventional accounting proxies. The subgroup evidence does not reveal whether investors consciously tolerate earnings management or simply interpret the same metric differently.

Pollution intensity appears to amplify the negative relationship, although the estimated coefficient difference is smaller than in the ownership and technology comparisons. Firms operating in pollution-intensive industries face greater environmental compliance costs and heightened reputational exposure. Under those conditions, uncertainty about financial reporting may reinforce concerns about the feasibility of costly environmental upgrades. However, environmental exposure also influences the types of green projects firms undertake and the investors willing to fund them. The observed difference could reflect a combination of project risk, regulation, and investor selection rather than a singular penalty for accounting discretion.

These results suggest that a uniform sustainable-finance screening rule may overlook meaningful differences in corporate circumstances. A discretionary-accrual threshold that is informative in one industry may be less informative in another. Conversely, giving firms broad exemptions on the basis of state ownership or technological status could weaken accountability. The appropriate response is not to abandon comparable reporting standards but to interpret financial and sustainability indicators jointly, with attention to sectoral business models and the quality of independent verification.

For regulators, the findings support a focus on the integrity and comparability of both financial and ESG disclosures. Strengthening audit quality, improving the transparency of sustainability metrics, and requiring consistent reporting of green-funding uses may reduce uncertainty for capital providers. Such measures are likely to be more defensible than assuming that a high ESG score automatically compensates for weaknesses in financial reporting. The reported interaction does not support that assumption, and the broader literature warns that ESG indicators can themselves be influenced by selective disclosure [10], [18].

For investors, the distinction between a direct ESG effect and an interaction effect is practical. A firm with a favorable ESG rating may be attractive on average while still displaying a negative association between accrual intensity and sustainable-investor ownership. Investment screening should therefore evaluate accounting quality and sustainability performance separately before considering how they interact. Independent assurance, scrutiny of accrual composition, and comparison with industry peers may help identify cases where apparently strong ESG performance coexists with unusual financial-reporting patterns.

For corporate managers, the results imply that sustainability initiatives and reporting credibility should be treated as complementary responsibilities. A firm seeking green capital cannot rely exclusively on environmental commitments if investors question the transparency of its accounts. This is especially relevant for private companies and businesses in traditional or pollution-intensive sectors, where the reported associations are stronger. Nonetheless, managers should not interpret the coefficients as evidence that a specific reduction in discretionary accruals will mechanically generate a particular increase in green financing. The estimates describe relationships in the observed sample, not guaranteed returns to a reporting intervention.

Several limitations narrow the scope of inference. The sample contains listed nonfinancial Chinese firms and excludes special-treatment entities, so it may not represent smaller private companies, unlisted firms, or businesses in other institutional settings. The financing outcome is based on sustainable-investor shareholdings, which do not capture the complete landscape of green loans and bonds. The earnings-management measure combines legitimate and opportunistic accrual variation. ESGP is represented by a single rating provider, making it difficult to evaluate rating disagreement or the separate environmental, social, and governance dimensions.

The temporal design also leaves questions unanswered. The original sample spans a decade of policy development, but the reported baseline does not isolate every regulatory reform or sector-specific policy shift. Year fixed effects control for common annual shocks but cannot identify how a particular policy changed the relationship for differently exposed firms. The exclusion of later observations in one robustness exercise is informative, yet the reason for coefficient attenuation is not established. A richer analysis could examine policy timing and exposure directly, provided suitable data and identification assumptions were available.

Future work could distinguish discretionary accruals from real earnings management and assess whether income-increasing and income-decreasing practices have different implications for sustainable investors. Separate measures of green loans, bonds, equity holdings, and project expenditure would clarify which financing channels are most sensitive to accounting quality. Studies could also evaluate rating-provider disagreement, the distinct ESG pillars, audit quality, and ownership-related institutional support. These extensions would help identify mechanisms that the present reduced-form evidence cannot establish.

