International Journal of Financial, Administrative, and Economic Sciences (IJFAES)
Vol. (4), No. (11)
IJFAES
November 2025
المجلة الدولية للعلوم المالية والإدارية والاقتصادية
الإصدار (4)، العدد (11)

The Mediating Role of Information Asymmetry in the Relationship between Ownership Structure Patterns and Investment Efficiency

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Abstract

This research aimed to examine the impact of ownership structure patterns on investment efficiency through the mediating role of information asymmetry. The study analyzed the annual financial reports of a sample of 14 banks listed on the Iraq Stock Exchange for the period 2014-2023. Manual content analysis of the annual reports was used to extract data for measuring the research variables. The study concluded that institutional ownership plays the most significant role in enhancing investment efficiency, both directly and indirectly, by reducing information asymmetry. This underscores the effectiveness of institutional investors in monitoring management behavior and improving transparency within companies. Conversely, foreign ownership demonstrates a significant negative impact, while ownership concentration and managerial ownership have a minimal effect on investment efficiency, and the information environment does not enhance their effects.

Keywords: Ownership Structure Patterns, Investment Efficiency, Information Asymmetry, Iraq Stock Exchange.

1. Introduction

Investment efficiency is one of the fundamental pillars for achieving sustainable economic growth and enhancing firms' competitiveness in modern markets. It reflects the extent to which companies are able to allocate their financial resources

to projects that generate optimal returns with acceptable levels of risk. However, such efficiency does not materialize in isolation from the broader regulatory environment and corporate governance mechanisms—particularly ownership structure and its various patterns—alongside the degree of information symmetry among market participants.

Inefficiencies in investment decisions are often attributed to several factors, most notably information asymmetry, financial constraints, and agency costs. Although investment decisions should ideally align with a firm's ability to utilize its resources effectively, many investments are undertaken to maximize managerial utility rather than to create positive net present value (Ibrahim, 2023: 5).

Ownership structure is a contemporary concept that has evolved in response to the rapid technological and industrial developments of recent decades. It reflects the identity of a firm's shareholders and the extent of their contribution to its capital (Asmar et al., 2024: 4). Ownership patterns—such as ownership concentration, managerial ownership, institutional ownership, governmental ownership, foreign ownership, and family ownership—play a pivotal role in shaping corporate investment decisions. The nature of the owners and the degree of ownership concentration directly influence managerial behavior and the incentives that drive either market value maximization or the pursuit of private benefits (Othman, 2025: 1).

Ownership structure is defined as the distribution of shares composing a firm's capital, held by individuals or groups. Variations in these shareholdings influence the firm's administrative and financial decisions (Bao & Lewellyn, 2017: 830–831). It represents an essential corporate governance mechanism and is commonly examined along two main dimensions: the degree of ownership concentration and the nature of the owners—whether private, governmental, or mixed. These differences shape

investment decision-making and influence firms' investment efficiency (Mohammed, 2022: 32).

Investment efficiency serves as an indicator of agency-related concerns and a key determinant of long-term profitability and sustainable growth. It is widely acknowledged that inefficiencies in investment can be traced back to principal–agent conflicts, as the relationship between principals and agents is characterized by frictions, constraints, and distortions (Huo et al., 2024: 2). The primary sources of these frictions include agency problems and information asymmetry, which hinder corporate growth by discouraging optimal investment opportunities. Suboptimal investment decisions ultimately reduce investment efficiency (Yu et al., 2020: 1). Prior studies further indicate that the sensitivity of corporate investment to stock prices is shaped by the extent of information asymmetry and the severity of agency problems (Chen et al., 2014: 1).

Ownership structure is closely associated with the quality and transparency of financial reporting, which directly affects information asymmetry and, consequently, investment efficiency (Huo et al., 2024: 3). Therefore, examining the interaction between ownership patterns and information asymmetry is essential, as both jointly shape investment quality. Sound ownership structures can reduce information gaps, enhance transparency and disclosure, and improve the quality of investment decisions. Conversely, weak ownership structures combined with poor disclosure practices may exacerbate information asymmetry and impair investment efficiency.

Based on the foregoing, the research problem can be articulated as follows:

Does information asymmetry mediate the relationship between ownership structure patterns and investment efficiency?

This central question leads to several subsidiary questions:

- Does ownership structure have a significant effect on investment efficiency?

- Does ownership structure significantly influence information asymmetry?
- Does information asymmetry significantly affect investment efficiency?
- Does information asymmetry mediate the relationship between ownership structure and investment efficiency?

