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The effect of real earnings management, fraud, and earnings informativeness, as the moderating variable, on investment efficiency

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Abstract
Research aims: This study aims to analyze the relationship between real earnings management, fraud, and earnings informativeness, as the moderating variable, on investment efficiency.
Design/Methodology/Approach: The samples tested consisted of 333 observations in manufacturing companies during 2018-2020. The hypothesis testing used moderated regression analysis through Eviews-12.
Research findings: The results uncovered that real earnings management with cash flow (EM_CFO), production (EM_PROD), and discretionary costs (EM_DISEXP) had a negative effect on investment efficiency, while fraud had a positive effect. Besides, earnings informativeness as the moderation variable only affected fraud on the investment efficiency.
Theoretical contribution/Originality: This study used real earnings management with EM_CFO, EM_PROD, and EM_DISEXP as a transition approach from accrual earnings management. In previous studies, fraud was not directly examined on investment efficiency. Adding earnings informativeness as a moderation variable thus gives another perspective on the relationship between independent and dependent variables.
Practitioner/Policy implication: The implication for the practitioner is to provide consideration for earnings management, fraud, earnings informativeness, and investment efficiency. From a policy’s view, this study can give an overview to Financial Services Authority (OJK) and Investment Coordinating Board (BKPM) to consider and know the important elements in the financial statements and encourage investment efficiency.
Research limitation/Implication: The limitation is that the coverage of samples was only from the manufacturing industry. Exploring other sectors, extending the period, and deepening analysis is open for better research, including using other proxies in each variable. The implication is not only as additional literature but also can give the shareholders and management an overview of the investment’s decision-making.
Keywords: Real Earnings Management; Fraud; Earnings Informativeness

Introduction

Investment is a well-known activity among the public, both individuals and in the companies. Generally, the objective of making the investments is to support the company's operational activities.

At the entity level, the manager acts as the party who is given the responsibility by the shareholders to run the business, including making investment decisions. The fact shows that information asymmetry arises in the relationship between managers and shareholders. A gap also exists between shareholders as principals and managers as agents (Jensen & Meckling, 1976). The information asymmetry impacts managers to make inappropriate investment decisions (Sakti & Septiani, 2015).

Investment activity is expected to be used for a long time, bringing future benefits (Hidayat & Mardijuwono, 2021). All decisions made in investment activity will impact the return obtained by the company. When the company makes the right investment decision, the return will be optimal, and investment efficiency will be achieved. On the other side, investment inefficiency is represented by over-investment and under-investment conditions. Over-investment occurs when the investment decision in the company exceeds its funding capacity, while under-investment happens when the company is in a passive position and does not make any investment activities (Fajriani et al., 2021).

In Indonesia, the realization of domestic investment itself has increased by 7-25% from 2018 to 2021 (Statistik, 2021; Statistik, 2018). The question is, “Is the realization efficient?” The investment efficiency of the companies in Indonesia is relatively still in the low position, reflected by the high Incremental Capital Output Ratio (ICOR) (Fajriani et al., 2021). ICOR displays the ratio between capital investment and yield/output. A higher ICOR indicates higher capital or additional costs incurred by the company to produce an output. In 2019, Indonesia's ICOR was 6.88 and was expected to increase to 8.16 in 2021 (Elena, 2021). The higher ICOR, the more inefficient the investment.

From previous studies, several factors found could influence companies to invest efficiently. Those factors include earnings management (Yapono & Khomsatun, 2018; Bzeouich et al., 2019), quality of earnings (Efrinal, Wulandari, 2019; Hung et al., 2020), quality of financial reporting (Gusmawan & Novita, 2017; Aulia & Siregar, 2018; Ardana & Sujana, 2018; Shahzad et al., 2019; Sitorus & Murwaningsari, 2019; Assad & Alshurideh, 2020; Fajriani et al., 2021; Akasumbawa & Haryono, 2021), quality of financial information (Elaoud & Jarboui, 2017; Saputri, 2020), and audit quality (Assad & Alshurideh, 2020; Hammami & Hendijani Zadeh, 2020). Moreover, most factors cover earning or reporting or financial information quality. Since quality in the company is crucial, this study focuses on the variables impacting the quality of earning or reporting or financial information, like earnings management and fraud, which contradict each other. Fraud is prohibited in practice, but earnings management activities are still allowed in the accounting implementation.

Furthermore, investment efficiency should be carried out by the managers in the company by utilizing the appropriate resources. Supervision and control from the shareholders are still necessary, considering the information asymmetry still exists and is unavoidable in the company's operations. In the agency theory concept (Jensen & Meckling, 1976), managerial behavior and information asymmetry will lead to the problem of under and over-investment (Bzeouich et al., 2019). It happens because the

managers do not always prioritize the shareholders' welfare or interests. Hence, good supervision in the company will support investment efficiency. The investment will indirectly encourage economic growth in the country because it will increase the output or capital investment, increase the potential foreign investment, and achieve investment efficiency (Aulia & Siregar, 2018). Increased investment, especially in the manufacturing industry sector, has a broader impact on the Indonesian economy by optimizing the value added to domestic natural resources, employment, and foreign exchange earnings from exports (Firmansyah & Triastie, 2020).