The reported data-access restriction creates a further reproducibility challenge. Without the underlying observations and detailed variable-construction procedures, external researchers cannot fully verify sample selection, winsorization, interpolation, standard errors, or the instrument's construction. The inconsistency between

the robustness text and table concerning winsorization and the disagreement between the ESG interaction coefficient and its narrative interpretation are particularly important. Transparent code, anonymized variable definitions, and a detailed estimation appendix would improve the credibility and usefulness of future replications, even where confidential firm-level data cannot be shared.

The broader contribution is therefore one of disciplined integration rather than a claim that financial reporting alone determines access to sustainable capital. The analysis links a reporting-quality proxy to the participation of environmentally oriented shareholders and shows that this relationship varies across firms. At the same time, the findings illustrate how easily causal language and moderation claims can exceed what observational estimates support. A credible sustainable-finance research agenda must be attentive not only to statistical significance but also to construct validity, model interpretation, and reproducibility.

A further methodological consideration concerns the difference between a statistically estimated interaction and an economically meaningful moderation pattern. An interaction coefficient may be statistically distinguishable from zero while having a limited effect over the range of observed ESG scores. Conversely, even a modest interaction may matter for firms located near investment-screening thresholds. Interpreting the published estimate fully would require marginal-effect calculations at representative ESG values, corresponding confidence intervals, and plots of the fitted relationship. Those outputs are not supplied in the source. The analysis can therefore establish the direction of the reported linear interaction but should not claim to have measured its practical magnitude across the full ESG distribution.

Another unresolved issue is the stability of the relationships over the study period. The years from 2014 to 2023 encompass changes in sustainability disclosure practices, financing policy, investor awareness, and the composition of listed companies. Common year effects account for average shifts but do not reveal whether the earnings-management association strengthened as sustainable finance matured. Interactions with policy periods or investor participation could help distinguish institutional evolution from a stable reporting-quality premium. Such extensions would require new estimations and should not be inferred from the existing coefficients.

The results also invite reflection on the distinction between capital allocation and environmental effectiveness. Attracting investors with sustainability mandates does not necessarily imply that the recipient firm achieves lower emissions, improved resource efficiency, or successful environmental innovation. Likewise, reduced participation by such investors does not prove that a company has abandoned its transition plans. Assessing the real environmental consequences of reporting credibility would require project-level investment data and subsequent performance indicators. The present findings concern an intermediate financial outcome that may influence environmental transformation but does not directly measure it.

Finally, the consistency of signs across robustness models should be evaluated alongside differences in samples and estimands. Excluding three years changes the population of observations and may alter the economic conditions under which investors made decisions. Replacing the dependent variable with a green-credit ratio shifts attention from equity ownership to debt financing. Instrumentation changes both the estimation strategy and the observations included. Agreement across these exercises is informative because it suggests the negative relationship is not confined to a single implementation, yet the coefficients should not be treated as interchangeable estimates of one precisely identified structural parameter.

6. CONCLUSION

The evidence from 29,971 Chinese listed-firm observations between 2014 and 2023 indicates a persistent negative association between the absolute magnitude of discretionary accruals and the proportion of equity held by environmentally oriented investors. The relationship survives several reported changes in model specification, and an instrumental-variable exercise also yields a negative coefficient. These patterns are consistent with the view that uncertainty about financial reporting may impede participation by sustainability-focused capital providers, although they do not establish that earnings management causally determines financing access.

The study further identifies statistically significant differences by ownership, technological orientation, and pollution intensity. The negative earnings-management association is stronger among private firms than state-owned enterprises, among non-high-technology firms than high-technology firms, and among heavily polluting firms than their less-polluting counterparts. These differences are compatible with variations in institutional support, investor expectations, and environmental scrutiny. Their underlying mechanisms remain unverified, and the findings should not be generalized to all forms of green credit or to firms outside the observed market without further evidence.

The reported ESG moderation result warrants a specific qualification. Although ESG ratings have a positive direct coefficient, the published interaction between ESG performance and earnings management is negative, contradicting the original article's description of a buffering effect. Preserving empirical integrity requires reporting this inconsistency openly. The overall findings favor stronger financial disclosure, careful evaluation of ESG information, and financing practices sensitive to firm circumstances. Future research would

benefit from broader financing measures, explicit causal designs, transparent estimation procedures, and separate analysis of the environmental, social, and governance dimensions.

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