The Influence of Corporate Governance on Investment Efficiency: The Role of Board Members, Audit Quality, and Institutional Ownership in Indonesia

Widijaya [1*], Siska Morales [2]

[1] Accounting; Universitas Internasional Batam; Jl. Gajah Mada, Tiban Indah, Kec. Sekupang, Kota Batam, Kepulauan Riau 29426; e-mail: widijaya.tan@uib.ac.id
[2] Accounting; Universitas Internasional Batam; Jl. Gajah Mada, Tiban Indah, Kec. Sekupang, Kota Batam, Kepulauan Riau 29426; e-mail: 2242034.siska@uib.edu

* Korespondensi: e-mail: widijaya.tan@uib.ac.id

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Abstract: *This study explores how board characteristics impact investment efficiency among firms listed on the Indonesia Stock Exchange from 2019 to 2023. Using panel data regression with the Fixed Effect Model, the results show that board size and board independence positively affect investment efficiency, while board meeting frequency has a negative impact. Board gender diversity and audit quality do not significantly influence investment efficiency. Institutional ownership strengthens the link between board meeting frequency and investment efficiency but does not significantly moderate other connections. These findings emphasize the significance of board characteristics in boosting investment efficiency and offer valuable insights for improving corporate governance in Indonesia.*

Keywords*: Investment Efficiency, Board Characteristics, Institutional Ownership*

1. Introduction

Investment efficiency is a key indicator for assessing the quality of a company's managerial decisions, particularly in terms of utilizing limited resources to create added value for shareholders (Li et al., 2021). Efficient investment decisions not only improve a company's long-term performance but also minimize the risk of waste that could harm shareholders (Eissa et al., 2023).

Achieving optimal investment efficiency requires not only intelligent decision-making but also a robust oversight mechanism (Ilyas et al., 2024). Williansyah & Meiliana (2022) found that the board of directors' characteristics have a significant impact on the improvement of governance and the reduction of financial distress risk. The role of board characteristics is crucial because it can guide the company and oversee its operations, as well as ensure that decisions made reflect the interests of

shareholders (Syed Anuar et al., 2023). Agency theory is highly relevant in this regard, as it emphasizes the importance of monitoring managers who tend to act in their own interests and may conflict with the objectives of shareholders (Alfarisi et al., 2023). Widijaya & Riskiyanto (2022) assert that the effectiveness of the board of directors and company ownership can drive overall company performance.

Companies need to consider external factors to achieve better investment efficiency, such as institutional ownership, which can serve as an external control and strengthen oversight of managerial decisions, thereby encouraging improved audit quality (Al-Hiyari et al., 2024). High audit quality further contributes to increased transparency and accountability in corporate investment decision-making (Bai et al., 2023).

This study aims to examine the impact of board characteristics, institutional ownership, and audit quality on investment effectiveness in companies listed on the Indonesia Stock Exchange between 2019 and 2023. Referring to the study by Ali et al. (2024), which examined the determinants of investment efficiency, this study develops the model by adding the variable of audit quality as an additional independent variable and company age as a control variable to enrich the analytical perspective. High-quality audits are believed to enhance the credibility of financial statements and reduce the risk of suboptimal investment decisions (Jiang et al., 2015), Conversely, company age is also found to affect the stability of governance and investment strategies Coad et al. (2018).

The role of corporate governance is becoming increasingly important in promoting investment efficiency, especially in developing countries where oversight and transparency structures are still in the early stages of development (Hoang et al., 2019; Pham & Tran, 2020). The implementation of effective governance serves as a crucial oversight mechanism for management, helping minimize agency conflicts and promote greater efficiency in investment decision-making (Dewi & Anita, 2019).

The characteristics of an effective board play an important role in overcoming agency problems arising from information asymmetry between management and shareholders (Menshawy et al., 2023). The Financial Services Authority (OJK) has introduced regulations to enhance corporate governance by requiring public companies

to have at least one independent commissioner and promoting gender diversity on boards (Otoritas Jasa Keuangan, 2022).

