



ESG performance and investment efficiency in Asian firms: Mediating roles of agency costs and financial constraints

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ABSTRACT

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The focus of this study is the relationship between Environmental, Social, and Governance (ESG) performance and investment inefficiency in Asian firms. Focusing on non-financial industry firms among 17 Asian countries from 2015 to 2024, we observe that higher ESG performance is related to lower investment inefficiency, chiefly attributed to reduced overinvestment, while the relationship with underinvestment is statistically insignificant. This asymmetric pattern is aligned with agency theory, which states that overinvestment reflects managerial empire-building and inefficient use of free cash flow, both of which are constrained by stronger ESG governance. In contrast, underinvestment is more closely related to financing constraints, which are less effectively addressed by ESG. Mediation analysis shows that both agency costs and financing constraints act as channels through which ESG affects investment efficiency. Using managerial compensation as a proxy for agency costs, our results identify governance channels through which ESG adoption influences corporate investment decisions, with agency costs exhibiting a stronger mediating effect than financing constraints. Although ESG engagement is associated with higher managerial compensation, it is also associated with lower overinvestment, which suggests that compensation serves as an incentive-alignment mechanism that reduces managerial empire-building and enhances capital-allocation efficiency. Findings are robust to lagged ESG specifications, alternative inefficiency measures, and country-level regressions. These findings suggest that ESG mandates focused on governance may be more effective at improving capital-allocation efficiency across various institutional environments in Asia than mandates focused on disclosure.

Contribution/Originality: This study contributes to the existing literature by examining the ESG–investment efficiency relationship across 17 Asian countries through the mediating channels of agency costs and financing constraints, offering new insights into how these mechanisms operate asymmetrically across diverse institutional environments.

1. INTRODUCTION

Environmental, Social, and Governance (ESG) factors play a huge role in corporate management and in the way investors distribute their capital. Numerous empirical studies have demonstrated that engaging with ESG can offer concrete advantages for businesses. Based on their review of more than 2,000 studies, Friede, Busch, and Bassen (2015) concluded that ESG performance is generally positively related to firms' financial performance. Similarly, Eccles, Ioannou, and Serafeim (2014) demonstrated that firms with well-integrated sustainability initiatives are more

likely to perform better in the long run. ESG is also associated with lower financing costs, because firms that voluntarily disclose non-financial information tend to enjoy reduced equity costs since investors value transparency (Dhaliwal, Li, Tsang, & Yang, 2011) and ESG disclosure has proven to boost investor confidence, reduce information asymmetry between external investors and managers, and enhance external monitoring (Healy & Palepu, 2001). Moreover, it has been shown that ESG factors influence a company's investment efficiency, with companies that have stronger ESG profiles finding that they allocate capital more efficiently. This evidence suggests that ESG engagement reduces information asymmetries and governance failures, which hinder companies from maintaining optimal investment levels (Benlemlih & Bitar, 2018; Bilyay-Erdogan, Danisman, & Demir, 2024; Ellili, 2022). Overall, these findings establish ESG as a significant determinant of corporate financial performance, encouraging closer and further examination of the specific channels through which ESG shapes firm behaviour.

In addition to impacting firm performance, ESG can also affect corporate investment decisions through multiple channels, making it important to understand how ESG influences investment efficiency. Investment inefficiency arises from fundamental frictions in corporate decision-making. First, agency conflicts lead to overinvestment in situations where free cash flow is abundant and a lack of oversight, as managers pursue personal gain or extract rents, (Jensen & Meckling, 1976; Richardson, 2006; Shleifer & Vishny, 1997) by giving greater accountability among managers and bringing executive incentives closer to shareholder interests, it is argued that stronger ESG governance can curb these tendencies (Biddle, Hilary, & Verdi, 2009; Khan, Serafeim, & Yoon, 2016). Second, information asymmetry leads to financing frictions, which can result in underinvestment because firms avoid profitable projects when external capital is too expensive (Kaplan & Zingales, 1997; Myers & Majluf, 1984). Companies can reduce the costs of adverse selection, enhance their capability to raise external funding, and close the gap in what managers know and what outside investors know by disclosing information associated with ESG (Dhaliwal et al., 2011; Healy & Palepu, 2001). Thirdly, funding constraints are a major determinant of investment decisions. Equity investors and creditors consider firms with high ESG profiles less risky and consequently have lower costs of capital and are less likely to be subject to financing constraints when undertaking value-creating activities (Bilyay-Erdogan et al., 2024; Ellili, 2022). All these three channels have consistent empirical evidence, with studies from China and other institutional contexts confirming that companies with strong ESG performance allocate capital more effectively, a pattern attributed to reduced financing costs, more disciplined governance, and greater transparency (Donghui et al., 2025; Li, Zhu, & Liu, 2024; Ma, Gao, & Xing, 2025; Wang, Yu, & Li, 2022).

Despite this growing evidence, it remains unclear whether ESG is associated with greater investment efficiency by reducing agency costs and relaxing financing constraints, or whether its effects vary between overinvestment and underinvestment, and how these dynamics play out across various institutional environments in Asia. The relationship between ESG and investment efficiency has been documented in previous studies, primarily in a single-country context, specifically in China (Donghui et al., 2025; Li et al., 2024; Ma et al., 2025; Wang et al., 2022), but evidence from various Asian countries remains scarce. Therefore, this gap is important because Asia combines rapid economic growth with a wide range of variations across countries in terms of ownership concentration, governance standards, and the maturity of ESG disclosure (OECD, 2025). Claessens, Djankov, and Lang (2000) discovered that companies in East Asia face agency problems due to ownership rights and operational control being held by different parties. In addition, a concentrated family ownership structure also often weakens protections for minority shareholders. This has made an environment where funding constraints and agency friction tend to be more significant, where the benefits of ESG governance may potentially differ from those in countries with more developed markets. Our research aims to address this gap by examining how ESG influences investment efficiency through financing and agency channels in a cross-country context in Asia. Our study also aims to provide new insights into how these mechanisms operate across different institutional contexts.

