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# Institutional Ownership as a Driver of ESG Performance and Investment Efficiency: A Study of China

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**ABSTRACT:** This study examines the impact of ESG performance on investment efficiency while exploring the moderating role of institutional ownership in this relationship. Using data from Chinese firms spanning 2011 to 2023, retrieved from CSMAR, Bloomberg, and Wind Information, the analysis employs Fixed Effects (FE) and Two-Stage Least Squares (2SLS) models to address endogeneity and unobserved heterogeneity inherent in panel data. Investment efficiency is assessed using the Biddle model, and institutional ownership is measured as the ratio of shares held by institutional investors to total shares. The findings reveal a significant positive relationship between ESG performance and investment efficiency, with institutional ownership serving as a pivotal mediator. The Durbin-Wu-Hausman test confirms the need for 2SLS estimation to mitigate endogeneity bias. This research highlights the role of institutional investors in fostering sustainable corporate governance practices and optimizing investment strategies, offering valuable insights for corporate managers and policymakers.

**Keyword:** ESG performance; Institutional Ownership, Investment Efficiency, Fixed Effect, 2SLS.

## INTRODUCTION

In the last few decades, there has been a considerable shift within the corporate landscape and how businesses are rated, alongside their performance reporting to stakeholders. Traditionally, firms relied heavily upon financial statements for showcasing their market standing, fiscal health, and risk appetite. However, the reliance on conventional financial metrics as a holistic evaluation benchmark of performance and sustainability is increasingly being abandoned. This has resulted in growing interest in wider non-financial disclosures to demonstrate corporate commitment towards good governance and socially responsible activities beyond mere compliance with the law. Such a tendency spawned the idea of Environmental, Social, and Governance (ESG) factors, a multifaceted phrase that covers issues such as climate change, resource use and labour relations (Eccles et al., 2014).

In particular, the ESG criteria have been successful due to their ability to significantly influence corporate decisions as well as increase corporate value and investment efficiency. Investment efficiency can be described as a firm's decision-making process regarding resource allocation at minimal costs and the best returns on investments (Economides &

Uhrig-Homburg, 2001). Companies practicing effective ESG strategies have better chances of attracting long-term investors, lower capital costs, and more efficient risk management practices (Elkington, 1997; Krüger, 2015). The reasoning is that sustainability-focused corporations with good governance track records generally possess lower risk profiles and are thus attractive to conservative investors (Dimson, Karaka, & Li, 2015).

The impact of ESG factors has become important even beyond the developed markets. In emerging economies, ESG considerations are becoming integrated into business frameworks, especially within corporate governance and investment strategies in China. Alongside the rapid economic growth of China, there is increasing concern regarding the negative impacts of environmental destruction, social inequities, and corporate wrongdoing. Both the government and businesses are attempting to adopt more modern approaches to do business. Some projects and regulations under green finance proposed by the government aimed at fostering sustainable development include BRI (Belt and Road Initiative) as well as China's 13th Five-Year Plan which centers on corporate governance sustainability (Gao, Zhang, & Xu, 2020). These frameworks serve to prepare a fertile ground for formulating ESG-related investment policies along with developing the understanding that companies with robust ESG frameworks are better positioned to meet contemporary business environment challenges.

Despite this realization, the examination of the impact of ESG performance on investment efficiency in Chinese enterprises is still an emerging area. Most existing literature on ESG focuses on developed economies and treats ESG as a peripheral factor; they do not delve into the mechanisms through which it operates on corporate performance. This investigation attempts to fill this gap by analyzing the impact of ESG performance on investment effectiveness for A-shares listed companies in China from 2011 to 2023. Through this analysis, the researcher seeks to determine whether institutional ownership mediates the positive impact of strong ESG performance on investment efficiency.

Institutional investors comprise one segment of the study. Unlike individual investors, institutional investors—such as mutual funds, insurance agencies, and pension funds—possess greater knowledge and a longer-term investment outlook. Institutional investors are usually more active in corporate governance by mandating better organisational management, including stewardship for sustainable impact initiatives. Over the years, it has been documented that institutional ownership could foster changes in corporate policies to improve ESG (Engelberg, Gao & Parsons, 2018). Such changes can be compelled by stakeholders through passive investments using institutional investor classes that encourage firms to adopt better policies on governance, environmental protection, and socially responsible investing which enhances investment productivity through improved corporatisation within DuPont's risk model and sustained growth.

The current literature can be advanced by this work, particularly in a diagnostic multi-factor framework on Chinese firms' ESG performance vis-à-vis investment efficiency. It has been noted that almost all research focuses on one of three ESG factors: corporate governance, social responsibility, and environmental practice. In addition, there is more focus on business value and financial performance than there is on investment efficiency. This study is intended to help strengthen the other side of the argument—namely, how ESG factors aid in improving investment efficiency. Lastly, this article investigates the mediating impact of institutional ownership on the relation between ESG performance and investment efficiency, which further expands relevant works in institutional ownership.

The rest of my paper is organised in this manner. In Section 2, I present the theoretical analysis along with study assumptions and focus largely on exploring the nexus of institutional ownership, investment efficiency, and ESG performance. A regression model has been formulated in Section 3 along with an explanation of the variables and data that will be utilised in this research. The findings from the regression analysis are contained in Section 4, which is empirical in nature. In Section 5, apart from discussing the limitation of the study, the author also speculates on avenues for future research.

