

Investigate The Influence Of The Fama and French Five-Factor Model On The SRI-KEHATI Stock Index (The Period of 2015–2022)

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ABSTRACT

The capital market functions as an intermediary for the flow of funds between investors and companies, in accordance with the general principle that the greater the risk, the greater the potential profit. In estimating returns, there are several methods, one of which is the Fama French five factor model which was developed from the CAPM, APT and Fama French three factor models. This research aims to evaluate the relationship between the five-factor Fama French model and excess returns on the SRI-KEHATI stock index from 2015 - 2022. This research method adopts quantitative analysis with an associative causality approach and uses a purposive sampling technique to select 9 companies as samples. Data analysis used by Eviews 12. Study findings show that market factors have a significant influence on excess returns, while size, value, profitability and investment factors are not significant on excess returns. Overall, the Fama-French model's five factors collectively influence excess returns. This finding confirms that market conditions will influence the excess returns obtained by investors.

ABSTRAK

Pasar modal berfungsi sebagai perantara aliran dana antara investor dan perusahaan, sesuai dengan prinsip umum bahwa semakin besar risikonya, maka akan semakin besar potensi keuntungannya. Dalam mengestimasi return ada beberapa metode salah satunya fama french five faktor model yang dikembangkan dari model CAPM, APT dan fama french three faktor model. Penelitian ini bertujuan untuk mengevaluasi hubungan model Fama French lima faktor terhadap kelebihan return pada indeks saham SRI-KEHATI dari tahun 2015 - 2022. Metode penelitian ini mengadopsi analisis kuantitatif dengan pendekatan asosiatif kausalitas dan menggunakan teknik purposive sampling untuk memilih 9 perusahaan sebagai sampel. Analisis data yang digunakan Eviews 12. Temuan studi menunjukkan bahwa faktor pasar memiliki pengaruh signifikan terhadap excess return, sementara faktor ukuran, nilai, profitabilitas, dan investasi tidak signifikan terhadap excess return. Secara keseluruhan, model Fama French lima faktor secara kolektif mempengaruhi excess return. Temuan ini menegaskan bahwa kondisi pasar akan mempengaruhi excess return yang diperoleh oleh investor.



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INTRODUCTION

Financial management is crucial not only for both publicly listed companies and those yet to be listed to make a public offering. They need to adopt efficient and effective financial management, as this helps achieve the company's goals more efficiently. The capital market has a central role as an intermediary between investors and companies that need funding (Tandelilin, 2017). This follows the theory that states the greater the risk, the greater the potential profit (Komara & Yulianti, 2019). Assessing excess stock returns is vital for investors. Positive estimates indicate potentially lucrative opportunities, surpassing deposit interest benefits. Conversely, negative estimates pose risks, potentially harming

investors. (Shiddiq et al., 2020). In evaluating profit potential, a commonly used method is the Capital Asset Pricing Model (CAPM), first introduced by Sharpe (1964), Lintner (1965), and Mossin (1966), which is based on Markowitz's theory. Furthermore, Ross (1976) developed a new Alternative Pricing Theory (APT) method. The three-factor model by Fama and French incorporates the market risk factor, firm size factor, and book-to-market ratio factor. Subsequently (Fama & French, 2015), the model was extended to encompass five factors, which now include profitability and investment factors. This five-factor model of Fama and French consists of market risk factors, company size factors, book-to-market ratio factors, profitability factors, and investment factors. Previous research shows that the Fama and French five-factor model is better at explaining portfolio returns than the three-factor model (Sembiring & Komara, 2020), (Altinay et al., 2023), (Putra & Susanti, 2019), and (Huang, 2019). However, some studies show that the value factor becomes less relevant (Fama & French, 2015), (Sembiring, 2018).

