

Article

Does ESG Performance Improve Corporate Profit Quality? Evidence from Chinese A-Share Listed Firms

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Abstract

In the context of advocating the high-quality development of companies, this study explores the mechanism underlying the relationship between ESG performance and profit quality (PQ) and the moderating effect of media reputation. Given the wide variety and large number of indicators of corporate profitability, establishing evaluation methods for assessing PQ presents a critical challenge. We adopted the game theory combination weight method to construct a multi-dimensional PQ evaluation system. Using a sample of Chinese A-share listed companies from 2011 to 2024, the study applies two-way fixed effects estimation and instrumental variable analysis to test study hypotheses. The research findings indicate that (1) ESG performance and its sub-dimensions positively influence PQ and that (2) media reputation positively moderates the relationship between ESG performance and PQ. We further discovered that different ESG dimensions have distinct effects on various dimensions of PQ. Therefore, this study contributes to the literature on ESG and PQ while providing practical guidance for companies pursuing high-quality development.

Keywords: ESG; profit quality; media reputation; game theory combination weight method

1. Introduction

Chinese companies are currently pursuing high-quality development. Companies are adopting a systematic approach to planning and deployment, balancing their own development with environmental and social responsibilities while implementing effective management strategies, which embodies the core philosophy of environmental, social, and governance (ESG) in promoting sustainable development. By moving beyond the singular focus on profit maximization and addressing stakeholder needs across environmental, social, and governance dimensions, ESG promotes the transformation of companies from scale expansion to quality improvement. Given that profitability is the foundation for corporate survival and development, high-quality corporate development manifests as high-quality profitability. Profit quality (PQ) serves as a crucial benchmark for assessing corporate strength, forecasting future earnings prospects, and evaluating corporate value, in line with the requirements of quality-driven growth. Strong ESG performance can gain the support of stakeholders and promote resource accumulation, thereby helping to improve PQ.

When the impact of ESG on PQ is examined, the information environment in which a company operates cannot be overlooked, particularly the overall reputation constructed



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through comprehensive media coverage. A company's media reputation (MR) represents the media's overall assessment of the company by the media (Deephhouse, 2000). According to signalling theory, the media can accelerate the dissemination of information and alleviate information asymmetry. MR is a crucial component of a company's external information environment. MR shapes how stakeholders interpret and respond to a company's ESG information, thereby playing an important moderating role in the ESG-PQ relationship.

Overall, there is considerable scope for research on the relationship between ESG performance and PQ. First, existing research has not yet reached a consensus regarding the definition and measurement methods of PQ. There are three mainstream viewpoints: the first focuses on the relationship between corporate profits and cash flows, judging whether corporate profits can generate sufficient, continuous, and growing-potential cash inflows (Mikhail et al., 2003); the second focuses on whether the company's profits are sustainable (Dichev et al., 2013); and the third focuses on the smoothness and predictability of the company's earnings during the accounting period (Francis et al., 2004). Such studies mostly treat the measurement of PQ as a single-dimensional variable, ignoring the multi-faceted nature of PQ. Although a few studies have treated PQ as a multi-dimensional variable, most of them use equal-weighted indices and fail to control the correlations among different dimensions. Therefore, the existing studies still have a one-sidedness in both the selection of PQ evaluation indicators and the method of indicator weighting. In response to this, our research aims to construct a reasonable and effective comprehensive PQ evaluation system.

Second, many studies have explored the relationship between ESG performance and corporate value, and the conclusions drawn are inconsistent (Clark & Viehs, 2014). Most studies employ single metrics to measure corporate value, such as return on assets (ROA), return on equity (ROE), and Tobin's Q. While these indicators assess the quantity of a company's profits, they fail to reflect its quality. Although they evaluate how much profit the companies have generated, they fail to answer questions such as whether these profits are sustainable, whether there is sufficient cash support, whether the structure is reasonable, and whether it is stable. The possible phenomenon is that two companies with the same profit figures may have fundamental differences in their PQ due to the different composition and sustainability of their profits. When PQ is measured improperly, the true impact of ESG performance on profits is obscured, which may be the reason for the different results of existing studies on the relationship between ESG performance and profits.

Third, existing perspectives on understanding the impact of ESG on corporate profitability include market competition (Jung & Yoo, 2023), information disclosure (Fatemi et al., 2018), and investor preferences (Z. Chen & Xie, 2024); however, they overlook the mediating role of MR. China is currently in the digital information era, where media penetration and influence have intensified. Therefore, when the relationship between ESG and PQ is studied, the MR variable should be included.

To address the aforementioned research gaps, we examine the impact of ESG performance on corporate PQ and the moderating role of MR in this relationship. The contributions of this study are primarily reflected in the following aspects. First, we construct a comprehensive evaluation system for PQ, encompassing five dimensions: profit level, sustainability, cash-generating capacity, structure, and stability. By applying the game theory combination weight method to assign weights to PQ evaluation indicators, we establish a scientifically sound and reasonable comprehensive PQ evaluation model. Second, we make a theoretical distinction between profit quantity and profit quality. Many previous studies on ESG and performance have adopted traditional financial performance metrics that measure profitability or firm value as single-period, single-dimensional quantities. However, these single-dimensional indicators cannot capture the multi-dimensional characteristics of profits. ESG is essentially a strategy oriented towards sustainable development,

aiming to create long-term value rather than short-term profits. By introducing this theoretical distinction, we have supplemented the stakeholder theory by focusing on PQ rather than short-term profitability as the main performance outcome of ESG engagement. This has theoretical significance for defining and measuring corporate performance in ESG research. Third, this study extends the ESG literature to the context of emerging economies. Currently, most of the evidence on the impact of ESG on profits comes from developed countries. Given the significant differences in economic systems and market sophistication between transition economies such as China and developed nations, research findings from developed countries may not be directly applicable to developing economies. By examining this relationship in the Chinese context, we extend its empirical application to an emerging-market setting. Fourth, this study advances research on media participation in corporate governance. Examining the moderating role of MR in the ESG-PQ relationship contributes to understanding the impact of ESG on PQ from an external governance perspective.

2. Theoretical Analysis and Research Hypotheses

2.1. Profit Quality

Previous studies have measured profitability using proxies such as accrual quality, persistence, predictability, smoothness, conservatism, and value relevance (Schipper & Vincent, 2003; Francis et al., 2004; Dechow et al., 2010; Perotti & Wagenhofer, 2014). Since no single proxy is optimal for all decision-making contexts (Dechow et al., 2010), PQ depends on these multiple characteristics and is therefore a multi-dimensional concept. This study defines PQ as a multi-perspective and comprehensive representation of a company's profitability. It captures the essence of corporate profitability through a series of financial metrics encompassing five dimensions: profit level, sustainability, cash-generating capacity, structure, and stability. The profit level depends on the support of the other four dimensions. Sustainability not only relies on the growth of main business income but also involves the continuous circulation of cash flow (Dechow et al., 2010); that is, sustainability requires the driving force of structure and the guarantee of cash-generating capacity. The stability of the structure provides a fundamental guarantee for stability, and the stability of the fluctuation of the company's profit, in turn, supports sustainability. Thus, the five dimensions are mutually reinforcing and interdependent, together defining a company's PQ.

Specifically, the profit level refers to the accounting profit measured on an accrual basis, reflecting the amount of a company's profit. Profit level reveals a company's ability to obtain profits and capital returns by utilizing various resources within a certain period of time, and it is a necessary condition for the company's survival and development. Numerous studies on corporate financial performance essentially focus on profit levels, and the indicators adopted include ROA, ROE, and Tobin's Q.

Sustainability refers to the extent to which current profits contribute to long-term profitability and reflects a company's capacity for sustainable development. High-quality profits manifest not only in the short term but also maintain continuity and exhibit growth trends. Persistent profitability attracts greater stakeholder investments. This attribute is intrinsically linked to corporate strategy, with profit sustainability often influenced by differentiation and cost leadership strategies (Fairfield & Yohn, 2001). Companies establish barriers to entry through innovative technologies, enabling more durable sales of their products and services. This supports sustainable development and enhances profit sustainability. However, when companies adopt short-term profit strategies while neglecting innovation capacity building, they may undermine profit sustainability and consequently reduce their PQ. In addition, sustainability is affected by factors such as industry competition and the external market environment (Lev, 1983).

Cash-generating capacity refers to the effective inflow of cash and cash equivalents during profit formation, reflecting a company's ability to generate cash from its profits. Under the accrual basis, a company's book profits cannot fully and truly reflect its current profit. Only when book profits are promptly converted into cash can a company's profits be truly realized. Sufficient and stable cash flow is the foundation for sustainable development and supports ongoing operations. Cash-generating capacity reflects whether a company can make timely payments to employees, suppliers, and creditors, and meet its tax obligations. If a company's cash flow is disrupted, it faces an increased risk of failure.

Structure refers to the ratio of each component of a company's profits to its total profit, revealing the composition and coordination of the profits. The structure reflects the contribution of a company's core business to its profits. A high level of structure indicates strong competitiveness in the company's core business, a favourable competitive position within the industry, and the ability to better withstand shocks from macroeconomic policies and industry cycles. If a company exhibits a poor profitability structure with an irrational composition of earnings, it suggests that a significant portion of its profits may be derived from non-recurring or unsustainable profits from other business activities. This development model involves substantial operational risks.