In other theories, signaling theory is connected to reducing information asymmetry between the principal and agent (Beyer et al., 2018). Through the signal, information asymmetry will decrease, and the manager can convey the good prospects of the company (Wiguna & Murwaningsari, 2022). The signal is intended for the shareholders and investors that will be used for the decision-making (including the investment decision). Investment efficiency will be achieved when information asymmetry is controlled as a main problem of the agency and signaling theory. Meanwhile, controllable asymmetry information in the company denotes that the principal and agent have almost the same objective to get the maximum returns/benefits. Signal to the shareholders will have an impact that the shareholders will increase the injection of funds into the company and the firm value (Henny, 2017). The injection of funds can be used for investment activities and potentially increase investment efficiency because it is utilized appropriately. Moreover, a signal to the investor represents good prospects and will attract investors (Rachmawati, 2021). This attraction also benefits the company in achieving investment efficiency since investors and markets' trust in the company is the impact of better company information and performance (current and future). The above signifies that research on investment efficiency is vital and more interesting to be performed in Indonesia.

This study focuses on earnings management and fraud. Earnings management is a variable that has been widely researched in the past and has always been developed until now. There are two ways to understand earnings management, seeing it as an opportunistic earnings management to maximize the utility and seeing it as an efficient earnings management to provide flexibility to the managers to protect themselves and the company when anticipating the unexpected events (Adiwibowo, 2018). The conditions when the manager acts opportunistically will be affected by decisions that are not in line with the interests of shareholders. Furthermore, it will result in over-investment and under-investment. Therefore, earnings management is indicated to have a negative impact on investment efficiency (Yapono & Khomsatun, 2018; Bzeouich et al., 2019).

From a fraud perspective, there are three forms of fraud such as asset misappropriation, corruption, and fraud in financial statements (Association of Certified Fraud Examiners (ACFE), 2020). Under the same report, ACFE concluded that the most material impact on the company is fraud in the financial statements. From the definition itself, fraud is the wrongful act by one or more individuals within management as those charged with governance, employees, or third parties and involves deception to gain an unfair or

unlawful advantage (IAPI, 2021). Hence, examining fraud's investment efficiency will give another view of the material impacts of the manipulation in accounting.

Both earnings management and fraud under the quality of earning or reporting or financial information potentially impact the wrong investment decision and lead to over and under-investment. Related to that, inconsistencies in previous results have been noted and triggered further examination in this study. Earnings management has a positive effect on investment efficiency (Wang et al., 2019), while other studies concluded that earnings management has a negative effect on investment efficiency (Yapono & Khomsatun, 2018; Bzeouich et al., 2019). From the fraud variable, most of the studies emphasize the determinants of fraud and its relationship to fraud theory, such as the triangle (Utomo, 2018), pentagon (Farmashinta & Yudowati, 2019), and diamond (Yesiariani & Rahayu, 2017).

Additionally, investment is sometimes associated not only with returns but also with predictions of future earnings and earnings informativeness (Malau et al., 2020; Chung, 2021). In this regard, earnings or profit must be informative. Earnings informativeness can be measured by the future earnings using Future Earnings Response Coefficient (FERC). Therefore, research on the FERC predicts future earnings that investors will use to make investments. As part of earnings management, income smoothing has been shown to affect FERC negatively (Firmansyah & Herawaty, 2016). Since Collins Kothari Shanken Sloan's model (CKSS) approach can estimate a direct relationship between past, current, and future earnings, it was used in this study.

The existence of the relationship between earnings management and investment efficiency and earnings management and FERC triggers the relationship between FERC and investment efficiency and whether FERC can be acted as moderating variable on investment efficiency. In this case, stock price informativeness is defined as information about future earnings and cash flows as reflected by current-period stock returns (Firmansyah, 2017). Therefore, stock price informativeness intersects the earnings informativeness.

From the problems discussed, several differences are identified compared to the previous research, adding earnings informativeness as a moderating variable and using fraud and real earnings management variables to test their effect on investment efficiency. First, earnings informativeness is the ability of earnings in the level of decision-making or return (Yanti & Taqwa, 2020). Investment efficiency is also related to decision-making and return on investment activity. Of this similarity, this study plans to elaborate on the relationship between both variables, especially for the conjunction between earnings informativeness and the other factors determining investment efficiencies, such as earnings management and fraud. Thus, putting earnings informativeness as moderation would be developed in the study focusing on the result of the decision-making. Second, the previous studies examined real earnings management and fraud with different proxies. As a limitation of previous studies, most of them still used accrual approaches in earnings management, which were ineffective. Hence, this study used a real earnings management proxy due to the shifting process from accrual earnings management to real earnings management.

The reasons are that accrual earnings management attracts the attention of auditors and regulators, and there is a higher risk if management only relies on accrual earnings management to achieve profit targets (Roychowdhury, 2006). Fraud is also examined on the investment efficiency and earnings informativeness, considering there is a relation/same context under financial/reporting quality.

Further, performing the test of this study contributes to the additional literature, which can give an overview to the stakeholders in the investment's decision-making. Specifically, it is to prove the effect between earnings management, fraud, and earnings informativeness on investment efficiency based on the research gap and linkage in all variables mentioned.

Literature Review and Hypotheses Development

Agency Theory

Jensen and Meckling (1976) define an agency relationship as a contract between one or more parties who act as principals - employing other parties (agents) to do something on their behalf, including delegation for decision-making to agents. In carrying out their responsibilities, the agents are believed not always to act to achieve the principal's interests. The conflict of interests and information asymmetry incurred can reduce the investment efficiency in the company because managers do not make an investment that will give the best result to the company or shareholders.