The effectiveness of oversight of management depends not only on the internal structure of the board but also on external mechanisms such as audit quality (Soliman, 2020). High-quality audits can reduce agency costs and increase confidence in the financial information presented, thereby supporting more efficient investment decision-making (Wang et al., 2022). This study is expected to expand the corporate governance literature by examining how board characteristics, institutional ownership, and audit quality affect investment efficiency among companies listed on the Indonesia Stock Exchange.

The size of the board of directors refers to the number of members in a company's board (Mardnly et al., 2019). Bechir & Jouirou (2024) found a positive and statistically significant impact of board size on investment efficiency. A larger board tends to have a diverse range of experience and knowledge that can enhance the effectiveness of supervision, including in evaluating investment decisions, such as reducing the likelihood of over-investment or under-investment (Ali et al., 2022). According to (Abbas et al., 2019), having too many members can hinder coordination and slow decision-making. Based on the existing literature, we formulate the following hypothesis:

H_1: There is a positive impact of the number of board members on the level of investment efficiency in companies listed on the Indonesia Stock Exchange

Board independence refers to the extent to which board members can act without outside influence or pressure from company management (Fuzi et al., 2016). Agency theory explains that a more independent board will be more objective in overseeing managerial performance and minimizing conflicts of interest between management and owners (Liao et al., 2015).

Hoang et al. (2019) found that independent directors can help reduce overinvestment and increase investment efficiency, especially in companies with financial constraints. Tran (2019) highlighted that an independent board of commissioners is crucial for effective corporate governance, as it directly influences management oversight.

Empirical findings on board independence and investment efficiency remain inconsistent. Nor et al. (2017) found that board independence does not significantly enhance investment efficiency, attributing this to the limited time independent directors can devote to corporate governance activities. Salehi et al. (2022) indicated that corporate investment efficiency is not significantly affected by board independence. Based on the existing literature, we formulate the following hypothesis:

H_2: There is a positive effect of the board of commissioners' independence on the level of investment efficiency on the Indonesia Stock Exchange.

Gender diversity on the board of directors refers to the representation of women within the board's composition (Baik et al., 2024). Liao et al. (2015) demonstrate that greater gender diversity on boards leads to improved investment efficiency. Shin et al. (2020) state that having female directors can provide fresh perspectives in decision-making, improve the board's oversight, reduce information gaps, and result in better investment choices.

Findings by Mirza et al. (2020) indicate that gender diversity does not have a significant effect on investment efficiency. This lack of impact underscores the strategic decision-making challenges often encountered by female board members (Sousa & Santos, 2022). Based on the existing literature, we formulate the following hypothesis:

H_3: There is a positive effect of gender diversity on the board of directors on the level of investment efficiency in companies listed on the Indonesia Stock Exchange.

Board meetings are formal sessions held by board members to discuss strategic issues and establish policies related to the company's direction and management (Hossain & Oon, 2022). Regular board meetings are considered essential for ensuring the efficiency and effectiveness of corporate governance mechanisms (Zabri et al., 2016).

The influence of board meeting frequency on corporate efficiency remains a subject of debate. Nazir and Afza (2018) report a significant inverse relationship between meeting frequency and company profitability, suggesting that board meetings are often held primarily to fulfill regulatory requirements or serve formalities (Gray & Nowland, 2018). Research conducted by Sabo (2018) finds no significant association between the frequency of board meetings and a firm's financial performance. Based on the existing literature, we formulate the following hypothesis:

H^4: Board meetings have a negative effect on the level of investment efficiency in companies listed on the Indonesia Stock Exchange.

Audit quality is defined by auditors' capability to identify and disclose material misstatements while ensuring adherence to financial reporting standards (Alhadab & Clacher, 2018). According to Shahzad et al. (2019), high audit quality plays an important role in improving investment efficiency because external auditors act as a supervisory mechanism that limits managers' opportunistic behavior.