Stability refers to the degree of consistency with which a company generates profit, reflecting the magnitude of profit fluctuations. Companies with stable profits tend to capture and maintain a certain market share, demonstrating stronger risk resilience and sustainable development capability. Excessive profit volatility signals significant operational risks, potentially eroding stakeholder trust and reducing resource allocation, thereby lowering the PQ. Some studies have examined the correlation between earnings volatility and earnings management, suggesting that artificially "smoothed" earnings reflect earnings management practices. Such manipulated stability often stems from weak enforcement or low-quality accounting standards (Leuz et al., 2002). However, other scholars argue that earnings stability provides greater informational content regarding earnings, specifically indicating the extent to which current earnings changes are reflected in future earnings (Tucker & Zarowin, 2005). Despite the debate surrounding the relationship between earnings stability and PQ, constructing metrics for it remains crucial. This would facilitate a better differentiation between genuine earnings stability and artificially created stability.

2.2. ESG and Profit Quality

Stakeholder theory posits that when companies balance and address stakeholder needs, they earn stakeholder trust and support, build stronger relationships, and thereby enhance PQ. From the perspective of internal stakeholders, good ESG performance can increase employees' sense of identification and responsibility toward the organization (Vanhamme et al., 2012), reduce employee turnover tendencies (Ghosh & Gurunathan, 2014), and help create a positive work environment, thereby enhancing the company's productivity and management efficiency. For external stakeholders, ESG performance reduces information asymmetry, strengthens investor and creditor trust in the company, alleviates financing costs, and secures stable capital inflows (Moser & Martin, 2012). ESG performance influences consumer attitudes, perceptions, and behaviors (Lee & Shin, 2010); sparks consumer interest before purchase; shapes purchase intent and actions during the buying process; and affecting post-purchase satisfaction and loyalty (Carvalho et al., 2010). Corporate responsibility toward suppliers helps maintain operational stability and reduces supply chain risk. Fulfilling ESG responsibilities enables companies to gain government support through various financial subsidies and preferential policies while reducing the likelihood of incurring regulatory penalties (Seera et al., 2025). Stakeholder

capital contributions facilitate resource accumulation and the creation of economic, social, and environmental value, thereby enhancing corporate PQ.

Fulfilment of corporate environmental responsibilities enhances PQ. First, it enhances a company's innovation capabilities. [Aragón-Correa and Sharma \(2003\)](#) argue that excellent environmental management fosters unique, valuable, and organizationally embedded resources and capabilities, thereby promoting innovation and securing a competitive advantage. Second, environmental responsibility serves as a signalling mechanism, conveying the company's commitment to environmental protection to stakeholders such as consumers, investors, and governments, thereby securing their support and resource returns ([Baldissarro et al., 2026](#)). Finally, fulfilling environmental responsibility alleviates regulatory pressure and enhances corporate legitimacy ([Shih et al., 2021](#)), contributing to profit stability.

The fulfilment of corporate social responsibility enhances PQ. This helps increase corporate reputation, which constitutes a significant strategic advantage and intangible assets. Owing to its uniqueness and difficulty in replication, reputation poses a barrier to imitation by competitors, thereby reducing a company's operational risk. [Flammer \(2013\)](#) reported that stock prices respond positively when companies announce socially responsible initiatives. This finding indicates market recognition of the long-term value created by ESG activities, which is largely derived from an enhanced reputation. Furthermore, reputation functions as a signalling mechanism, revealing multidimensional information about the company to stakeholders, strengthening commitment, and improving market transaction efficiency ([Fombrun & Shanley, 1990](#)).

Corporate governance performance contributes to enhancing PQ. First, sound corporate governance mitigates agency problems and information asymmetry, aligning management decisions with shareholder interests to positively affect corporate value ([Bagh et al., 2025](#)). Second, sound corporate governance enables managers to utilize corporate resources more effectively ([W.-W. Chen et al., 2025](#)) and enhance investment efficiency ([Tang et al., 2025](#)), thereby positively influencing corporate performance. Finally, strong corporate governance performance provides institutional safeguards for creating multi-stakeholder value ([Nadeem, 2020](#)) and facilitates sustainable development.

However, not all scholars agree that ESG has a positive impact on PQ. Trade-off theory suggests that a company's ESG performance incurs new costs, including the costs of building and upgrading environmental protection technologies and production lines, as well as costs associated with large or long-term donations. Since a company's resources and capabilities are limited, these direct and indirect costs may reduce its competitive advantage and value ([Dai et al., 2021](#)). Some scholars, from an agency theory perspective, argue that managers may over-invest in ESG-related activities for reasons such as increasing personal compensation, building personal reputation, or hiding negative information. Managers gain private benefits while firm value is diminished. However, with the dissemination and development of the ESG concept, more studies have supported the stakeholder theory. Moreover, legitimacy theory further supports this claim, as good ESG performance strengthens a firm's legitimacy.

Admittedly, ESG performance may entail short-term costs. We emphasize that under the logic of mutual benefit among stakeholders and long-term value creation, ESG performance can ultimately enhance PQ through mechanisms such as resource accumulation, reputation building, and risk mitigation. Therefore, the following hypothesis is proposed:

H1. *ESG has a positive effect on PQ.*

H1a. *Corporate environmental responsibility (E) has a positive effect on PQ.*

H1b. *Corporate social responsibility (S) has a positive effect on PQ.*

H1c. *Corporate governance (G) has a positive effect on PQ.*

2.3. The Moderating Role of Media Reputation

MR, which serves as an effective “credibility guarantee,” influences stakeholders’ interpretations and responses to corporate actions. According to signalling theory, the media can accelerate information dissemination and reduce information asymmetry. When a company enjoys a high MR because of exceptional product quality, sound financial performance, or innovative technological capabilities, this reputational capital generates a “halo effect.” When such a company discloses ESG information or implements related initiatives, stakeholders are more inclined to trust the authenticity and effectiveness of its ESG actions on the basis of its positive reputation (Srinivasan & Hanssens, 2008). This multi-dimensional resource support from stakeholders further amplifies the positive impact of ESG performance on PQ. Conversely, a company with poor MR and frequently embroiled in negative news, even if it has truly engaged in ESG practices, is prone to being questioned about “greenwashing,” and its positive information may be discounted or ignored during the dissemination process. Consequently, the positive effects of ESG performance are offset by negative media evaluations, hindering effective PQ improvement.

In addition, MR also exerts an external governance and monitoring role. The news media not only verify and monitor non-financial information disclosed by companies but also reduce agency costs and curb managerial self-interest (Ruben et al., 2018). With the expansion of media influence, negative reports raise the likelihood that greenwashing will be exposed and may even lead to regulatory intervention or legal penalties. Accordingly, the following hypothesis is proposed:

H2. *MR positively moderates the positive effect of ESG on PQ such that when the level of MR is high, the positive effect of ESG on PQ is enhanced, and when the level of MR is low, this relationship is weakened.*

3. Research Methodology

3.1. Data Collection and Empirical Model

This study uses Chinese A-share listed companies on the Shanghai and Shenzhen stock exchanges from 2011 to 2024 as a research sample. The data used come mainly from Bloomberg, the China Stock Market & Accounting Research Database, and the Chinese Research Data Services Platform (CNRDS). To enhance comparability and validity, sample selection is conducted in accordance with the following principles: (1) companies with missing key variable data are excluded to ensure the availability and continuity of the data; (2) ST, *ST, and PT companies are excluded; and (3) considering that the accounting standards and accounting treatment methods used by listed companies in the financial industry have special provisions, companies in the financial industry are excluded. Through the above screening steps, a total of 6349 unbalanced panel data points of 980 listed companies were ultimately obtained. To avoid the influence of sample outliers, all continuous variables were winsorized by 1%.

To test the hypotheses, we employ a two-way fixed effects regression model. This specification controls for both individual and time fixed effects. Given the panel structure of our data, unobserved firm-level heterogeneity (individual effects) and time-specific shocks (time effects) may both bias the estimates if not properly controlled for. We therefore adopt a two-way fixed effects specification. To address potential heteroscedasticity, we estimate all regressions with robust standard errors, which adjust the t-statistics accordingly.

3.2. Measurement Instruments

3.2.1. ESG

ESG data were sourced from ESG ratings published in the Bloomberg database. Within this rating system, each of the three dimensions—environment (E), social (S), and governance (G), carries a 33% weighting. The E dimension comprises seven primary indicators and 46 secondary indicators, including metrics such as CO₂ emissions, SO₂ emissions, total waste, total water usage, and environmental fines. The S dimension includes six primary indicators and 46 secondary indicators, covering metrics such as the employee turnover rate, workplace accidents, minority employee proportion, and female employee proportion. The G dimension comprises eight primary indicators and 30 secondary indicators, including metrics such as the proportion of independent directors, board size, board attendance rate, and number of board meetings held. The higher the score is, the better the company's ESG performance.