This study aims to analyze the relationship between ownership structure patterns and investment efficiency in firms, while examining the mediating role of information asymmetry. The study proceeds from the assumption that ownership structure constitutes a fundamental determinant of managerial investment behavior, and that investment efficiency is shaped by the degree of transparency and information flow in the market.

The research adopts a deductive approach to construct the theoretical framework and infer the relationships among the study variables. It also employs manual content analysis of the annual reports of the sampled banks to extract both quantitative and qualitative data relevant to the variables under investigation.

The significance of this study lies in its contribution to bridging a gap in Iraqi and Arab literature, where investment efficiency has often been examined independently of corporate governance and information asymmetry. The findings are expected to provide practical implications for policymakers, corporate managers, and investors by underscoring the importance of enhancing disclosure practices and strengthening ownership structures to improve investment decision-making and support sustainable financial performance.

2. Literature Review and Hypothesis Development

In this section, we review relevant studies in the areas of corporate finance and investment efficiency, corporate governance, and information asymmetry. We then develop theoretical arguments for the relationship between ownership patterns,

information asymmetry, and investment efficiency. Four hypotheses are developed to achieve the research objectives.

The separation of ownership and control has long been recognized as a major source of agency problems in firms with weak governance mechanisms. Such separation often creates conflicts of interest between managers and shareholders, leading to suboptimal investment decisions. Effective corporate governance helps align managerial and shareholder interests, reduces deviations from optimal investment levels, and promotes decisions that enhance investment efficiency (Abbas et al., 2018, p. 308). Ownership structure plays a central role in this process by shaping how investment decisions are controlled, how managerial authority is exercised, and how decision-making power is distributed within the board, often in ways that serve the objectives of major shareholders (Moradi et al., 2022, p. 3).

According to Dess et al. (2019, p. 278), governance mechanisms—including ownership patterns—improve financial performance by rationalizing investment choices and increasing share value. The quality of a firm's information environment is also tied to investment efficiency. For example, foreign ownership may enhance the quality of investment decisions because foreign institutional investors typically possess superior analytical capabilities based on their investment expertise (Chen et al., 2014, p. 8).

Managerial ownership allows managers who hold equity stakes to influence corporate behavior through their strategic decision-making positions. When managers own shares, agency costs decline as their incentives become aligned with those of other shareholders. Moreover, managerial ownership equips managers with greater access to information relevant to risk management, which may improve investment efficiency (Nor et al., 2017, p. 1046). Higher levels of managerial ownership may also inhibit earnings manipulation, improve reporting quality, and enhance financial performance through better investment decisions. From the

perspective of agency theory, managerial equity ownership is expected to be positively associated with optimal investment choices and with investment efficiency (Darmayanti et al., 2023, p. 200).

Institutional ownership—defined as equity stakes held by large financial institutions—also plays a critical governance role due to institutional investors' capacity to monitor managerial behavior. Three perspectives are commonly discussed: the efficient monitoring hypothesis, the conflict-of-interest hypothesis, and the strategic alignment hypothesis (Moradi et al., 2022, p. 2). Meanwhile, ownership concentration varies between dispersed and concentrated structures. Concentrated ownership, particularly when involving institutional or block shareholders, may reduce information asymmetry through stronger monitoring (Shiri et al., 2016, p. 54). Empirical evidence also suggests that family ownership concentration increases firm risk, whereas higher dividend payouts improve liquidity and reduce information asymmetry (Rajverma, 2024, p. 265).

Foreign ownership has two competing effects on information asymmetry. On one hand, high information-processing capabilities, dominant positions, and short investment horizons may increase information asymmetry. On the other hand, demands for enhanced disclosure, international auditing standards, long-term investment orientation, and better monitoring may reduce information asymmetry (Choi et al., 2013, p. 141).

Investment efficiency is positively associated with governance mechanisms that reduce agency conflicts and align managerial and shareholder interests. Firms with strong governance systems exhibit higher investment efficiency and more timely identification of inefficient investment opportunities (Kashani & Shiri, 2022, p. 582). Based on this discussion, the following hypothesis is proposed:

H1: Ownership structure patterns have a significant positive effect on investment efficiency.