Theoretically, information asymmetry becomes the primary problem in the company in the context of the principal and agent relationship. The existence of information asymmetry also creates deviation from the optimal investment (Bzeouich et al., 2019). Deviation issues are impacted by the management's behaviors concerning the quality of the earnings or reporting. Thus, higher earnings quality will reduce conflict of interest and information asymmetry (Cherkasova & Rasadi, 2017). Practically, earnings quality is related to earnings management, fraud, and earnings informativeness. Earnings management and fraud come from management behavior, which adjusts/modifies the actual earnings. As a result, the earnings or reports do not capture the real condition of the company. Moreover, the characteristics of earnings and reports must be informative since they will be used in decision-making. Those items will be directly impacted by investment efficiency.

Signaling Theory

The signal theory states that the company must provide information to make it easier for the principal as the owner to make decisions. Management can reduce the information asymmetry in the company by giving signals to the parties or investors outside the company. The profit generated by the company is expected to be useful for the decision-making taken by the management and investors. In addition, profit is also used to assess the company's prospects and predict future profits (Sari & Febriyanto, 2019).

When the earnings/profits are in a good position, it can become a signal to the shareholders and investors. The signal (covering financial and non-financial items) indicates that companies are better than others (Rachmawati, 2021). Here, earnings informativeness in the companies is a signal the stakeholders use to get better information and perform analysis and decision-making. The signal is usually positive, showing that the company is in good condition and performance. However, the fact shows that there are adjustments and modifications of the earnings or reports by the management, reflected in the earnings management and fraud. Thus, the signal is inappropriate for the stakeholders because the performance has been intervened and manipulated.

Hypotheses Development

Earnings management appears when managers intervene in the financial statements or reporting. Under agency theory (Jensen & Meckling, 1976), managers who act opportunistically and tend to get their interests will harm the company and shareholders. When managers pursue their interests, they will tend to waste the company's capital or resources and utilize it for their own. As a result, the capital or resources that should be utilized appropriately and potentially give a return to the company will not exist. The improper utilization of the investment activities will reflect the over-investment or under-investment, which is not in line with the shareholders' interest. Asymmetry of information incurred between principal and agents also becomes the main problem in the company due to conflict of interests from both parties. It aligns with the previous study (Umiyati & Riyanto, 2019) that over-investment and under-investment are also impacted by information asymmetry, indicating a moral hazard and adverse selection problems. There is also a negative effect between earnings management and investment efficiency (Yapono & Khomsatun, 2018; Bzeouich et al., 2019). They further concluded that earnings management must be reduced to make an investment more efficient since the information gap or asymmetry impacts the quality of earnings, affecting the expected return obtained by the company. Furthermore, the quality of earnings and return also become a signal to the investors and shareholders as part of their consideration in the decision-making in the investment. This study covers earnings management, i.e., cash flow, production, and discretionary costs (Roychowdhury, 2006).

H_{1a}: *Earnings management under cash flow has a negative effect on investment efficiency*.

H_{1b}: *Earnings management under production has a negative effect on investment efficiency*.

H_{1c}: *Earnings management under discretionary costs has a negative effect on investment efficiency*.

Fraud is known as the action taken by a company that causes misstatements in the financial statements to obtain a higher profit. Elaboration of the studies of the fraud determinants has been carried out from year to year (Utomo, 2018; Farmashinta &

Yudowati, 2019; Septriani & Desi Handayani, 2018; Yesiariani & Rahayu, 2017; Nugroho et al., 2021). Based on several studies, it is concluded that two factors that always affect fraud are external pressure and financial stability (Firmansyah et al., 2022). It denotes that high external pressure and low financial stability will lead the management to commit fraud in financial statements or reporting because the managers must perform well to the stakeholders. High manipulation and fraud performed by the managers indicate that the managers do not make the right decision (including the investment decision) to maximize the benefit to the company. Other than the above factors, fraud is also related to the quality of the reporting. In addition, the quality of reporting and earnings positively affects investment efficiency (Aulia & Siregar, 2018; Efrinal & Wulandari, 2019; Hung et al., 2020). Good quality of reporting represents the inexistence of fraud in the company since the financial statements already reflect the actual condition of the company without noting any manipulation. Related to the agency and signaling theory, no manipulation of earnings or reports noted in the company means no asymmetry or gap information exists between the principal and the agent. All appropriate information has been disclosed and reported and can further be used as a signal to the shareholders and investors for the decision-making.

H₂: *Fraud has a negative effect on investment efficiency*.

Previous studies have already shown the effect of earnings management on investment efficiency, earnings management on earnings informativeness (Firmansyah & Herawaty, 2016), earnings informativeness on investment efficiency (Usman, 2006). The discussion of earnings management related to investment efficiency has been previously mentioned in H_1. In addition, earnings management is related to earnings informativeness (especially in future earnings) as it can give sufficient information to the users of the financial statements, either in a positive or negative perspective. Earnings informativeness also cannot be separated from the current year's return, which reflects the earnings' surprise and news during the current year or period and will impact the changes in future earnings (Collins et al., 1994). When management intervenes in the financial information under earnings management to maximize the profit, it means the financial figure is not informative because it cannot capture the actual condition of the company. This condition is impacted by the gap in information between the principal and agent under an agency theory, which consistently exists in the company. The asymmetry information also becomes a challenge for the company to disclose or report the earnings more informative to the stakeholders and affects the decision-making and investment efficiency.

Earnings informativeness is still related to investment efficiency because managers will learn from the stock price when making investment decisions (Chen et al., 2005). Stock prices are related to the profit or earnings that can give a signal to the other parties. Earnings informativeness is also a signal to make a better investment decision for the stakeholders through better analysis of the current and future earnings. Based on the above relationship in the variables, this study reviews and sees the potential of overall impact from earnings management, earnings informativeness, and investment efficiency

as a result of the managers' decisions. Same with the H_1, the researchers cover all types of real earnings management.