3.2.2. Profit Quality

PQ represents a multi-perspective, comprehensive reflection of a company's profitability and evaluates its essence by calculating a series of financial indicators. Therefore, the indicators used to measure PQ should be multidimensional. Based on the existing literature (Schipper & Vincent, 2003; Francis et al., 2004; Dechow et al., 2010; Perotti & Wagenhofer, 2014), we selected five key dimensions, that is, profit level, sustainability, cash-generating capacity, structure, and stability, as the primary indicators for the evaluation index system. Based on the meaning of the above five dimensions and related research, 40 PQ evaluation indicators were initially selected. To validate these indicators, we employed the Delphi method. We constructed a five-point Likert scale (1 = very unimportant, 3 = average, 5 = very important) and administered a questionnaire to 11 senior experts in the field. The panel comprised 6 university professors with research interests in accounting, financial management, and sustainable development, and 5 industry practitioners with 6 to 19 years of work experience. After statistical analysis and consistency testing, Cronbach's α exceeded 0.7, indicating good internal consistency. Following the removal of 17 unimportant indicators, 23 indicators were retained. The final PQ evaluation indicator system is presented in Table 1, which, to the extent possible, reflects the company's PQ comprehensively.

Specifically, the three profit-level indicators measure a company's ability to generate profits over a given period—that is, the amount of profits. The six sustainability indicators assess whether earnings exhibit continued growth. For instance, the growth rate of total assets reflects the profitability of the company's operating assets; a higher value indicates a larger scale of operating assets and more sustained profit growth. The five cash-generating capacity indicators reflect the condition of the company's capital chain, integrating accrual-based profit measures with cash-based flow indicators to analyse cash-generating capacity. The three structure indicators reflect a company's profit sources and clarify the wealth contribution of production, operation, investment, and financing activities over the past period. The six stability indicators reflect the volatility of corporate earnings—greater volatility implies less stable earnings and higher risk.

The critical step in constructing the PQ evaluation indicator system is to determine the weights of the primary and secondary indicators. The effective use of weighting methods enhances the accuracy of the comprehensive evaluation indicators. Current primary weighting approaches include subjective, objective, and combined subjective-objective weighting. This study adopts a combined subjective-objective weighting approach, which leverages the strengths of both methods: highlighting the subjective expertise of experts in the subjective weighting method while utilizing the high precision and objectivity of the

objective weighting method. On the basis of relevant research (Xiao et al., 2024), we selected the game theory combination weight method. Specifically, the subjective weighting method employs order relation analysis (G1), whereas the objective weighting method uses the criterion importance through intercriteria correlation (CRITIC) method.

Table 1. Evaluation indicator system of PQ.

Primary Indicators	Secondary Indicators
A ₁ Profit Level	A ₁₁ ROA = net profit/average total assets
	A ₁₂ ROE = net profit/average net assets
	A ₁₃ Earnings per share = net income/weighted average number of shares outstanding
A ₂ Sustainability	A ₂₁ Net profit growth rate = (net profit of the current year – net profit of the previous year)/net profit of the previous year
	A ₂₂ Sustainable growth rate = ROE × retained earnings ratio/(1 – ROE × retained earnings ratio)
	A ₂₃ Total asset turnover = net operating revenue/average total assets
	A ₂₄ The growth rate of ROE = (ROE of the current period – ROE of the previous period)/ROE of the previous period
	A ₂₅ The growth rate of operating profit = (current period operating profit – previous period operating profit)/previous period operating profit
	A ₂₆ The growth rate of total assets = the increase in total assets for the current period/the total assets at the beginning of the period
A ₃ Cash-Generating Capacity	A ₃₁ Cash content of operating income = cash received from sales of goods and services/operating income
	A ₃₂ Total assets cash recovery rate = (increase in cash and cash equivalents – net cash flows from financing activities)/average total assets
	A ₃₃ Working capital turnover ratio = operating income/average working capital
	A ₃₄ Net cash content of operating profit = net cash flow from operating activities/operating profit
	A ₃₅ Net cash content of net profit = net cash flow from operating activities/net profit
A ₄ Structure	A ₄₁ Core business profit margin = core business profit/total profit
	A ₄₂ Operating gross profit margin = (operating revenue – operating cost)/operating revenue
	A ₄₃ Operating profit ratio = operating profit/total profit
A ₅ Stability	A ₅₁ ROA coefficient of variation = ROA standard deviation/ROA mean (five years)
	A ₅₂ ROE coefficient of variation = ROE standard deviation/ROE mean (five years)
	A ₅₃ Coefficient of variation for core business profit margin = standard deviation of the core business profit margin/average value of the core business profit margin (five years)
	A ₅₄ Coefficient of variation in operating profit margin = standard deviation of operating profit margin/average value of operating profit margin (five years)
	A ₅₅ Coefficient of variation in operating gross profit margin = standard deviation of operating gross profit margin/average value of operating gross profit margin (five years)
	A ₅₆ Coefficient of variation in total asset cash recovery rate = standard deviation of total asset cash recovery rate/average value of total asset cash recovery rate (five years)

(1) G1 Method

We adopted the G1 method to measure the subjective weights of the PQ evaluation indicators. The G1 method eliminates the need to construct a judgment matrix, offering the advantages of intuitiveness, simplicity, and ease of application. First, a questionnaire survey was conducted among 11 senior experts in the field to determine the relative importance of the five primary indicators of PQ and their secondary indicators. Second, the scoring results of the relative importance of each layer of indicators were obtained. Finally, a statistical analysis was conducted on the scoring results to calculate the subjective weights of the primary and secondary indicators. The calculation steps for determining the weights using the G1 method are as follows:

First, the experts determine the ordinal relationships among the evaluation indicators x_j and the ratio of importance between x_{j-1} and x_j . The calculation formula is as follows.

$$r_j = \frac{w_{j-1}^{(1)}}{w_j^{(1)}} \quad (1)$$

Second, on the basis of the ratio r_j of the importance degrees of the evaluation indicators x_{j-1} and x_j , the subjective weight $w_j^{(1)}$ for the j -th evaluation indicator is calculated. The superscript (1) denotes the G1 method.

$$w_j^{(1)} = (1 + \sum_{j=2}^m \prod_{k=j}^m r_k)^{-1}, \text{ and } w_{j-1}^{(1)} = r_j w_j^{(1)} \quad (2)$$

As a result, we obtain all the subjective weights of the evaluation indicators based on the G1 method $w^{(1)} = (w_1^{(1)}, w_2^{(1)}, \dots, w_n^{(1)})^T$ and satisfy $0 \leq w_j^{(1)} \leq 1, \sum_{j=1}^m w_j^{(1)} = 1$.

(2) CRITIC Method

We employed the CRITIC method to obtain objective weights for the PQ evaluation indicators. The CRITIC method calculates weights on the basis of the comparison of the strength and conflict between indicators. Comparison strength refers to the degree of variation within the same indicator across different evaluation subjects and is measured as the standard deviation. Conflicts are determined on the basis of the correlation between indicators. If the positive correlation between indicators is strong, their conflict is weak. The calculation steps for determining the weights using the CRITIC method are as follows:

To ensure the comparability of the raw data, it is necessary to standardize the data for each indicator. It should be noted that for the reverse indicators within the stability dimension—where higher values indicate greater earnings volatility and thus lower PQ—we applied a positive transformation prior to standardisation. Specifically, we used the range-normalisation method to reverse-map the original values to the $[0, 1]$ interval, so that higher transformed values consistently represent greater earnings stability and higher quality.

We selected the improved range change method to standardize the raw data, as this approach effectively reduces the impact of extreme values (maximum and minimum) within an indicator on the overall dataset. If the standard deviation σ of an indicator's data is less than or equal to 100, the range change method is applied for standardization. When the standard deviation σ of an indicator exceeds 100, directly applying the range change method yields processed data with insufficient discrimination, which hinders subsequent empirical testing. Therefore, we first log-transformed the data before applying the range change method to mitigate the adverse effects of large variance. Furthermore, when the original data with a standard deviation σ exceeding 100 contain negative values, direct logarithmic transformation is not feasible. Drawing on [Trigueiros \(2019\)](#), the log-

modulus transformation proposed by John and Draper (1980) is applied to such data before standardization. The standardization formula is as follows:

Suppose that there are n evaluation objects and m evaluation indicators. x_{ij}^t represents the original data of the j -th evaluation indicator of the i -th evaluation object in year t , and y_{ij}^t represents the standardized data of the j -th evaluation indicator of the i -th evaluation object in year t . If the j -th evaluation indicator is a positive indicator, the standardization formula is as follows:

$$y_{ij}^t = \frac{x_{ij}^t - \min(x_{ij}^t)}{\max(x_{ij}^t) - \min(x_{ij}^t)}, \sigma \leq 100 \quad (3)$$

$$y_{ij}^t = \frac{\log x_{ij}^t - \log \min(x_{ij}^t)}{\log \max(x_{ij}^t) - \log \min(x_{ij}^t)}, \sigma > 100 \quad (4)$$

