The Mediating Role of Investment Efficiency on The Relationship between Earnings Quality and Firm Performance

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Abstract
This study aims to examine the mediating effect of investment efficiency on the relationship between earnings quality and firm performance. It provides evidence from Jordanian non-financial firms over the period from 2012 to 2019 using the panel data analysis method. The findings conclude that earnings persistence, earnings predictability, and earnings smoothness significantly affect firm performance. Furthermore, earnings persistence and earnings smoothness significantly affect investment efficiency. Moreover, investment efficiency mediates the relationship between earnings persistence, earnings smoothness, and firm performance. Finally, the current study suggests that other factors influencing company performance be investigated in future research, particularly in diverse nations like the MENA.
Keywords: Earnings Quality, Investment Efficiency, Jordanian Listed Firms, Agency Theory

Introduction
Jordan is a resource-poor nation; as a result, it relies heavily on the private sector to create jobs for its people (Ibrahim & Hanefah, 2016). As a result, major efforts have been made to attract investors. For example, the Amman Stock Exchange (ASE) was founded to enhance firm performance by enhancing transparency, accountability, and disclosure in Jordan's regulatory framework. However, the ASE has witnessed a bit of volatility since it started in a number of various areas. Examples include a decline in the market capitalization to gross domestic product (GDP) percentage from 93.5 in 2012 to 49.7 in 2019, a decline in the value of trading from 1,978.8 JD billion to 1,585.4 JD billion in 2019, and a decline in the volume of shares traded from 2,384.1 JD billion to 1,247.2 JD billion in 2019 (Alkhazaleh et al., 2022). Family-owned firms dominate, with a small number of shareholders in Jordan, Saudi Arabia, Syria, and Egypt, holding the majority of the shares (Omet, 2006). In contrast to developed

nations, the main agency conflict in the Jordanian situation of listed companies is between minority shareholders and controlling shareholders, rather than the more normal dispute between management and shareholders. Additionally, like many developing countries, Jordanian firms have concerns with transparency and investor rights protection (Al Lawati et al., 2021). In this situation, the company's ability to obtain outside financing will be limited. Consequently, low firm performance was a result (Alkurdi *et al.*, 2021).

The previously mentioned information makes it abundantly evident that Jordanian companies are performing poorly. Information asymmetry and agency conflicts may be the key frictions contributing to poor company performance, according to several studies (Aslam & Haron, 2020; Phan & Duong, 2021). According to Rubino et al (2017), managerial opportunism issues and agency issues between minority and dominant shareholders make it difficult to increase corporate value. Previous research has demonstrated that many variables, including earnings quality, can be viewed as determinants of company performance. High earnings quality produces highly accurate information, which lowers the amount of information risk (Shahzad *et al.*, 2019).

High earnings quality is also connected with lesser lower systematic risk and information asymmetry. Ahmed (2020) provided evidence from Middle Eastern countries, particularly Gulf Council countries, where the ownership of firms is concentrated, and indicated that earnings quality affects firm performance positively and significantly. Likewise, Ramadan (2015) documented that earnings quality leads to high firm performance in Jordanian firms, where earnings quality reduces agency costs and limits the likelihood of engaging in earnings management, which will reflect positively on Jordanian firm performance.

Although there are other proxies that affect earnings quality, most prior research only looked at one or a few accrual indicators. The current study emphasizes the persistence, smoothness, and predictability of earnings time-series attributes. According to several studies ((Dimitropoulos et al., 2019; Houcine, 2017), earnings persistence, earnings smoothness, and earnings predictability are significant predictors for company stakeholders and investors to offer investment, and affect stock prices, resulting in high-quality earnings. Investment efficiency is also included in this study as a mediator variable. Investment inefficiency refers to selecting projects with a current net worth that is negative (overinvesting) or failing to take advantage of chances while making investments (Hayati & Sedaghat, 2016)

Earnings quality can influence investment efficiency. According to evidence from the Jordanian environment provided by Alkhafaji et al (2020), earnings quality has a favorable effect on investment efficiency. As well, Assad and Alshurideh (2019) indicated that earnings quality positively affects the investment efficiency of Saudi firms. On the other hand, the efficacy of a firm's investments, according to Cao *et al* (2020), specifies its potential cash flows and profitability and has a substantial impact on the expansion of the firm and future survival. Salehi et al (2022) reported that investment efficiency affects firm value, whereas investment efficiency is a crucial for determining firm value.

A number of reasons led to the current study's motivation. Firstly, there are not many studies that have specifically looked at Jordan or the Middle East's performance of firms. The present study might close the gap left by earlier research. Second, the current study focuses on time series proxies of earnings quality because the majority of earlier studies of earnings quality focused on accruals proxies. Third, to close the gaps left by other studies, the present study goes one step further and investigates the role of investment efficiency as a mediator component that explains the relationship between earnings quality and firm performance.

The rest of the sections of the essay are as follows: The literature on the research hypothesis is included in Section 2. The methodology is shown in Section 3. Section 4 shows the findings and discussion that follow. Section 5 presents the conclusion and limitations.