***H_{3a}**: Earnings management under cash flow affects investment efficiency, moderated by earnings informativeness.*

***H_{3b}**: Earnings management under production affects investment efficiency, moderated by earnings informativeness.*

***H_{3c}**: Earnings management under discretionary costs affects investment efficiency, moderated by earnings informativeness.*

As discussed, it is concluded that fraud is related to the quality of reporting. It is also consistent with the previous study, concluding that it negatively and significantly affects the quality of financial statements (Nurhayati & Muniarty, 2018). When companies make manipulation fraud in the reporting, current and future earnings will be less accurate because they do not reflect the companies' actual performance. As a further impact, management cannot make the proper decision in the investment and potentially impact the over or under-investment. In addition, earnings informativeness, represented by FERC, is expected to make better earnings predictions. Under the agency theory, if management can predict earnings, they will have useful information to maximize their interests.

On the other hand, earnings predictions can signal the investors to increase their investment in the company. Many investors show interest in a company with a good earnings prediction, and it will backfire on the managers because they need to act carefully in all decisions they will be taking. In agency theory, managers will make investment decisions based on the shareholders' authority, which is delegated to them (Jensen & Meckling, 1976). Consideration in decision-making is influenced by the information asymmetry in the company. Furthermore, managers will consider all decisions (including investment decisions), whether they will take either overly aggressive action by prioritizing their interest or overly conservative action by making better investment decisions and achieving investment efficiency, given the fact that not all information is disclosed and reported to the stakeholders. Thus, financial forecasts, as an informative disclosure of companies in the market, aim to reduce information asymmetry and increase investment efficiency (Chung, 2021).

***H_4**: Fraud affects investment efficiency, moderated by earnings informativeness.*

Based on the hypothesis development, the model for this research is shown in Figure 1.

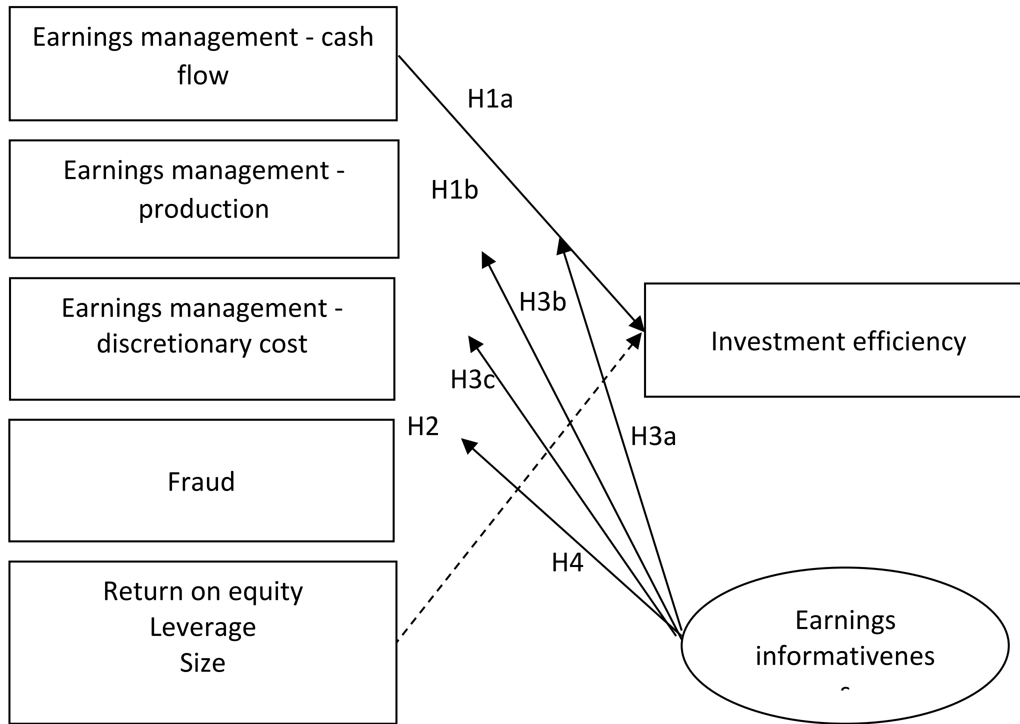

Figure 1 Research Model

Research Method

This study used moderated regression analysis to explain the relationship between independent and dependent variables in the manufacturing companies listed on the Indonesian Stock Exchange from 2018 to 2020. Manufacturing companies were used in this study because the Indonesian government has paid attention to this sector to increase investment (Perindustrian, 2019b). This sector also plays an important role in accelerating the national economic growth in Indonesia, as one of the target countries for investment (Perindustrian, 2019a). This study could cover the maximum result from the investment impacts compared to the other sectors through these manufacturing companies. In addition, the samples were taken from the 2018 observation year because the growth in domestic investment realization during the last five years was the highest in 2018. It can be indicated that investment development in Indonesia will be better in the following years.

The samples were determined using purposive sampling and resulted in 333 samples with several criteria as Table 1.

Data were collected from www.idx.co.id and the company's website. In addition, this study's observation period was extended from 2016 to 2021 because sales growth, earnings per share, and return were utilized in periods t-2 and t+1 in the model.