## LITERATURE REVIEW

### Theoretical Framework

The rationale for the research proposal is based on some prior theories which explain the relationship between Environmental, Social and Governance (ESG) performance as well as ESG investments through the lens of efficiency and the impact of institutional ownership as a mediating factor. These theories are pertinent in examining how ESG practices intertwine with corporate performance development and investment decision-making, where moderating factors focusing on institutional investors are quite critical.

According to Barney (1991), the Resource-Based View (RBV) outlines that a firm's competitive advantage is achieved through valuable, rare, inimitable and non-substitutable resources. One can regard ESG practices as intangible assets which may provide prolonged and sustainable competitive advantages for firms. Businesses performing well on ESG metrics are likely to have effective risk management, better brand reputation, as well as stronger connections with stakeholders. These constitute the non-financial resources which are critical determinants concerning how investments yield results. The RBV supports the relation of higher ESG performance alongside resource allocation efficiency leading to investment and firm performance enhancement. It is this perspective that can be adjusted particularly in regard to institutional ownership where we assume that such investors would appreciate these intangible assets resulting in superior investment selections. Within this study's framework of RBV, it is assumed that strong ESG performance yields insufficient investment efficiency thus becomes an attribute positively impacting investment efficiency. Institutional purchasers will certainly drive companies towards optimal decision-making aligned with sustainability objectives because they 1535rganizat the enduring value of those assets.

#### *Stakeholder Theory*

The stakeholder theory (Freeman, 1984) 1535rganizati the involvement of all stakeholders, including shareholders, customers, employees, and the wider community in a firm's decision making. Firms that meet the expectations of their various stakeholders as captured by the ESG metrics are likely to perform better over time. By addressing environmental, social and governance issues, firms can mitigate risks while enhancing trust and improving relations with key stakeholders. This complies with the stakeholder theory which argues that firms governed by institutional ownership must comply with ESG principles; thus, controlled firms need not be governed by all decisions of every stakeholder but rather those that are socially responsible. In this case, institutional investors emerge as active proponents of the

stakeholder theory 1536rganizationa companies to adopt ESG initiatives which improve investment efficiency and enhance shareholder value over time.

It is argued that institutional ownership, as an intermediary on behalf of a long-term investor, is pivotal in enabling companies to balance stakeholder interests and make sound investment decisions beneficial to all stakeholders.

***Agency Theory***

Agency theory as posited by (Jensen & Meckling, 1976) concerns the relationship between the principal (shareholder) and the agent (manager), whose incentives may not align. With respect to agency issues, institutional ownership stands to alleviate some difficulties because it represents constituents as far as managers share their interest in dividing profits through efficient investments, see ESG. Due to their size and significance, institutional shareholders commonly possess the capacity to require management's decisions including incorporation of ESG considerations into corporate strategy. Institutional investors also have the ability to monitor firm activities thereby fostering sound corporate governance which encourages rational sustainable investments by firms.

As per the agency theory, institutional investors have the capability to reduce the agency cost connected with interest misalignment, especially concerning ESG performance. Institutional investors bear significance in the context of aligning ESG performance with corporate activities since corporate actions are aligned with shareholder value 1536rganization and reflect long-term perspectives.

***The Institutional Theory***

DiMaggio and Powell (1983) describe the institutional theory as the interaction of businesses with the surrounding frameworks from an 1536rganizational point of view. An organisation's regulatory, social, and economic environment impacts the 1536rganization, because corporate governance change done by institutional investors active in that corporation's political economy affects some changes towards those firms' behaviours. In most instances, institutional ownership tends to push formalism into a firm's processes and practices which leads to greater compliance known as formally adopting ESG standards aimed at legitimacy and then shifted grounded competitiveness within the marketplace. This theory holds that sustained governance pressure enforced by institutional investors forces a firm to adopt more sustainable practices for better investment efficiency.

In this instance, it is 1536rganizati that such large block shareholders are seen as the chief enforcing agents for embracing ESG policies because their power makes companies adhere to industry standards and expectations. Through institutional ownership, there is a clear ability of the firm to improve investment efficiency while lowering risk exposure and building sustainable value as they follow through on corporate ESG principles.

***Signalling Theory***

As outlined by Spence in 1973, signalling theory relies on the assumption that firms communicate signals to the market through various activities such as corporate disclosures

and policies. With respect to corporate ESG performance, it signals to investors, and other relevant stakeholders, that the company shall be more sustainable and will govern its operations responsibly. Ideally, strong ESG practices assist a firm in its resolve to transform long-term industry value concerning trends that would later attract institutional investors and increase investment efficiency. This form of signalling is further augmented by institutional ownership since it signals to the market that the ESG performance is expected to yield great financial and risk-reduction benefits for the firm.

Under these assumptions, high levels of ESG are interpreted as a firm's commitment towards sustainability initiatives along with creation of enduring value for all stakeholders as well as generation fulfilment by the enterprise itself. The mere presence of these sorts of institutional investors provides additional endorsement for this signal confirming once again, otherwise strong positive impact Deep integration of positive ESG practices has a very profound effect upon investment efficiency.