Review of Related Literature
Theoretical Framework

The agency theory served as the foundation for this study (Anwar & Malik, 2020; Alkhazalih et al., 2023; Sadaa et al., 2023). Prior literature indicates two types of agency issues. First, the agency issues between shareholders and management (Sadaa et al., 2023). Second, the agency issue between minority and dominant shareholders. The majority of previous studies highlighted the first type of agency issue. However, in developing nations like Jordan, the second type of agency issue is more prominent because the ownership structure in these environments is highly concentrated. Accordingly, the main agency conflicts could be between minority shareholders and controlling shareholders (Shleifer & Vushny, 1997). In such a scenario, the firm's ability to obtain financing from outside will be limited. According to Alzoubi (2016), this is because minority owners lack confidence that their investments won't be expropriated by controlling shareholders.

Rubino (2017) reported that agency issues between minority shareholders and dominant shareholders make the firms unable to maximize their firm value. Furthermore, agency theory indicates that controlling shareholders have more power to access information than minority shareholders. Therefore, information asymmetry between dominant shareholders and minority shareholders is present. To reduce agency issues between dominant and minority shareholders, firms seek to increase information quality. Hung et al. (2020) demonstrated that earnings quality could be an efficient tool to mitigate information asymmetry and agency issues between minority shareholders and dominant shareholders and enhance investment efficiency; thereby improving firm performance.

Hypothesis Development
The Relationship between Earnings Quality and Firm Performance

According to Khanh and Hung (2020), earnings quality has a key role in mitigating information asymmetry and supporting the expansion of firms. Earnings quality is linked to accurate information about the firm cash flow, according to a study by Shahzad et al., (2019), who also reported that earnings quality is linked to lower equity costs. This reduces information risk, information asymmetry, and equity costs. Earnings quality could therefore be a useful tool to assist creditors and shareholders in enhancing the corporate board's management authority and thereby limiting representation expenses. Information asymmetry and agency conflicts affect Jordanian firms, as stated in the introduction. Earnings persistence is crucial to minimizing information asymmetry, according to (Park *et al.*, 2018). Alsufy et al (2020) conducted a study on Jordanian firms, earnings quality enhances protecting investors, boosts investor confidence, and increases share prices. Additionally, Alqirem *et al.* (2020) found that Jordanian industrial public shareholding firms' market value is increased by their high earnings quality. Earnings smoothness was utilised by Munjal et al (2021) as an attribute for earnings quality and was applied to 500 Indian companies.

They found that smooth earnings positively affect the return on assets. Using a sample of Portuguese companies, Tobin's Q. Duarte et al (2022) showed that earnings smoothness, earnings predictability, and earnings persistence have a minimal impact on company performance. Aguguom (2019) revealed that earnings persistence and smoothness have a

favourable impact on firm value by using smoothness, and persistence as proxies for earnings quality. However, Ma and Ma (2017) demonstrated that earnings quality negatively influences company performance. Similarly, Sunday et al (2020) reported that the effect of earnings quality on firm performance is minimal and negative. The present study supports the following hypotheses since earnings quality is thought to be a useful instrument to improve company performance by delivering more accurate information

H1: There is a positive relationship between earnings quality and firm performance.
H1a: There is a positive relationship between earnings persistence and firm performance.
H1b: There is a positive relationship between earnings predictability and firm performance.
H1c: There is a positive relationship between earnings smoothness and firm performance.

The Relationship between Earnings Quality and Investment Efficiency
Several studies have demonstrated that earnings quality also influences investment efficiency. Where earnings quality minimizes information asymmetry in highly concentrated ownership, which lowers the cost of adverse selection and minimizes the moral hazard issue (Cherkasova & Rasadi, 2017). Carvalho and Kalatzis (2018) conducted a study on seven different Latin American countries between 1992 and 2009. The study reported that high earnings quality could help to in reducing asymmetric information because high earnings quality implies better financial information, which ultimately results in improved investment decisions. Likewise, Dou et al (2019) utilized accruals quality on a sample of US companies and reported that companies with earnings quality invest in an efficient way through the mitigation of the adverse selection problem.

Numerous studies were also carried out in Jordan and nearby nations with a similar culture. For instance, Assad and Alshurideh (2019) presented data from the Gulf Cooperation Council, where ownership is concentrated and dominating shareholders and minority shareholders frequently engage in conflict. According to the study, earnings quality increases investment efficiency by mitigating asymmetric information between minority and dominant shareholders by increasing the transparency of a firm's financial statements, which makes it easier for outside capital suppliers to keep an eye on management. Additionally, Bekheet (2019) used a sample of Saudi firms to provide evidence from the Arab environment. Smoothness, persistence, and predictability were used as proxies for earnings quality and found that these qualities help firms make rational investment decisions by mitigating asymmetric information. Alkhafaji et al (2020) demonstrated that most Jordanian firms do not use conservative accounting practices, leading to information asymmetry and inefficient investment choices. The current study predicts that earnings quality influences investment efficiency positively by mitigating agency issue and information asymmetry between dominant shareholders and minority shareholders, as discussed above. Thus, the current investigation lends support to the following hypotheses

H2: There is a positive relationship between earnings quality and investment efficiency.
H2a: There is a positive relationship between earnings persistence and investment efficiency.
H2b: There is a positive relationship between earnings predictability and investment efficiency.
H2c: There is a positive relationship between earnings smoothness and investment efficiency.