Previous research has focused on the five-factor model of Fama and French. According to (Fama & French, 1993), Market returns influence excess returns (Gharaibeh & Al-qudah, 2020), (Agustin et al., 2022) and (Komara et al., 2020). However, it needs to be supported by research from (Novak, 2010), (Sudiyatno & Irsad, 2011), and (Sitanggang & Rizkianto, 2024). The size factor variable affects excess return (Chen & Lu, 2021), (Thafani & Ediriwickrama, 2022), and (Widyaningsih & Zen, 2021). However, it needs to be supported by research from (Munawaroh & Sunarsih, 2020), (Wijaya & Sadria, 2019), and (Buditomo et al., 2024). The value factor variable has an impact on excess return (Sembiring, 2018), (Nugraha, 2020), and (Putra & Susanti, 2019). However, found insignificant by research from (Sholihati, 2023), (Thafani & Ediriwickrama, 2022), and (Sitanggang & Rizkianto, 2024). Variable profitability factors affect excess return (Yuliyana & Sembiring, 2022), (Anuno et al., 2023), and (Zada et al., 2018). However, this needs to be supported by research from (Munawaroh and Sunarsih, 2020) (Widyaningsih & Zen, 2021). and (Sholihati, 2023). Investment factor variables affect excess return (Putra et al., 2019), (Liamukda et al., 2020), (Liu, 2021) and (Agathia et al., 2022). However, it was found insignificant by research from (Yuliyana & Sembiring, 2022), (Darma et al., 2022), and (Buditomo et al., 2024).

The data analysis, the SRI-KEHATI Index has recorded impressive growth in stock trading. With performance that far exceeds the JCI. The collaboration between IDX and the KEHATI Foundation (Indonesian Biodiversity Foundation) in the establishment of this index has yielded positive results, as seen from the data in 2022, which showed an increase of 1.35%, compared to only 0.11% of the JCI (Bareksa, 2022). The SRI-KEHATI Index was launched in 2009 and is updated every 6 months in May and November. The following is the data on return, market return, firm size, BE/ME, profitability, and total assets.

Table 1 Return, market return, firm size, BE/ME, profitability, and total assets of SRI-Kehati Index stocks from 2015 to 2022

Years Period	Return	Market Return	Frim Size	BE/ME	Profitability	Total Assets
2015	-0,30%	-0,19%	93.379.049.279.520	-1,23%	0,72%	-1,47%
2016	0,18%	0,10%	111.802.956.927.320	-0,74%	0,82%	0,41%
2017	0,07%	0,14%	138.198.463.308.640	-1,89%	3,11%	0,40%

2018	-0,09%	-0,06%	131.691.330.853.760	0,35%	1,09%	-0,80%
2019	-0,05%	-0,04%	137.541.993.280.360	-1,10%	0,86%	-0,12%
2020	-0,06%	-0,06%	127.170.303.810.440	-0,40%	-0,53%	0,02%
2021	-0,14%	0,07%	131.596.653.195.000	-1,70%	0,32%	0,65%
2022	-0,02%	-0,01%	155.602.469.097.040	-0,61%	0,97%	-0,34%

Source: (sahamok, 2023) and (IDX, 2023), data reprocessed (2023)

Investment

Allocating excess funds involves various options for someone who has sufficient financial resources. One option that can be considered is Investment, this investment activity is carried out in the capital market. The capital market provides information on stock market performance that is generally described in the form of an index, which is often referred to as a stock market index. In this study, the SRI-KEHATI index is used because the company has assets that exceed the predetermined limit, allowing the company to obtain excess funds from the entirety of the company's assets (Santo et al., 2022).

Return and Risk

Komara (2016) states that the benefits for investors, namely the results of their Investment, are known as returns. Returns can be grouped into two types: realized returns and anticipated returns (expected returns). Meanwhile, risk is the uncertainty that arises when the realized return doesn't align with the anticipated return.

Asset Pricing Model

In projecting investment returns, several methods can be utilized, one of which is the Capital Asset Pricing Model (CAPM), where the only variable believed to affect stock returns is market risk. However, in 1976, Ross developed the Arbitrage Pricing Theory (APT). This new method involves more complex assumptions and procedures by considering factors such as GDP growth, inflation, and tax rate changes. Although APT accommodates various factors to predict returns, it sometimes struggles to explain the precise impact of these factors due to the lack of clear standardization. In 1993, Fama and French demonstrated that company size and BE/ME significantly influence excess returns. In a follow-up study in 2015, they expanded their model to include profitability and investment levels, resulting in the five-factor model. Thus, this five-factor model consists of market risk, company size, BE/ME, profitability, and investment.

Excess Return

Excess return refers to the additional return received by investors that exceeds the risk-free rate of return. It's calculated by subtracting the monthly risk-free rate from the monthly stock return (R_f) (Hardianto, d., 2009).