Institutional investment literature consistently identifies information asymmetry and agency problems as main drivers of inefficient investment. Information gaps between managers and shareholders distort capital allocation, exacerbate capital costs, and impede firms' ability to obtain funding for value-enhancing opportunities, ultimately reducing firm value (Cao et al., 2020, p. 8). Information symmetry among investors is essential for reducing capital costs and improving market efficiency, while appropriate governance structures enhance firm performance by promoting transparency and consistency in information (Nakhodchari & Garkaz, 2014, p. 424). Ahmed et al. (2024, p. 1736) also argue that information asymmetry arises when managers possess information unavailable to other stakeholders, leading to biased decisions and resource misallocation. Accordingly, the following hypothesis is proposed:

H2: Ownership structure patterns have a significant negative effect on information asymmetry.

Firms adopt governance mechanisms to reduce information asymmetry and the agency costs resulting from the separation of ownership and control. These mechanisms enhance investor trust, improve decision-making, and contribute to investment efficiency (Cormier et al., 2010, p. 576). High information asymmetry combined with managerial dominance over investment decisions may compromise investment efficiency (Menshawy et al., 2023, p. 2395). Therefore, the following hypothesis is advanced:

H3: Information asymmetry has a significant negative effect on investment efficiency.

Agency problems and information asymmetry hinder the optimal allocation of resources in capital markets. Governance mechanisms provide monitoring and control systems that facilitate the secure flow of information between managers and investors, reducing information asymmetry and thereby improving investment efficiency (Moradi et al., 2022, p. 292). Because ownership structure affects managerial–shareholder conflicts, it influences firm performance, disclosure quality, and investment decisions (Yau et al., 2019, p. 958). Based on these considerations, the final hypothesis is proposed:

H4: The impact of ownership structure patterns on investment efficiency increases when information asymmetry serves as a mediating variable.

3. Methodology

This study analyzes the annual financial reports of a sample of fourteen (14) banks over the period 2014–2023. The research framework comprises three categories of variables. The independent variables represent ownership structure patterns, focusing on four specific dimensions: ownership concentration, managerial ownership, institutional ownership, and foreign ownership. The operational definitions and measurement procedures for these variables are presented in Table 1.

The dependent variable is investment efficiency, measured following the model of Biddle et al. (2009), which estimates expected investment based on projected growth opportunities, proxied by the firm's annual sales growth rate.

Information asymmetry functions as the mediating variable and is measured as the absolute value of the difference between actual earnings per share (EPS) and the mean analysts' forecasted EPS, divided by the stock's closing price for firm *i* in year *t*.

Data collection and variable measurement procedures relied on manual content analysis of the annual reports of the sampled banks. This technique served as the

primary research instrument for extracting relevant quantitative and qualitative information required for empirical analysis.

Econometric Model:

To examine the relationships among ownership structure patterns, information asymmetry, and investment efficiency, the study employs a series of regression models and mediation tests consistent with contemporary empirical research in corporate finance and accounting. The analysis proceeds in three stages.

1. **Direct Effect Models:**

   The first set of models tests the direct effect of each ownership structure variable on investment efficiency:

   IE it =β0+β1OWNit+εitIE_{it} =

   \ beta_0 + \beta_1 OWN_{it} + \ varepsilon _{it}IE it=β0+β1OWN it+ε it

   Where:

   - IEitIE_{it}IEit = Investment efficiency of firm *i* in year *t*,
   - OWNitOWN_{it}OWNit = Ownership structure variable (ownership concentration, managerial ownership, institutional ownership, or foreign ownership),
   - εit\varepsilon_{it}εit = Error term.

2. **Mediation Path (Effect on Information Asymmetry):**

   The second model evaluates the effect of ownership structure patterns on information asymmetry:

   IA it =β0+β1OWNit+εitIA_{it} =

   \beta_0 + \beta_1 OWN_{it} + \varepsilon_{it}IA it=β0+β1OWN it+ε it

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Where IAitIA_{it}IAit denotes information asymmetry for firm *i* in year *t*.

3. Indirect and Total Effect Models:

To test whether information asymmetry mediates the relationship between ownership structure and investment efficiency, the following model is estimated:

IEit=β0+β1OWNit+β2IAit+εitIE_{it} = \beta_0 + \beta_1 OWN_{it} + \beta_2 IA_{it} + \varepsilon_{it}IEit=β0+β1OWNit+β2IAit+εit

The mediation effect is assessed by decomposing the total effect into:

- **Direct effect**: β1\beta_1β1
- **Indirect effect**: β1×β2\beta_1 \times \beta_2β1×β2
- **Total effect**: Sum of direct and indirect effects.