The Relationship between Investment Efficiency and Firm Performance

The efficiency of investment is regarded as one of the most significant variables that specify the firm's valuation and, consequently, the wealth of investors. According to Carvalho and Kalatzis (2018), an inefficient investment could lead to investments in projects that fail, which would influence the performance of the firm. According to prior studies, the key frictions that cause inefficient investment are asymmetric information and agency issues. Asymmetric information and agency issues between dominant shareholders and minority shareholders occur in situations of ownership concentration (Alhadab et al., 2019). Existing research by Hayati and Sedaghat (2016); Alsmady (2022); Tran, (2020), and Anwar and Malik (2020) indicates that investment efficiency is related to reduced information asymmetry, which in turn results in a reduced level of adverse selection and moral hazards issues, improving firm performance. Using data from a developing nation, Saif *et al* (2020) demonstrated that business investment decisions had a considerable influence on the performance of the firm. Investment choices, therefore, aim to maximize shareholder wealth. Investment choices would also guarantee the development of new jobs, boost consumption, and open up fresh investment prospects. For markets in Romania, Moldova, Russia, and Serbia, Hatem (2016) looked at four countries, and their findings revealed a significant association between corporate investment and company performance.

According to Mukhtar (2016), who used 30 companies in the chemical sector of Pakistan, increased investment had a favourable impact on firm profitability. By using a large sample from Asian firms. According to Alsayegh et al (2023), investment efficiency increases firm value. The impact of corporate sustainability performance on business value is also mediated by investment efficiency. Therefore, the present study supports the following hypotheses

H3: There is a positive relationship between investment efficiency and firm performance.

The Mediating Role of Investment Efficiency on the relationship between Earnings Quality and Firm Performance

Moral hazards and adverse selection, which result in information asymmetry between minority shareholders and controlling shareholders, influence investment efficiency (Anwar & Malik, 2020). Therefore, identifying variables that may lessen agency conflicts and information asymmetry may improve investment efficiency. Numerous factors may have an impact on the efficacy of investments, according to earlier studies. For instance, earnings quality. According to Shahzad et al (2019), companies with high earnings quality make more effective investments. Higher earnings quality also improves shareholders' ability to monitor management behaviour and lowers agency expenses.

On the other hand, one of the most significant elements influencing corporate performance is investment efficiency. Long-term shareholder wealth growth is made possible by investment efficiency since investments in profitable projects generate positive returns that foster the company's expansion (Liu *et al.*, 2022). Alsayegh et al (2023) revealed that investment efficiency positively affects firm value. As well as investment efficiency, which mediates the effect of corporate sustainability performance on firm value. The mediation theory stated that IV causes M, which causes DV. According to this theory, the present study measures the relationship between earnings quality (IV) and firm performance (DV) and how it is improved through investment efficiency (Med.V). The current study hypothesizes that earnings quality enhances firm performance. Also, earnings quality enhances investment

efficiency. In addition, investment efficiency enhances firm performance by reducing the issues between minority shareholders and dominant shareholders. Finally, investment efficiency mediates the relationship between earnings quality and firm performance. Thereby, the current study supports the following hypotheses:

H4: Investment efficiency mediates the relationship between earnings quality and firm performance.

H4a: Investment efficiency mediates the relationship between earnings persistence and firm performance.

H4b: Investment efficiency mediates the relationship between earnings predictability and firm performance.

H4c: Investment efficiency mediates the relationship between earnings smoothness and firm performance.

Methodology
Sample
This study utilized the listed companies on the Amman Stock Exchange. Purposive sampling is the basis for the study, which considers logic while choosing the population sample. Statements from the listed company from 2012 to 2019 were gathered. The current study chose this period because firm performance declined severely during this period due to external and internal factors. The last sample of firms is 78 non-financial firms listed in ASE.

Measurements
Dependent Variable
The current study utilizes Tobin's Q, which has been commonly employed in prior literature (Dakhlallh *et al.*, 2020; Buachoom, 2018). Studies have been using measures that are based on accounting and market data, and the oldest and most widely used measure is Tobin's Q.

(Market value + Book value of Debt) / Book value of assets
Tobin's Q, a theoretically based indicator of economic return, is the percentage of the market value of a firm's assets plus the book value of its debt to their replacement cost (Tobin, 1969). The denominator is the assets at book value, and the numerator is the share price multiplied by the total number of shares plus the debt at book value.