Market Factor

The market factor (market return) is obtained as The disparity from the monthly average market return across all stocks minus the monthly risk-free rate (Hardianto, d., 2009). (Putra et al., 2019) state investors can utilize market return as a analytical tool in making investment decisions.

Size Factor

The second factor is the size factor, defined as a value that can provide an overview of the small or large scale of a company (Komara & Yulianti, 2019). Company size can be calculated through multiplying the annual stock price by the outstanding shares count (Jogyanto, 2017). The size factor is proxy SMB (Small Minus Big). Where company classified as 50% big shares (B) if the company size value is above the median, while the company is classified as 50% small shares (S) if the company size value is below the median (Sembiring & Komara, 2020), according to (Hardianto, d., 2009) SMB can be calculated using the following formula:

$$SMB = \frac{1}{3} \left(\frac{S}{L} + \frac{S}{M} + \frac{S}{H} \right) - \frac{1}{3} \left(\frac{B}{L} + \frac{B}{M} + \frac{B}{H} \right)$$

Value Factor

The third factor is the value factor (BE / ME) proxy by HML (High Minus Low). Book to market ratio is the book value ratio to market value (Justina, 2017). HML is formed based on stocks consisting of 30% of stocks with high BE / ME (H), 40% of stocks with medium BE / ME (M), and 30% of stocks with low BE / ME (L) (Sembiring & Komara, 2020). HML can be calculated using the following formula:

$$HML = \frac{1}{2} \left(\frac{S}{H} + \frac{B}{H} \right) - \frac{1}{2} \left(\frac{S}{L} + \frac{B}{L} \right)$$

Profitability Factor

The fourth factor, profitability, reflects how much excess funds or profits a company has managed to achieve up to a certain period of time and utilizes the Robust Minus Weak (RMW) proxy. According to (Hou et al., 2014) and (Chiah et al., 2015), the profitability variable in the five-factor model can be calculated through ROE and stock valuation. A total of 30% of robust stocks have high profitability. 30% of stocks categorized as weak exhibit low profitability, while 40% of stocks categorized as medium encompass other stocks. (Acaravci & Karaomer, 2017). Referring to (Fama & French, 2015), RMW can be calculated with the following formula:

$$RMW = \frac{1}{2} \left(\frac{S}{R} + \frac{B}{R} \right) - \frac{1}{2} \left(\frac{S}{W} + \frac{B}{W} \right)$$

Investment Factor

The fifth factor, namely the Investment factor, can be explained as the act of buying an asset or item in the hope of getting future profits (Tandelilin, 2017). Investment is proxied by CMA (Conservative Minus Aggressive). Asset growth can be utilized for its calculation. 30% of stocks are categorized as conservative (C), while another 30% represent the highest asset growth. Stocks are classified as aggressive (A), and the remaining 40% are categorized as medium (Acaravci & Karaomer, 2017). According to (Fama & French, 2015), CMA can be calculated with the following formula:

$$CMA = \frac{1}{2} \left(\frac{S}{C} + \frac{B}{C} \right) - \frac{1}{2} \left(\frac{S}{A} + \frac{B}{A} \right)$$

Hypothesis

Market Factors

An increase in market return can also increase stock price fluctuations, so investors will demand additional returns from these shares (Candika, 2018). Therefore, the greater the market return, the greater the return on Investment in securities. Conversely, investment returns on securities tend to decrease when the market decreases. Thus, market conditions that have increased indicate investor optimism, which provides an opportunity for investors to take into account excess return as a factor in evaluating the potential for additional profits from stocks, which can then serve as a foundation for decision-making for their investments (Putra et al., 2019) Therefore, the initial hypothesis posited in this study is: H1: Market Factors Have a Positive Effect on Excess Return

Size Factor

Trisnadewi (2012) states that companies included in the large classification Small companies tend to bear lower risks compared to larger counterparts as they exhibit better control over market conditions and can navigate economic competition more effectively. Thus, the smaller the company's market capitalization value, the higher the return rate. Conversely, the greater the company's market capitalization, the smaller the return. This implies that investors can take advantage of the market capitalization value of the market as a factor of one of the markers to calculate the excess return of shares, which can then become the basis for making decisions for their Investment. Therefore, The hypothesis formulated for the second factor, H2: Size Factor Has a Negative Influence on Excess Return.