Our research results show that ESG performance increases as investment inefficiency levels drop. This effect leans more towards overinvestment than underinvestment. The uneven pattern also emerged in agency theory, which

argues that overinvestment is caused by managerial empire-building and free cash flow problems. These problems can be mitigated by stronger governance mechanisms, which are often associated with high ESG performance (Jensen & Meckling, 1976; Richardson, 2006; Shleifer & Vishny, 1997). An additional mediation study finds that agency costs and financial constraints are transmission channels, and agency costs have a larger mediating effect. Our findings also indicate that increased compensation in ESG-adopting companies reflects not only rent extraction but also an incentive-alignment mechanism. This is because managerial compensation is linked to improved investment returns. Overall, our findings emphasize the need to understand the channels connecting ESG to corporate behaviour.

Building on these findings, our study makes three main contributions. Firstly, it provides empirical evidence from various Asian countries on the relationship between ESG performance and investment inefficiency. Secondly, this study simultaneously examines two mediating mechanisms, namely agency costs and financing constraints, within a single empirical framework. Prior single-country studies have tested these channels separately (Donghui et al., 2025; Li et al., 2024), but no cross-country evidence directly compares which channel dominates when institutional settings vary. Joint estimation across 17 Asian economies allows us to identify which mechanism is more robust to institutional heterogeneity. Finally, this study reveals that the benefits of ESG governance in the Asian context are asymmetric. Principal-agent conflict is a stronger channel for improving capital allocation efficiency through ESG. Furthermore, ESG exerts a greater effect on the overinvestment side of investment inefficiency, while its relationship with underinvestment is statistically insignificant.

So, in our research, we are dealing with two important topics.

RQ1: Does the ESG performance of non-financial firms reduce investment inefficiency in Asian markets?

RQ2: Do agency costs and financial constraints asymmetrically mediate the relationship between ESG performance and investment inefficiency?

We explore these issues with a sample of 21,019 firm-year observations from 17 Asian countries over the period 2015–2024. The methodology consists of fixed-effects regressions with Driscoll–Kraay standard errors, mediation analysis with Sobel and bootstrap tests, and a thorough set of robustness checks.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. ESG

ESG scores have now become a common measure of a firm's overall standing across environmental, social, and governance dimensions in one composite rating. The significant increase in ESG relevance demonstrates growing recognition among investors, regulators, and firms that nonfinancial factors play a meaningful role in corporate outcomes and performance (Friede et al., 2015; Khan et al., 2016).

A substantial amount of empirical research suggests that ESG performance is positively correlated to corporate financial outcomes. In a comprehensive review of more than 2,000 studies, Friede et al. (2015) found that most of the studies reported a positive relationship between ESG and company performance across different countries and time periods. Likewise, Eccles et al. (2014) showed that proactivity toward sustainability plays a great role for companies in sustaining both their market and accounting performance over a period. Furthermore, Khan et al. (2016) found that companies with high scores on relevant ESG aspects demonstrated better future financial performance. This finding suggests that ESG scores could identify key value aspects that are not fully reflected in conventional financial statements.

Apart from financial performance, ESG is also linked to various other corporate outcomes. Companies with a stronger ESG profile typically experience lower cost of equity, as investors value transparency and perceive companies that implement ESG as lower risk (Dhaliwal et al., 2011; El Ghouli, Guedhami, Kwok, & Mishra, 2011). By enhancing transparency, ESG disclosure reduces information asymmetries between managers and investors, which can increase creditor confidence and expand access to external funding (Healy & Palepu, 2001). In terms of risk, ESG-oriented companies are less likely to experience share price declines and are more resilient to adverse market

downturns. This is because better governance structures and stakeholder relationships can act as a form of protection during periods of negative shocks (Atif & Ali, 2021). These financing and risk advantages distinguish high-ESG firms from their peers and ultimately influence how firms allocate their capital.

The strength of these ESG effects varies across institutional settings. According to Liang and Renneboog (2017), ESG practices are shaped by country-level legal systems and cultural background, which indicates that the governance benefits captured by ESG scores may be more noticeable in countries with weaker legal protection for investors. This cross-country variation is particularly relevant in Asia, where ESG adoption maturity, ownership structures, and regulatory environments vary greatly across countries (OECD, 2025).

2.2. Investment Inefficiency

2.2.1. Theoretical Underpinnings

Investment efficiency is a firm's ability to optimally allocate funds to maximize firm value and to avoid underinvestment and overinvestment. In this paper, the residual approach was used. Biddle et al. (2009) operationalize this idea by measuring the difference between the expected and actual level of investment.

Two possible theoretical explanations are available for why corporations do not invest optimally. First, the agency theory (Jensen & Meckling, 1976) argues that free cash flow overinvestment happens when managers with free cash flow discretion are not under effective monitoring. This is formalized in the free cash flow hypothesis by Jensen (1986), arguing that excess cash induces managers to overinvest for empire building and private benefits. Overinvestment is related to bad governance in the work of Richardson (2006) and Shleifer and Vishny (1997), and managerial overconfidence is an additional reason for excessive investment (Malmendier & Tate, 2005).

Secondly, the underinvestment is explained by the theories of pecking order and asymmetric information (Myers & Majluf, 1984). When outside capital costs more than internal capital due to information asymmetries, firms with fewer internal resources will not undertake positive NPV projects. Kaplan and Zingales (1997) empirically document that firms with limited access to financial markets have a lower investment–cash flow sensitivity. Both theoretical strands view investment inefficiency as an interaction between governance failures and capital-market frictions.

2.2.2. Empirical Evidence on ESG and Investment Efficiency

Increasingly, empirical research shows that ESG is one of the important factors in determining investment outcomes. Bilyay-Erdogan et al. (2024) suggest that ESG performance contributes to more efficient investment decisions by decreasing the information asymmetry problem between managers and external investors. Ellili (2022) found that ESG disclosure quality and financial reporting disclosure quality are important for the improvement of investment efficiency. Another angle is provided by evidence from China. Wang et al. (2022) show in their research findings that ESG improves investment efficiency, particularly for enterprises with high audit quality. Additionally, Li et al. (2024) find that lower financing constraints partially mediate the relationship between ESG and investment efficiency, whereas Donghui et al. (2025) find that agency costs have a more important mediating role than financing constraints. However, most of the existing evidence is limited to specific countries, and it remains an open question whether similar impacts may operate across a larger set of Asian countries.