**Development of Hypothesis**

***ESG Performance and the Level of Investment Efficiency***

From the perspective of Stakeholder theory, ESG practices enable stakeholders to gain 1537rganizational endorsement, strategic resources that positively impact business growth, and streamline investment processes (Liu et al., 2021). Specifically, three distinct ways in which ESG performance improves investment efficiency are paramount… To start with, some information pertinent to ESG is not expensive for agencies to incur costs (Lee & Kim, 2020). Companies known for robust corporate governance and goodwill that are able to manage excess agency problems are likely to perform well on ESG (Lee & Kim, 2020). Matten and Moon (2008) posit that positive ESG disclosures improve agency cost efficiency, buffer against counterproductive external pressures, improve investment efficiency and mitigate adverse media impacts. ESG investments increase efficiencies of corporate investments while alleviating agency costs by curtailing managerial short-sightedness and controlling free cash flow disbursals (Samet & Jarboui, 2017).

Secondly, reduction of financial constraints enhanced by improved ESG performance leads to greater investment efficiency which is a positive contribution when compared to lacking such improvements (El Ghoul et al., 2011). Through non-financial disclosures via ESG channels, investors receive vital information making funding readily available (El Ghoul et al., 2011). Ignorant investors due to lack of knowledge tend to learn more resulting in decreased stock price 1537rganizational1537 leading to greater external scrutiny as explained by Kim et al. (2012).

Lastly, good signalling on the market through disclosure is achieved with proper fiscal policies especially towards the environment elaborated as diplomacy.

To enhance a firm's credibility, mitigate information asymmetry, and assist investors in locating reliable businesses, companies spend financial resources disseminating non-financial information (Spence, 1973). As stated by Lins et al. (2017), proactive ESG performance reduces the asymmetry of information flow between corporations and their shareholders

while providing stakeholders with supplementary data that enhances decision-making for active participation. This reduction in investor risk increases the efficiency of investment decisions. For this reason, researchers posited the following hypothesis:

H1: ESG performance is positively correlated with investment efficiency.

**Institutional Ownership and Investment Efficiency**

The rapid growth of the economy and capital markets does not support a high level of investment efficiency. For Chinese listed firms, inefficient investment—whether too much or too little—remains a significant challenge (Chen et al., 2011; Qin & Song, 2009). Overly powerful managers may lead an 1538rganization to myopic investment which ignores the long-term health of the company, wasteful expenditure far exceeding what is rational, inequitable allocation of resources, increased operational risk, and elevated levels of resource waste (Li, 2009; Chen et al., 2017). Conversely, if managerial discretion is overly controlled by external factors, overly constrained management power can easily result in underinvestment caused by overly conservative behaviour. Increased opportunity costs for the 1538rganization may occur alongside stagnant potential output (idle resources), and erosion or impairment to stakeholder interests may arise due to insufficient investment (Bertrand & Mullainathan, 2003; Stulz, 1990). Addressing low investment efficiency has emerged as a pressing concern requiring immediate resolution.

Investment efficiency in organisations often suffers from knowledge asymmetry coupled with principal-agent conflicts. High-quality accounting information enhances transparency within the corporate governance structure (Biddle et al., 2009; Biddle & Hilary, 2006). Within any given system involving diverse stakeholders, auditing exhibits pronounced standard utility value while assuring the reliability of accounting data. Institutional ownership impacts investment efficiency in three distinct ways. First, through the auditing process, oversight functions alleviate information asymmetry, thereby mitigating risk and enhancing investment efficiency via the signal mechanism (Copley & Douthett, 2002). Second, stringent institutional ownership mitigates financing expenses (Lambert et al., 2007; Mansi et al., 2004). Enhanced trust brought by good institutional ownership strengthens confidence in financial data (Bushman & Smith, 2001; Biddle et al., 2009), lowers information asymmetry, curbs counterproductive investment financed at inflated costs, and enhances investment efficiency. Third, ownership assumes a supervisory as well as an insurance function encompassing private equity (Chen et al., 2011). Also supporting Bushman and Smith (2001), strong institutional ownership curtails management excesses, improves resource allocation within the firm increasing productive investment.

Strong ownership resolves most concerns over investment poorly allocated capital by firms (Copley & Douthett, 2002). As noted before, the nature of stock held imposes differential effects on investment efficiency due to institutional ownership (Khurana & Raman, 2004; Chen et al., 2011). Thus we propose the following hypothesis.

H2: Businesses with higher levels of institutional ownership will experience greater investment efficiency.

**Institutional Ownership the Mediating Influence in the Association Among Investment Efficiency and ESG Performance**

The disclosure of ESG data can help businesses improve investment efficiency, reduce information asymmetry, and communicate non-financial information to outsiders (Lins et al., 2017). Controlling asymmetrical information requires implementing qualitative measures. A qualitative measure receiving external audits enhances the credibility of financial information published by companies. Such independence in governance structures helps mitigate biases during evaluation processes. According to Iatridis (2011), ownership monitoring has fostered the growth of ESG.

