



## Does COVID-19 Pandemic Moderate Financial Leverage, Firm Size, and Dividend Pay-out Ratio on Systematic Risk (Beta) of Stock?



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### Abstract

The purpose of this study was to obtain empirical evidence regarding the effect of financial leverage, firm size, and dividend payout ratio on the systematic risk (beta) of stocks with the COVID-19 pandemic as a moderating variable. The data used is secondary data obtained from annual reports of LQ-45 index companies listed on the Indonesia Stock Exchange during the 2018-2022 period. The data analysis technique used was sub-group moderation. The total population in this study was 45 companies listed in the LQ-45 index, using the purposive sampling method, where 115 observations were obtained. The research results show that: 1) financial leverage has a positive effect on the systematic risk (beta) of stocks; 2) firm size has no effect on the systematic risk (beta) of stocks; 3) dividend payout has a negative effect on the systematic risk (beta) of stocks; 4) the COVID-19 pandemic strengthened the effect of financial leverage on the systematic risk (beta) of stocks; 5) the COVID-19 pandemic was unable to moderate the effect of firm size on the systematic risk (beta) of stocks; and 6) the COVID-19 pandemic strengthened the effect of the dividend payout ratio on the systematic risk (beta) of stocks. This research has implications for investors as an indicator to assess and analyze their investment in certain companies. By considering the systematic risk (beta) of stocks, financial fundamentals, and macroeconomic variables, investors are expected to be able to detect possible risks in investing their capital and maximize returns or profits.

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## 1 Introduction

The purpose of investors buying stocks is to expect maximum returns and minimal risk. As an investor, the ability to estimate the return of a security is very important and necessary. One of the popular and widely used return estimation models in finance is the Capital Asset Pricing Model (CAPM). In the CAPM, the expected return is determined by the market return, risk-free return, and systematic risk/beta. This study only assesses systematic risk because systematic risk (beta) cannot be eliminated by diversification. Beta is a measure of the volatility of securities returns to market returns.

Measuring the beta of a stock can be used with a single-index model. The single index model is based on the observation that the price of a security fluctuates in the direction of the market price index (Jogiyanto, 2017). A stock with a beta of one means that the change in the profit level of a stock changes in proportion to changes in the market profit rate. Stocks with a beta of more than one are relatively sensitive to market changes, while a beta of less than one is referred to as a defensive stock.

Research by Fama & French (1992), received a great deal of attention, both in academia and in the popular press, with articles featuring the headline "Beta Is Dead!". This study makes two related points. First, they conclude that the relationship between average return and beta is weak over the period 1941 to 1990 and almost non-existent from 1963 to 1990. Second, they argue that a security's average return, or beta, is negatively related to a firm's price-earnings ratio (P/E) and market-to-book ratio (M/B).

Unlike the research from Hsia et al. (2000), who stated that beta is still important because beta is the heart and soul of the CAPM model which is widely used in financial and investment management. So there are still many who use and consider beta in market risk theory. In addition, according to Zimmerman (1983), which states that beta has a positive relationship with the rate of return.

The capital market developed rapidly during the period when the Indonesian economy was growing. Securities beta is related to security returns and market returns. If the systematic risk value (beta) of the company's stock is normal, then investor interest will be high. This will be different if the company's beta values are high, of course, it will cause uncertainty in investment and investor interest in investing decreases. Previous studies have examined a lot about the relationship between several components of financial variables on stock beta. These financial component variables include financial leverage, firm size, and dividend payout.

Financial Leverage is an additional net profit owned by security due to using income (debt) in the company's capital structure (Adenugba et al., 2016). Research conducted by Beaver et al. (1970); Iqbal et al. (2015); Nainggolan & Solikhah (2016); Rizal & Pringgabayu (2018); Rita et al. (2019); Sulistia et al. (2020), found that financial leverage has a positive effect on the systematic risk (beta) of stocks. According to research conducted by Parthasarathy (2019), it is estimated that Financial Leverage will increase income variability due to fixed interest payments in addition to other income variables and his research shows that there is a positive influence between Financial Leverage and systematic risk (beta) of stocks.

Firm size or variable asset size can be measured by the logarithm of total assets. This variable is predicted to have a negative relationship with the systematic risk (beta) of stocks (Jogiyanto, 2017). A company that has good company conditions will have a great opportunity to earn high profits in a stable manner, so the smaller the chance for the company to not fulfill its obligations to investors, the risk borne by investors will be low. Research conducted by Beaver et al. (1970); Iqbal et al. (2015); Kurniawati et al. (2016); Agustin et al. (2019), showed that firm size has a negative effect on systematic risk (beta) of stocks. The dividend is very important because it is one of the indicators used by investors in analyzing the prospects of a company by looking at the dividend policy of that company. An investor assumes that if a company always increases dividends, the company is in good condition and vice versa (Kustini & Pratiwi, 2011).