Table 1 The Research Samples

Criteria	Total
Manufacturing companies listed in the IDX in 2022	181
Manufacturing companies listed in the IDX during 2020	(2)
Manufacturing companies listed in the IDX during 2019	(17)
Manufacturing companies listed in the IDX during 2018	(10)
Manufacturing companies used currencies other than Rupiah	(29)
Not available data	(9)
Outlier data	(3)
Total companies used in the research	**111**
The observation period of testing	**3**
Total samples	**333**

The model used in this study is as follows:

$$INVEST_{i,t} = \alpha + \beta 1EM_CFO_{i,t} + \beta 2EM_PROD_{i,t} + \beta 3EM_DISEXP_{i,t} + \beta 4M_SCORE_{i,t} + \beta 5EM_CFO*FERC_{i,t} + \beta 6EM_PROD*FERC_{i,t} + \beta 7EM_DISEXP*FERC_{i,t} + \beta 8M_SCORE*FERC_{i,t} + \beta 9\ ROE_{i,t} + \beta 10LEV_{i,t} + \beta 11SIZE_{i,t} + \varepsilon_{i,t} \ \ldots (1)$$

The formula $INVEST_{i,t}$ denotes the IPSAS-based disclosure level I in the t period; α shows the constant; β1 β2 β3 β4 β5 β6 β7 β8 β9 β10 and β11 indicate the regression coefficient; EM_CFO signifies the earnings management with cash flow; EM_PROD represents earnings management with production; EM_DISEXP earnings management with discretionary cost; M_SCORE fraud; FERC earnings informativeness; ROE return on equity; LEV leverage; SIZE company's size.

Several things were considered in the testing as follows: (1) the model used in fraud was the Beneish model, i.e., the most accurate model compared to other models (Adilla & Ferli, 2021); (2) CKSS model used only covered one year of earnings and return ahead instead of three years of earnings and return since this study only aimed to test the FERC, not to maximize R^2 in the regression; (3) the control variables used in this study were company's return on equity, leverage, and size.

Operational Variables Definition

Investment Efficiency (INVEST)

Investment efficiency was measured through net increase of tangible and intangible assets divided by total assets, according to Gomariz & Ballesta (2014) as follows. The sales growth used is prior year's sales growth as a benchmark for ability of the company to increase the revenue from period t-2 and t-1.

$$INVEST_{i,t} = \beta_0 + \beta_1{}^{*}Sales\ growth_{i,t-1} + \varepsilon_{i,t} \ \ldots (2)$$

Earnings Management (EM_CFO, EM_PROD, and EM_DISEXP)

Earnings management was measured through real earnings management from operating cash flow in period t, production in period t which reflected by cost of goods sold (COGS) in period t and movement inventory from period t and t-1, and discretionary costs in period t, according to Roychowdhury (2006) as follows. Measurements used total assets (A) in prior year t-1 and sales (S) which include sales in period t, t-1, growth from period t and t-1, growth from period t-1 and t-2.

$$CFO_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) + \varepsilon_t \ldots (3)$$

$$PROD_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_1(S_t/A_{t-1}) + \beta_2(\Delta S_t/A_{t-1}) + \beta_3(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \ldots (4)$$

$$DISEXP/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \beta_2(S_{t-1}/A_{t-1}) + \varepsilon_t \ldots (5)$$

Fraud (M_SCORE)

Fraud was measured through eight components ratio from days' sales in the receivable (DSRI), gross margin (GMI), asset quality (AQI), sales growth (SGI), depreciation (DEPI), sales, general and administrative expenses (SGAI), total accruals to total assets (TATA), and leverage (LVGI), according to Beneish (1999) as follows.

$$M_SCORE = -4.840 + 0.920^{*}DSRI + 0.528^{*}GMI + 0.404^{*}AQI + 0.892^{*}SGI + 0.115^{*}DEPI - 0.172^{*}SGAI + 4.679^{*}TATA - 0.327^{*}LVGI \ldots (6)$$

DSRI used to see the proportion of receivables to revenue in two consecutive years in period t and t-1. GMI used to see the proportion of gross profit period t-1 to gross profit period t. Gross profit calculated from sales deducted by COGS. AQI is used to see the proportion of total assets to changes in asset realisation in two consecutive years in period t and t-1. Changes in asset realisation calculated from the proportion of current assets and fixed assets to the total assets. SGI used to see sales growth in companies period t to period t-1. DEPI used to see the proportion of depreciation expense to depreciation expense and total fixed assets. Ratio calculated from the two consecutive years in period t-1 to period t. SGAI used to see the proportion of sales expenses, general, and administration to sales in two years, period t to period t-1. TATA used to see the extent which managers use discretionary cost to manipulate revenue, calculated from net income deducted by operating cash flow in period t to total assets in period t. LVGI used to see the proportion of total debt (long term liabilities and current liabilities) to total assets period t to period t-1.

Earnings Informativeness (FERC)

Earnings informativeness was measured to predict future profits, according to Collins et al. (1994) as follows. The proxy used are share return (R) in period t+1, share return in period t, earning per share (X) in period t-1, earning per share in period t, and earning per share in period t+1.

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + \varepsilon_t \ldots (7)$$

Return on Equity (ROE)

Return on equity is used to measure a company's ability to obtained the profit through owned equity. Return on equity was measured by net income to total equity:

$$ROE = \frac{Net\ income}{Total\ equity} \ldots (8)$$

Leverage (LEV)

Leverage is used to measure the company's ability to fulfill its obligations. Leverage was measured by total liabilities to total asset.

$$LEV = \frac{Total\ liabilities}{Total\ asset} \ldots (9)$$

Size (SIZE)

Size is used to see the company's condition through natural logarithm of market capitalization.

Results and Discussion

The data from Table 2 show the results of descriptive statistics of 333 data. Variable INVEST had a minimum value of -5.422567 in HDTX year 2018 and a maximum value of -0,000073 in SMCB year 2020. The mean value was -0.070943. This study's negative value resulted from the absolute residual value times -1 (Gomariz & Ballesta, 2014). The higher residual value means the company did more efficiently in the investment. In addition, the standard deviation value of 0.304534 showed that the average deviation made by the company was 30.45%.