Value factor

Referring to Fama & French (1993), companies with high BE/ME values tend to have lower profitability than companies with lower BE/ME values. In addition, a high BE/ME value may indicate that the company is experiencing financial difficulties. As a result, there can be an overreaction from investors, which in turn will value the company's shares as undervalued shares (Darma et al., 2022). Therefore, a higher book-to-market ratio indicates that the stock is undervalued and has the opportunity to provide a higher compensation return. Then the third hypothesis was formed: H3: Value Factor Has a Positive Influence on Excess Return.

Profitability Factor

As the profitability of an issuer increases, so does the risk it faces. Therefore, investors tend to allocate their investments to companies with high profitability, anticipating higher returns. This finding is corroborated by research conducted (Wijaya et al., 2017). Therefore, the fourth hypothesis: H4: Profitability Factor Has a Positive Influence on Excess Return.

Investment Factors

Asset growth reflects the use of assets in the company's operational activities. A growing company will require capital that requires more significant funds. Consequently, the greater the investment value, the higher the excess return. Investors view companies that use investment activities that they can anticipate and have good prospects, so investors

expect long-term security and benefits from their investments. Therefore, the fourth hypothesis was formed: H5: Investment Factors Have a Positive Influence on Excess Return.

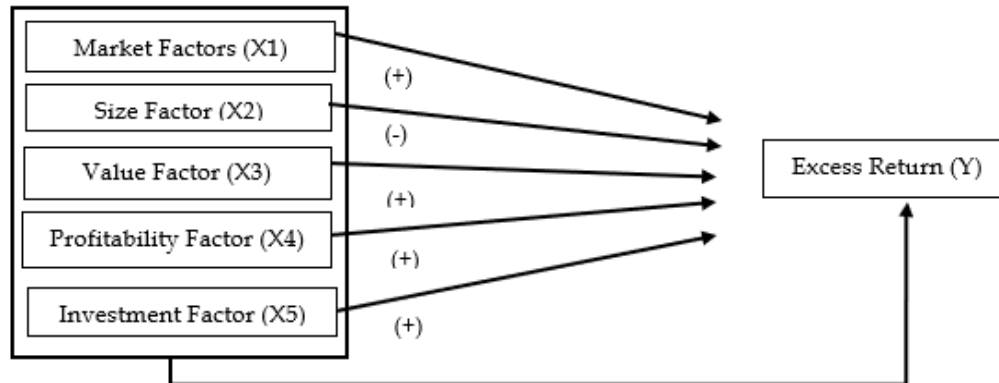


Figure 1 *Research Model*

RESEARCH METHOD

The study employs quantitative research methods, using both descriptive and causal associative techniques. Its purpose is to explore the impact of independent variables on the dependent variable, excess return. The population includes all issuers listed on the SRI-KEHATI index on the Indonesia Stock Exchange (IDX) from 2015 to 2022, totaling 43 companies. Non-probability sampling, either random or purposive (Sugiyono, 2019), was used for sample selection based on the following criteria:

1. Companies continuously included in the SRI-KEHATI Index from 2015 to 2022;
2. Companies consistently releasing annual financial reports from 2015 to 2022;
3. Companies reporting a close price in December for each year from 2015 to 2022;
4. Companies that did not undergo corporate actions during 2015-2022.
5. Companies maintaining a positive BE/ME ratio throughout 2015-2022, avoiding financial difficulties (Fama & French, 1993);
6. Companies with consistently positive equity values from 2015 to 2022, as negative equity renders ratios meaningless (Subekti & Kusuma, 2001);
7. Companies demonstrating positive asset growth during 2015-2022, as negative growth suggests funding management issues (Acaravci & Karaomer, 2017).

This selection yielded a sample of 9 companies.

The analysis utilizes parametric inferential statistics. The stages of data processing are as follows:

1. Calculate market return using the formula $R_m - R_f$;
2. Form the SMB portfolio group by ranking companies based on market capitalization into small (50%) and big (50%) groups;
3. Form the HML portfolio group by ranking companies based on book-to-market ratio into high (30%), medium (40%), and low (30%) groups;
4. Assess profitability using ROE, ranking companies into robust (30%), medium (40%), and weak (30%) groups;
5. Measure investment through asset growth, categorizing companies into conservative (30%), medium (40%), and aggressive (30%) groups.