If the j -th evaluation indicator is a reverse indicator, the standardization formula is as follows:

$$y_{ij}^t = \frac{\max(x_{ij}^t) - x_{ij}^t}{\max(x_{ij}^t) - \min(x_{ij}^t)}, \sigma \leq 100 \quad (5)$$

$$y_{ij}^t = \frac{\log \max(x_{ij}^t) - \log x_{ij}^t}{\log \max(x_{ij}^t) - \log \min(x_{ij}^t)}, \sigma > 100 \quad (6)$$

The comparative strength s_j of the j -th evaluation indicator is calculated using standardized data with the following formula:

$$s_j = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (y_{ij} - \bar{y}_{.j})^2} \quad (7)$$

The correlation coefficient $r_{jj'}$ between the j -th indicator and the j' -th indicator is calculated using standardized data according to the following formula:

$$r_{jj'} = \frac{\sum_{i=1}^n (y_{ij} - \bar{y}_{.j})(y_{ij'} - \bar{y}_{.j'})}{(n-1)s_j s_{j'}} \quad (8)$$

The overall conflict index f_j is calculated using the correlation coefficients between the evaluation indicators as follows:

$$f_j = \sum_{j'=1}^m (1 - r_{jj'}) \quad (9)$$

The information content c_j of the j -th indicator is calculated using contrast intensity and conflict as follows:

$$c_j = s_j f_j \quad (10)$$

The information content of the j -th indicator is normalized to obtain its objective weight $w_j^{(2)}$, where the superscript (2) denotes the CRITIC method. The calculation formula is as follows.

$$w_j^{(2)} = \frac{c_j}{\sum_{j=1}^m c_j} \quad (11)$$

As a result, we obtain all the objective weights of the evaluation indicators based on the CRITIC method $w^{(2)} = (w_1^{(2)}, w_2^{(2)}, \dots, w_m^{(2)})^T$ and satisfy $0 \leq w_j^{(2)} \leq 1$, $\sum_{j=1}^m w_j^{(2)} = 1$.

(3) Game Theory Combination Weight Method.

We chose the game theory combination weight method to integrate the G1 and CRITIC methods. Subjective experience and objective facts may conflict in the design of indicator weights. However, the game theory combination weight method can analyse the coordination and consistency between the two in the conflict, reflecting the idea that different weighting methods compete with each other yet are in harmony and solving the problem of determining weights more objectively and comprehensively. The specific process for calculating the optimal comprehensive weight is as follows:

Assuming that L weighting methods are used to calculate the weights, the basic weights under each method can be obtained as follows:

$$w_k = \{w_{k1}, w_{k2}, \dots, w_{km}\} \quad (k = 1, 2, \dots, L) \quad (12)$$

Therefore, a weight set $\{w_1, w_2, \dots, w_m\}$ is constructed, comprising L weighting methods. Let the weight distribution coefficients be $\alpha_k = \{\alpha_1, \alpha_2, \dots, \alpha_L\}$, $\alpha_k > 0$. Then, any linear combination of the L weight vectors w_k is given by

$$w = \sum_{k=1}^L \alpha_k w_k \quad (13)$$

To minimize the deviation between w and each w_k , the weight distribution coefficient α_k is optimized, thereby yielding the following countermeasure model:

$$\min \left\| \sum_{i=1}^L \alpha_i w_i - w_k \right\|_2 \quad (14)$$

In accordance with the differential properties of the matrix, linear equations with equivalent optimal derivative conditions are obtained as follows:

$$\begin{bmatrix} w_1 w_1 & w_1 w_2 & \cdots & w_1 w_L \\ w_2 w_1 & w_2 w_2 & \cdots & w_2 w_L \\ \vdots & \vdots & \ddots & \vdots \\ w_L w_1 & w_L w_2 & \cdots & w_L w_L \end{bmatrix} \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \vdots \\ \alpha_L \end{bmatrix} = \begin{bmatrix} w_1 w_L \\ w_2 w_L \\ \vdots \\ w_L w_L \end{bmatrix} \quad (15)$$

Normalize the values $(\alpha_1, \alpha_2, \dots, \alpha_L)$ obtained from the above formula:

$$A_k = \frac{\alpha_k}{\sum_{k=1}^L \alpha_k} \quad (16)$$

Ultimately, the optimal combination weights obtained through the game theory combination weight method are as follows:

$$W^* = \sum_{k=1}^L A_k w_k \quad (17)$$

We adopt the optimal combination weights obtained as the combination weight of the PQ evaluation indicators to measure the PQ of the listed companies, as shown in Table 2.

Table 2. Weights of the evaluation indicators of PQ.

Primary Indicators	G1	CRI TIC	Combination Weights	Secondary Indicators	G1	CRI TIC	Combination Weights
A_1	0.284	0.210	0.230	A_{11}	0.098	0.091	0.093
				A_{12}	0.098	0.086	0.089
				A_{13}	0.089	0.033	0.048
A_2	0.237	0.178	0.194	A_{21}	0.054	0.024	0.032
				A_{22}	0.031	0.070	0.060
				A_{23}	0.034	0.016	0.021
				A_{24}	0.041	0.023	0.028
				A_{25}	0.050	0.023	0.030
				A_{26}	0.026	0.022	0.023
				A_{31}	0.040	0.016	0.022
A_3	0.215	0.252	0.242	A_{32}	0.049	0.059	0.056
				A_{33}	0.029	0.033	0.032
				A_{34}	0.049	0.064	0.060
				A_{35}	0.049	0.080	0.072
				A_{41}	0.028	0.098	0.079
A_4	0.110	0.247	0.210	A_{42}	0.034	0.057	0.050
				A_{43}	0.048	0.092	0.080
				A_{51}	0.035	0.031	0.032
A_5	0.154	0.113	0.124	A_{52}	0.029	0.007	0.013
				A_{53}	0.032	0.031	0.032
				A_{54}	0.020	0.004	0.008
				A_{55}	0.013	0.008	0.010
				A_{56}	0.024	0.032	0.030

3.2.3. Media Reputation

Drawing on the research of [Deephouse \(2000\)](#) and [Vogler et al. \(2016\)](#), this study employs the Janis–Fadner coefficient to construct the MR variable. Media coverage data were sourced from the CNRDS, which encompasses more than 400 online media outlets and more than 600 newspapers, providing counts of positive and negative reports within the media coverage. CNRDS applies a dictionary-based text analysis approach to determine sentiment, which assesses the overall tone of each news article by examining the proportion of positive and negative words in the text. Given that MR captures the valence of media coverage rather than its intensity or volume—that is, media attention—the Janis–Fadner coefficient, as a balanced measure of positive versus negative coverage, serves as an appropriate indicator of MR. The Janis–Fadner coefficient, established by [Janis and Fadner \(1943\)](#), comprehensively evaluates positive and negative information. It was first introduced into MR research by [Deephouse \(2000\)](#). The calculation formula is as follows:

$$\text{Janis} - \text{Fadner coefficient} = \begin{cases} \frac{f^2 - fu}{t^2} & \text{if } f > u \\ 0 & \text{if } f = u \\ \frac{fu - u^2}{t^2} & \text{if } f < u \end{cases} \quad (18)$$

where f represents the number of positive reports, u represents the number of negative reports, and t is the sum of f and u . The Janis–Fadner coefficient ranges from -1 to 1 , with

values closer to 1 indicating better MR for the company. A high J–F coefficient indicates that a company operates in a more favourable and supportive information environment. In such an environment, each responsible ESG initiative undertaken by the company is more likely to be fairly evaluated, positively disseminated, and ultimately integrated into stakeholders' decision-making processes, thereby increasing the company's PQ.

3.2.4. Control Variables

To avoid alternative explanations, we selected the following control variables. The fixed asset ratio (Fixed) is measured as the ratio of net fixed assets to total assets, reflecting the configuration of the scale and structure of fixed assets. The capital maintenance and increase ratio (CMIR), measured as the ratio of equity at the end of the current year to equity at the end of the previous year, is related to the sustainability of corporate development. The investment level (Invest) is measured as the ratio of cash paid for constructing fixed, intangible, and other long-term assets to total assets at the beginning of the period. Excessive inventory not only ties up corporate funds but also exposes the firm to inventory impairment risks, which may affect the continuity and stability of earnings. The balance of shareholding (Balance) is measured as the ratio of the second-largest shareholder's stake to the largest shareholder's stake. This governance mechanism helps to alleviate internal agency conflicts within the company, thereby promoting the improvement of PQ. The book-to-market ratio (BM) is measured as the ratio of book value to total market value. BM is correlated with investor preferences and may have an impact on the company's profitability. The inventory ratio (INV) is measured as the ratio of net inventory to total assets. If INV is too high, it not only leads to a large accumulation of enterprise funds, but also poses the risk of inventory discount, which has an impact on the continuous and stable profitability. Firm age (FirmAge) is measured as the number of years since the company's establishment, as companies at different life-cycle stages may exhibit different PQ levels. Audit fees (AuditFee) are measured as the natural logarithm of audit expenses. Lower audit fees may reflect the auditor's ability to obtain high-quality information at a lower cost, which in turn suggests lower information asymmetry and may therefore affect the firm's sustainable development and PQ.