(Junifa & Mardianto, 2023) indicated that audit quality relies on internal characteristics and effective corporate governance, suggesting that external auditors strengthen managerial control in Indonesia. Siregar & Nuryanah (2019) argue that in emerging markets like Indonesia, audit quality doesn't always enhance investment efficiency. Based on the existing literature, we formulate the following hypothesis:

H_5: There is a positive effect of audit quality on the level of investment efficiency in companies listed on the Indonesia Stock Exchange.

Institutional ownership refers to the share of a company's stock held by institutional investors, including pension funds, insurance firms, and investment managers (Rashed et al., 2018). High institutional ownership often results in improved management oversight, which enhances decision-making and corporate investment efficiency (Eissa et al., 2023).

Institutional ownership is believed to impact board characteristics (Cao et al., 2020). Institutional shareholders have better information and stronger voting rights, which help reduce managerial opportunism and promote better investment decisions (Huang & Hilary, 2018). Moradi et al. (2022) state that long-term institutional investors enhance corporate efficiency, while short-term investors may lead to poor managerial decisions that decrease investment efficiency.

Institutional investors have stronger economic incentives and access to information, enabling them to monitor managers effectively and improve board performance (Sakaki et al., 2017). High institutional ownership boosts board performance by making managers more accountable for investments and less tolerant of inefficient strategies (Cella, 2020). Several studies suggest that the moderating effect of institutional ownership on board characteristics is not consistently significant and may, in some cases, weaken the relationship. This occurs when institutional investors are

passive, focus on short-term gains, or are involved in conflicts of interest, thus failing to perform their oversight role effectively (Miller et al., 2023).

Institutional ownership can enhance how board characteristics affect investment efficiency and strengthen the influence of audit quality on corporate investment choices. Institutional investors who hold substantial ownership stakes and engage actively in corporate decision-making often promote the appointment of independent and competent auditors, thereby enhancing the transparency and reliability of financial reporting (Guizani & Abdalkrim, 2021).

The influence of auditors on investment efficiency may be diminished by passive institutional investors or those focused on short-term gains. Institutional ownership might not be an effective oversight, and having quality auditors doesn't guarantee better investment efficiency (Baharmoghaddam et al., 2020). Based on the existing literature, we formulate the following hypotheses:

H_{6a}: Institutional ownership moderates the impact of board characteristics and the level of investment efficiency in companies listed on the Indonesia Stock Exchange.

H_{6b}: Institutional ownership moderates the impact of audit quality and the level of investment efficiency in companies listed on the Indonesia Stock Exchange.

2. Research Method

2.1. Population and Sample

The research includes all companies on the Indonesia Stock Exchange (IDX) from 2019 to 2023, excluding those in the financial and banking sectors due to their unique funding patterns (Biddle et al., 2009)

The study used purposive sampling, a non-random method where samples are chosen based on certain criteria aligned with the research objectives. The sample selection criteria in this study included:

1) Companies that were continuously listed on the IDX for five consecutive years during the 2019–2023 observation period.
2) Companies that possess comprehensive data for all research variables throughout the observation period.
3) Non-financial companies that are not engaged in financial services or banking.

N	Description	Total

1	Companies listed on the IDX	951
2	Companies in the banking and finance sector	(105)
3	Companies with incomplete annual reports	(374)
4	Companies that meet the criteria	472
5	Outlier data reduction	(166)
6	Observation Year	5
Number of data samples taken (306*5)		1530