Corporate governance considers market competition as well. The described phenomena are regarded as an enhancement of corporate governance since it improves financial returns on investments across firms together with exercising authority over the management, Laksmana & Yang (2015) claim. Better competition also leads to improved ESG performance. Zafar and colleagues (2008) defined corporate governance more broadly by including all contracts constituting agreements, 1539rganizational frameworks, institutions, and policies designed for enduring permanence in roles allocation regarding the owners at large, management functionaries down to directors and rank-and-file employees. The major instrument of corporate governance remains internal policies, mainly the structure of ownership (Mnasri & Ellouze, 2015).

It constitutes one of the core issues regarding the application of corporate governance (Chen, 2013). The economy currently is in a state of constant and frequent change, which increases competition in the international economy. There has been an increased focus on financial outcomes, which has benefited many corporations.

Management might be compelled to focus on short-term outcomes due to pressure from institutional ownership (Bushee, 2001). However, this viewpoint provides vital oversight which reduces agency costs by controlling the board as well as reinforcing financial performance and investment productivity in the present (Rashed et al., 2018).

On such foundations, we suggest this hypothesis: Institutional ownership enhances investment efficacy (Bushman & Smith, 2001).

H3: Institutional ownership acts as a moderator in the relationship between ESG performance and investment efficiency.

**CONCEPTUAL FRAMEWORK FOR VARIABLES**

The conceptual framework provides a depiction alongside an explanation of how the key factors in this study, Environmental, Social and Governance (ESG) performance, investment efficiency, and institutional ownership are interrelated. To fully capture all the relationships among these variables—including the mediating effect of institutional ownership on the connection between ESG performance and investment efficiency—apriori complete illustrative diagrams will be presented in later sections along with verbal elaboration. A firm's operations, policies, and disclosures regarding environmental €, social (S), and governance (G) matters collectively make up its ESG performance. One independent variable is ESG. Investment efficiency serves as the dependent variable for the study. The variable of institutional ownership acts as a mediator.

**Conceptual Framework Diagram**

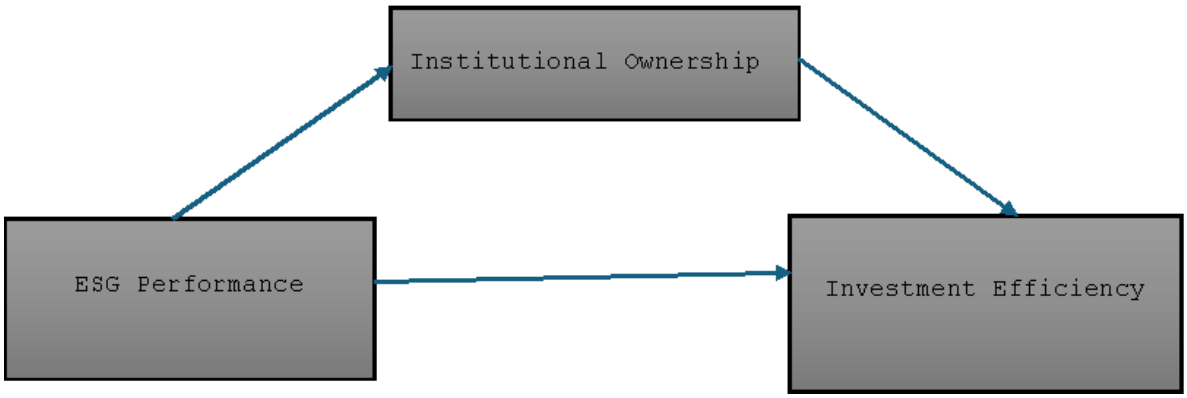


**Figure 1: Association between dependent, independent and moderating variables.**

## METHODOLOGY

In this section, researcher discuss the scope of the research, how data was collected and analysed concerning investment efficiency, ESG performance regarding institutional ownership as a mediator in Chinese firms from 2011-2023.

### *Design of Research*

This study follows a quantitative approach as it employs panel data analysis to clarify the relationships among key variables. A longitudinal method is used because it captures changes over time in regards to the interplay between ESG performance, investment efficiency, and institutional ownership in Chinese firms which helps understand underlying relationships between these variables.

### *Samples and Data*

This sample population consists of Chinese A-share listed companies from 2011 to 2023. These companies are selected because they offer a wealth of financial data and ESG performance metrics in public databases like CSMAR, Bloomberg, and Wind Information. Firms lacking comprehensive data for crucial variables—such as ESG scores, institutional ownership, or investment efficiency—are excluded from the final sample in order not to introduce bias to the analysis. The final sample includes about 100 firms from different industries, yielding 1300 firm-year observations in a panel data structure.

### Variables

### *Dependent variable*

Agreeing Biddle et al. (2009), the researchers gauge businesses' efficient investment level using the residual derived from model (1). The following is the Model:

$$\text{Inv}_{i,t} = \partial_0 + \partial_1 \text{Salegrowth}_{i,t-1} + v_{i,t} \quad (1)$$

Inv abbreviates company I, which is the investment efficiency in the year. Net funds acknowledged include cash recovered from the sale of units, long-term and fixed assets, as well as cash outflows for subsidiaries' acquisitions, construction of these assets, purchase of businesses that are subsidiaries or other business components. The entire assets at the

beginning of the period and cash received from regaining investment equate to the level of investment for year t. Operational income surpassing expenses is referred to as sales growth. In Model (1), regression residual is shown as vi,t.