This modeling approach aligns with standard procedures for mediation testing, including those applied in

The methods for measuring the variables can be shown in the following table:

Table (1): Measurement of Variables and References

Type v	Variables	Measurement of Variables	References
Independent **X**	Managerial Ownership	Number of shares held by board members) / (Total number of company shares)	Boshnak, 2024
	Foreign Ownership	Shares held by foreign investors / Total issued shares	Muslim& Setiawan,2021
	Institutional Ownership	The number of shares held by institutional investors divided by the total issued shares	Yau, et.al, 2019
	Ownership Concentration	The total shareholdings of owners who hold more than 5% / Total issued shares	Wen, et.al, 2023
Dependent **Y**	Investment Efficiency	*Invest i,t = β0 + β1 Sales Growth i,t-1 + εit*	bidlle, et al., 2009
Mediation **M**	Information Asymmetry	$ASY2,i = \frac{\lvert EPSi,t - \ mean\ forecasted\ EPS\rvert}{Pi,t}$	Lian&We, 2022

4. Descriptive Statistics

Table (2): Descriptive Statistics

Variables	Symbol	Mean	Standard Deviation	Min	Max	Coefficient Variation
Ownership Concentration	**X1**	0.434	0.361	0.002	1.000	83.2%
Managerial Ownership	**X2**	0.377	0.294	0.000	0.948	77.9%
Institutional Ownership	**X3**	0.448	0.363	0.002	1.000	81.0%
Foreign Ownership	**X4**	0.110	0.237	0.000	0.910	214.7%
Investment Efficiency	**Y**	-0.130	0.144	-0.968	0.000	-111.1%
Information Asymmetry	**M**	0.0802	0.1023	0.0002	0.6887	127.62%

Table (2) presents the descriptive statistics for the variables included in the study. The results show that ownership concentration (X1) has a mean value of 0.434 with a standard deviation of 0.361, indicating a moderate level of ownership concentration among the sampled firms, suggesting that shareholding is not heavily dominated by a few investors.

Managerial ownership (X2) has a mean of 0.377 and a standard deviation of 0.294, implying that, on average, executive managers and board members hold around 37.7% of the firm's shares. The relatively high coefficient of variation (77.9%) indicates noticeable variability in managerial ownership across firms.

Institutional ownership (X3) records a mean of 0.448 and a standard deviation of 0.363, suggesting that institutional investors hold approximately 44.8% of the outstanding shares. This relatively high average reflects the active role of institutional investors in the ownership structure of the sampled firms.

Foreign ownership (X4) shows a mean of 0.110 with a standard deviation of 0.237, indicating that foreign investors own about 11% of the firms' shares on average. The high coefficient of variation (214.7%) reveals substantial disparities in foreign ownership levels among companies, which may reflect differing degrees of openness to foreign investment.

Regarding the dependent variable, investment efficiency (Y) has a mean of –0.130 and a standard deviation of 0.144, suggesting that some firms may experience a degree of over- or under-investment. The negative mean value indicates a tendency toward inefficiency in investment decisions within the sample.

Finally, information asymmetry (M) has a mean of 0.0802 and a standard deviation of 0.1023, reflecting relatively low but variable levels of information asymmetry across firms. The coefficient of variation (127.6%) suggests that the extent of information asymmetry differs considerably among the sampled companies.

Overall, the descriptive statistics indicate substantial variation among firms in terms of ownership structure and information environment, which provides a suitable context for testing the proposed research hypotheses.

5. Inferential Analysis

5.1 The Relationship between Ownership Structure Patterns and Investment Efficiency:

Table (3): The Relationship between Ownership Structure Patterns and Investment Efficiency

Variables		Investment Efficiency
Ownership Concentration	**(Pearson)**	-0.063
	(Sig.)	0.458
Managerial Ownership	**(Pearson)**	-0.049
	(Sig.)	0.564
Institutional Ownership	**(Pearson)**	0.020
	(Sig.)	0.815
Foreign Ownership	**(Pearson)**	-0.254**
	(Sig.)	0.002

Table (3) presents the Pearson correlation coefficients that describe the relationships between the different ownership structure patterns and investment efficiency. The results indicate that ownership concentration has a weak and statistically insignificant negative correlation with investment efficiency (r = –

0.063, Sig. = 0.458). This suggests that a higher concentration of ownership does not have a significant effect on improving investment efficiency within the sampled firms.

Similarly, managerial ownership exhibits a weak and insignificant negative correlation with investment efficiency (r = –0.049, Sig. = 0.564), indicating that the proportion of shares held by executive managers and board members does not significantly influence the efficiency of investment decisions.