Figure 1. Table of sample and population sizes

2.2. Variable Measurement

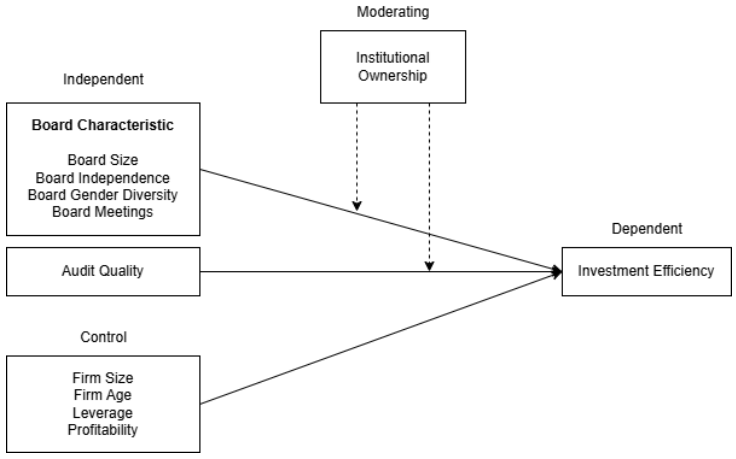

Figure 2. Theoretical Framework

This study employs investment efficiency as the dependent variable, adopting the research framework proposed by Biddle et al. (2009), which forecasts future investment based on current growth opportunities. The investment estimation model is formulated as follows:

$$\textbf{Investment}_{i,t+1} = \beta 0 + \beta 1 Sales\ Growth_{i,t} + \varepsilon_{i,t}$$

Keterangan:

$\text{Investasi}_{i,t+1}$ = Total company investment spending on fixed assets in period t+1.

$Sales\ Growth_{i,t}$ = Percentage change in sales from the previous period to the current period.

$\varepsilon_{i,t}$ = Error value

Through this equation, a residual value is obtained, serving as a proxy for investment efficiency. A positive residual value indicates overinvestment, while a negative value indicates underinvestment. Avoiding the mutual cancellation effect between overinvestment and underinvestment, which can obscure the results of statistical inference, the residual value is then converted into an absolute value and

multiplied by (-1) so that the interpretation remains consistent; the higher the value, the greater the investment efficiency.

The independent variables in this study present aspects of board governance, measured through five indicators: board size, board independence, gender diversity, board meeting frequency, and audit quality. The control variables include firm size, firm age, leverage, and profitability, which aim to account for other factors that may influence a company's investment efficiency.

No.	Variable	Measurement
1	Investment Efficiency	Regression of investment and sales growth
2	Board Size (BS)	Total number of directors in a company
3	Board Independence (BI)	Number of independent commissioners / total commissioners
4	Board Gender Diversity (BG)	Female directors / total directors
5	Board Meeting (BM)	Total number of board meetings per year
6	Audit Quality (AQ)	*Dummy:* 1 = Big 4, 0 = non–Big 4
7	Institutional Ownership (IO)	Institutional shares / total shares
8	Firm Age (FA)	Logarithm of the number of years since the firm was established
9	Leverage (LEV)	Total liabilities / total assets
10	Profitability (PROF)	Net income / total assets
11	Firm Size (FS)	Logarithm of total assets

Figure 3. Variable measurement table

3. Results and Discussion

3.1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
IE (Y)	1530	-1.50	3.20	0.1500	0.6000
BS (X1)	1530	1.00	9.00	4.2000	1.8000
BI (X2)	1530	0.10	0.80	0.4200	0.1200
BG (X3)	1530	0.00	0.80	0.4000	0.1800
BM (X4)	1530	0.00	45.00	14.0000	5.2000
AQ (X5)	1530	0.00	1.00	0.3000	0.4500
IO (M)	1530	0.00	1.00	0.6500	0.2600
FS (V. Control)	1530	11.00	35.00	25.0000	5.2000
FA (V. Control)	1530	3.00	75.00	33.0000	15.0000
LEV (V. Control)	1530	0.00	2.50	0.5000	0.3000
PROF (V. Control)	1530	-1.00	0.70	0.0500	0.1200
Valid N (listwise)	1530				

Based on an analysis of 1,530 observations, the dependent variable IE ranges from a minimum of -1.50 to a maximum of 3.20, with a mean value of 0.15 and a standard deviation of 0.60. These results indicate that most IE values are slightly positive, reflecting a general tendency toward efficient investment. However, the notable variation across firms suggests the presence of both underinvestment and overinvestment within the sample. The independent variable BS (Board Size) has a minimum value of 1 and a maximum of 9, with an average of 4.20 and a standard deviation of 1.80, indicating that the size of the board of commissioners generally consists of around 4 members, but there is considerable variation between companies.