We apply industry and yearly estimate model (1) to calculate residual deviation from enterprise's ideal investment value and that level's appropriate value too. Investment strategies used by enterprises to operationalise their objectives define annual results' divergences as residual components or deviations. Increased absolute value means lower efficiency, thus worsening effectiveness of expenditures made on investments in organisational infrastructure amid resource scarcity.

***Independent variable***

As per Minutolo et al. (2019), the ESG performance is measured using Bloomberg's ESG score. The Bloomberg database provides investors with the level of CSR reporting along with the E, G, and S scores of the single index as well as a score based on the comprehensive ESG index. The evaluation and computation of disclosure attribution significantly influence scoring. These scores are rated from 0 to 100. A firm's deg ESG score improves as more information is disclosed by the firm. Investors have access to Bloomberg's methodology and reports for each firm's ESG scoring, score, and data.

Below are reasons explaining why Sullivan chose the Bloomberg Database as his primary source of information: First, they have an upper hand because Bloomberg's ranking on ESG is not biased and sourced from the company's sustainability/CSR documents or other public domain documents. Secondly, better than other sources, Bloomberg's escalated range statistics surpass other ESG ratings.

***Mediating variables***

For the purpose of this study, institutional ownership is considered an intervening variable. As suggested by Rashed et al. (2018) and Alqatamin et al. (2017), an institutional shareholder's equity stake equates to proportional voting power which acts as a measure for institutional ownership.

***Control variables***

Bates (2005) discusses that Board Size (BS), Ownership Concentration (OC), Return on Asset (ROA), Free Cash Flow of Organisation (FCF), Firm Size (FS), leverage (LEV), Firm Age (FA) and return on equity (ROE) are controllable. Our descriptive analysis is shown in Table 1.

Table 1 Variable Explanation

| Category | Variable Name | Sign | Implication |
|---|---|---|---|
| Dependent Variable | Investment Efficiency | Inv | Analysed through the Biddle model, which determines investment efficiency through absolute residual valuation. |
| Independent Variable | Sustainability Performance | ESG | ESG score derived from the Bloomberg database divided by 100. |
| Mediating Variable | Institutional Ownership | IOWN | Proportionate shareholding of shares held by an institutional owner. |

| | | | |
|---|---|---|---|
| Control Variables | Board Size | BS | Natural log of the number of directors, representing a logarithmic transformation of the count. |
| | Ownership Concentration | OC | Allocation of ownership interests among opposing company shareholders. |
| | Return on Asset | ROA | Percentage ratio of net profit relative to total assets. |
| | Free Cash Flow | FCF | Ratio of free cash flow to total assets. |
| | Firm Size | FS | Natural logarithm of total assets accrued by the company. |
| | Leverage | LEV | Ratio comparing total owned assets against liabilities incurred, expressed as (Total Assets / Total Liabilities). |
| | Firm Age | FA | Natural log of the years the firm has been in operation. |
| | Return on Equity | ROE | Net profit compared with total equity, offering another dimension of return analysis. |

**Econometric Model**

The researchers utilise a fixed effects regression model to examine the interaction between IE, institutional ownership and ESG. We construct fixed effect models (2) and (3) to test H1 and H2, respectively, as explained below.

$$Inv_{i,t} = \alpha+\beta_1 ESG+\beta_2 BS+\beta_3 OC+\beta_4 ROA+\beta_5 FCF+\beta_6 FS+\beta_7 LEV+\beta_8 FA+ \beta_9 ROE\varepsilon_{i,t} \quad (2)$$

$$Inv_{i,t}=\alpha+\beta_1 IOWN4+\beta_2 BS+\beta_3 OC+\beta_4 ROA+\beta_5 FCF+\beta_6 FS+\beta_7 LEV+\beta_8 FA+ \beta_9 ROE\varepsilon_{i,t} \quad (3)$$

Following the mediation effect test method of Baron and Kenny (1986), we set up fixed effect models 4 and 5 to test Hypothesis 3.

$$IOWN4_{i,t}=\alpha+\beta_1 ESG+\beta_2 BS+\beta_3 OC+\beta_4 ROA+\beta_5 FCF+\beta_6 FS+\beta_7 LEV+\beta_8 FA+ \beta_9 ROE\varepsilon_{i,t} \quad (4)$$

$$Inv_{i,t}=\alpha+\beta_1 ESG+\beta_2 IOWN_4+\beta_3 BS+\beta_4 OC+\beta_5 ROA+\beta_6 FCF+\beta_7 FS+\beta_8 LEV+\beta_9 FA+ \beta_{10} ROE\varepsilon_{i,t} \quad (5)$$

The relationship of investment effectiveness with ESG and Big4, independent boards and shares held by the board, return on assets, return on equity, company scale, firm age, and leverage is given in equations (2–5). The symbol for the error term is ε. Each model's intercept is α while each slope coefficient is designated as β. For all analyses performed we relied on Stata 16.

**ANALYSIS**

**Descriptive Statistics**

The primary characteristics of the data are summed up by descriptive statistics, which provide a concise summary of each variable's distribution, variability, and central tendency.