4. Results

4.1. Descriptive Statistics and Correlation Analysis

Table 3 presents the descriptive statistics and correlation analysis of the variables. Descriptive statistics reveal that PQ has a mean of 0.485 and a standard deviation of 0.071, indicating noticeable variation in PQ across the sample companies. The mean and standard deviation of ESG performance are 3.367 and 0.307, respectively, suggesting significant differences in ESG performance among the sample companies. The mean value of MR is 0.093, indicating that most companies face relatively low media oversight and receive generally positive media evaluations. Correlation analysis reveals a significant positive relationship between ESG performance and PQ, providing preliminary validation of Hypothesis 1. Furthermore, most control variables exhibited significant correlations with the core variables, indicating that the selected control variables effectively mitigated omitted variable issues. Additionally, the absolute values of all the correlation coefficients between the variables were less than 0.5. To examine potential multicollinearity among the variables in the research model, a variance inflation factor (VIF) test was conducted on all the variables in the model. The results are presented in Table 4. The maximum VIF value is 1.52, which is below the threshold of 4 proposed by Hair et al. (2010), indicating that there are no severe multicollinearity issues in the model estimation.

Table 3. Descriptive statistics and correlations.

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. PQ	0.485	0.071	1.000										
2. ESG	3.367	0.307	0.325 ***	1.000									
3. MR	0.093	0.238	0.298 ***	0.177 ***	1.000								
4. Fixed	0.236	0.187	−0.100 ***	0.014	−0.005	1.000							
5. CMIR	1.140	0.275	0.090 ***	−0.022 **	0.116 ***	−0.108 ***	1.000						
6. Invest	0.055	0.056	−0.019	−0.048 ***	0.049 ***	0.276 ***	0.249 ***	1.000					
7. Balance	0.327	0.290	0.012	0.177 ***	−0.036 ***	−0.009	0.041 ***	0.036 ***	1.000				
8. BM	0.719	0.268	−0.036 ***	0.138 ***	−0.063 ***	0.162 ***	−0.100 ***	−0.091 ***	−0.009	1.000			
9. INV	0.162	0.157	−0.004	−0.145 ***	−0.095 ***	−0.437 ***	−0.000	−0.293 ***	−0.120 ***	0.049 ***	1.000		
10. FirmAge	2.958	0.315	0.189 ***	0.313 ***	0.041 ***	−0.060 ***	−0.053 ***	−0.169 ***	0.049 ***	0.089 ***	0.048 ***	1.000	
11. AuditFee	14.102	0.827	0.134 ***	0.437 ***	0.011	−0.028 **	0.000	−0.009	0.140 ***	0.360 ***	−0.013	0.035 ***	1.000

Note: *** $p < 0.01$; ** $p < 0.05$.

Table 4. Results of the multicollinearity test.

Variables	VIF	1/VIF
ESG	1.52	0.651
MR	1.07	0.932
Fixed	1.40	0.713
CMIR	1.11	0.897
Invest	1.25	0.798
Balance	1.06	0.944
BM	1.26	0.792
INV	1.38	0.725
FirmAge	1.19	0.843

4.2. Testing the Research Hypotheses

Given the use of unbalanced panel data in this study, a two-way fixed effects model was employed in the regression analysis to control for the potential impacts of individual and time effects. The Hausman test results also indicate that the fixed-effects model is appropriate. Additionally, robust standard errors were used to mitigate potential heteroskedasticity issues in the model. Table 4 presents the test results for our proposed hypotheses.

As shown in column (1) of Table 5, the positive correlation between ESG performance and PQ is significant at the 1% level ($\beta = 0.010$, $t = 3.50$), indicating that ESG performance has a significant positive influence on PQ. Thus, Hypothesis 1 is supported. Specifically, a 1% increase in ESG performance is associated with a 0.01% improvement in PQ. Companies create value through ESG practices and gain new opportunities, forming a virtuous cycle that enhances PQ. Regarding the control variables, the coefficient on CMIR is consistent with expectations, indicating that the accumulation of equity capital contributes to PQ improvement. The results for the remaining control variables are broadly consistent with prior literature and are not discussed further for concise reporting.

Table 5. Results of the direct effects.

Variables	(1) PQ	(2) PQ	(3) PQ	(4) PQ
ESG	0.010 *** (3.50)			
ESG_E		0.001 * (1.49)		
ESG_S			0.005 *** (3.12)	
ESG_G				0.005 * (1.72)
MR				
ESG*MR				
Constant	0.541 *** (13.47)	0.573 *** (13.94)	0.562 *** (14.15)	0.547 *** (13.22)
Controls	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	5892	5443	5888	5892
Within R ²	0.109	0.111	0.108	0.107
F	38.05	34.79	37.41	36.69

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; * $p < 0.1$.

Column (2) shows that the positive correlation between ESG_E and PQ is significant at the 10% level, indicating that companies' fulfilment of environmental responsibilities

has a significant positive effect on PQ, thus validating Hypothesis 1a. Column (3) shows that the positive correlation between ESG_S and PQ is significant at the 1% level, indicating that fulfilling social responsibility significantly and positively affects PQ, thus validating Hypothesis 1b. Column (4) indicates that the positive correlation between ESG_G and PQ is significant at the 10% level, demonstrating that governance performance significantly and positively impacts PQ, thereby validating Hypothesis 1c.

Table 6 column (1) presents the results of testing the moderating effect of MR. To eliminate multicollinearity, both the independent variables and the moderator variables are centered. The coefficient for the interaction term between ESG and MR (ESG*MR) is 0.011, which is significant at the 10% level. This finding indicates that stronger MR enhances the positive relationship between ESG and PQ, thereby validating Hypothesis 2. The interaction coefficient of 0.011 implies that a one-unit increase in MR raises the marginal effect of ESG on PQ by 0.011 units. At the mean level of MR (0.093), a one-standard-deviation increase in ESG (0.307) is associated with approximately a 0.70% improvement in PQ relative to its mean (0.485). At a high level of MR (mean + 1 standard deviation = 0.331), the same ESG improvement yields approximately a 0.86% increase in PQ, whereas at a low level of MR (mean – 1 standard deviation = –0.145), it yields only about a 0.53% increase. Moving from low to high MR levels, the marginal effect of ESG on PQ increases by approximately 0.33 percentage points, and the economic magnitude at high MR is approximately 1.62 times that at low MR. These findings suggest that the moderating effect of media reputation is not only statistically significant but also economically meaningful in terms of its amplification role.

Table 6. Results of the moderating effects.

Variables	(1) PQ	(2) PQ	(3) PQ	(4) PQ
ESG	0.010 *** (3.25)			
ESG_E		0.001 * (1.80)		
ESG_S			0.003 ** (2.20)	
ESG_G				0.006 * (1.80)
MR	0.025 *** (10.21)	0.032 ** (12.25)	0.026 *** (11.21)	0.024 *** (10.16)
ESG*MR	0.011 * (1.72)			
ESG_E*MR		0.003 ** (2.13)	0.007 * (1.77)	
ESG_S*MR				
ESG_G*MR				0.007 (0.91)
Constant	0.536 *** (13.44)	0.559 *** (13.50)	0.460 *** (17.44)	0.537 *** (13.10)
Controls	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	5892	5443	5784	5568
Within R ²	0.134	0.076	0.133	0.132
F	38.62	32.36	49.58	37.83

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

To visually observe MR's moderating effect, we plot the relationship using the method recommended by Aiken and West (1991). The impact of ESGs on PQ under high MR levels (one standard deviation above the mean) and low MR levels (one standard deviation below the mean) are shown in Figure 1. As shown in Figure 1, the positive effect of ESGs on PQ is steeper when MR is higher.

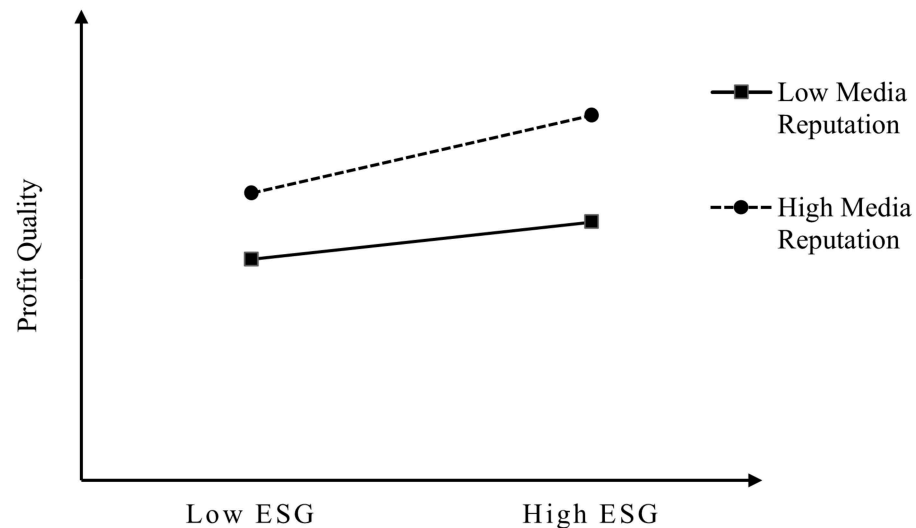


Figure 1. Graphical representation of the moderating effect of media reputation.