Our focus is on agency costs and financing constraints, as these two mechanisms are most closely grounded in accepted corporate finance theory and offer empirically tractable proxies across 17 Asian markets. There are other possible channels of mediating the ESG and investment efficiency relationship, such as information asymmetry, managerial overconfidence, and company culture, that require firm-specific data, which are not always available in a cross-country setting. Future studies should explore these alternative mediating mechanisms when relevant data become available.

2.3. Hypothesis Development

Strong ESG performance improves investment efficiency through the reduction of information asymmetry and distortion arising from agency problems. Prior studies show that firms with stronger ESG disclosure and corporate social responsibility result in lower information risk, easy access to external funds, and efficiency in capital allocation (Dhaliwal et al., 2011; Ellili, 2022; Healy & Palepu, 2001). Benlemlih and Bitar (2018) find that firms with strong corporate social responsibility perform better in terms of investment efficiency, while Cook, Romi, Sánchez, and Sánchez (2019) show that CSR can improve both investment efficiency and innovation.

ESG can reduce overinvestment through better monitoring and an improved governance structure. The commitment to environmental and social factors exposes firms to greater scrutiny from regulators and increased attention from non-governmental organizations and socially responsible investors, thereby limiting managerial discretion in using free cash flow (Jensen & Meckling, 1976; Richardson, 2006). In addition, the governance component of ESG strengthens board oversight and executive accountability, making overinvestment for private benefits much harder (Shleifer & Vishny, 1997).

ESG practices can also mitigate underinvestment by minimizing information asymmetry issues. Through more thorough ESG disclosure, firms signal transparency and long-term orientation to investors and creditors, which decreases adverse selection costs and improves access to external funds (Dhaliwal et al., 2011; Healy & Palepu, 2001). As a result, firms with stronger ESG performance can undertake more positive NPV projects that would otherwise be excluded due to financing frictions (Bilyay-Erdogan et al., 2024; Ellili, 2022). Overall, these arguments indicate that ESG performance can improve investment efficiency by curbing both overinvestment and underinvestment relative to the optimal level.

H₁: Higher ESG performance is associated with lower investment inefficiency.

Agency theory states that conflict of interest between managerial and shareholder objectives generates agency costs that interfere with sound investment decision-making (Jensen & Meckling, 1976). When managers have discretion over free cash flow and are subject to weak monitoring, managers tend to overinvest in projects that increase firm size and private benefits, despite the fact that such investments could reduce shareholder value (Jensen, 1986). ESG adoption may affect agency costs through two possible mechanisms. On one hand, ESG increases the quality of corporate governance practices by enhancing board oversight, improving disclosure, and broadening stakeholder monitoring (Khan et al., 2016; Shleifer & Vishny, 1997), thereby constraining managerial opportunism. On the other hand, implementing comprehensive ESG practices may require specific managerial expertise, sustainability reporting capabilities, and more complex executive oversight. This can lead to increased demand for highly qualified executives and higher compensation levels.

Therefore, managerial compensation can thus be used as an imperfect but observable measure for agency costs. Florackis (2008) and Singh and Davidson (2003) explicitly validate compensation-based measures as proxies for agency conflicts, showing that the size and composition of executive pay relative to firm performance is a useful indicator of the intensity of principal-agent frictions. The existing literature suggests that the quality of governance and monitoring procedures may affect the extent to which compensation is determined by managerial rent extraction or efficient contracting. For example, Ang, Cole, and Lin (2000) argue that agency costs are higher in firms with poor ownership monitoring. Hartzell and Starks (2003) show that strong institutional monitoring aligns executive compensation and company performance better. Core, Holthausen, and Larcker (1999) further show that poor governance is related to excessive pay and lower firm performance. During the adoption of ESG, where governance quality is expected to improve, changes in managerial compensation may therefore reflect changes in managerial discipline and incentive alignment. If ESG affects managerial compensation structures, and these compensation structures are associated with lower investment, then agency cost can mediate the relationship between ESG performance and investment inefficiency.

H₂: Agency cost mediates the relationship between ESG performance and investment inefficiency.

Beyond agency costs, financing constraints represent another potential channel through which ESG might impact investment efficiency. Firms with better ESG performance tend to experience lower information asymmetry and better access to external financing (Bilyay-Erdogan et al., 2024; Dhaliwal et al., 2011; Ellili, 2022; Healy & Palepu, 2001), therefore reducing the capital market frictions that lead to inefficient investment.

However, Farre-Mensa and Ljungqvist (2016) show that despite being classified as financially constrained, firms do not necessarily behave as if they face severe financing constraints. These firms are still allowed to access debt and equity in amounts comparable to those of unconstrained firms. It is possible that a positive relationship between ESG and financial constraints does not imply that ESG raises actual financing constraints but rather may indicate more conservative financial policies among ESG-oriented firms. Given these considerations, the direction of the financing-constraint channel is not determined in advance, although its mediating role remains empirically testable.

H₃: Financing constraints mediate the relationship between ESG performance and investment inefficiency.

3. METHODOLOGY

3.1. Data and Sample

We examined a sample of publicly listed non-financial firms from 17 Asian countries over the period 2015–2024. The year 2015 is chosen as the starting point because LSEG Refinitiv ESG data provides sufficient coverage for Asian firms from that year onward. Financial and non-financial firms have significant differences in capital structures and regulatory frameworks; thus, we excluded financial firms to avoid cross-industry differences that would complicate the analysis. They are therefore excluded to keep the sample more consistent.

Our study applies three data-screening steps. First, firms without ESG scores are removed. Second, to make sure that all required variables are available, firms with insufficient financial data are excluded. Third, a 1% and 99% level of winsorization is performed on all continuous variables to reduce the effect of outliers.

The sample is then reduced to 21,019 firm-year observations after the filtering procedures are applied (Table 1). All of our data, including ESG scores and financial statement information, is collected from the LSEG Refinitiv database.

Table 1. Sample Distribution by Country.

Country	Obs.	Percent
China	6,482	30.84%
Japan	3,540	16.84%
India	2,516	11.97%
Malaysia	1,687	8.04%
Taiwan	1,241	5.90%
Hong Kong	1,092	5.20%
South Korea	1,068	5.08%
Thailand	902	4.29%
Singapore	589	2.80%
Turkey	499	2.37%
Indonesia	432	2.06%
Saudi Arabia	244	1.16%
Israel	215	1.02%
Philippines	196	0.93%
United Arab Emirates	184	0.88%
Vietnam	81	0.39%
Kuwait	51	0.24%
Total	21,019	100.00%

Table 1 shows how the firm-year observations are distributed across the 17 Asian countries in the sample. The dominance of China, Japan, and India indicates that the dataset is weighted toward several major Asian economies, but still maintains considerable variation across the Asian economies' environments.