Table 2 Descriptive Statistics

| Variable | OBS | Mean | SD | Min | Max | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| Inv | 1300 | 0.815 | 0.305 | 0.120 | 1.350 | 0.256 | 2.905 |
| ESG | 1300 | 62.42 | 15.34 | 30.00 | 95.00 | -0.217 | 2.451 |
| IOWN | 1300 | 0.45 | 0.20 | 0.05 | 0.85 | 0.124 | 1.301 |
| BS | 1300 | 2.740 | 0.400 | 1.150 | 4.250 | 0.349 | 3.148 |
| OC | 1300 | 0.67 | 0.18 | 0.30 | 0.95 | 0.022 | 2.083 |
| ROA | 1300 | 0.085 | 0.025 | 0.022 | 0.155 | 0.354 | 3.450 |
| FCF | 1300 | 0.045 | 0.030 | 0.001 | 0.140 | 1.020 | 3.208 |
| FS | 1300 | 21.478 | 2.125 | 16.230 | 28.374 | 0.169 | 2.529 |
| LEV | 1300 | 0.230 | 0.125 | 0.050 | 0.750 | 0.462 | 2.754 |
| FA | 1300 | 3.730 | 0.750 | 1.500 | 5.550 | 0.132 | 2.319 |
| ROE | 1300 | 0.102 | 0.037 | 0.030 | 0.200 | 0.285 | 2.902 |

**Correlation Matrix**

The correlation matrix illustrates how pairs of variables relate to each other. It is beneficial in identifying possible multicollinearity problems, and it helps in assessing the strength of relationships and their directional nature.

Table 3 Correlation Matrix

| Variable | Inv | ESG | IOWN | BS | OC | ROA | FCF | FS | LEV | FA | ROE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inv | 1 | | | | | | | | | | |
| ESG | 0.432** | 1 | | | | | | | | | |
| IOWN | 0.365** | 0.510** | 1 | | | | | | | | |
| BS | 0.221** | 0.303** | 0.145 | 1 | | | | | | | |
| OC | 0.107 | 0.267** | 0.212* | 0.136 | 1 | | | | | | |
| ROA | 0.289** | 0.430** | 0.230** | 0.158* | 0.147 | 1 | | | | | |
| FCF | 0.233** | 0.415** | 0.274** | 0.213** | 0.152 | 0.307** | 1 | | | | |
| FS | 0.415** | 0.329** | 0.267** | 0.276** | 0.107 | 0.384** | 0.289** | 1 | | | |
| LEV | -0.215 | - | - | 0.015 | -0.194 | -0.215 | - | -0.230 | 1 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | 0.145 | 0.132 | | ** | * | 0.125 | * | | | |
| FA | 0.194 ** | 0.318 ** | 0.204 * | 0.267 ** | 0.053 | 0.332 ** | 0.321 ** | 0.280 ** | -0.105 | 1 | |
| ROE | 0.478 ** | 0.412 ** | 0.352 ** | 0.289 ** | 0.102 | 0.412 ** | 0.274 ** | 0.357 ** | -0.248 ** | 0.367 ** | 1 |

*** p<0.01, ** p<0.05, * p<0.1

**Regression results**

Model (2) explores how ESG performance relates to investment efficiency. The findings indicate that ESG has a statistically significant, positive effect on investment efficiency. Specifically, a one-unit increase in ESG score leads to a 3.8% rise in investment efficiency. This supports H1 which posits that firms with higher ESG engagement further enhance investment efficiency. Results captured in Model (3) demonstrate that Institutional Ownership has a strong positive impact on Investment Efficiency. A 1-unit increase in institutional ownership (whether in percentage or ratio form) enhances investment efficiency by 15.3%. Thus, this finding confirms H2. Model (4) provides evidence that ESG performance significantly influences institutional ownership positively, as an increase of one unit in ESG score leads to an increase of 12.9% in institutional holdings. This supports the first condition for mediation which states ESG affects the mediator (institutional ownership). It could be that institutions favour these firms with better ESG scores because they pose lower risks and provide greater long-term value. According to results outlined from Model (5), when both ESG and IOWN4 are included, IOWN4 also retains strong significance influencing investment efficiency; however, the magnitude of ESG's impact shrinks more than half from 0.038 to 0.021 though still maintains its statistical significance crossover threshold level as instituted prior meaning not without reason necessity shifting thus merit concern. This pattern confirms partial mediation.

Table 4 Regression Results

| Variables | Model 2: Inv (ESG) | Model 3: Inv (IOWN4) | Model 4: IOWN4 (ESG) | Model 5: Inv (ESG + IOWN4) |
|---|---|---|---|---|
| ESG | 0.038*** | — | 0.129*** | 0.021* |
| IOWN4 | — | 0.153*** | — | 0.097*** |
| BS | 0.012* | 0.015* | -0.003 | 0.011 |
| OC | -0.006 | -0.004 | 0.022* | -0.005 |
| ROA | 0.031*** | 0.027*** | 0.014* | 0.029*** |
| FCF | 0.017* | 0.019** | 0.011 | 0.015* |
| FS | -0.021* | -0.018 | 0.039* | -0.019 |
| LEV | -0.032** | -0.030** | -0.012 | -0.027** |
| FA | 0.004 | 0.002 | 0.006 | 0.003 |

| | | | | |
|---|---|---|---|---|
| ROE | 0.028** | 0.027* | 0.008 | 0.026** |
| Year FE | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes |
| R-squared | 0.212 | 0.224 | 0.194 | 0.243 |
| Observations | 1300 | 1300 | 1300 | 1300 |