RESULTS and DISCUSSION

Classic Assumption Test

Table 2 *Chow Test*

Redundant Fixed Effects Tests			
equation: Untitled			
Test cross-section fixed effects effects Test			
	Statistic	d.f.	Prob.
Cross-section F	0,8872	(8,58)	0,533
Cross-section Chi-square	8,312018	8	0,4036

Source: Data processed by Eviews 12 (2023)

Table 3 *Hausman test*

Correlated Random Effects - Hausman Test			
equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	1.0000

Source: Data processed by Eviews 12 (2023)

Table 4 *Lagrange Multiplier Test*

Lagrange Multiplier Tests for Random Effects			
Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0,986641	1,435585	2,422226

(0,3206) (0,2309) (0,1196)

Source: Data processed by Eviews 12 (2023)

Table 2 shows a Chi-square value of 0.4036, which is greater than ($\alpha = 0.05$), so H0 is accepted. Table 3 indicates that the Cross-section random probability number of 1 exceeds ($\alpha = 0.05$), meaning H0 is also accepted here. Additionally, Table 4 presents the LM test, where the Breusch-Pagan probability number of 0.986 is greater than ($\alpha = 0.05$), confirming that the most suitable model is the Common Effect Model, as follows:

Table 5 Common Effect Model Estimation

Variables	Common Effect Model	
	Coefficient	Prob.
C	-0,033	0,722
X1	1,037	0,000
X2	0,000	0,110
X3	-0,100	0,197
X4	0,019	0,965
X5	0,045	0,810
R-squared	0,319	
Adjusted R-squared	0,267	
F-statistic	6,187	
Prob(F-statistic)	0,000	
Durbin-Watson stat	2,179	

Source: Data processed by Eviews 12 (2023)

Based on Table 5, the regression model equation obtained between the dependent variable (excess return) and the independent variables is as follows:

$$R_{pt} - R_{ft} = -0.033 + 1.037 (R_{mt} - R_{ft}) + 0.000 \text{ SMB} + -0.100 \text{ HML} + 0.019 \text{ RMW} + 0.045 \text{ CMA} + e_{pt}$$

DISCUSSION

Influence of Market Factors on Excess Return

Based on the data listed in Table 5, there is a regression coefficient and P-value for the market return (X1), which is 1.037 and $0.000 < 0.05$, respectively. Thus, H0 is rejected. Indicates that market return significantly and positively impacts excess return with a high significance level. A positive market return indicates bullish market conditions, which illustrates the opportunity for investors to invest in the capital market (Putra et al., 2019). With a coefficient of 1.037, every 1% market return will be followed by an increase in excess return of 1.03%. This finding supports several studies from (Fama & French, 2015), (Gharaibeh & AL-qudah 2020), (Agustin et al., 2022), and (Komara et al., 2020) that market return influences excess return.

Influence of Size Factor on Excess Return

The data analysis presented in Table 5 demonstrates that the size factor variable represented by SMB (X2) has a regression coefficient and P-value, which are 0.000 and $0.110 > 0.05$ respectively, thus H0 is accepted, indicating that the size factor does not have a significant effect on excess return. The insignificance of the results in this study is likely because companies with small sizes tend to

have a relatively small proportion of debt, so they do not provide a significant burden for the company. Moreover, certain investors take into account not just the company's size but also its ability to generate returns on investment. As a result, the outcomes of this study deviate from the initial hypothesis and differ from previous research conducted (Fama & French, 2015). However, this study is in line with research conducted by (Munawaroh & Sunarsih, 2020), (Wijaya & Sadria, 2019) and (Buditomo et al., 2024), which shows that the size factor has no significant influence on excess return.

Influence of Value Factor on Excess Return

The data analysis in Table 5 shows that the value factor variable represented by HML (X3) has a regression coefficient and P-value of -0.100 and $0.197 > 0.05$, respectively. Thus, H0 is accepted, indicating that the value factor does not significantly influence excess return. This may be due to the company's low market valuation, so investors are less interested in the company's shares, which results in a decrease in stock prices and its impact on stock returns. This finding is inconsistent with the research hypothesis and does not support the research conclusions (Fama & French, 2015). However, this finding is in line with the findings of studies conducted by (Sholihati, 2023), (Thafani & Ediriwickrama, 2022), and (Sitanggang & Rizkianto, 2024). Similarly, these results indicate that the value factor does not exert a significant effect on excess return. With a coefficient of -0.100, any decrease in the value factor by 1% will be followed by an increase in excess return of 0.1%. Therefore, a decrease in the value factor signifies positive stock performance, leading to an uptick in the stock market price. This fosters optimism among investors regarding the company's future performance.