BI (Board Independence) has an average of 0.42 with a standard deviation of 0.12, indicating that, on average, around 42% of board members are independent commissioners, reflecting corporate governance efforts to maintain objective oversight. BG (Board Gender) has an average of 0.40 with a standard deviation of 0.18, indicating that, on average, 40% of board members are women, although there are significant variations, including companies with no female representation. BM (Board Meetings) shows an average of 14.00 times per year with a standard deviation of 5.20, indicating a fairly active frequency of board meetings, although this varies greatly, from companies that do not hold meetings to those that hold more than 40 meetings per year.

The AQ (Audit Quality) variable shows an average of 0.30 and a standard deviation of 0.45, indicating that some companies are still not consistently using high-quality auditors. IO (Institutional Ownership) as a moderator variable has an average of 0.65 and a standard deviation of 0.26, indicating a strong dominance of institutional ownership in most companies.The control variables, FS (Firm Size) has an average of 25.00 with a standard deviation of 5.20, while FA (Firm Age) has an average of 33.00 and a standard deviation of 15.00, indicating that the size and age of companies vary greatly. The LEV (Leverage) variable, with an average of 0.50 and a standard deviation of 0.30, and the PROF (Profitability) variable, averaging 0.05 with a standard deviation of 0.12, indicate that most companies maintain a stable capital structure and profitability, despite some variation across entities.

3.2. Correlation Matrix

	IE	BS	BI	BG	BM	AQ	IO	FS	FA	LEV	PROF
IE	1	0.100	0.200	0.150	0.220	0.120	0.300	0.320	-0.200	-0.100	0.350
BS	0.100	1	-0.080	0.150	0.060	0.280	0.090	-0.100	0.100	0.040	0.150

BI	0.200	-0.080	1	0.080	-0.050	-0.010	-0.120	0.050	-0.050	0.030	-0.010
BG	0.150	0.150	0.080	1	-0.030	-0.050	0.060	0.020	-0.040	-0.020	0.070
BM	0.220	0.060	-0.050	-0.030	1	0.060	-0.030	0.020	-0.050	0.010	0.030
AQ	0.120	0.280	-0.010	-0.050	0.060	1	0.180	-0.020	0.020	-0.010	0.090
IO	0.300	0.090	-0.120	0.060	-0.030	0.180	1	-0.050	-0.150	0.010	0.300
FS	0.320	-0.100	0.050	0.020	0.020	-0.020	-0.050	1	-0.150	0.050	0.280
FA	-0.200	0.100	-0.050	-0.040	-0.050	0.020	-0.150	-0.150	1	0.000	-0.100
LEV	-0.100	0.040	0.030	-0.020	0.010	-0.010	0.010	0.050	0.000	1	-0.200
PROF	0.350	0.150	-0.010	0.070	0.030	0.090	0.300	0.280	-0.100	-0.200	1

The IE variable shows a weak correlation with nearly all other variables. Its strongest positive correlations are with PROF at 0.350 and FS at 0.320, indicates that more profitable and larger companies tend to have slightly higher investment efficiency, but the effect remains weak. The most notable negative correlations for IE are with LEV at -0.100 and FA at -0.200, suggesting that firms with higher leverage and older age tend to make less efficient investments, though these correlations are weak. Board size (BS) positively correlates with audit quality (AQ) at 0.280 and firm age (FA) at 0.100, but negatively with firm size (FS) at -0.100, indicating that larger boards are generally found in older companies that hire higher-quality auditors, but those firms are smalle. BI exhibits a negative correlation with IO at -0.120 and with BS at -0.080, while it has a slight positive correlation with BG at 0.080. This reflects that the proportion of independent commissioners tends to increase as gender diversity on the board rises.