Variable EM consisted of cash flow, production, and discretionary cost. Variable EM_CFO had a minimum value of -0.330955 in ALKA year 2020 and a maximum value of 0.461970 in MLBI year 2018. Variable EM_PROD had a minimum value of -0.708368 in the UNVR-

Table 2 Descriptive Statistics

	INVEST	EM_CFO	EM_PROD	EM_ DISEXP	M_ SCORE	ROE	LEV	SIZE
Mean	-0.070943	5.08E-18	-1.79E-16	5.08E-18	-1.715215	0.030333	0.453292	28.10336
Maximum	-7.30E-05	0.461970	0.398366	0.598854	150.5579	2.244585	2.899874	33.69838
Minimum	-5.422567	-0.330955	-0.708368	-0.270935	-10.11992	-4.112526	0.003453	24.13800
Std. Dev.	0.304534	0.100156	0.161750	0.127581	9.417886	0.445348	0.283727	2.086152
Observations	333	333	333	333	333	333	333	333

year 2019 and a maximum value of 0.398366 in the KMTR year 2019. Then, variable EM_DISEXP had a minimum value of -0.270935 in ALKA year 2018 and a maximum value of 0.598854 in PYFA year 2018. The average deviations made by the company for EM_CFO, EM_PROD, and EM_DISEXP were 10.02%, 16.18%, and 12.76%, respectively.

Variable M_SCORE had a minimum value of -10.11992 in the TIRT year 2020 and a maximum value of 150.5579 in the GDST year 2018. Standard deviation from all items under EM and M_SCORE had a higher value than the mean value, showing a high data distribution in these variables. Regarding the control variables, only ROE had a high data distribution compared to LEV and SIZE.

Moreover, the model selection test utilized Eviews-12 concluded that the fixed effects model was the most suitable. However, since there was a heteroscedasticity problem in the model under panel data, the model applied for the result of the testing was the GLS model.

The result of this study supports H_{1a}, H_{1b}, and H_{1c} captured the negative effect of earnings management on investment efficiency, in which all earnings management had a probability value of 0.0000 < 0.025 (one-tailed) and negative coefficient for EM_CFO, EM_PROD, and EM_DISEXP at 0.418811, 0.355062, and 0.548381, respectively (see Table 3). This study's negative effect aligns with the previous study's result (Bzeouich et al., 2019; Li, 2018). In the agency theory, the manager can decide something on behalf of the principal. In the same theory, the conflict of interest and asymmetry information between principal and agent make managers/agents able to decide something to obtain the benefit to themselves and not necessarily gain the optimal return to the companies in the investment activities. As an impact, managers will perform earnings management to adjust the financial condition in the company. Earnings management is thus concluded as opportunistic actions (Firmansyah, 2017). It will conduct the manager to be selfish and always pursue their interest.

Table 3 GLS Testing Results

Variable	Coefficient	t-Statistic	Prob.
C	0.082735	0.267647	0.7892
EM_CFO	-0.418811	-6.914551	0.0000
EM_PROD	-0.355062	-5.804398	0.0000
EM_DISEXP	-0.548381	-4.440161	0.0000
M_SCORE	0.009396	4.138837	0.0001
EM_CFO_FERC	0.195944	0.952519	0.3419
EM_PROD_FERC	-0.274551	-1.138623	0.2562
EM_DISEXP_FERC	0.070214	0.261259	0.7941
M_SCORE_FERC	-0.021930	-4.128567	0.0001
ROE	-0.004847	-0.368585	0.7128
LEV	0.118668	2.816879	0.0053
SIZE	-0.006901	-0.638069	0.5241
R-squared	0.569063		
Adjusted R-squared	0.321939		
F-statistic	2.302736		
Prob(F-statistic)	0.000000		

Moreover, opportunistic actions represent missing information and can impact the wrong investment decision. It can be said that higher earnings management indicates over or under-investment in the company, representing a lower quality of earnings since it does not reflect the actual condition of the company. Further, it also reflects lower monitoring the shareholders perform to supervise the managers in the operational and investment activities. Investment efficiency will be hard to achieve if those conditions are not reduced or remediated. It is also in line with the statement that the greater the earnings management, the more possibility the company will deviate from the ideal investment (Linhares et al., 2018). Hence, it can be said that if the company performs earnings management, the inefficiency of the investments may occur in the company.

Nevertheless, the result of this study contradicts the previous study (Wang et al., 2019), concluding that it positively affected investment efficiency. The study denotes that earnings management is an efficient way (not an opportunistic way) to adjust the accounting records, and further, the data can be used as a signal to the market. From the regulator's perspective, the accounting treatment and approach are already issued under the accounting standards. Hence, no significant concern is noted in applying earnings management in the company, and achieving investment efficiency is possible. In addition, signaling theory covers the financial information from the earnings management that the investors and shareholders can use to get more benefits in the investment activities.

Since earnings management is closely related to financial statements or earnings quality, higher earnings will reduce over-investment and under-investment (Cherkasova & Rasadi, 2017; Houcine, 2017; Firmansyah et al., 2022). Hence, improving the quality of earnings or reports will overcome information asymmetry incurred from agency theory and increase the possibility of investment efficiency because it increases the opportunity for company managers to pursue maximum profits for the company and shareholders (Fathmaningrum & Dewi, 2021). Good quality earnings or reports can also improve the monitoring function of shareholders to oversee investment decisions taken by managers (Putra & Damayanthi, 2019). To increase investment efficiency, continuous monitoring and supervision from the principals or shareholders are also required in operational and investment activities. Corporate governance, in this case, has an important role in making the right/proper investment decisions (Simanungkalit, 2017).