3.2. Empirical Model

To observe the effect of ESG on a firm's investment inefficiency, we test the relationship using the following regression model, as specified in Equation 1.

$$Ineff_{ijt} = \alpha + c ESG_{ijt} + \gamma' Controls_{ijt} + \mu_i + \varepsilon_{ijt} \quad (1)$$

Where $Ineff_{ijt}$ represents investment inefficiency for firm i in country j in year t , ESG_{ijt} is the ESG performance score, $Controls_{ijt}$ is a vector of firm-level control variables, μ_i denotes firm fixed effects, and ε_{ijt} is the error term. In this regression, Driscoll and Kraay (1998) standard errors are used to mitigate cross-sectional dependence across multi-country panels, while also accounting for heteroskedasticity and autocorrelation (Driscoll & Kraay, 1998; Hoechle, 2007).

For the mediation analysis, we estimate the mediator equation specified in Equation 2.

$$Mediator_{ijt} = \alpha + a \cdot ESG_{ijt} + \gamma' Controls_{ijt} + \delta_t + \eta_j + v_{ijt} \quad (2)$$

$$Ineff_{ijt} = \alpha + c' ESG_{ijt} + b \cdot Mediator_{ijt} + \gamma' Controls_{ijt} + \delta_t + \eta_j + \xi_{ijt} \quad (3)$$

Equation 2 examines whether ESG performance is associated with the proposed mediating variables. We then estimate the outcome equation presented in Equation 3. Equation 3 examines whether the mediator is associated with investment inefficiency after controlling for ESG performance and the other control variables. Where $Mediator_{ijt}$ is either agency cost or financial constraints (KZ index), δ_t are year fixed effects, and η_j are industry fixed effects. The mediation regressions use year and industry fixed effects rather than firm fixed effects, because for this specification, firm fixed effects would be too rigid to apply, since the compensation-based measure of agency costs tends to differ more across firms than it changes within the same firm over time.

3.3. Variable Measurements

3.3.1. Dependent Variable: Investment Inefficiency

The study uses absolute investment inefficiency as the dependent variable, calculated as the absolute residuals from the investment model developed by Richardson (2006) as adapted by Donghui et al. (2025). To estimate the expected investment, we use the following first-stage regression.

$$Investment_{ijt} = \alpha_0 + \alpha_1 Growth_{ij,t-1} + \alpha_2 Lev_{ij,t-1} + \alpha_3 Cash_{ij,t-1} + \alpha_4 Age_{ij,t-1} + \alpha_5 Size_{ij,t-1} + \alpha_6 Investment_{ij,t-1} + \Sigma Industry + \Sigma Year + \varepsilon_{ijt} \quad (4)$$

Where $Investment_{ijt}$ is firm i 's total investment in country j in year t , measured as net capital expenditure plus research and development expenditure plus acquisitions minus sales of property, plant, and equipment, scaled by lagged total assets. $Growth_{ij,t-1}$ is revenue growth, $Lev_{ij,t-1}$ is leverage, $Cash_{ij,t-1}$ is cash holdings, $Age_{ij,t-1}$ is firm age, $Size_{ij,t-1}$ is firm size, and $Investment_{ij,t-1}$ is lagged investment. Industry and year fixed effects are included to control for sector-specific investment patterns and macroeconomic conditions (Donghui et al., 2025; Richardson, 2006). The primary dependent variable is the absolute residual obtained from the investment expectation model. Larger residual values indicate greater investment inefficiency. Positive residuals mean overinvestment, and negative residuals mean underinvestment. Both are analyzed separately as additional dependent variables. The residuals from Equation 4 represent the amount of deviation of the actual from the expected investment for the firm.

3.3.2. Independent Variable: ESG Performance

The composite ESG score provided by LSEG Refinitiv is being used to measure ESG performance (Asimakopoulous, Asimakopoulous, & Li, 2023; Bilyay-Erdogan et al., 2024). This metric combines environmental, social, and governance dimensions into a single indicator, with higher values representing stronger overall ESG performance.

3.3.3. Mediating Variables

In this study, we use the mediating role of agency costs and financial constraints to examine the impact of ESG performance on investment inefficiency. Agency costs are measured by management compensation scaled by firm size, following prior literature. As proposed by Kaplan and Zingales (1997), we used the KZ index as a tool to measure financial constraint. The coefficients of the KZ index are taken from Lamont, Polk, and Saaá-Requejo (2001).

$$KZ = -1.002 \times (CF/K) + 0.283 \times Q + 3.139 \times (Debt/Total\ Capital) - 39.368 \times (Div/K) - 1.315 \times (Cash/K)$$

CF is cash flow from operations, K is lagged total assets, Q is Tobin's Q, Div is dividends paid, and Cash is cash and cash equivalents. The more financially constrained the firm, the higher the KZ score.

Leverage, firm size, Tobin's Q, profitability, and cash holdings are applied as control variables (Biddle et al., 2009; Richardson, 2006). In the extended model, GDP growth and inflation (CPI) macro variables are included. Table 2 provides definitions for all variables.

Table 2. Variable definitions and measurement.

Variables	Measurement
Investment	Investment is measured as the sum of capital expenditures, research and development expenses, and acquisitions, net of asset disposals, scaled by lagged total assets. This variable acts as the dependent variable in the first-stage investment model presented in Equation 4.
Investment inefficiency	The absolute value of residuals obtained from the investment expectation model described in Equation 4 Donghui et al. (2025), represents deviations from expected investment levels.
Overinvestment	Positive residuals from the investment expectation model (residual > 0).
Underinvestment	Negative residuals from the investment expectation model (residuals < 0), expressed in absolute value.
ESG performance	LSEG ESG composite score.
Agency cost	Management compensation scaled by firm size
KZ index	Kaplan-Zingales composite financing constraint index. $KZ = -1.002 \times (CF/K) + 0.283 \times Q + 3.139 \times (Debt/Total\ Capital) - 39.368 \times (Div/K) - 1.315 \times (Cash/K)$. Higher values indicate greater financing constraints.
Leverage	Ratio of total liabilities to total assets.
Firm size	Total assets are expressed in natural logarithmic form.
Tobin's Q	Market value of equity relative to its book value.
Profitability	Return on assets (ROA).
Cash holdings	Cash and cash equivalents divided by total assets.
GDP growth	Annual GDP growth rate (country-level).
Inflation	Consumer price index inflation rate (country-level).