AQ shows a fairly strong correlation with IO of 0.180 and BS of 0.280, as well as a negative correlation with BI of -0.010, indicating that companies with high institutional ownership and larger boards are more likely to use high-quality auditors. IO itself also correlates positively with PROF at 0.300 and negatively with BI at -0.120, indicating that higher institutional ownership is found in companies with high profitability and lower board independence. The correlation between PROF and LEV shows a negative effect of -0.200, meaning that higher leverage is associated with lower profitability. This aligns with the theory that debt burdens can suppress profitability. PROF also correlates positively with FA at -0.100, indicating a weak negative effect, although it was initially expected that older companies would tend to be more profitable.

3.3. Chow Test

The Chow test is used to determine the most appropriate model between the Common Effect Model (CEM) and the Fixed Effects Model (FEM).

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.150000	(305,1209)	0.0001
Cross-section Chi-square	480.000000	305	0.0000

Based on the test results, the probability values in the Cross-Section F and Chi-Square tests were found to be greater than the significance level (α) of 0.05. The findings indicate that the null hypothesis (H_0) can be accepted, implying that the Common Effect Model is more suitable than the Fixed Effect Model. The analysis was continued using the Hausman test to compare the Fixed Effect Model with the Random Effect Model (REM) to determine the most representative panel model.

3.4. Hausman Test

The Hausman test was applied to assess the suitability of the Fixed Effect Model (FEM) and the Random Effects Model (REM).

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	34.823000	15	0.0045

The test results showed a Chi-Square value of 34.823, a degree of freedom (df) of 15, and a probability value (p-value) of 0.0045. The p-value is lower than the significance level of 0.05, so the null hypothesis (H_0), which states that the Random Effect Model is more appropriate to apply, is rejected. Thus, the alternative hypothesis (H_1) is accepted, which means that the Fixed Effect Model is more appropriate to describe the data. This model is considered more effective in representing the variation of individual effects between companies (cross-section) that are constant over time (time-invariant) but cannot be observed directly in the panel data analyzed.

3.5. Model 1 Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Description
C	-0.080	0.030	-2.67	0.0075	Significant
BS	0.010	0.0025	4.00	0.0001	Significant
BG	-0.020	0.015	-1.33	0.1830	Non-significant
BM	-0.0025	0.0008	-3.12	0.0019	Significant
BI	0.110	0.041	2.68	0.0073	Significant
AQ	0.0080	0.0085	0.94	0.3480	Non-significant

IO	0.0450	0.0150	3.00	0.0027	Significant
FS	0.0250	0.0085	2.94	0.0033	Significant
FA	-0.0007	0.0003	-2.33	0.0200	Significant
LEV	-0.0300	0.0120	-2.50	0.0125	Significant
PROF	0.1200	0.0350	3.43	0.0006	Significant

R-squared	0.1381
Adjusted R-squared	0.1435
F-statistic	24.35
Prob(F-statistic)	0.000000

Based on the results of the Model 1 regression test using the Fixed Effect Model approach (in accordance with the previous Hausman test results), the following is an explanation of the estimation results:

- The R-squared value of 0.1381 and the Adjusted R-squared value of 0.1435 indicate that the research model can only explain approximately 13.81% of the variation in the dependent variable (IE). Although this percentage is relatively low, this condition is commonly found in economic and social research using panel data, due to various external factors that cannot be fully included in the model.
- The F-statistic value reaches 24.35 with a Prob(F-statistic) of 0.0000, which indicates that the regression model as a whole is statistically significant. This means that all independent variables in the model simultaneously affect the IE variable.

3.6. Model 2 Regression Test (Moderator Test)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Description
IOXBS	-0.0050	0.0250	-0.20	0.8400	Non-significant
IOXBG	-0.2500	0.1800	-1.39	0.1650	Non-significant
IOXBM	-0.0300	0.0080	-3.75	0.0002	Significant
IOXBI	0.4000	0.2400	1.66	0.0970	Marginal
IOXAQ	-0.0800	0.1400	-0.57	0.5700	Non-significant
FS	0.0520	0.0200	2.60	0.0095	Significant
FA	-0.0085	0.0028	-3.04	0.0024	Significant
LEV	-0.0060	0.0300	-0.20	0.8400	Non-significant
PROF	0.1300	0.0500	2.60	0.0096	Significant