Independent Variables
Earnings quality is a multiple, contextual concept that is subjective to each user and lacks a standard definition. Based on earnings predictability, earnings persistence, and earnings smoothness, the current study creates earnings quality (Aguguom, 2019; Krishnan & Zhang, 2019; Hoang et al., 2019).
The first proxy for earnings quality is earnings persistence. Earnings persistence shows a firm's profit quality and shows that earnings can be retained over time rather than only because of a given event. Accordingly, the current study follows previous literature (Li, 2019; Fatma & Hidayat, 2019; Hung et al., 2020) to use earnings persistence as a measurement for earnings

quality by using the following model, where earnings persistence is the coefficient of slope from the regression of future earnings on present earnings in the equation:

$$E_{it+1} = \alpha_0 + \alpha_1 E_{it} + e_{it}$$

Where Et is net earnings before extraordinary items in year t. All variables in Equation are divided by the firm is total assets in year t − 1.

The second proxy for earnings quality is earnings predictability. Where earnings predictability indicates the degree to which present earnings may be utilized to predict future earnings. Thus, earnings predictability is the standard deviation of the residuals (vj) from the persistence equation (Hoang et al., 2019; Dimitropoulos et al., 2019; Krishnan & Zhang, 2019). Finally, smoothness, according to Francis et al. (2006), is 'the relative absence of variability'. Lennox (2016) indicate that earnings smoothness shows high earnings quality, so smoothness is considered a desirable property for earnings quality. The current study uses the measurement of smoothness, which was used in a prior study (Hoang et al., 2019; Lennox et al., 2016; Šodan, 2015; McInnis, 2010; Francis *et al.*, 2004), as the percentage of the firm's standard deviation of net income before extraordinary items divided by beginning total assets, to its standard deviation of cash flows from operations divided by beginning total assets.

Mediating Variable

The current study uses an investment sensitivity measurement that has been broadly used in prior literature (Mclean et al., 2012; Javakhadze et al., 2016; Chen et al., 2017; Tran, 2020). This measurement utilizes the sensitivity of investment to investment opportunities to determine the efficiency of investment where investment expenditure is positively related to investment opportunities.

A measure of investment that includes capital, R&D, and acquisition expenditures while deducting cash from the sale of PPE divided by lagged total assets is included in the equation for the linear regression. Operating cash flow divided by MTB and net PPE, calculated as the proportion of the market value of total assets to book value of total assets at the beginning of the fiscal year (defined as total assets plus the product of stock price and the number of common shares outstanding minus the book value of debt), shown as follows:

$$Invest_{it} = \beta_0 + \beta_1 OCF_{t-1} + \beta_2 MTB_{t-1} + \varepsilon_{it}$$

The residuals from the equation of investment are used to determine investment efficiency. Underinvestment is represented by the adverse residuals of the investment model, and overinvestment is represented by the positive residuals. So, the test variable, i.e., IE, is the absolute value of the residual, which reflects an efficient investment. This indicates that a higher value of residual represents a higher level of efficiency (Lv & Xiong, 2022; Liu *et al.*, 2022).

Control Variables

Besides the previously mentioned factors, the present study also incorporates several control variables to control firm-specific characteristics. Firm size is represented by the natural logarithm of the firm's total assets at the end of the accounting year (Nguyen et al., 2015). The dividend per share is represented by the rate of dividend payout. Finally, firm liquidity represents by current assets divided by current liabilities.

Research Model
The present study followed the strategy of Baron and Kenny (1986) and Sobel (1982) to investigate the significance of the indirect and direct effects of earnings quality on firm performance. As well, panel-corrected standard errors (PCSE) have been utilized to investigate the suggested hypotheses. Where the diagnostic analysis reported that the models of the current study show heteroscedasticity and autocorrelation, it needs to address this issue to achieve accurate estimates. FGLS is one of the critical techniques (Parks, 1967); however, this technique is invalid when N is greater than T; it requires a relatively large T in relation to N. Thus, the current study employs (PCSE), because it is a suitable estimator when N is greater than T (Carl *et al.*, 2020; Singla, 2020; Mnif & Imen, 2020). Furthermore, to mitigate the effect of outliers, every variable that has extreme values at the upper and lower of 1 and 5% has been winorized. Panel-corrected standard errors (PCSE) are used for calculating the following models:

$$FP_{it} = \beta_{it} + \beta_1 Persis_{it} + \beta_2 Perdic_{it} + \beta_3 Smooth_{it} + \beta_4 FS_{it} + \beta_5 Liquid_{it} + \beta_6 Divid_{it} + e_{it}$$
$$(1)$$

$$IE_{it} = \beta_{it} + \beta_1 Persis_{it} + \beta_2 Perdic_{it} + \beta_3 Smooth_{it} + \beta_4 FS_{it} + \beta_5 Liquid_{it} + \beta_6 Dividend_{it} + e_{it}$$
$$(2)$$

$$FP_{it} = \beta_{it} + \beta_1 Investment\ Efficiency_{it} + +\beta_2 Firm\ Size_{it} + \beta_3 Liquidity_{it} + \beta_4 Dividend\ per\ Share_{it} + e_{it}$$
$$(3)$$

$$FP_{it} = \beta_{it} + \beta_1 Persis_{it} + \beta_2 Perdic_{it} + \beta_3 Smooth_{it} + \beta_4 IE_{it} + \beta_5 FS_{it} + \beta_6 Liquid_{it} + \beta_7 Divid_{it} + e_{it}$$

$$(4)$$

Where: FP is TobinsQ, Persis is earnings persistence, Predict is earnings predictability, Smooth is earnings smoothness, IE is investment efficiency, FS is firm size, Liquid is the firm's liquidity, Divid is the dividend per share.