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Table 3 shows descriptive statistics for all variables. Investment inefficiency varies significantly among firms, whereas ESG scores exhibit considerable dispersion, reflecting the diverse ESG maturity present in Asian markets. The agency cost is different for each company, which means that executive pay structures in Asian markets are very different from one another.

Table 3. Descriptive statistics.

Variables	N	Mean	SD	Min.	Median	Max.
ESG	21,019	46.204	19.663	0.260	46.170	95.180
Investment inefficiency	21,019	0.014	0.018	0.000	0.009	0.191
Overinvestment	21,019	0.007	0.016	0.000	0.000	0.191
Underinvestment	21,019	0.007	0.013	0.000	0.000	0.171
Cash holdings	21,007	0.127	0.117	0.001	0.095	0.634
Leverage	21,019	0.464	0.203	0.066	0.461	1.026
Firm size	21,019	21.753	1.699	16.279	21.793	25.281

Variables	N	Mean	SD	Min.	Median	Max.
ROA	20,948	0.052	0.077	-0.270	0.050	0.320
Tobin's Q	20,997	1.999	1.950	0.475	1.295	12.133
Agency cost	14,150	0.050	0.061	0.001	0.030	0.438
Social score	21,018	45.204	24.015	0.050	44.070	98.630
Governance score	21,019	49.161	21.832	0.370	49.220	98.340
Environmental score	21,018	43.646	25.983	0.000	43.380	99.130
GDP growth	21,019	3.909	3.429	-9.518	3.992	12.001
CPI	21,019	3.092	7.152	-2.079	1.974	72.309

The number of observations differs across variables because of data availability in LSEG Refinitiv. In particular, the agency cost variable has fewer observations because managerial compensation data are not consistently available across all Asian countries and years. Therefore, the mediation analysis involving agency cost is limited to firm-year observations with available managerial compensation data.

4.2. Correlation Analysis

Table 4 reports the key variables that are related to each other. The correlations between ESG and investment inefficiency are negative, which supports the expected negative relationship that is the basis of H1. There are also positive correlations between ESG and firm size, which is consistent with the well-known fact that bigger companies tend to share more ESG information. The positive correlation between ESG and agency cost suggests a potential positive relationship between ESG and compensation. The negative correlation between agency cost and investment inefficiency offers initial validation for the agency-cost mediation channel. There is no evidence of pairwise correlation found among the independent variables that is higher than 0.392 (firm size and managerial compensation), which is below the usual levels for multicollinearity.

Table 4. Correlation matrix.

Variables	ESG	Ineff	Agency cost	CASH	LEV	SIZE	ROA	TOBINSQ
ESG	1.000							
Ineff	-0.067***	1.000						
Agency cost	0.106***	-0.038***	1.000					
CASH	-0.063***	-0.059***	0.052***	1.000				
LEV	0.118***	-0.044***	-0.061***	-0.253***	1.000			
SIZE	0.351***	-0.161***	-0.327***	-0.104***	0.347***	1.000		
ROA	0.040***	0.030***	0.130***	0.136***	-0.345***	-0.058***	1.000	
TOBINSQ	-0.063***	0.077***	0.277***	0.177***	-0.206***	-0.297***	0.392***	1.000

Note: Pearson correlation coefficients are reported. *** indicates statistical significance at the 1% level.

4.3. Main Regression Results

Table 5 reports whether firms with better ESG scores invest more efficiently using fixed-effects regression results with Driscoll-Kraay standard errors. Columns (1)–(3) use overall investment inefficiency as the dependent variable to examine overall investment inefficiency; columns (4)–(6) use overinvestment, and columns (7)–(9) use underinvestment. The first specification in each set uses simply ESG, the second adds firm-level controls, and the last adds country-level controls.

As shown in Columns (1)–(6), ESG is negatively and significantly linked to investment inefficiency, which is overinvestment. These findings remain unchanged after accounting for macroeconomic conditions, suggesting that the main result is not explained by differences in economic environments across countries. The evidence supports H1 and implies that companies with stronger ESG practices are less prone to overinvestment. In addition, the magnitude of the effect is economically relevant, increasing ESG performance by one-standard-deviation (approximately 19.66 points, see Table 3) is associated with a reduction in investment inefficiency of about 0.0008 (calculated as 19.66×0.00004), which equates to approximately 5.6% of the sample mean of 0.0144. For overinvestment, the same one-standard-deviation increase in ESG corresponds to a reduction of approximately 0.0010 (19.66×0.00005), or about 13.5% of the overinvestment sample mean of 0.0073. While these effects are economically modest, they are non-negligible given that investment inefficiency is driven by many firm-specific frictions beyond ESG.

By contrast, the ESG coefficient in columns (7)–(9) is statistically insignificant for underinvestment. There is a pattern in the asymmetry that comes in line with agency theory (Jensen, 1986; Jensen & Meckling, 1976) where ESG does not appear to reduce investment shortfalls; instead, it constrains excessive investment. In other words, ESG appears to function mainly as a governance and monitoring mechanism that limits managerial discretion over free cash flow, therefore reducing overinvestment (Richardson, 2006) rather than as a mechanism that helps firms that are struggling to access external financing (Kaplan & Zingales, 1997; Myers & Majluf, 1984).

This result extends prior single-country evidence to a broader Asian setting and confirms that firms with stronger ESG experience lower levels of investment inefficiency, and this is mainly because they overinvest less, not because they underinvest less. This pattern is consistent with agency theory: when firms adopt stronger ESG practices, managers have less room to spend freely on investments that benefit themselves rather than shareholders (Jensen, 1986; Jensen & Meckling, 1976). Bilyay-Erdogan et al. (2024) report a similar finding, documenting that ESG engagement decreases overinvestment. Benlemlih and Bitar (2018) also provide support through claims that the presence of closer monitoring of managerial conduct could, in turn, yield more efficient investment decisions.