To examine whether the moderating effect of MR differs across ESG sub-dimensions, we re-estimated the moderation model using each of the three ESG pillar scores (E, S, and G) as the independent variable. As shown in Columns (2), (3), and (4) of Table 6, the moderating effect of MR on the E–PQ relationship is significantly positive, and the moderating effect on the S–PQ relationship is also significantly positive. However, the moderating effect on the G–PQ relationship is not statistically significant. A possible explanation is that environmental and social dimensions are more publicly visible and interpretable, making them more readily covered by the media and perceived by the public. As an information intermediary, MR can therefore effectively amplify the positive effects of E and S on PQ. By contrast, the influence of corporate governance on PQ is more likely to operate through internal mechanisms rather than through external information dissemination and reputation amplification via the media. Moreover, the assessment and interpretation of governance quality rely more heavily on specialized information intermediaries such as analysts, auditors, and institutional investors. Consequently, the moderating role of MR is more limited in the G dimension.

4.3. Robustness Tests

4.3.1. Robustness Tests for Measurement Bias

Robustness tests for measuring bias can significantly mitigate the issue of conceptual mismatch in core variables. First, to avoid errors in the calculation process of Bloomberg's ESG rating indicators, we use the Huazheng Rating Indicator (ESG1) as the proxy variable for ESG. The ESG rating indicators of Huazheng draw on mainstream ESG rating systems abroad and incorporate the local characteristics of China's financial market to conduct a comprehensive rating of the ESG levels of all listed companies in China. As shown in columns (1), (2), (3) and (4) of Table 7, ESG1 is significantly positively correlated with PQ at the 1% level, ESG1_E is significantly positively correlated with PQ at the 5% level, ESG1_S is significantly positively correlated with PQ at the 1% level, and ESG1_G is significantly positively correlated with PQ at the 1% level. Column (5) of Table 7 shows that ESG1*MR

is significant at the 10% level. The verification results when the explanatory variables are replaced are consistent with the previous text, once again verifying Hypothesis 1, Hypothesis 1a, Hypothesis 1b, Hypothesis 1c, and Hypothesis 2.

Table 7. Robustness test results for replacing ESG indicators.

Variables	(1) PQ	(2) PQ	(3) PQ	(4) PQ	(5) PQ
ESG1	0.038 *** (4.27)				0.015 ** (2.17)
ESG1_E		0.009 ** (2.17)			
ESG1_S			0.012 *** (3.06)		
ESG1_G				0.032 *** (4.11)	
MR					0.013 *** (7.28)
ESG1*MR					0.042 * (1.65)
Constant	0.412 *** (7.33)	0.454 *** (13.24)	0.523 *** (12.03)	0.428 *** (7.91)	0.421 *** (14.41)
Controls	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
N	5892	5929	5892	5892	6101
Within R2	0.111	0.373	0.108	0.112	0.419
F	38.49	58.87	37.83	38.12	182.60

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Second, we sort all companies' PQ scores within the same year and divide them into three equal groups, assigning values of 1, 2, and 3 from low to high as a proxy variable (PQ1) for PQ. As shown in Table 8, ESG is significantly positively correlated with PQ1 at the 1% level; ESG_E is significantly positively correlated with PQ1 at the 5% level; ESG_S is significantly positively correlated with PQ1 at the 5% level; ESG_G is significantly positively correlated with PQ1 at the 5% level; and ESG*MR is significantly positively correlated with PQ1 at the 5% level. The validation results after replacing the dependent variable align with the earlier findings, confirming the robustness of the conclusions of this study.

Finally, to validate the measurement quality of PQ, we re-calculated the PQ index using an equal-weighting approach (PQ2), assigning a weight of 0.2 to each of the five dimensions with equal weights for indicators within each dimension, and re-estimated our main regressions with PQ2 as the dependent variable. As shown in Column (6) of Table 8, the positive effect of ESG on PQ2 is again confirmed, indicating that our core conclusions are highly robust and not dependent on the specific weighting method employed. Notably, the within- R^2 of the equal-weighting model (0.063) is lower than that of the main model (0.109), and the t-statistic for the ESG coefficient is also smaller (2.86 vs. 3.50 in the main model). These results suggest that the equal-weighting approach introduces additional measurement noise by assigning equal importance to all dimensions—underweighting the contribution of high-information dimensions while overweighting low-information dimensions—thereby reducing the overall explanatory power of the model. By contrast, the game theory-based combination weighting method adopted in this study effectively reduces the noise from less informative dimensions, yielding more precise estimates and

higher model fit. This provides direct empirical evidence for the validity and superiority of our proposed weighting method.

Table 8. Robustness test results for replacing PQ indicators.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	PQ1	PQ1	PQ1	PQ1	PQ1	PQ2
ESG	0.193 *** (2.80)				0.180 *** (2.61)	0.063 *** (2.86)
ESG_E		0.019 ** (1.78)				
ESG_S			0.085 ** (2.37)			
ESG_G				0.155 ** (2.13)		
MR					0.298 *** (6.20)	
ESG*MR					0.280 ** (1.97)	
Constant	4.303 *** (4.95)	4.502 *** (5.07)	4.706 *** (5.49)	4.217 *** (4.68)	4.337 *** (4.97)	2.703 *** (9.93)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	5892	5511	5888	5892	5892	5892
Within R ²	0.068	0.051	0.076	0.075	0.076	0.063
F	33.07	24.44	30.53	30.58	30.83	25.85

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; ** $p < 0.05$.

4.3.2. Robustness Tests for Endogeneity Issues

To mitigate endogeneity concerns arising from reverse causality and to capture the lagged effects, we lagged ESG by one period ($t - 1$), while all other variables are measured in the current period (t). This specification establishes a clear temporal ordering, as ESG is measured prior to the dependent variable, thereby alleviating concerns about reverse causality in the time dimension. The results are presented in Column (1) of Table 9. The coefficient on lagged ESG (L.ESG) is significantly positive at the 5% level, indicating that the enhancing effect of ESG on PQ exhibits a lagged pattern. Moreover, the moderating role of MR is again confirmed.

Furthermore, considering that companies with higher PQ scores are better positioned to excel in environmental protection, social responsibility fulfilment, and corporate governance optimization, thereby driving improvements in ESG performance, an inverse causal relationship may exist between the two. Therefore, we employ the instrumental variable construction method proposed by Lewbel (1997). Lewbel's (1997) method for constructing instrumental variables builds effective internal instruments without relying on external factors, thereby helping to mitigate endogeneity bias to some extent. Specifically, we use the cube of the difference between a firm's ESG score and the industry average ESG score for the same year as the instrumental variable (ESG_IV). The ESG instrumental variable satisfies the following conditions: the Kleibergen–Paap rk LM statistic is significant at the 1% level, indicating no identification problem; the Kleibergen–Paap Wald rk F statistic exceeds the critical value of the Stock–Yogo weak instrumental variable identification F test at the 10% significance level, rejecting the null hypothesis of weak instrumental variables. As shown in column (3) of Table 9, ESG and PQ are significantly positively correlated at the 5% level, indicating that ESG promotes PQ.

Table 9. Robustness test results for endogeneity issues.

Variables	(1)	(2)	(3)	(4)
	PQ	ESG	PQ	PQ
L.ESG	0.007 ** (2.07)		0.017 ** (2.18)	
MR	0.024 *** (9.62)			
L.ESG*MR	0.013 * (1.81)			
ESG_IV		3.541 *** (7.52)		
ESG				0.075 *** (13.79)
Constant	0.420 *** (7.09)	0.872 *** (6.86)	0.169 *** (8.23)	0.207 *** (6.84)
Controls	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	4612	6035	6035	5892
F	41.57	56.53	45.82	55.43
Kleibergen-Paap rk LM statistic		105.326 ***		
Kleibergen-Paap Wald rk F		56.53 > 16.38		

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. 16.38 is the critical value for the Stock-Yogo test at the 10% significance level.

To mitigate potential estimation bias arising from sample selection concerns, we further employed the entropy balancing method as a robustness check. Specifically, we divided the sample into high-ESG and low-ESG groups based on the median ESG score and performed entropy balancing by matching on the third moments of the control variables. We then re-estimated the main regressions using the matched sample. The results, reported in Column (4) of Table 9, show that the regression coefficient remains positive and significant at the 1% level, confirming the robustness of our findings.

4.3.3. Robustness Test of ESG's Nonlinear Effects on PQ

Given that some studies indicate a non-linear relationship between ESG performance and corporate performance (Azmi et al., 2021), we examine the non-linear effects of ESG performance on PQ. Drawing on the methodology proposed by Haans et al. (2016) for testing U-shaped relationships, this study employs a U test to examine whether a U-shaped relationship exists between ESG and PQ. As shown in Table 10, the overall test p value is non-significant, regardless of whether the control variables are included. This finding indicates that the hypothesis of a U-shaped relationship between ESG performance and PQ is not supported, further substantiating the robustness of Hypothesis 1 proposed in this study.