Empirical Results
The current study's purpose is to investigate how earnings quality influences company performance. Also, to investigate the mediating role of investment efficiency on the relationship between earnings quality and firm performance. Descriptive statistics, diagnostic tests, and regression analysis findings are presented in this section.

Descriptive Statistics
Table **I** displays summary data for the variables used in the current study's regression, including the median, maximum value, mean value, standard error, and minimum value. In Table **I**, the maximum value of Tobin's Q is 2.43, and the minimum is 0.46. The mean Tobin's Q is 1.10, indicating the future prospects of Jordanian firms are well. In addition, the standard deviation is 0.51. Where previous studies indicated that Tobin's Q of more than 1 implies that the prospects of the firms are well (Bhagat & Bolton, 2019). According to the results,

investment efficiency is on average 0.059, and the standard deviation is 0.05. Whereas the highest value is 0.21 and the lowest value is 0.003, respectively. It is critical to keep in mind that investment values are absolute values.

Table I
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
TobinsQ	624	1.102	0.514	0.462	2.43
IE	624	0.059	0.055	0.003	0.206
Persis	624	0.033	0.046	-0.05	0.134
Predic	624	0.0002	0.043	-0.205	0.212
Smooth	624	0.57	1.769	-3.389	5.122
FS	624	17.358	1.232	15.403	20.297
Divid	624	0.1	0.18	0	0.75
Liquid	624	5.256	4.928	1.25	20.79

To assess earnings quality, three proxies are used. The descriptive analysis is shown in Table **I**. According to persistence, predictability, and smoothness, the minimum earnings quality is 0.05, 0.20, and 3.39, while the maximum value is 0.13, 0.21, and 5.12, respectively. The mean values are 0.03 and 0.57, respectively. According to (Bekheet et al., 2019), Saudi Arabia's mean values for earnings smoothness, earnings predictability, and earnings persistence are, respectively, 0.73, 0.74, and -0.85. Additionally, (Kimouche, 2021) discovered that Algerian companies' average earnings persistence is 0.04 in value. While among Iranian companies, the mean value of earnings persistence is 0.36. Regarding control variables, the mean value for firm size was 17.3, and the standard deviation is 1.23. The current study followed previous studies in calculating firm size, as firm size is a natural logarithm of total assets, and 17.3 equals 88000000 JD. Whereas the average firm's liquidity is 5.25. Furthermore, the maximum value of the dividend is 0.75, while the average is 0.10.

Diagnostic Tests
The independent variables' common coefficients can be seen in the correlation matrices, as seen in Table **II**. The greatest correlation, 0.12 between earnings persistence and investment efficiency, illustrates that the multicollinearity of the independent variables employed in the current study model is not problematic (Tabachnick & Fidell, 2019; Alhadi *et al.*, 2020). Also, Table II demonstrates that all of our independent variables' variance inflation factors (VIFs) indicate to be significantly below the 10-cutoff point, based on (Greene, 2002). According to the findings, the highest VIF value is 1.08. Multicollinearity is not likely to pose issues.

Table II

Matrix of Correlation

Variables	-1	-2	-3	-4	-5	-6	-7	VIF
(1) IE	1							1.05
(2) Persis	0.123	1						1.08
(3) Predic	0.014	0	1					1.03
(4) Smooth	0.107	-0.052	0.03	1				1.02
(5) FS	-0.055	0.21	0.039	-0.005	1			1.06
(6) Divid	0.063	0.102	0.032	0.015	0.024	1		1.01
(7) Liquid	-0.081	0.039	0.005	-0.021	0	-0.018	1	1.01

To confirm that the residuals had a normal distribution, a normality test was also applied. The skewness and kurtosis test's P-value is greater than 0.05, as shown in Table **III**. The residuals are therefore normally distributed.

Table III

Normality Test

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob>chi2
Residuals	624	0.062	0.446	4.05	0.132

Because consistent variance, covariance, and mean requirements should validate the suggested models and parameters, data stationarity is essential for panel data, it is crucial to consider whether the data are stationary or not. Using the following test, stationarity is checked. Table IV shows that every variable employed was discovered to be stationary at each of its levels.

Table IV

Unit root test (Levin-Lin-Chu)

Variables	Statistics	p-value
Persis	-13.24	0.00
Predic	-11.07	0.00
Smooth	-19.29	0.00
TobinsQ	-7.34	0.00
Liquid	-10.75	0.00
Divid	-3.98	0.00
FS	-13.03	0.00
IE	-10.25	0.00

The Result of Regression

The present study conducted several significant checks, including residual normality, heteroscedasticity, and autocorrelation, before doing the panel data regression. The outcomes showed that autocorrelation and heteroscedasticity are prevalent. (PCSE), an appropriate technique estimator that eliminates both autocorrelation and heteroscedasticity, is used in the present study to address these econometric issues (Carl et al., 2019; Mnif & Imen, 2020; Singla, 2020). As well, the current study follows the Baron and Kenny (1986) method and the Sobel test to investigate the mediation role of investment efficiency on the relationship between earnings quality and firm performance. Accordingly, four steps were conducted to examine the direct and indirect effects.