This study also showed that earnings management with discretionary costs had the greatest influence on investment efficiency, followed by cash flows and production amounted to 54.8%, 41.9%, and 35.5%, respectively. Discretionary cost produce output that cannot be directly measured in monetary terms. As a result, it is not easy to detect earnings management within the company. The above result contradicts previous research by Baskoro & Wardhani (2014), showing that real earnings management through cash flows did not affect investment. It means the company is too optimistic about covering investment efficiency with earnings management under an accrual approach. In addition, the proportion of over and under-investment in the samples tested was quite similar, around 51.7% and 48.3%, respectively. This condition reflects that the earnings management components had the same possibility to affect over and under-investment.

The result of this study supports the H_2 capturing the effect of fraud on investment efficiency, which had a probability value of 0.0001 < 0.025 (one-tailed) but had a positive coefficient at 0.009396 (see Table 3). Although the result was significant, it contradicts H_2, which showed a negative effect. In fact, the company has two classifications: manipulator and non-manipulator (Hołda, 2020). Manipulator had a M_SCORE value above -1.78. From the samples tested, the data distribution based on the above classification for manipulator and non-manipulator companies had values of 12% and 88%, respectively. It means non-manipulator companies were dominant in the samples. The initial context of fraud was under the negative side as a manipulator company. However, the data revealed that the non-manipulator had a positive effect on investment efficiency, indicating that the findings are still consistent with the hypothesis, which proves that the manipulator companies had a negative effect on investment efficiency.

Concerning the quality of reporting, fraud is identical to bad quality. Meanwhile, good quality in financial reporting makes managers more accountable because they can reduce information asymmetry and moral hazard. Companies with good reporting quality also positively affect investment efficiency (Aulia & Siregar, 2018; Akasumbawa & Haryono, 2021; Assad & Alshurideh, 2020). In addition, accountable managers will make better decisions in the investment and achieve investment efficiency. According to the agency theory, when the principal and agent have the same interests in increasing the company's profit, there is no gap in information between the agent and principal. There is no indication that the agent/manager acts without considering the principal's target. Hence, all actions, disclosures, and reports by the managers are based on the manager's best effort to achieve the company's good performance because no irregular behavior, such as performing manipulation, impacts the quality of reporting and harms the principal and company.

It can also be said that managers with lower external pressure and higher financial stability condition in the company will be reluctant to perform any fraud in the financial statements. Besides, supervision or monitoring from the shareholders also positively contributes to reducing the company's fraud. In this study, a higher M_SCORE value (manipulator) reflects the bad quality of the financial reporting, exposing a higher possibility of fraud and less possibility of investment efficiency because the information gap made managers make a wrong decision in the company and fail to achieve investment efficiency. The result of the control of fraud is almost the same as the earnings management, which concludes that the governance in the company has the highest impact on the quality of reporting (Manik, 2020).

The result contradicts the previous study (Firmansyah et al., 2022) that proved no effect between fraud and investment efficiency due to managers' higher awareness of the dangers of fraud. From the samples tested, the portion of the manipulator and non-manipulator companies were around 32-35% each year, which means they had the same possibility to perform fraud yearly. From a further review of the eight components in the M_SCORE, the three biggest contribution ratios to the M_SCORE value were DSRI (receivables), SGI (sales growth) and GMI (gross margin). In overview, those three items are actually classified as major components in the companies as part of the key

performance indicator to measure the effectiveness of the company in achieving the goal/target.

However, the result of this study does not support H_{3a}, H_{3b}, and H_{3c} that, showed no effect of earnings management on investment efficiency with earnings informativeness as moderating variable, with the probability value for EM_CFO, EM_PROD, and EM_DISEXP of 0.3419, 0.2562, 0.7941, respectively, > 0.05 (one-tailed) (see Table 3). Related to that, the main focus of earnings informativeness is the future earnings response coefficient. If managers perform earnings management, it will be affected by the lower earnings informativeness (future earnings). As further analysis of the real earnings management components, it can be concluded that potentially, there is no impact of cash flow, production, and discretionary cost components on the earnings informativeness (future earnings) and investment efficiency. The above result disagrees with the previous study by Firmansyah (2017) that real earnings management positively affected earnings informativeness. The informativeness of profit obtained from the available information can be used to assess future profits and as a positive signal to the stakeholders. Higher real earnings management reflects higher future information, which can be used in investment decision-making.

On the other hand, there was no influence between earnings management and earnings informativeness (Sari & Febriyanto, 2019; Nisrina & Herawaty, 2016). This result shows that the informativeness of future earnings could not be a signal to parties outside the company, which further will impact increased profits and investor interest in the company. In other words, it has not been proven that informative earnings could strengthen and weaken earnings management on investment efficiency. From the earnings management's perspective, as an opportunistic action of managers to obtain maximum profits, it indicates that informative future earnings do not become a consideration and guarantee that companies can make the right decisions and impact investment efficiency. Since the action is still allowed, managers will take earnings management actions without considering future earnings conditions to make investment decisions. As long as earnings management is carried out fairly, it will not affect the role and position of the managers themselves in the company. Information gap under agency theory is also not a problem in the company as long as the managers still comply with the accounting standards. Thus, the existence and absence of the earnings management does not directly affect the earnings informativeness.