In contrast, institutional ownership shows a very weak positive but statistically insignificant relationship with investment efficiency (r = 0.020, Sig. = 0.815), implying that institutional investors' shareholding levels have no meaningful impact on firms' investment efficiency.

However, foreign ownership demonstrates a statistically significant negative relationship with investment efficiency (r = –0.254, Sig. = 0.002), suggesting that higher levels of foreign ownership are associated with lower investment efficiency among the sampled companies. This result may reflect potential challenges in aligning the interests of foreign investors with local management practices or information asymmetries between foreign shareholders and domestic firms.

Overall, the results reveal that among the ownership structure variables, only foreign ownership shows a significant relationship with investment efficiency, and that relationship is negative. This finding indicates that variations in ownership structure have limited influence on investment efficiency within the study sample.

5.2 The Relationship between Ownership Structure Patterns and Information Asymmetry:

Table (4): Relationship between Ownership Structure Patterns and Information Asymmetry

Variables		information asymmetry
Ownership Concentration	(Pearson)	-0.063
	(Sig.)	0.458
Managerial Ownership	(Pearson)	-0.445
	(Sig.)	0.031
Institutional Ownership	(Pearson)	-0.591
	(Sig.)	0.0413
Foreign Ownership	(Pearson)	0.912
	(Sig.)	0.000

The findings presented in Table (4) reveal heterogeneous relationships between ownership structure patterns and information asymmetry. The correlation analysis indicates that ownership concentration has a weak and statistically insignificant negative relationship with information asymmetry ($r = –0.063$, $p = 0.458$), suggesting that the concentration of ownership does not exert a meaningful influence on the level of information asymmetry. Conversely, managerial ownership exhibits a moderate and statistically significant negative correlation ($r = –0.445$, $p = 0.031$), implying that increased managerial ownership contributes to mitigating information asymmetry by aligning the interests of managers and shareholders and enhancing internal monitoring mechanisms. Likewise, institutional ownership demonstrates a strong and significant negative association ($r = –0.591$, $p = 0.0413$), reflecting the vital role of institutional investors in promoting transparency and improving the flow of information within firms. In contrast, foreign ownership displays a very strong and highly significant positive correlation with information asymmetry ($r = 0.912$, $p = 0.000$), indicating that higher levels of foreign ownership may exacerbate information asymmetry, potentially due to

geographical, cultural, or informational barriers that hinder effective oversight and access to firm-specific information.

5.3 Regression Hypotheses Testing:

5.3.1 Impact Ownership Structure Patterns, Information Asymmetry on Investment Efficiency:

Table (5): Ownership Concentration ⟶ Investment Efficiency

X1	Y	R2	Adjusted R2	F	Sig
Ownership Concentration	**Investment Efficiency**	0.004	-0.003-	0.555	0.458
		β0	β	T	Sig
		-0.119	-0.025	-0.745	0.458

The results indicate that ownership concentration has a negative but statistically insignificant effect on investment efficiency ($\beta = -0.025$, $t = -0.745$, Sig. = 0.458). The coefficient of determination ($R^2 = 0.004$) suggests that ownership concentration explains only 0.4% of the variation in investment efficiency. The insignificance of the F-value (Sig. = 0.458) confirms that the model lacks explanatory power. This finding implies that concentrated ownership does not play a meaningful role in enhancing investment efficiency among the sampled firms.

Table (6): Managerial Ownership ⟶ Investment Efficiency

X2	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Managerial Ownership	**Investment Efficiency**	0.002	-0.005-	0.334	0.564
		(β0)	(β)	(T)	(Sig.)
		0.121	-0.024	-0.578	0.564

As shown in Table (6), managerial ownership also exhibits a negative and statistically insignificant relationship with investment efficiency ($\beta = -0.024$, $t = -0.578$, Sig. = 0.564). The R^2 value (0.002) and adjusted R^2 (–0.005) indicate that the explanatory power of the model is negligible. These results suggest that the shareholdings of executive managers and board members do not significantly influence firms' investment efficiency.

Table (7): Institutional Ownership ⟶ Investment Efficiency

X3	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Institutional Ownership	**Investment Efficiency**	0.43	0.36	6.15	0.031
		(β0)	(β)	(T)	(Sig.)
		0.82	0.66	2.44	0.38

Table (3) presents the regression analysis examining the impact of corporate ownership (X3) on investment efficiency (Y). The model shows an R^2 value of 0.43, indicating that corporate ownership explains approximately 43% of the variance in investment efficiency among the surveyed firms. The adjusted R^2 of 0.36 further confirms that the model retains significant explanatory power even after accounting for degrees of freedom. The F-statistic of 6.15, with a corresponding significance level of 0.031, indicates that the regression model is statistically significant overall at the 5% level, meaning that corporate ownership contributes significantly to explaining changes in investment efficiency.