Table VI
First Step: The Relationship between Earnings quality and Firm Performance
 Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Dependent variables	Explanatory Variables	Coef.	St.Err.	p-value	Sig
Tobins'Q	Persistence	2.224	0.843	0.008	***
	Predictability	0.845	0.426	0.047	**
	Smooth	0.011	0.005	0.026	**
	FS	0.044	0.021	0.039	**
	Divi	0.001	0.003	0.667	
	Liqui	-0.006	0.006	0.324	
	Constant	0.317	0.365	0.386	
	Chi-square	17.43 (0.00)			
	Heteroskedasticity (chi2)	5.10 (0.00)			
	Serial Correlation	18.10 (0.00)			
	R-squared	58.60%			
	N	624			

 *** p<.01, ** p<.05, * p<.1

Table **VI** reports the findings of the analysis that investigates the influence of earnings quality on firm performance. The goodness of fit was accepted in the form of a significant F-statistic. Earnings quality explained approximately 17.4 percent of the difference in firm performance. The results of regression, as shown in Table VI, show that earnings persistence significantly affects significantly firm performance (P<0.00, Coe 2.22). The results presented that firm performance was higher as earnings persistence was higher. Therefore, H1a was supported. Regarding earnings predictability, the findings reported that earnings predictability affect significantly firm performance. Hence, H1b was supported. Likewise, the findings indicated that earnings smoothness affect significantly firm performance. Therefore, H1c was accepted. Concerning control variables, Table VI shows that firm size affects significantly firm performance. However, a firm's liquidity and dividend per share do not significantly affect the firm performance.

Second Step: The Relationship between Earnings quality and Investment Efficiency
Table **VII** presents the findings of a regression that explores the influence of earnings quality on investment efficiency. The goodness of fit was accepted in the form of a significant F-

statistic. Earnings quality explained approximately 36.3 percent of the variation in investment efficiency.

Table VII
Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Dependent variables	Explanatory Variables	Coef.	St.Err.	p-value	Sig
Investment Efficiency	Persis	0.224	0.055	0.000	***
	Predic	0.036	0.047	0.441	
	Smooth	0.002	0.001	0.011	**
	FS	-0.005	0.002	0.031	**
	Divid	-0.0001	0.003	0.991	
	Liquid	-0.001	0.001	0.005	***
	Constant	0.149	0.039	0.000	***
	Chi-square	**36.30 (0.00)**			
	Heteroskedasticity (chi2)	**8.99 (0.00)**			
	Serial Correlation	**7.11 (0.00)**			
	R-squared	**27.10%**			
	N	**624**			

*** p<.01, ** p<.05, * p<.1

The findings of regression are shown in Table **VII** and present that earnings persistence significantly affects investment efficiency (P<0.00, Coe 0.22). The findings reported that investment efficiency was higher as earnings persistence was higher. Therefore, H2a was supported. Regarding earnings predictability, the findings show that earnings predictability does not significantly affect investment efficiency. Hence, H2b was not supported. Moreover, the results demonstrate that earnings smoothness has a significant and positive relationship with investment efficiency (P<0.01, Coe 0.002). Therefore, H2c was supported.

Third Step: The Relationship between Investment Efficiency and Firm Performance
Table **VIII** presents the findings of a regression that explores the influence of investment efficiency on firm performance. The goodness of fit was accepted in the form of a significant F-statistic. Investment efficiency explained approximately 64.2 percent of the variation in firm performance.

Table VIII

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Dependent variables	Explanatory Variables	Coef.	St.Err.	p-value	Sig
	IE	1.359	0.299	0.000	***
	FS	0.054	0.019	0.004	***
Tobins'Q	Divi	0.001	0.002	0.679	
	Liqui	-0.003	0.006	0.568	
	Constant	0.124	0.325	0.704	
	Chi-square	**35.07 (0.00)**			
	Heteroskedasticity (chi2)	**30.45 (0.00)**			
	Serial Correlation	**18.7 (0.00)**			
	R-squared	**64.20%**			
	N	**624**			

*** p<.01, ** p<.05, * p<.1*

The findings of the regression are presented in Table **VIII** and indicate that investment efficiency significantly affects firm performance (P<0.00, Coe 1.35). The findings indicated that investment efficiency was higher as firm performance was higher. Therefore, H3 was supported. Concerning control variables, the findings indicated that a firm's liquidity does not significantly affect firm performance. Moreover, the findings indicate that dividend per share has no significant relationship with firm performance. Finally, Table **VIII** shows that firm size significantly affects firm performance (P<0.01, Coe 0.05).