Under the manufacturing industry, the samples tested were classified into three sectors: the basic and chemical industry, the miscellaneous industry, and the consumer goods industry. The data distributions for each sector were 44.2%, 19.8%, and 36%, respectively. In addition, each sector separated the companies into eighteen (18) sub-sectors. The earnings management value between -0.075 and 0.075 indicated that no real earnings management exists (Roychowdhury, 2006). Based on the samples' classification, the basic and chemical industries became the biggest executor of real earnings management for cash flow, production, and discretionary costs. Then, the highest sub-sector as executor of real earnings management was under the food and beverage industry for EM_CFO and

EM_DISEXP, while for EM_PROD, the highest executor was under the automotive industry.

The result of this study reinforces $H_{4,}$ which showed the effect of fraud on investment efficiency with earnings informativeness as the moderating variable, with the probability value of 0.0001 < 0.05 (one-tailed) (see Table 3). In this regard, non-manipulator firms have been proven to influence investment efficiency positively, as analyzed earlier. With the moderating variable of future earnings informativeness, which is intended as a positive signal to the market and to see the market response, investment efficiency was reduced. Because fraud should not be done and avoided by the company, more information on future earnings will make the managers more flexible to play and modify the financial information extensively. Hence, the investment efficiency achievement is lower. After the managers know the company's position and performance (including the future earnings), they can set the strategy to make the investment decision. Thus, shareholders and investors do not notice any suspicious action or threaten their position in the companies.

Moreover, no specific references were identified from previous studies for this fraud model. Nevertheless, regarding risk and decision-making, this result is not in line with the previous study (Malau et al., 2020), which proved that earnings informativeness is closely related to reducing the risk in the company since it indicates better governance. The informativeness of stock prices also directs companies to minimize the possibility of inefficient investments in decision-making (Xu, 2021; Chung, 2021).

As the control variable, only leverage positively affected the investment efficiency with a probability value of 0.0053 (Table 3). From the data, the proportion of companies with total liabilities higher than total assets (leverage value more than 1) was only 1.2%, while the remaining companies, around 98.8%, had total assets higher than total liabilities. It means the companies with lower debts/liabilities were proven to increase investment efficiency. Here, the relationship between the principal and agent caused agency costs, costs incurred for monitoring activities by the principal and bonding activities by the agent (Jensen & Meckling, 1976). Lower agency costs represent lower monitoring and bonding activities because the companies do not spend many costs to minimize the asymmetry of information and conflict of interest. Hence, leverage can monitor managers' actions and discipline managers (Bzeouich et al., 2019). Under the signaling theory, a lower leverage value signals to the market that the companies are stable. As a result, it will attract an investor to invest in the company and get optimal returns. Similar to the previous study (Firmansyah & Herawaty, 2016), it is concluded that leverage was a negative component that reflected the higher utilization of debts and captured the lower performance of the company in generating future earnings. Furthermore, it would impact the optimization of the returns/earnings.

Investment efficiency did not affect the remaining variables, size and return on equity. There is no guarantee that the company's size, given the better/worst returns, impacted the investment efficiency. Under the agency theory, no differentiator noted that the company's size would reduce the agency problem. Big, medium or small companies are in

the same possibilities facing information asymmetry, which impacts decreased investment efficiency. Per signaling theory, size does not affect the FERC (Wiguna & Murwaningsari, 2022). As the company's indicator to measure the ability to generate profit, ROE was not fully proven and reflected the utilization of the profit to the investment activities that resulted in the optimal returns. Although higher ROE potentially reflects lower agency problems, it cannot be captured that the manager pursued the benefit/returns and maximized the profit to the company because there is an indication that ROE achieved only reflected the good performance of the managers to get the bigger incentives/bonus. ROE can also signal the market to achieve investment efficiency, but this study did not prove it.

Conclusion

The earnings management under cash flow, production, and discretionary costs has a negative effect on investment efficiency. Meanwhile, fraud in the non-manipulator context positively affects investment efficiency. As a moderating variable, earnings informativeness only affects fraud the investment efficiency, while earnings informativeness does not affect earnings management and investment efficiency. The significant effect in the above variables is closely related to the information asymmetry, which still needs to be monitored by the shareholder to achieve investment efficiency. In addition, the insignificant effect in the remaining variables is possibly affected by the other variables outside the study.

Both earnings management and fraud are often connected with the quality of financial reporting. Earnings management tends to be allowed compared to fraud which is prohibited. Then, good quality reporting related to earnings informativeness further impacts the management's investment decision and results in over/under-investment. Considering fraud riskier than earnings management, this study showed the influence of earnings informativeness regarding fraud on investment efficiency as one of the factors considered before performing the fraud.

The limitations of this study that can be considered for future researchers are inconsistent results of fraud's effect on investment efficiency with the previous studies. The future researcher thus can; (1) explore it using different sectors outside the manufacturing, and consumer goods; (2) extend the observation period; and (3) use other proxies in future research to see and prove the relationship of new variables.

This study has several implications. First, to future researchers, this study can be additional literature for future research on more in-depth testing related to the relationship between earnings management, fraud, earnings informativeness, and investment efficiency. Second, to the shareholders, it provides an overview of the company's condition related to investment efficiency and a reference for decision-making consideration. Third, to management, it is to provide an overview of the company's condition related to investment efficiency and suggest plans and strategies achieve the goal. Fourth, to the practitioner, it gives information about the relationship between

earnings management, accounting fraud, earnings informativeness, and investment efficiency. Fifth, to Financial Services Authority (OJK), this study provides an overview of the elements in the financial statements that potentially affect investment. Sixth, to Investment Coordinating Board (BKPM), this research is to provide an overview of efficient investment and strive for optimization of investment in the future.

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