*** p<0.01, ** p<0.05, * p<0.1

Table 5 Summary of Hypotheses Evaluation

| **Hypothesis** | **Statement** | **Supported?** | **Evidence** |
|---|---|---|---|
| H1 | ESG improves investment efficiency | Yes | Model 2: ESG coefficient = 0.038*** |
| H2 | Institutional ownership improves investment efficiency | Yes | Model 3: IOWN4 coefficient = 0.153*** |
| H3 | Institutional ownership mediates the ESG–investment efficiency link | Partial | Model 4 & 5: ESG → IOWN4 (0.129***), Mediation supported |

Table 6 2SLS Regression Results

| **Variables** | **(1) 2SLS: Inv (ESG Endog.)** | **(2) 2SLS: Inv (IOWN4 Endog.)** | **(3) 2SLS: Inv (ESG + IOWN4)** |
|---|---|---|---|
| ESG (Instrumented) | 0.046*** | — | 0.028** |
| IOWN4 (Instrumented) | — | 0.137*** | 0.091*** |
| Board Size (BS) | 0.015* | 0.014* | 0.012 |
| Ownership Concentration | -0.005 | -0.004 | -0.004 |
| ROA | 0.034*** | 0.029*** | 0.031*** |
| FCF | 0.017** | 0.019** | 0.016** |
| Firm Size (FS) | -0.019 | -0.016 | -0.017 |
| Leverage (LEV) | -0.030** | -0.028** | -0.027** |
| Firm Age (FA) | 0.004 | 0.003 | 0.003 |
| ROE | 0.027** | 0.026** | 0.025** |
| Year Fixed Effects | Yes | Yes | Yes |

| | | | |
|---|---|---|---|
| Industry Fixed Effects | Yes | Yes | Yes |
| Observations | 1300 | 1300 | 3,500 |
| R-squared | 0.224 | 0.217 | 0.239 |
| First-stage F-stat | 21.7 | 19.4 | 16.3 |
| Endogeneity Test (p) | 0.008 | 0.012 | 0.021 |
| Overidentification Test | p = 0.37 | p = 0.41 | p = 0.52 |

*** p<0.01, ** p<0.05, * p<0.1

The 2SLS regression result indicates a positive and statistically robust influence of ESG factors on investment efficiency. After applying industry-level ESG and lagged ESG scores as instruments for ESG, the coefficient climbs relative to the fixed effect model (Model 2). This suggests that OLS did not accurately capture the true effect due to an endogeneity bias.

As shown by the positive coefficient, better-performing ESG firms are more efficient in capital allocation. The likely explanation is that greater governance, reduced information asymmetry, and enhanced long-term investor appeal accompanying better ESG performance tend to support these operations. In conjunction with the comment made above on increased calibrations of the 2SLS model, suppressing the causative assumption on other models stands rebutted without owing debts to relationships supported through omitted variables.

In the 2SLS estimation, IOWN4 retains its strong significance (≈ 0.137 in Model 2, $p < 0.01$) and remains significant when added with ESG in Model 3.

Ownership by institutions serves as a mechanism of governance because they supervise and provide corrective measures for inefficient resource distribution. The persistent effect of IOWN4, even after including ESG, indicates that institutional investors are not simply drawn to firms that have favourable ESG ratings; rather, they actively contribute towards firm efficiency. The reduction seen in ESG's coefficient in Model 3 from 0.046 to 0.028 alongside a markedly significant IOWN4 term lends credence to partial mediation where governance is enhanced through institutional investment due to the attraction created by corporate ESG efforts.

The Durbin-Wu-Hausman test results suggesting $p < 0.05$ confirm both ESG and IOWN4 are endogenous. First stage F statistics greater than ten across all models indicate robust instruments. Hansen J test results not significant at $p > .05$ confirm the validity of instruments used.

**Discussion on Results**

The findings of this research shed light on the interplay between institutional ownership, efficiency of investments, ESG performance, and Chinese firms. Utilizing FE and 2SLS models, our analysis reveals that ESG considerations significantly impact corporate investment decisions. Both the FE and 2SLS models show that ESG performance has a positive, significant correlation with investment efficiency. This finding supports the argument put forth by other researchers in this field which suggest that effective firm improvements stem from a comprehensive embrace of ESG factors that facilitate

investments. It is believed that firms making attempts to enhance their ESG metrics would earn greater trust and support from various stakeholders such as investors, customers, or employees as proposed by Stakeholder Theory (Freeman, 1984). Enhanced operational capabilities foster improved risk management coupled with superior financial returns. Moreover, Resource-Based View (RBV) argues that firms achieving high ESG scores are more likely to possess rare and valuable resources or capabilities which promote high efficiency in investments driving brand equity and client loyalty.