Fourth Step: The Mediating Role of Investment Efficiency on The Relationship between Earnings Quality and Firm Performance

The Baron and Kenny (1986) approach to mediation analysis was utilized to examine this indirect effect of investment efficiency. According to Baron and Kenny, the relationships examined in the previous three steps must be significant to conduct the mediation analysis. The regression model's independent variables and dependent variables, the independent and the mediator, and the mediator and dependent variable, all need to be statistically related. The aforementioned regression was performed in the first two steps of the Baron and Kenny method of mediation analysis, with the outcomes displayed in Tables **VI** and **VII**. After determining whether there is no mediation, full mediation, or partial mediation, the hierarchal multiple regression model and the Sobel Test were employed in the current study to assess whether mediation is significant.

Table IX

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Dependent variables	Explanatory Variables	Coef.	St.Err.	p-value	Sig
Tobins'Q	Investment Efficiency	1.38	0.311	0.00	***
	Persistence	1.982	0.75	0.008	***
	Predictability	0.83	0.401	0.038	**
	Smooth	0.009	0.005	0.063	*
	FS	0.047	0.018	0.009	***
	Divi	0.001	0.002	0.579	
	Liqui	-0.003	0.005	0.53	
	Constant	0.177	0.312	0.57	
	Chi-square	**39.82 (0.00)**			
	Heteroskedasticity (chi2)	**7.06 (0.00)**			
	Serial Correlation	**19.49 (0.00)**			
	R-squared	**61.60%**			
	N	**624**			

*** p<.01, ** p<.05, * p<.1

Adjusting for the effect of the mediator variable (investment efficiency), the findings presented in Table **IX** indicated that earnings persistence affects firm performance positively and significantly firm performance (P<0.00, Coe 1.98). Hence, H4a was supported. However, the mediation was partial, where after incorporating investment efficiency as a mediating variable, the relationship between earnings persistence and firm performance was still significant. Moreover, Table **IX** indicates that earnings predictability affects positively and significantly firm performance (P<0.03, Coe 0.83). Hence, H4b was not accepted because earnings predictability has no significant effect in the first step. In other words, one of the mediation conditions has not been met. Finally, Table **IX** shows that earnings smoothness positively affects firm performance (P<0.00, Coe 0.44). But after incorporating the investment efficiency as a mediator the effect becomes insignificant. Accordingly, the mediation effect is full. Accordingly, H4c was supported.

The Sobel Test was then performed for individual predictive variables that significantly affected firm performance through investment efficiency as the mediator to assess the relevance of the mediation analysis. The findings of the Sobel test used to determine the relevance of the mediating variable to each independent variable that significantly affects the dependent variable are shown in Table **X**.

Table X
Sobel's Test

Variables	Statistics	P-value (one-tailed)
Persistence	2.29	0.01
Smooth	1.83	0.03

Calculating the regression coefficient and standard error for this regression coefficient for the relationship between the mediator and the dependent variable (after adjusting for the independent variable, path b) and the relationship between the mediator and the independent variable (path a) is necessary for the Sobel test (Obeidat, 2016). Regarding earnings persistence, the unstandardized β for path (a) = 2.22 and the standard error = 0.84, and for path (b) unstandardized β = 1.35 and the standard error = 0.29. The Sobel test value is then calculated using the data, and it is discovered that the t-value is 2.29 and the p-value < 0.01. On other hand, earnings smoothness has the unstandardized β for path (a) = 0.01 and the standard error = 0.005, and for path (b) unstandardized β = 2.22 and the standard error = 0.84. The Sobel test value is then calculated using the data, and it is discovered that the t-value = 1.83 and the p-value < 0.03.

Discussion and Conclusion
The current study sought to investigate the influence of earnings quality on investment efficiency and firm performance in Jordanian non-financial firms. The findings of the current study revealed that earnings persistence and earnings smoothness affect firm performance positively and significantly. Earnings persistence enhances investor-firm coordination through increased investment, less information asymmetry, decreased capital costs, and ultimately improved firm performance (Latif et al., 2017). Accordingly, earlier research suggested that firms with more persistent earnings perform better (Khanh & Hung, 2020; Huynh, 2018; Huynh, 2019; Latif et al., 2017). Concerning earnings smoothness, the results report that earnings smoothness affects firm performance positively and significantly. Smoothness is the relative absence of variability (Francis et al., 2006). This suggests that the smoother the earnings, the less volatile they are. Lennox et al. (2016) suggest that earnings smoothness shows high earnings quality, so smoothness is considered a desired attribute for earnings quality. This result implies that earnings smoothness assists managers in making better decisions as well as maintaining competitive advantages over their competitors, allowing them to get the best potential results (Huynh, 2018).

These findings support the agency theory's argument (Jensen and Meckling, 1976). According to agency theory, Jordan is a developing country with a concentrated ownership structure. Therefore, conflicts of interest between controlling and minority owners may be the main ones. In this situation, the company's ability to obtain outside financing will be hampered. Consequently, low firm performance was a result (Alkurdi et al., 2021). Moreover, the results reported that earnings persistence and earnings smoothness significantly improve firm performance in a concentrated setting. According to Ramadan (2015), earnings quality enhances firm performance in Jordanian firms by lowering agency costs and decreasing the chance of engaging in earnings management. According to Latif et al. (2017), these findings may be explained by the fact that earnings quality reduces agency conflicts, which, then lowers the cost of capital and improves firm performance under concentrated ownership.