Influence of Profitability Factors on Excess Return

The analysis in Table 5 reveals that the profitability factor variable proxied by RMW (X4) has a regression coefficient and P-value of 0.019 and $0.965 > 0.05$, respectively. Therefore, H0 is accepted, indicating that the Profitability factor has no significant effect on excess return. This is due to the absence of a significant impact on profitability as measured by ROE on excess return. The reason is that the majority of investors who invest in the SRI-KEHATI index are short-term investors who pay more attention to capital gains than dividends. Capital gain is the difference between the purchase and selling prices, so ROE is not considered the central aspect of investors' decision-making. The outcomes of this study diverge from the research hypothesis and fail to substantiate the study's findings (Fama & French, 2015). However, these findings are consistent with those conducted by (Munawaroh & Sunarsih, 2020), (Widyaningsih & Zen, 2021), and (Sholihati, 2023), showing that the profitability factor does not affect them. The excess return is represented by a coefficient of 0.019, indicating that for a 1% rise in the profitability factor, there's a corresponding 1.9% increase in excess return. This suggests that as company profitability escalates, so does the associated risk (Wijaya et al, 2017).

Influence of Investment Factors on Excess Return

From the data analysis outcomes outlined in Table 5, it's evident that the investment factor variable proxied by CMA (X5) has a regression coefficient and P-value, respectively 0.045 and $0.810 > 0.05$. Therefore, H0 is accepted, signifying that the investment factor does not exert a significant influence on excess return. This suggests that investors weigh other factors more heavily in their investment decisions. Most likely, investors pay more attention to other factors that are considered more influential on portfolio excess returns. The study's results imply that investors demonstrate less interest in companies with substantial asset growth, as these firms are inclined to retain earnings rather than distribute them through dividends. This finding is inconsistent with the research hypothesis and does not support the study's conclusions (Fama & French, 2015). However, it is consistent with the research (Yuliyana & Sembiring, 2022), (Darma et al., 2022) and (Buditomo et al., 2024). With a coefficient of 0.045, every 1% increase in investment factors will be followed by

an increase in excess return of 4.5%. The greater the need for funds owned by the company, the more likely the company is to retain most of its income.

Influence of market factors, size factors, value factors, profitability factors, and investment factors simultaneously on excess return

From the data analysis presented in Table 5, the Prob (F-statistic) value is 0.000000, indicating that the market factor, size factor, value factor, profitability factor, and investment factor collectively influence excess return according to the Fama and French five-factor model applied to the SRI-KEHATI stock index on the Indonesia Stock Exchange (IDX) from 2015 - 2022. This outcome aligns with the research hypothesis and corroborates the findings of prior studies conducted (Fama & French, 2015). Thus, the Fama and French five-factor model can guide investors in investing because it can explain excess returns and estimate returns on the SRI-KEHATI stock index.

CONCLUSIONS

From the above findings, market factors have a significant influence on excess return, while size, value, profitability, and investment factors do not have a significant influence on excess return. Simultaneous tests of the Fama and French five-factor model show its ability to estimate returns on the SRI-KEHATI stock index. This finding can be a guide For capital market players, particularly investors, selecting the appropriate investment vehicles is pivotal in decision-making. stocks listed on the SRI-KEHATI index that promise optimal returns. Nevertheless, this study has several limitations. This research is limited to companies included in the SRI-KEHATI index, which only has 25 companies that were members during the period. For future research, profitability factors can be calculated using profit margins or return on assets (ROA), which can affect returns, so they are taken into consideration in research. Moreover, future research researchers can consider adding other variables that can influence. For example, momentum (Munawaroh & Sunarsih, 2020), (Altinay et al., 2023), labour income growth rate (LBR) (Roy & Shijin, 2018), etc. For sampled companies, it is essential to constantly monitor market return factors and investment factors as indicators of market conditions that are considered in making investment decisions so that the condition of the company's shares can be appropriately maintained.

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