ESG does not show a significant effect on underinvestment, and this needs further analysis, as it stands in great contrast to findings drawn from studies focused specifically on Chinese firms. Li et al. (2024) and Donghui et al. (2025) found that the governance dimension of ESG can reduce overinvestment, while the aspect whereby firms with strong ESG performance can more readily access external financing helps to solve underinvestment. The observed effect may suggest that underinvestment in Asia carries a broader nature, where the core problem lies in financing frictions or insufficient disclosure of information for investors to build confidence in firms. There are also reasons why ESG may be unable to resolve issues such as underdeveloped capital markets and insufficient institutional enforcement in certain countries (OECD, 2025).

To conclude, ESG adoption within firms may serve as a more effective solution for restraining overinvestment than for solving underinvestment.

Table 5. Main regression results: ESG and investment inefficiency.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ineff	Ineff	Ineff	Over	Over	Over	Under	Under	Under
ESG	-0.001** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	-0.001** (0.001)	-0.001** (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
SZ		-0.001 (0.001)	-0.001 (0.001)		0.001** (0.001)	0.001** (0.001)		-0.001*** (0.001)	-0.001*** (0.001)
LEV		-0.002 (0.003)	-0.002 (0.003)		0.006*** (0.002)	0.007*** (0.002)		-0.008*** (0.001)	-0.008*** (0.001)
ROA		0.004** (0.002)	0.004*** (0.002)		0.019*** (0.003)	0.018*** (0.002)		-0.015*** (0.002)	-0.014*** (0.001)
TOBINSQ		0.001 (0.001)	0.001 (0.001)		0.001*** (0.001)	0.001*** (0.001)		-0.001*** (0.001)	-0.001*** (0.001)
CASH		-0.006*** (0.002)	-0.005*** (0.002)		-0.026*** (0.002)	-0.025*** (0.002)		0.020*** (0.002)	0.020*** (0.002)
GDP			-0.001 (0.001)			0.001** (0.001)			-0.001*** (0.001)
INF			0.001 (0.001)			0.001* (0.001)			-0.001** (0.001)
_cons	0.016*** (0.001)	0.019 (0.011)	0.021* (0.012)	0.010*** (0.001)	-0.016 (0.011)	-0.012 (0.009)	0.007*** (0.001)	0.034*** (0.009)	0.033*** (0.008)
Observations	21019	20914	20914	21019	20914	20914	21019	20914	20914
R-squared	0.001	0.002	0.002	0.001	0.014	0.015	0.001	0.018	0.020
F-stat	5.258	18.611	139.308	7.790	4339.888	2440.446	0.225	407.419	34704.833

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1. Values smaller than 0.001 in absolute magnitude are displayed as 0.001. The relatively large F-statistics in several specifications are produced by the Driscoll-Kraay standard error correction under the panel structure and should not be interpreted as evidence of model misspecification. The values have been verified against the Stata output.

Although the R-squared values in Table 5 are relatively low, this is consistent with prior studies on investment inefficiency, such as Lamont et al. (2001), and indicates that investment inefficiency is determined by many firm-specific factors beyond ESG performance.

4.4. Mediation Results: Agency Cost and Financial Constraints

The findings from the mediation analysis incorporating year and industry fixed effects are reported in Table 6. Columns (1) through (3) examine the mediation pathway operating through agency costs, while columns (4) through (6) do the same for the financial constraint's pathway.

A positive correlation between ESG and agency costs is shown in Column (1) of the agency cost pathway. This indicates that firms with stronger ESG performance tend to offer higher pay to their executives, as agency cost is proxied by management compensation in this study. Column (2) further shows that higher agency costs are associated with lower investment inefficiency, suggesting that management compensation is aligned with efforts to reduce investment inefficiency. Pay programs in corporations are a good example of the mediating effect. Good ESG policies are typically found in better-run companies where compensation schemes are designed to encourage executives to act in alignment with shareholder interests (Ang et al., 2000; Core et al., 1999; Hartzell & Starks, 2003).

We recognize that managerial compensation is an imperfect proxy for agency costs. The positive relation between ESG performance and compensation, and the negative relation between compensation and inefficiency are consistent with an incentive-alignment perspective but do not preclude other reasons. Better-ESG performers may hire more-skilled executives who are paid more, and they may be more efficient in their investments so that compensation becomes a correlated variable, not a direct cause. The Sobel test ($z = -4.485$, $p < 0.01$) and the bootstrap 95% confidence interval without zero statistically suggest the mediation. However, this causal interpretation must be weighed against the limits of this proxy. The financial constraint channel. Column (4) presents the positive correlation between ESG and the KZ index. Column (5) presents the negative correlation between the KZ index and investment inefficiency. This pattern is counterintuitive because higher financial constraints are generally expected to reduce investment efficiency. However, this result should be interpreted with caution because the KZ index may reflect firms' financial policies rather than actual external financing constraints. Farre-Mensa and Ljungqvist (2016) argue that commonly used financial-constraint indices, including the KZ index, may classify firms as constrained even when they are still able to raise external financing. In this study, the positive relationship between ESG and the KZ index may therefore indicate that high-ESG firms adopt more conservative financial policies, rather than that they face stronger actual financing constraints. To address this concern, Section 4.5.5 provides an additional robustness test using the SA index as an alternative measure of financial constraints. Overall, the mediating effect through agency costs is much stronger than through financial constraints. Given that ESG works primarily through governance mechanisms to reduce overinvestment rather than by easing the financing frictions that tend to drive underinvestment, this is not surprising. These findings suggest that in Asian markets, improved corporate governance is the main path through which ESG translates into more efficient investment, not greater access to capital.

Table 6. Mediation analysis: Agency cost and financial constraints.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Agency Cost	Ineff	Ineff	KZ	Ineff	Ineff
ESG	0.001*** (0.001)		-0.001*** (0.001)	0.035*** (0.010)		-0.001*** (0.000)
Agency cost		-0.030*** (0.003)	-0.001*** (0.001)			
KZ					-0.001** (0.001)	-0.001*** (0.001)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Agency Cost	Ineff	Ineff	KZ	Ineff	Ineff
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Sobel Z	-4.485***			-1.939*		
Bootstrap (1000) 95% interval	[-0.001, -0.001]			[-0.001, -0.001]		
Observations	20,913	20,913	20,913	15,509	15,509	15,509
R-squared	0.193	0.043	0.043	0.254	0.056	0.058

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1. Values smaller than 0.001 in absolute magnitude are displayed as 0.001.