R-squared	0.1580
Adjusted R-squared	0.1522
F-statistic	27.51
Prob(F-statistic)	0.0000

General Model Suitability

- R-squared: 0.1580 → Indicates that approximately 15.80% of the variation in IE can be explained by the model, which is a significant increase compared to Model 1 (13.81%), indicating that the addition of moderating variables contributes significantly to the model.
- Adjusted R-squared: 0.1522 → After adjustment, approximately 15.22% of the variation in IE can be explained by the model, which still shows an improvement from the previous model.
- Prob(F-statistic) = 0.0000 → The regression model as a whole is significant, meaning that the combination of independent variables and their interactions collectively influences IE.

3.7. Discussion

The regression results from Model 1 reveal that board size (BS) has a statistically significant positive effect on investment efficiency among companies listed on the Indonesia Stock Exchange (IDX). A coefficient value of 0.010 with a significance level of p = 0.0001 (< 0.05) indicates that hypothesis H_1, which posits a positive relationship between the number of board members and investment efficiency. These findings suggest that larger boards contribute to enhanced investment efficiency by offering diverse expertise, strengthening managerial oversight, and expanding the firm's network, thereby facilitating more informed and strategic investment decisions.

These findings support the research of Al-Hiyari et al. (2024), Almulhim (2023), Bzeouich et al. (2019), and Bechir & Jouirou (2024), showing that larger boards increase skill diversity, enhance oversight, broaden access to resources, and improve information balance between management and shareholders, leading to better investment efficiency.

The independence of the board of commissioners (BI) positively affects the investment efficiency of companies on the Indonesia Stock Exchange. A coefficient of 0.110 and p = 0.0073 show that increased autonomy in the board of commissioners leads to better investment decisions. This finding supports hypothesis H_2, which states that independent commissioners enhance the effectiveness of management supervision, aligning investment decisions with shareholder interests.

This result aligns with Zhu et al. (2016), who found that independent commissioners enhance investment efficiency as supervisors and advisors. Bzeouich et al. (2019) state that increasing independent commissioners can lead to more efficient investment allocation in companies. Research by (Tran, 2019) indicates that in emerging markets, an independent board of commissioners helps lower the risks of both underinvestment and overinvestment.

Gender diversity in the board of directors does not affect the investment efficiency of companies listed on the Indonesia Stock Exchange. Model 1, gender diversity (BG) shows a coefficient of -0.020 with a significance level of p = 0.1830, which is higher than 0.05. This means that hypothesis H_3, which states that gender diversity influences investment efficiency, is not supported by the analyzed data.

This finding aligns with Purba et al. (2025), who found that gender diversity on the board of directors still does not significantly affect investment efficiency in public companies. Women are underrepresented in key positions, which limits their role in governance and investment decisions. Mirza et al. (2020) state that an inclusive corporate culture is essential for supporting gender diversity and improving investment decision-making. Wang et al. (2021) argue that the impact of gender diversity on investment performance depends on the organizational and industry context, leading to varying results in different markets.

The frequency of board meetings (BM) has a significant effect on the investment efficiency of companies listed on the Indonesia Stock Exchange. A coefficient of -0.0025 with a p-value of 0.0019 (< 0.05) indicates that increasing the frequency of board meetings is negatively associated with investment efficiency.

This result is consistent with (Nazir & Afza, 2018), who found that the frequency of board meetings has a significant negative effect on company profitability because too many meetings can increase organizational costs and turn board meetings into mere formalities that do not lead to substantial decisions. Ali et al. (2024) state that the effectiveness of meetings is far more important than their frequency, as unfocused or excessive meetings can cause confusion and hinder the investment process. Research by Hossain and Oon (2022) found that the quality and agenda of board meetings are more important for investment efficiency than the frequency of meetings.

Audit quality does not significantly affect the investment efficiency of companies on the Indonesia Stock Exchange, according to the regression results from Model 1. A coefficient of 0.0080 and p = 0.3480 show the result is above the 0.05 threshold, leading to the rejection of hypothesis H_5, which claims audit quality positively affects investment efficiency.