4.4. Heterogeneity Analysis

4.4.1. Testing the Impact of ESG on PQ Across Segmentation Dimensions

Given that ESG scores are multidimensional indices based on environmental, social, and corporate governance factors and that PQ is also a multidimensional index encompassing five dimensions—profit level, sustainability, cash-generating capacity, structure, and stability—the influence of one dimension may sometimes offset that of another (Champagne

et al., 2024). This necessitates further investigation into the existence of cross-dimensional effects between ESG and PQ. Therefore, we separately examine the influence of ESG sub-dimensions on PQ sub-dimensions. This categorization helps identify which ESG dimension serves as the key driver for enhancing a company's PQ and which of the three ESG dimensions exerts the strongest influence on each specific PQ dimension.

Table 10. Test results for nonlinear effects of ESG and PQ.

	Without Control Variables		With Control Variables	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Interval	2.657	4.078	2.657	4.078
Slope	−0.006	0.038	−0.000	0.027
p-value	0.161	2.45×10^{-11}	0.482	1.46×10^{-6}
Overall test of presence of an Inverse U shape	0.161		0.482	
Extreme point	2.845		2.670	

Table 11 presents the test results for the impact of ESG_E on the PQ sub-dimensions. Column (2) indicates that the positive correlation between ESG_E and Sustainability (PQ_A2) is significant at the 5% level. Columns (1), (3), (4), and (5) indicate that the positive effects of ESG_E on Profit Level (PQ_A1), Cash-Generating Capacity (PQ_A3), structure (PQ_A4), and stability (PQ_A5) are not significant. There are two potential reasons for these findings. On the one hand, fulfilling environmental responsibilities enhances a company's innovation capabilities (Aragón-Correa & Sharma, 2003), enabling companies to enhance resource efficiency through innovative products and technologies, thereby increasing market competitiveness and ultimately positively impacting long-term performance. However, fulfilling environmental responsibilities requires substantial capital investment in clean production equipment and green R&D initiatives, which are characterized by high costs, significant risks, and extended return cycles. These factors may mitigate the positive effects of environmental responsibility performance on profit level, cash-generating capacity, structure, and stability.

Table 11. Test results for ESG_E impact on PQ sub-dimensions.

Variables	(1)	(2)	(3)	(4)	(5)
	PQ_A1	PQ_A2	PQ_A3	PQ_A4	PQ_A5
ESG_E	0.000 (0.38)	0.001 ** (2.04)	0.000 (0.17)	0.000 (0.57)	0.000 (1.41)
Constant	0.116 *** (20.16)	0.120 *** (5.80)	0.109 *** (4.99)	0.123 *** (26.23)	0.106 *** (15.10)
Controls	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
N	5443	5443	5443	5443	5443
Within R ²	0.059	0.071	0.065	0.015	0.035
F	16.03	25.60	19.02	6.27	14.44

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; ** $p < 0.05$.

Table 12 presents the test results for the impact of ESG_S on the PQ sub-dimensions. Columns (1), (2), (4), and (5) indicate significant positive correlations between ESG_S and profit level (PQ_A1), sustainability (PQ_A2), structure (PQ_A4), and stability (PQ_A5),

respectively. Column (3) shows that the positive impact of ESG_S on Cash-Generating Capacity (PQ_A3) is not significant. These findings may stem from two potential reasons: On the one hand, corporate social responsibility (CSR) implementation helps shape brand image and enhance reputation. Strong stakeholder relationships can attract long-term stable capital investments, such as by increasing core business revenue through consumer support. However, companies must invest funds to fulfil their social responsibilities. From a financial behavior perspective, CSR projects constitute external expenditures within profits (Y.-C. Chen et al., 2018), which in turn affects the enhancement of Cash-Generating Capacity from ESG_S.

Table 12. Test results for ESG_S impact on PQ sub-dimensions.

Variables	(1) PQ_A1	(2) PQ_A2	(3) PQ_A3	(4) PQ_A4	(5) PQ_A5
ESG_S	0.000 * (1.76)	0.002 *** (2.73)	0.001 (1.57)	0.000 * (1.65)	0.001 *** (3.30)
Constant	0.123 *** (18.92)	0.113 *** (5.60)	0.106 *** (5.10)	0.119 *** (25.59)	0.104 *** (15.54)
Controls	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
N	5888	5888	5888	5888	5888
Within R ²	0.061	0.068	0.062	0.016	0.034
F	17.29	26.87	20.33	6.70	15.59

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; * $p < 0.1$.

Table 13 presents the test results for the impact of ESG_G on the PQ sub-dimensions. Columns (2) and (3) reveal a significant positive correlation between ESG_G and Sustainability (PQ_A2) and Cash-Generating Capacity (PQ_A3). Columns (1), (4), and (5) indicate that the positive impact of ESG_G on Profit Level (PQ_A1), structure (PQ_A4), and stability (PQ_A5) is not significant. Agency theory suggests that strong corporate governance alleviates agency conflicts, improves decision-making quality, and strengthens cash flow management efficiency. These mechanisms, in turn, directly underpin sustainable operations and cash flow generation.

Table 13. Test results for ESG_G impact on PQ sub-dimensions.

Variables	(1) PQ_A1	(2) PQ_A2	(3) PQ_A3	(4) PQ_A4	(5) PQ_A5
ESG_G	−0.000 (−0.33)	0.003 * (1.72)	0.003 * (1.83)	−0.000 (−0.54)	0.000 (0.09)
Constant	0.123 *** (18.56)	0.105 *** (4.91)	0.097 *** (4.48)	0.122 *** (24.26)	0.105 *** (14.89)
Controls	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
N	5892	5892	5892	5892	5892
Within R ²	0.061	0.068	0.062	0.015	0.031
F	17.31	26.43	20.37	6.12	14.47

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; * $p < 0.1$.

4.4.2. Grouping Test Based on the Industry Competition Degree Perspective

The relationship between ESG performance and PQ may be influenced by the level of industry competition. High industry competition strengthens the impetus for resource allocation, prompting companies to further develop their resource value and leverage their advantages. Product market differentiation tends to be minimal in highly competitive industries. By fulfilling their ESG responsibilities, companies can differentiate themselves from their competitors through multiple avenues. The advantages gained from this differentiation are that it is difficult for competitors to replicate them and that they are sustainable (Grant, 1999). Therefore, ESG serves as a favourable pathway for companies to generate differentiated competitive advantage (Flammer, 2018). We anticipate that the positive relationship between ESG performance and PQ will be more pronounced in highly competitive industries.

We employ the Herfindahl–Hirschman Index (HHI) to characterize industry competitiveness. On the basis of the revenue of all listed companies within each sector, we calculate the HHI value for the aggregate revenue of all firms in that industry and use it as an indicator of competitiveness. A lower HHI value indicates higher industry competitiveness. The sample is grouped into high-competition and low-competition industries on the basis of the annual median HHI. Table 14 columns (1) and (2) present the regression results for the relationship between ESG performance and PQ performance under different industry competitiveness levels. In column (1) for the high industry competition group, the regression coefficient for ESG and PQ is 0.038, which is significant at the 1% level. In column (2) for the low industry competition group, the regression coefficient for ESG and PQ is 0.019, which is significant at the 1% level. The difference test of the two groups of coefficients reveals that the chi2 value is significant at the 1% level. These results indicate that when the degree of industry competition is high, the promoting effect of ESG on PQ is more significant, which is consistent with the expectations mentioned above. This finding can be understood through the lens of resource-based theory and competitive dynamics. In highly competitive industries, product market differentiation is limited, and companies must seek alternative sources of competitive advantage. ESG performance serves as a differentiation strategy that is difficult for competitors to imitate and sustainable over time. By contrast, in less competitive industries, companies face weaker pressure to differentiate through non-market strategies, reducing the marginal value of ESG as a competitive tool.

Table 14. Results of the grouping test.

Variables	(1)	(2)
	High Industry Competition Group	Low Industry Competition Group
	PQ	PQ
ESG	0.038 *** (9.46)	0.019 *** (4.78)
Constant	−0.052 *** (−7.48)	−0.047 *** (−12.13)
Controls	Yes	Yes
Firm	Yes	Yes
Year	Yes	Yes
Chi2	chi2 = 11.17 ***	
N	2961	2962
Adj-R ²	0.836	0.837
F	398.64	389.36

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$.

4.5. Mechanism Analysis

The above findings indicate that better ESG performance is associated with higher profit quality, providing solid empirical evidence for understanding the enabling effect of ESG. We further explore the specific mechanisms through which ESG enhances PQ. ESG performance not only aligns with companies' green development and sustainability processes and meets stakeholder demands but also helps firms broaden their financing channels and alleviate the negative impact of financing constraints (Dwomoh & Mensah, 2024), thereby improving PQ. Accordingly, we select financing constraints (KZ) as the mediating variable. Following Kaplan and Zingales (1997), we measure financing constraints by first qualitatively classifying the degree of constraints based on companies' financial conditions and then estimating the relationship between financing constraints and firm-specific characteristics, the coefficients of which form the KZ index. A higher KZ value indicates more severe financing constraints.