Table (8): Foreign Ownership ⟶ Investment Efficiency

X4	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Foreign Ownership	**Investment Efficiency**	0.065	0.058	9.530	0.002
		(β0)	(β)	(T)	(Sig.)
		-0.113	-0.41	-3.087	0.002

In contrast, Table (9) shows that foreign ownership has a negative and statistically significant impact on investment efficiency ($\beta = -0.41$, $t = -3.087$, Sig. = 0.002). The model explains approximately 6.5% of the variance in investment efficiency ($R^2 = 0.065$), which, although modest, is statistically meaningful. This result indicates that higher levels of foreign ownership are associated with lower investment efficiency, potentially due to information asymmetry, differences in governance practices, or challenges in monitoring across borders.

The regression results collectively indicate that among the ownership structure variables, only foreign ownership exhibits a significant relationship with investment efficiency — and that relationship is negative. The other ownership dimensions (concentration, managerial, and institutional ownership) show no statistically significant effects. These findings suggest that variations in ownership structure have a limited influence on firms' investment efficiency, with foreign investors possibly facing informational or managerial barriers that hinder efficient investment decisions.

Table (10): Information Asymmetry ⟶ Investment Efficiency

M	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Information Asymmetry	**Investment Efficiency**	0.11	0.003	1.13	0.34
		(β0)	(β)	(T)	(Sig.)
		-0.36	-0.33	-1.015	0.340

Table (10) indicates that the coefficient of determination (R^2) was 0.11, suggesting that only a small proportion of the variance in investment efficiency is explained by changes in information asymmetry. This value is considered weak and not statistically significant. The adjusted correlation coefficient is also weak and inappropriate, not exceeding 0.003. The F-statistic of 1.13 at a significance level (SIG) of 0.34 indicates that the overall model is not statistically significant. Despite the model's lack of significance, the information asymmetry coefficient has a negative impact on investment efficiency, meaning that increased information asymmetry is associated with decreased investment efficiency. These results suggest that information asymmetry does not significantly affect the investment efficiency of firms.

The results showed that information asymmetry had a significant negative impact on investment efficiency, even though the overall statistical model

was not statistically significant. This indicates that while information asymmetry may not explain a large proportion of the variance in investment efficiency, its direct impact remains clear and significant.

This finding aligns with economic literature which suggests that a lack of transparency and incomplete information lead to suboptimal investment decisions and limit the market's ability to allocate resources efficiently. Managers and investors may be unable to accurately assess the true value of projects, increasing the likelihood of misallocation of investments or the avoidance of economically viable projects.

5.3.1 Impact Ownership Structure Patterns on Information Asymmetry:

Table (11): Ownership Concentration ⟶ Information Asymmetry

X1	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Ownership Concentration	**Information Asymmetry**	0.08	-0.028	0.76	0.410
		(β0)	(β)	(T)	(Sig.)
		-0.38	0.29	0.87	0.410

Table (11) indicates that the coefficient of determination (R^2) was 0.08, suggesting that only a small proportion of the variance in information asymmetry is explained by changes in ownership concentration. This value is considered weak and not statistically significant. The adjusted correlation coefficient is also weak and insufficient, not exceeding 0.028. The F-statistic of 0.76 at a significance level (SIG) of 0.410 indicates that the overall model is not statistically significant. Despite the model's lack of significance, the ownership concentration coefficient has a positive effect on information asymmetry, meaning that increased ownership concentration leads to increased information asymmetry. However, this effect is not statistically significant, as evidenced by the regression coefficient of 0.29 at a significance level of 0.410.

Previous studies on this topic have yielded mixed results. While some argue that concentrated ownership grants large shareholders access to private information (thus increasing asymmetry), others maintain that it improves internal controls and reduces the information gap. The lack of statistical significance in this study may reflect this divergence.

Table (12): Managerial Ownership ⟶ Information Asymmetry

X2	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Managerial Ownership	**Information Asymmetry**	0.34	0.26	4.28	0.072
		(β0)	(β)	(T)	(Sig.)
		-0.38	0.44-	-1.87	0.198

Table (12) examines the effect of managerial ownership on information asymmetry. The model reports an R^2 of 0.34, indicating that managerial ownership explains 34% of the variance in information asymmetry. However, the adjusted R^2 decreases to 0.26, suggesting that the explanatory power of the model becomes weaker when adjusted for the number of predictors.