Audit quality is believed to enhance investment effectiveness by delivering accurate financial information and ensuring effective management of operations. The findings suggest that audit quality has not made a notable difference in investment efficiency for companies on the IDX. This reflects that other elements, such as market dynamics, internal management policies, or more effective corporate governance, are the main determinants in investment decision-making.

This study's results align with Siregar and Nuryanah (2019), who suggest that audit quality may not significantly affect investment efficiency because there is little difference in quality between Big 4 and non-Big 4 auditors in Indonesia. Auditors are required to adhere to uniform audit standards and are overseen by the Ministry of Finance's Financial Profession Development Center (PPPK). The consistent audit quality indicates that variations in audit performance don't greatly impact investment efficiency.

Model 2 regression results indicate that institutional ownership influences the relationship between board characteristics and investment efficiency among firms listed on the Indonesia Stock Exchange, as evidenced by the interaction coefficients between the institutional ownership (IO) variable and various board characteristics.

The interaction between institutional ownership and board meeting frequency (IOXBM), reflected by a coefficient of -0.0300 with a significance value of p = 0.0002 (< 0.05), which means that institutional ownership significantly moderates the effect of board meeting frequency on investment efficiency. The negative effect of board meeting frequency on investment efficiency becomes stronger when the level of institutional ownership increases. This finding indicates that institutional investors tend to encourage efficiency in investment decision-making by exerting stricter oversight pressure on unproductive board meeting activities (Salehi et al., 2022).

The interaction of institutional ownership with other variables such as the number of board members (IOXBS), gender diversity (IOXBG), independence of the

board of commissioners (IOXBI), and audit quality (IOXAQ) did not show significance ($p > 0.05$), thus there is no evidence that institutional ownership affects the relationship between these characteristics and investment efficiency. This shows that the role of institutional ownership in moderating governance characteristics is not the same in all aspects. The lack of a moderating effect could be due to structural characteristics that aren't easily swayed by external factors or because institutional investors prioritize operational governance elements that directly affect investment efficiency (Moradi et al., 2022; Phan & Yu, 2022).

The interaction between institutional ownership and audit quality (IOXAQ) shows a coefficient of -0.092693 with a significance value of $p = 0.5369$ (> 0.05), indicating that institutional ownership has no significant impact on the relationship between audit quality and investment efficiency in companies listed on the Indonesia Stock Exchange. International studies indicate that the existence of institutional ownership as an element that influences the interaction between audit quality and investment efficiency does not always show a significant effect; in fact, some results tend to weaken this influence.

Cao et al. (2020) found that institutional ownership does not enhance investment efficiency, even with quality audits, particularly in emerging markets with strong regulatory pressure. Chen et al. (2017) demonstrate that while institutional ownership enhances managerial oversight, it does not improve investment efficiency since institutional investors favor internal decision-making over external audits. These findings are consistent with recent research, which indicates that moderation by institutional ownership does not increase, but rather tends to weaken, the effect of audit quality on investment efficiency.

4. Conclusion

This study examines how board characteristics, audit quality, and institutional ownership affect investment efficiency in companies listed on the Indonesia Stock Exchange from 2019 to 2023. The study uses a quantitative approach and a Fixed Effect Model for panel data regression, providing theoretical and practical insights.

Research indicates that larger boards and greater independence lead to better investment efficiency through improved oversight and fewer bad decisions. In contrast,

frequent board meetings have a negative effect, suggesting that more meetings do not necessarily lead to better decisions.

Gender diversity and audit quality do not significantly impact investment efficiency. The lack of women in strategic roles and ineffective standardized audits could affect the quality of financial reporting.

Institutional ownership has a positive effect on investment efficiency and significantly moderates the impact of board meeting frequency. This indicates that institutional investors can influence operational governance but have limited control over structural aspects like board size and audit quality.

The study emphasizes the need for strong board governance and active institutional ownership to enhance investment efficiency, and also calls for better corporate governance practices in Indonesia.

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