Second, the result of the current study demonstrated that earnings persistence, and earnings smoothness, affect investment efficiency positively and significantly. These findings may be attributed to the fact that in concentrated settings, there is asymmetric information between minority and dominant shareholders due to the power of dominant shareholders in the firm. Therefore, controlling shareholders can requisition the wealth of minority shareholders by investing more than the optimal investment. In this vein, earnings persistence reduces information asymmetry, which results in decreased adverse selection and decreased moral hazard issues (Alsmady, 2022). Assad and Alshurideh (2019) provided evidence from the Gulf Cooperation Council where the ownership is concentrated, and the main conflicts are between minority shareholders and controlling shareholders. The study indicated that earnings quality improves investment efficiency by mitigating asymmetric information between minority shareholders and dominant shareholders and making the financial statements of firms more specific, which enables outside financing providers to monitor management easily. As well as high earnings quality, it enables managers to choose investments carefully and also helps firms that face financing difficulties access external finance, which results in high investment efficiency (Abd-Elnaby & Aref, 2019).

Third, the results document that investment efficiency significantly affects firm performance. This finding supports the notion that investment efficiency is one of the key elements affecting a firm's value thus, the wealth of investors (Elberry & Hussainey, 2020). Investment efficiency is linked to mitigating asymmetric information, which leads to mitigating adverse selection and the moral hazard challenge (Chen et al., 2017). In concentrated environments such as Jordan, the main information asymmetry and agency issues could be between dominant and minority shareholders. In this regard, investment efficiency is related to decreased agency conflicts and decreased information asymmetry. Therefore, firms with high investment efficiency align the interests between shareholders and management and between minority and controlling shareholders, which in turn, leads to a reduced level of adverse selection and moral hazard problems, thus enhancing firm performance. Several prior studies conducted in a concentrated ownership context demonstrated a positive impact of investment efficiency on firm performance (Salehi et al., 2022; Fauziah et al., 2021; Ma & Jin, 2016).

The findings of the current study reported that investment efficiency mediate the relationship between earnings persistence, earnings smoothness and firm performance in a significant way. This means high earnings quality implies accurate financial information, which then leads to better investment decisions and, in turn, a positive firm performance that results from having high investment efficiency. Clearly, firms with high earnings quality can reduce asymmetric information and agency issues between minority shareholders and dominant shareholders, leading to high investment efficiency. Also, a high level of investment efficiency enhances firm performance. Where Titman (2003) indicated that over-investment negatively influences the firm's performance. The study discovered that inefficient investment negatively affects firm performance. This occurs when managers use company assets to fund projects with low present values, which lower firm performance.

Theoretical and Practical Contribution
From the standpoint of agency theory, the study aimed to make theoretical and practical contributions to the subject of firm performance and earnings quality in Jordan. By examining the relationship between investment efficiency and earnings quality in the context of firm performance, the current study aimed to close a gap in the literature. The study also aimed

to provide some insight into how investment efficiency affects firm performance. The majority of earlier research focuses on the first kind of agency theory. On the other hand, the second kind of agency between controlling and minority owners is the primary cause of agency problems in Jordan. In order to explain the relationship between these factors, agency theory was utilized in the current study.

Practically speaking, the study's conclusions could help CEOs, finance managers, and other decision-makers improve company performance by improving earnings quality. Furthermore, by boosting earnings quality through investment efficiency, the current study's findings will offer an integrated approach that can improve performance for both the industrial and service sectors. As a result, firms can perform better than they did previously. Furthermore, the results of this study may encourage additional research in this field and open up new avenues for future investigation because there has been little empirical research on earnings quality and investment efficiency in the Jordanian industrial and services sector.

Implications and Limitations

This study examined the influence of earnings quality on investment efficiency and firm performance. By using 78 Jordanian non-financial firms. The results broaden our knowledge of the significance of earnings quality and its link to company performance via investment efficiency. The theoretical framework of this study was derived from literature underpinned by agency theory (Anwar & Malik, 2020; Zaid *et al.*, 2020; Alkhafaji et al., 2020).

Most of the previous literature highlighted the first type of agency problem. However, the main agency issue in Jordan is the second form of agency between minority shareholders and dominant shareholders. In previous literature, researchers focused on investment efficiency as a dependent variable. Therefore, the current study contributes to previous literature by employing investment efficiency as a mediator. Overall support was generally found for the theoretical framework, in that investment efficiency is an important mechanism that explains how earnings quality enhances firm performance. In practical terms, the findings of this study may assist finance managers, CEOs, and decision-makers in enhancing firm performance through earnings quality.

Moreover, the results of the present study provide an integrated model that can achieve better performance for industrial and service sectors by applying earnings quality through investment efficiency. Thus, firms can achieve better performance than before. However, the study has several limitations. The current study was confined to utilizing Tobin's Q as an indicator of firm performance. Accordingly, expanding the stream of research to include other proxies such as accounting proxies (ROA, ROE) could be interesting. Second, this study was confined to non-financial firms, so the results of the present study may not be generalized to the financial sector. Therefore, future research may be used in another sector and compare the results with those of the current study.

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