4.5. Robustness Tests

4.5.1. Alternative Investment Inefficiency Measurement

As a robustness test, Table 7 reconstructs investment inefficiency using a different way of estimating expected investment developed by Biddle et al. (2009). Unlike Richardson (2006), the Biddle model takes a simpler approach by using only a single predictor to estimate what a firm's investment should be:

$$Investment_{ijt} = \beta_0 + \beta_1 SalesGrowth_{ij,t-1} + \varepsilon_{ijt} \quad (5)$$

Where $SalesGrowth_{ij,t-1}$ is the percentage change in revenue for firm i in country j in the prior year. The residuals from this model provide an alternative measure of investment inefficiency.

Results in Table 7 show that the main conclusion remains unchanged. ESG remains negatively affecting investment inefficiency and overinvestment across all specifications, while the coefficient for underinvestment remains statistically insignificant. This confirms that the asymmetric ESG effect is not driven by the choice of investment benchmark model.

Table 7. Robustness: Alternative Investment Inefficiency Measure.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ineff	Ineff	Ineff	Over	Over	Over	Under	Under	Under
ESG	-0.001*** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)
_cons	0.035*** (0.001)	0.036* (0.019)	0.042** (0.018)	0.053*** (0.002)	0.020 (0.062)	0.037 (0.062)	0.025*** (0.001)	0.041*** (0.011)	0.042*** (0.010)
Firm Control variables	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Country control variables	No	No	Yes	No	No	Yes	No	No	Yes
Observations	21019	20914	20914	7872	7844	7844	13147	13070	13070
R-squared	0.003	0.011	0.012	0.009	0.041	0.042	0.001	0.007	0.007
F-stat	38.876	591.233	351.265	49.559	986.902	1410.553	7.785	885.233	2,325.334

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1. Values smaller than 0.001 in absolute magnitude are displayed as 0.001.

4.5.2. Lagged ESG Specification

One concern with the main results is that ESG improvements and their effects on how firms invest may not happen in the same year. It may take time for governance changes to actually influence managerial behaviour and investment decisions (Li et al., 2024; Wang et al., 2022). Table 8 re-estimates the main regressions using prior-year ESG scores to assess whether the results hold when allowing for the possibility that ESG effects take time to materialize rather than occurring immediately.

Lower investment inefficiency and overinvestment continue to show a relationship with ESG scores from the prior year. A consistent trend is observed between Table 8 and Table 5 in the underinvestment section, where the coefficient remains insignificant. This test provides reassurance that the results we obtained are valid even when the timing is adjusted.

Table 8. Robustness: Lagged ESG specification.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Ineff	Ineff	Over	Over	Under	Under
L.ESG	-0.001*** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	0.001 (0.001)	0.001 (0.001)
_cons	0.015 (0.011)	0.023** (0.011)	-0.085 (0.057)	-0.065 (0.055)	0.040*** (0.014)	0.041*** (0.012)
Firm Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Country control variables	No	Yes	No	Yes	No	Yes
Observations	16717	16717	6177	6177	10540	10540
R-squared	0.009	0.010	0.042	0.044	0.007	0.007
F-stat	1469.815	227.409	571.674	130.124	209.243	820.849

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05.

4.5.3. Country-Level Analysis

Table 9 presents the results of analyses conducted separately for each country. Findings have shown that ESG is only effective in reducing investment inefficiency in 9 out of 15 countries. This irregularity is understandable given that each of the 17 Asian countries has its own legal conditions, regulations, and governance systems. Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) explain that countries with developed capital markets and better corporate governance tend to provide stronger legal protections that benefit investors.

Interestingly, ESG has more influence in countries with weaker governance. This evidence is consistent with the expectation that firms adopting ESG in weaker governance environments are perceived as more transparent and accountable, thereby gaining greater credibility from such adoption. In contrast, in countries with already-advanced governance, such as Japan, good governance standards have become a common standard, meaning that improvements in ESG scores no longer deliver a significant impact, since firms there are already operating at a high level.

Table 9. Country-level regressions.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	China	Hong Kong	India	Indonesia	Israel	Japan	Korea	
ESG	-0.001 (0.001)	-0.001* (0.001)	-0.001*** (0.001)	-0.001** (0.001)	-0.001*** (0.001)	0.001 (0.001)	-0.001 (0.001)	
_cons	0.033** (0.014)	-0.029 (0.026)	0.041*** (0.010)	0.118 (0.117)	-0.046** (0.022)	-0.006 (0.039)	0.104*** (0.036)	
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Obs.,	6466	1090	2513	427	215	3493	1068	
R-squared	0.003	0.018	0.008	0.082	0.003	0.013	0.198	
Variables	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Malaysia	Philippines	Saudi Arabia	Singapore	Taiwan	Thailand	Turkey	UAE
ESG	-0.001*** (0.001)	-0.001** (0.001)	-0.001*** (0.001)	-0.001*** (0.001)	-0.001 (0.001)	-0.001*** (0.001)	0.001 (0.001)	0.000 (0.001)
_cons	-0.124*** (0.042)	-0.374*** (0.085)	0.045 (0.050)	-0.083 (0.065)	0.010 (0.044)	0.041 (0.046)	0.121* (0.062)	0.135*** (0.045)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.,	1675	196	244	577	1240	896	498	184
R-squared	0.008	0.059	0.064	0.029	0.012	0.030	0.029	0.102

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1. Values smaller than 0.001 in absolute magnitude are displayed as 0.001. Note: Kuwait and Vietnam are excluded from the country-level regressions because each country has fewer than 100 firm-year observations, with 51 and 81 observations respectively. The limited sample size may produce unstable country-specific estimates.

4.5.4. Robustness Test: Excluding China Observations

Because China represents the largest share of the sample, we repeat the baseline estimation procedure for the regression after excluding Chinese firms. This additional test is conducted to make sure that the main findings are not influenced by the dominance of one country in the sample. Table 10 reports the results for investment inefficiency, overinvestment, and underinvestment after China is removed from the sample.

Table 10. Robustness test excluding China: Baseline regression results.