Table 15 presents the empirical results for the mediating role of financing constraints. In Column (1), the coefficient on ESG is negative and significant at the 1% level, indicating that a 1% increase in ESG performance is associated with a 0.394% reduction in financing constraints. This suggests that ESG performance significantly lowers companies' financing thresholds and better meets their capital needs. Furthermore, in Columns (2) and (3), the coefficients on financing constraints are both significant at the 1% level, confirming that the mediating effect of financing constraints is statistically significant. These results provide evidence that ESG performance enhances PQ by alleviating financing constraints.

Table 15. Test results for the mediation effect of financing constraints.

Variables	(1)	(2)	(3)
	KZ	PQ	PQ
ESG	−0.394 *** (−3.05)		0.008 *** (2.68)
KZ		−0.007 *** (−18.88)	−0.007 *** (−18.76)
Constant	−2.881 * (−1.76)	0.544 *** (14.37)	0.522 *** (13.59)
Controls	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	5892	5892	5892
Within R ²	0.169	0.179	0.180
F	62.85	72.83	66.41

Note: The values in parentheses are the t-values calculated using the robust standard error of company-level clustering. *** $p < 0.01$; * $p < 0.1$.

5. Discussion and Conclusions

This study expounds on the essence of PQ and builds an evaluation model based on it, delving into the impact of ESG on PQ and the moderating role of MR. Using Chinese listed companies as the research sample, thorough empirical tests were conducted, yielding the following results. All three dimensions of ESG positively influence PQ (H1, H1a, H1b, and H1c). MR positively moderates the positive relationship between ESG and PQ (H2). Heterogeneity analysis reveals distinct influence patterns between ESG's three dimensions of ESG and PQ's five dimensions of PQ; the impact of ESG on PQ is more pronounced for companies operating in highly competitive industries.

5.1. Discussion

First, this study constructed a comprehensive evaluation model for PQ, encompassing five dimensions: profit level, sustainability, cash-generating capacity, structure, and stability. The literature varies in its definitions of PQ, designs of quantitative indicators, and analytical methods, with no consensus reached and ample room for further refinement. Early studies focused on specific aspects or limited financial metrics and failed to establish a systematic framework. As scholars have delved deeper into the essence of PQ, subsequent research has increasingly emphasized the segmentation of evaluation systems, covering profit sustainability, risk resilience, cash-generating capability, and stability (Ball & Shivakumar, 2005; Dichev et al., 2013; Francis et al., 2004; Mikhail et al., 2003). Therefore, we employ a game-theoretic combination of subjective and objective weighting methods to construct a PQ evaluation model, aiming to achieve a multi-perspective and comprehensive analysis of corporate profitability. This comprehensive analysis enhances corporate profitability transparency to a certain extent, responding to research calls to promote a shared understanding of a company's future prospects among internal and external stakeholders by improving PQ transparency (Pathak & Ranajee, 2020).

Furthermore, this study reveals a positive relationship between ESG performance and PQ, supporting previous research that holds a favourable view of the relationship between ESG performance and corporate performance (Chai et al., 2023; Fatemi et al., 2018). However, other studies present opposing views, suggesting that ESG hinders corporate performance (Duque-Grisales & Aguilera-Caracuel, 2019; Teng et al., 2021). Given that both opposing viewpoints measure profitability using single indicators or dimensions, the comprehensive impact of ESG performance on corporate profitability remains to be fully elucidated. In addition, this study reveals that the impact of ESG performance on PQ manifests differently under varying degrees of external competitive environments, deepening our understanding of the mechanism through which ESG performance influences PQ.

We also further explore the differences in how each ESG dimension affects each PQ dimension. The following research findings respond to the call by Bagh et al. (2024) for more nuanced investigations into each ESG dimension. This is essential for understanding the distinct effects of E, S, and G on multifaceted aspects of corporate performance. Such an approach avoids oversimplifying the complex relationship between corporate responsibility and profitability while providing valuable insights for management policy formulation. First, ESG_E appears to promote sustainability but does not show a statistically significant positive association with profit level, cash-generating capacity, structure, or stability. Corporate environmental responsibility appears to influence profit sustainability, supporting findings from M. V. Russo and Fouts (1997). Second, ESG_S is positively associated with profit level, sustainability, structure, and stability, although its association with cash-generating capacity is not significant. A company's assumption of social responsibility can meet the demands of stakeholders and accumulate social capital (A. Russo & Perrini, 2010), and companies with more social capital face lower levels of idiosyncratic risk (Luo & Bhattacharya, 2009). Cheung (2016) notes that reduced idiosyncratic risk encourages firms to reduce cash holdings. Our findings are generally consistent with this argument. Third, ESG_G appears to be positively associated with sustainability and cash-generating capacity, but its positive associations with profit level, structure, and stability are not significant. Numerous scholars have investigated the relationship between corporate governance and corporate performance, yielding divergent results. For instance, Durnev and Kim (2005) report that companies with better governance exhibit higher value, whereas Bauer et al. (2010) report no significant correlation between corporate governance and corporate value. Gompers et al. (2003) propose that the impact of corporate governance on corporate performance varies across time periods, attributing this to unobservable factors. Consequently,

the mechanisms through which corporate governance influences profit level, structure, and stability may involve more complex pathways, warranting further investigation.

Finally, we emphasize the importance of considering MR when examining the relationship between ESG and PQ. Given that we are in the digital information age, where media penetration and influence have intensified, research on the interactive mechanisms between MR and ESG remains insufficient. Unlike previous studies that equate media coverage volume with MR, we introduce the Janis–Fadner coefficient to comprehensively assess both positive and negative media evaluations of companies, thereby expanding the external environmental mechanism linking ESG and PQ. Our findings offer new insights into the moderating role of MR in the ESG–PQ relationship and suggest potential pathways through which ESG influences PQ.

5.2. Managerial Implications

China's economy is currently transitioning from high-speed growth to quality-oriented growth, presenting companies with new opportunities and challenges. At the micro level, ESG performance is an intrinsic driver of corporate sustainability. At the macro level, corporate PQ forms a crucial micro foundation for macroeconomic transformation and industrial restructuring and upgrading, propelling the formation of a sound economic development framework. This study examines the impact of ESG on PQ and the moderating role of MR. The findings might offer valuable insights and reference information for companies pursuing sustainable value creation.

First, ESG may represent one effective pathway for enhancing a company's PQ. Through empirical tests, we verified the positive relationship between ESG and PQ, as well as the influence of each dimension of ESG and each dimension of PQ. This helps companies "target their efforts" and provides perspectives and solutions for improving PQ. For instance, the positive associations between the social dimension of ESG and multiple PQ dimensions illustrate how companies' fulfilment of responsibilities towards employees, consumers, and communities translates into multi-dimensional improvements in PQ, highlighting the central role of social responsibility in driving comprehensive PQ enhancement.

Second, companies should establish a media reputation management mechanism. A company's MR shapes stakeholders' perceptions of the company, which in turn may influence its sustainable development. Companies should pay close attention to media evaluations of their performance and appropriately guide public discourse. Positive media coverage conveys a responsible corporate image to stakeholders, directing their limited attention towards the company's ESG initiatives. This may accelerate the feedback on ESG performance and ultimately help companies achieve higher-quality earnings. Conversely, negative media portrayals weaken stakeholder trust and may adversely affect the company's future development.

5.3. Limitations and Future Research

This study holds theoretical and practical significance for understanding how ESG enhances PQ; however, it also has certain limitations that provide directions for future research. First, as analysed earlier, stakeholders play a crucial role in the relationship between ESG and PQ, making this avenue worthy of further exploration. For instance, stakeholders may have different priorities within a company, and how these varying priorities influence the ESG–PQ relationship warrants deeper investigation.

Second, while this study employs empirical methods to examine the impact of ESG on PQ, it lacks supporting case studies in this regard. Future research could integrate case studies to elucidate the underlying mechanisms and pathways through which ESEs influence PQ. Additionally, case studies can comprehensively analyse the profitability of

sample companies across five dimensions—profit level, sustainability, cash-generating capacity, structure, and stability—to identify specific weaknesses and develop targeted solutions. This would foster advanced management models that are both replicable and scalable, offering valuable insights into other organizations.

Third, regarding the measurement of the PQ index, the five-dimensional construct we adopt represents an initial attempt to capture the multi-dimensional nature of PQ. Although we employed the Delphi method for indicator selection and a game theory-based combination weighting approach to enhance measurement validity, we acknowledge that alternative construct specifications may yield different results. Future research could further validate and refine the PQ index using more advanced measurement techniques.

Fourth, the Bloomberg ESG scores used in this study primarily cover larger and more visible listed firms, which may introduce certain coverage bias. Although we have employed the Huazheng ESG ratings, which have broader coverage, as a robustness check, caution should be exercised when generalising our findings to small and medium-sized firms.

Fifth, despite our efforts to address endogeneity through multiple approaches, the observational nature of our data precludes definitive causal inference. Unobserved confounding variables, reverse causality, and dynamic feedback effects may still bias our estimates. Future research could employ quasi-experimental designs, such as regulatory shocks or policy changes, to strengthen causal identification.

Finally, our findings are based on a sample of Chinese A-share listed companies, which limits the generalisability of our conclusions to other institutional contexts. Although this country-specific focus provides valuable insights into ESG practices in emerging economies, cross-country comparative studies are needed to assess the external validity of our findings.

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