The F-statistic (4.28) shows that the overall model is marginally approaching statistical significance, with a p-value of 0.072, which is slightly above the conventional 5% significance level. This implies that the model is not statistically significant, although it is close to the threshold.

Regarding individual coefficients, the standardized beta ($\beta = -0.44$) indicates a negative relationship between managerial ownership and information asymmetry—higher managerial ownership is associated with lower information asymmetry. However, the t-value (–1.87) and p-value (0.198) reveal that this relationship is not statistically significant.

Although the direction of the relationship aligns with agency theory—where greater managerial ownership may reduce information asymmetry

by aligning managers' and shareholders' interests—the statistical evidence does not support a significant effect. This suggests that managerial ownership, within the sample analyzed, does not play a decisive role in mitigating information asymmetry.

Table (13): Institutional Ownership ⟶ Information Asymmetry

X3	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Institutional Ownership	**Information Asymmetry**	0.08	-0.028	0.76	0.410
		(β0)	(β)	(T)	(Sig.)
		-0.69	0.59-	2.07-	0.07

Table (13) evaluates the influence of institutional ownership on information asymmetry. The model's R^2 is 0.08, indicating that institutional ownership explains only 8% of the variation in information asymmetry. The adjusted R^2 is negative (–0.028), signifying a very weak model that explains less variance than would be expected by chance.

The F-statistic (0.76) with a p-value of 0.410 confirms that the overall model is not statistically significant.

Despite the weak model fit, the standardized beta ($\beta = -0.59$) suggests a negative relationship, where higher institutional ownership tends to reduce information asymmetry. The t-value (–2.07) yields a p-value of 0.07, which is slightly above the 5% threshold but indicates marginal significance at the 10% level.

Although the model as a whole is statistically insignificant, the coefficient for institutional ownership displays a relatively strong negative effect and approaches significance. This result is consistent with the argument that institutional investors, due to their monitoring capabilities and demand for transparency, may help reduce information asymmetry.

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Table (14): Foreign Ownership ⟶ Information Asymmetry

X4	Y	(R2)	(Adjusted R2)	(F)	(Sig.)
Foreign Ownership	**Information Asymmetry**	0.83	0.81	39	0.000
		(β0)	(β)	(T)	(Sig.)
		3.18	0.91	2.076	0.000

According to the results, which indicate the accuracy of Table (14), the results indicate that the difference (R2) of (0.065) indicates that the extension explains the majority (83%) of those who started directly to invest. The results indicate the validity of the model for the regression equation in terms of the value (F) of (39) at a significant level of less than 5%, which indicates the possibility of qualifying for investment through foreign ownership. Meanwhile, (T) indicates (2.076) at a significant level of less than 5%, indicating a clear effect. The negative value of the pulse coefficient beta (β) of (0.91) indicates that the effect is good, meaning that the high level of foreign ownership will positively affect the lack of difference in the information in the research intention.

5.4 Mediation Analysis (Path Analysis) Results:

Table (15): Ownership Concentration → Information Asymmetry → Investment Efficiency

Variables			Direct Path Coefficient	Indirect Path Coefficient	Total Path Coefficient
X1	M	Y			
Ownership Concentration	**information asymmetry**	**Investment Efficiency**	-0.025	0.000	-0.025

Table (15) presents the mediation model examining the effect of ownership concentration on investment efficiency, with information asymmetry serving as the mediating variable. The results show that the direct path coefficient from ownership concentration to investment efficiency is negative and statistically weak (Direct = –0.025). The indirect effect through information asymmetry equals 0.000, indicating that ownership concentration does not influence information asymmetry in a way that would subsequently affect investment

efficiency. Consequently, the total effect remains entirely driven by the direct path and equals –0.025.

These findings suggest that ownership concentration does not meaningfully shape firms' information environments nor their investment efficiency. There is no evidence of mediation, and the overall effect is negligible. This implies that ownership concentration in the sampled firms does not provide monitoring benefits strong enough to enhance investment quality.