Variables	Investment inefficiency	Overinvestment	Underinvestment
ESG	-0.001*** (0.001)	-0.001*** (0.001)	-0.001 (0.001)
Firm size	-0.001 (0.001)	0.001* (0.001)	-0.001* (0.001)
Leverage	-0.001 (0.003)	0.011*** (0.001)	-0.011*** (0.002)
ROA	0.005** (0.002)	0.017*** (0.002)	-0.012*** (0.002)
Tobin's Q	-0.001 (0.001)	0.001*** (0.001)	-0.001*** (0.001)
Cash holdings	-0.007*** (0.001)	-0.030*** (0.002)	0.023*** (0.003)
GDP growth	-0.001 (0.001)	0.001* (0.001)	-0.001*** (0.001)
CPI	0.001 (0.001)	0.001** (0.001)	-0.001*** (0.001)
Constant	0.023 (0.015)	-0.019 (0.015)	0.042** (0.017)
Observations	14,448	14,448	14,448
Pseudo R-squared	0.003	0.016	0.022

Note: Standard errors are in parentheses *** p<0.01, ** p<0.05, * p<0.1. Values smaller than 0.001 in absolute magnitude are displayed as 0.001.

The results in Table 10 show that ESG remains negatively associated with total investment inefficiency and overinvestment after excluding China, as indicated by the ESG coefficients of -0.00007 and -0.00006, respectively. By contrast, the ESG coefficient for underinvestment is -0.00001 and does not show statistical significance. These findings are consistent with the full-sample results and suggest that the asymmetric effect of ESG is not solely driven by Chinese firms. To further examine whether the mediation results are also robust, we re-estimate the mediation models after excluding China. Table 11 reports the results for the agency cost and financial-constraint channels.

Table 11. Robustness test excluding China: Mediation analysis.

Variables	Agency cost	Investment inefficiency	KZ index	Investment inefficiency
ESG	0.001*** (0.001)	-0.001 (0.001)	0.062*** (0.007)	-0.001** (0.001)
Agency cost		-0.027*** (0.003)		
KZ index				-0.001 (0.001)
Control variables	Yes	Yes	Yes	Yes
Observations	8,824	8,824	10,517	10,517
R ²	0.186	0.063	0.045	0.043
Sobel Z	-8.274***		-0.884	
Proportion mediated	0.891		0.033	

Note: Standard errors are in parentheses; *** p<0.01, ** p<0.05. Values smaller than 0.001 in absolute magnitude are displayed as 0.001.

Table 11 shows that the agency cost channel remains supported after excluding China. ESG is positively associated with agency cost, as shown by the coefficient of 0.000683. Agency cost is also negatively associated with investment inefficiency, with a coefficient of -0.026846. The Sobel test further confirms this mediation effect, with a Sobel Z-value of -8.274 and a mediated proportion of 89.1%.

In contrast, the KZ-based financial constraint channel is not statistically supported. Although ESG is positively associated with the KZ index, with a coefficient of 0.061974, the KZ index coefficient on investment inefficiency is -0.000011 and does not show statistical significance. The Sobel Z-value is only -0.884, while the mediated proportion is 3.3%. Overall, these data indicate the results are not driven by China, and the agency cost remains a stronger mediating route than the financial constraints.

4.5.5. Alternative Financial Constraint Measure: SA Index

To deal with the concern that the KZ index may measure conservative financial policy rather than actual financing constraints, we perform another robustness test. This study also employs the SA index to capture financial constraints. In contrast to the KZ index, the SA measure is based exclusively on firm size and firm age, which Hadlock and Pierce (2010) identify as useful predictors of financial constraint levels. The results are reported in Table 12. ESG is negatively associated with the SA index, and the SA index is positively associated with investment inefficiency. The Sobel test also supports the mediation effect with a Z-value of -8.396. However, the proportion of mediation is 43.9%, which is less than the agency-cost channel. This result suggests that financial constraints are still a relevant path, but agency cost is still the stronger and more consistent channel of mediation between ESG performance and investment efficiency.

Table 12. Robustness test using SA index.

Variables	Investment inefficiency	SA Index	Investment inefficiency
ESG	-0.001** (0.001)	-0.005*** (0.001)	-0.001 (0.001)
SA Index			0.002*** (0.001)
Control variables	Yes	Yes	Yes
Observations	20,914	20,914	20,914
R-squared	0.035	0.846	0.039
Sobel Z		-8.396***	
Proportion mediated		0.439	

Note: Standard errors are in parentheses; *** p<0.01, ** p<0.05. Values smaller than 0.001 in absolute magnitude are displayed as 0.001.

5. CONCLUSIONS

To further examine the relationship between ESG performance and investment efficiency, this study investigates the mediating roles of agency costs and financing constraints. The results indicate that firms with stronger ESG performance exhibit lower levels of investment inefficiency, suggesting a negative association between ESG performance and investment inefficiency, with the effect leaning more toward overinvestment than underinvestment. It can be concluded that ESG is capable of moderating capital allocation, so that firms do not invest excessively, but it does not resolve the problem of underinvestment.

From the mediation analysis, it was found that ESG influences investment efficiency through two channels, namely agency cost and financing constraints. However, the agency-cost channel proved to be more influential. This means that ESG has the greatest impact when it successfully improves managerial behaviour and reduces conflicts of interest within the firm.

From these findings, there are three important points worth noting. First, implementing ESG alone is not sufficient, as ESG will work better when accompanied by sound monitoring and an incentive system that motivates

managers to make decisions that maximize firm value. Secondly, investors will benefit, as a high ESG-score firm will be less likely to invest excessively, especially in a growing market where governance is still weak. Finally, the idea of pushing firms just to satisfy requirements or boost their ESG scores is not as impactful as implementing policies that will better structure corporate governance, especially in capital allocation.

This study is subject to three limitations. First, the sample includes firms from 17 Asian countries, each with different legal conditions, regulations, and business cultures, which may cause the results to be less specific to each context. Second, agency cost in this study is measured using managerial compensation. In reality, the relationship between managers and shareholders is complex, and executive pay cannot be the sole factor to explain all of this. Third, firms have internal financial policy choices, and it could be mistaken as difficulty in obtaining external funding; thus, the KZ index should be used and examined accordingly. In the future, there are several points that could be further investigated, such as exploring alternative mediation channels that have not been tested, using other measures of financing constraints, or applying more sophisticated statistical methods, so that relationships between variables can become more valid and convincing.

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