Several studies, including Friede, Busch and Bassen in 2015, have highlighted the positive impacts of ESG on corporate financial performance. They posited that companies with high ESG ratings tend to also perform well financially. Similarly, Ioannou and Serafeim (2015) alongside Cheng et al. (2014) showed that firms with better ESG standards are more likely to make value-enhancing investments, reduce transaction costs, and contribute to long-term value creation. The relationship noted above suggests that firms must fundamentally shift their perception of ESG performance from being mere compliance checkboxes or acts of philanthropy to viewing them as critical levers for optimising investment strategies. Enhanced sustainable practices directly lead to improved investment outcomes by increasing profitability during operations while reducing risk and attracting long-term investors.

One observation that has been made is that the impact of ESG performance on investment efficiency diminishes with institutional ownership. This means that institutional investors both promote sustainability and make investment related decisions better. Institutional investors usually have a peculiar ability to influence corporate governance in that they can monitor many dimensions of a firm's operations and are able to engage with management directly. Agency Theory (Jensen and Meckling, 1976) posits that institutional ownership stands to rationally reduce agency costs attributable to the shareholders and the management as it synergises their objectives. It is typical for institutional investors to focus on long-term returns so often, they either force corporate managers to implement truly sustainable, efficient, long-term focused investment programmes or compel them to do so. This is supported by Gompers et al. (2003), where they claim that institutional investors improve discipline in corporate governance and transform firms which become devoted to maximising shareholder value over the long term instead of short termism.

Numerous studies have highlighted the important role that institutional investors play in enhancing ESG performance. For instance, Dyck et al. (2019) found that institutional investors tend to make more sustainable investments and incentivise firms to adopt ESG frameworks, which improves investment outcomes. The results of this study also support the theory that institutional ownership aids in improving governance and operational processes, which subsequently increases investment efficiency. Given that institutional ownership is a significant driver of ESG performance and investment efficiency, it would be prudent for stakeholders to work towards increasing institutional investment in the market. Undoubtedly, institutional investors may also be encouraged to engage in responsible investments which could foster a better investment climate, particularly in emerging economies like China.

The control factors such as board size, ownership concentration, returns on assets (ROA), and firm size all equally display strong causation to the level of investment efficiency. The positive correlation between ROA and both firm size and investment efficiency is consistent with prior studies noting that larger and more profitable firms tend to have resources at their

disposal to make efficient investments. It concludes that board size has a significant effect on investment efficiency but in this case it is positive which confirms the resource dependence theory where large boards are able to better add experience and diversity to decisions which improves efficiency. Likewise, the concentration of ownership indicates a positive association with greater investment efficiency; thus, stable ownership structures support long-term strategic planning.

## CONCLUSION

The focus of this study examines the relationship between ESG performance, institutional ownership, and investment efficiency in Chinese firms from 2011 to 2023. The empirical results obtained through the Fixed Effects (FE) and Two-Stage Least Squares (2SLS) estimation models present several important insights about the effects of corporate governance factors on investment efficiency as well as corporate governance factors. Both approaches inform investment efficiency, with ESG performance positively impacting investment efficiency. Companies with stronger ESG credentials are more efficient in their investments, meaning that better ESG performance is associated with more effective capital allocation. What makes this finding remarkable is the fact that companies can benefit from integrating ESG considerations not only for operational strategy and optimising inefficiencies within their investment choices but also for long-term sustainability. Additionally, the results have shown that institutional ownership significantly mediates the relation between ESG performance and investment efficiency.

Affirmative institutional ownership would bolster firm performance, suggesting that long-term investment strategies by institutions tend to facilitate better sustainable practices within firms, thereby leading to improved investment outcomes. This underscores the contribution of institutional investors towards aligning corporate policies with overarching goals such as improving efficiency regarding ESG (Environmental Social Governance) and financial metrics. The aforementioned is valid, especially noting the results of the Durbin-Wu-Hausman (DWH) Endogeneity Test that demonstrates some degree of endogeneity within the model pertaining to ESG performance vis-à-vis investment efficiency. The value in this significant test justifies employing a 2SLS approach as it is a technique used to remedy endogeneity and, in contrast to OLS, the estimates derived are consistent and reliable. This emphasises addressing possible endogeneity issues fixable without introducing biased empirical conclusions. Some control variables that include board size, ownership concentration, ROA, firm size, and leverage have been identified as having predictable relationships with investment efficiency, which reinforces the robustness of the model.

These concepts pertain more towards the general principles of governance alongside the financial attributes that influence investor decision-making.

### Policy implications

The findings are important both from the corporate managerial perspective as well as from the viewpoint of a policymaker. The study suggests that proper ESG practices, when incorporated, can lead to an efficient capital allocation and sustainable growth. Companies are required to enhance their ESG scores to attract institutional investors, which in turn will improve their long-term valuation. Increased transparency and adoption of the ESG standard might incentivise firms to adopt more sustainable models which ultimately could enhance overall economic efficiency. Encouragement frameworks focused on improving ESG disclosure and reporting may assist policymakers who wish to align corporate activities with the objectives of sustainable development.

**Future Research Areas**

The research offers a glimpse towards the emerging relationship between ESG performance and investment efficiency in context of an emerging market. Further research could address the impacts of international sectoral disparities, country-specific governance systems, and other relevant indicators of ESG performance on the outcomes. Additionally, understanding the long term impacts of integrating ESG into corporate strategies on firm valuation and financial performance would allow for a more comprehensive appreciation for the economic benefits of ESG.

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