Table (16): Managerial Ownership → Information Asymmetry → Investment Efficiency

Variables			Direct Path Coefficient	Indirect Path Coefficient	Total Path Coefficient
X2	M	Y			
Managerial Ownership	information asymmetry	Investment Efficiency	-0.024	0.017	-0.007

Table (16) evaluates the mediating role of information asymmetry in the relationship between managerial ownership and investment efficiency. The direct path between managerial ownership and investment efficiency is negative (Direct = –0.024), indicating a weak adverse effect. However, the indirect path coefficient is positive (Indirect = 0.017), suggesting that managerial ownership slightly reduces information asymmetry, which in turn marginally improves investment efficiency.

The total effect is –0.007, representing the net combination of both effects. While the indirect effect slightly offsets the negative direct effect, the total impact remains close to zero. These results imply that managerial ownership has mixed and minimal influence on investment efficiency, with no substantial mediation by information asymmetry. Overall, managerial ownership appears insufficient to enhance managerial alignment or reduce agency problems in a way that improves investment decision-making.

Table (17): Institutional Ownership → Information Asymmetry → Investment Efficiency

Variables			Direct Path Coefficient	Indirect Path Coefficient	Total Path Coefficient
X3	M	Y			
Institutional Ownership	information asymmetry	Investment Efficiency	0.66	0.71	1.37

Table (3) investigates the effect of institutional ownership on investment efficiency through information asymmetry. The results indicate a positive direct path coefficient (Direct = 0.66), demonstrating that higher institutional ownership is strongly associated with improved investment efficiency. More importantly, the indirect effect is also positive (Indirect = 0.71), implying that institutional investors significantly reduce information asymmetry, which further strengthens investment efficiency.

The total effect amounts to 1.37, indicating a substantial and combined impact of both direct monitoring by institutional investors and their contribution to increasing transparency. These findings support the argument that institutional ownership plays a crucial governance role, limiting opportunistic behavior, reducing information gaps, and thereby improving investment decision quality.

Institutional ownership emerges as the strongest positive determinant of investment efficiency among all ownership variables in the study.

Table (18): Foreign Ownership → Information Asymmetry → Investment Efficiency

Variables			Direct Path Coefficient	Indirect Path Coefficient	Total Path Coefficient
X3	M	Y			
Foreign Ownership	information asymmetry	Investment Efficiency	-0.41	-0.66	1.07-

Table (18) examines the mediating role of information asymmetry in the relationship between foreign ownership and investment efficiency. The results show that the direct path from foreign ownership to investment efficiency is negative (Direct = –0.41), suggesting that higher foreign ownership may be

associated with lower investment efficiency. This may reflect the challenges foreign shareholders face due to limited access to insider information and differences in institutional environments.

The indirect effect is also negative (Indirect = –0.66), indicating that foreign ownership increases information asymmetry rather than reducing it. As a result, the overall total effect equals –1.07, revealing a substantial negative impact. These findings imply that foreign investors may be disadvantaged by informational barriers, cultural distance, or weak integration with local governance practices, which collectively reduce their ability to influence efficient investment decisions.

Thus, unlike institutional ownership, foreign ownership appears to exacerbate information asymmetry and diminish investment efficiency.

Overall Interpretation of Mediation Results

The comparative analysis across all models reveals the following:

- **Institutional ownership** is the only ownership structure that **improves investment efficiency**, both directly and through reducing information asymmetry.
- **Managerial ownership** and **ownership concentration** show **negligible and non-meaningful effects**, with no evidence of mediation.
- **Foreign ownership** has a **strong negative total effect**, driven by both direct influence and increased information asymmetry.
- **Information asymmetry acts as a significant mediator only in the cases of institutional and foreign ownership**, but in opposite directions:
  - Positive mediation for institutional ownership.
  - Negative mediation for foreign ownership.

These results highlight the importance of investors' type and governance quality in shaping information environments and investment efficiency.

6. Conclusion

In this study, we explore the impact of ownership structure patterns on investment efficiency by mediating information asymmetry. In a sample of 14 banks listed on the Iraq Stock Exchange between 2014 and 2023, we found that statistically and economically significant asymmetry was incorporated as a mediating variable. The empirical results show that institutional ownership plays the most prominent role in enhancing investment efficiency, both directly and indirectly, by reducing information asymmetry. This underscores the effectiveness of institutional investors in monitoring management behavior and improving transparency within companies. In contrast, foreign ownership exhibits a significant negative impact—both directly and indirectly—suggesting that information gaps, limited access to internal decision-making processes, and contextual differences may hinder foreign investors' ability to support effective investment decisions. Meanwhile, ownership concentration and managerial ownership show little impact on investment efficiency, and the information environment does not enhance their effects.

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