Investment theory states that investment is an activity that sacrifices a number of funds that can be consumed at this time to be placed in a productive asset, with the hope that these assets will bring more results than what was sacrificed at the beginning of the investment (Jogiyanto, 2017). The COVID-19 pandemic is one measure for investors to make decisions in investing their capital. If the COVID-19 pandemic has a negative impact on a country's economy, investors tend to invest in the financial market rather than the capital market. This impact in investment in the capital market going down and ultimately results in a weakening of stocks in the capital market which will result in an increase in the company's risk in the capital market. Therefore, the COVID-19 pandemic can strengthen or weaken the relationship between financial component variables and stock beta.

This research was conducted on companies listed on the LQ-45 stock index. Selection of the LQ-45 Index (Liquid-45 Index), because it is formed from the 45 most actively traded stocks. In addition, the LQ-45 Index is also a stock

index consisting of 45 stocks on the Indonesia Stock Exchange with high liquidity and large market capitalization and has passed selection according to several selection criteria. The reason for research on this observation year range is because according to [Jogiyanto \(2017\)](#); [Gonedes \(1973\)](#), beta can be estimated using a 5-year period and this period is the optimal period.

### *Literature review and hypothesis development*

The investment theory states that every security will generate returns and risks. Investors will tend to choose a high rate of return with low risk. If a company has a high financial leverage ratio, it indicates that the profit is lower than the fixed costs, causing greater financial risk. As a result of this, the company's prospects will decrease, thus making investors less interested in investing in companies that have low returns.

Research conducted by [Aygoren et al. \(2016\)](#); [Beltrame et al. \(2018\)](#), shows that there is an effect of the Financial Leverage ratio on the systematic risk (beta) of stocks. This statement is supported by research conducted by [Beaver et. al. \(1970\)](#); [Iqbal et al. \(2015\)](#); [Nainggolan & Solikhah \(2016\)](#); [Rizal & Pringgabayu \(2018\)](#); [Sulistia et al. \(2020\)](#), which shows that financial leverage has a positive effect on the systematic risk (beta) of stocks.

The greater the level of financial leverage of the company, the higher the financial risk. This will cause the company's prospects to decline, the impact of which will affect stock prices. Changes in stock prices will be followed by changes in stock returns. The greater the variation (change) in stock returns, the greater the stock beta. Based on the description above, the hypothesis that can be formulated in this study is as follows.

*H1: Financial leverage has a positive effect on the systematic risk (beta) of stocks.*

Investment theory explains the concept that a high level of risk results in a high rate of return, while a low level of risk results in a low rate of return. An investor who hopes to get high yields must be able to accept conditions with high potential losses. Therefore, investors tend to make considerations in determining their investment decisions to minimize risks and maximize their profits. The relevance of this theory is the relationship between firm size and systematic risk (beta) of stocks, investors will tend to choose companies that have low risk while still considering good returns. The larger the size of the company, the greater the opportunity for the company to obtain higher profits, thus the risk borne by the company will be lower.

Research conducted by [Aygoren et al. \(2016\)](#); [Puspitaningtyas \(2017\)](#); [Karakus \(2017\)](#); [Beltrame et al. \(2018\)](#), shows that there is an influence between the firm size variable and the systematic risk (beta) of stocks. This statement is supported by research conducted by [Beaver et al. \(1970\)](#); [Iqbal et al. \(2015\)](#); [Kurniawati et al. \(2016\)](#); [Agustin et al. \(2019\)](#); [Rita et al. \(2019\)](#), stated that firm size has a negative effect on the systematic risk (beta) of stocks.

The greater the value generated, the company has good prospects. Companies that have good prospects in the long term will cause the company stocks to remain attractive to investors so that the stock price is relatively high and stable. If the price fluctuation is small, it means that the change in the return on the relevant stock is also small. The smaller the change in stock returns, the smaller the company's stock beta. Based on the description above, the hypothesis that can be formulated in this study is as follows.

*H2: Firm size has a negative effect on the systematic risk (beta) of stocks.*

The dividend is very important because it is one of the indicators used by investors in analyzing the prospects of a company by looking at the dividend policy in that company. An investor assumes that if a company always increases dividends, the company is considered to be in good condition and vice versa ([Kustini & Pratiwi, 2011](#)). Dividend payments are less risky than capital gains ([Kustini & Pratiwi, 2011](#)). Thus, a company that pays a high dividend ratio will have less risk than holding it in the form of retained earnings. Bird in the hand theory explains that investors like high dividends because dividends received are like birds in the hand where the risk is smaller than dividends that are not distributed ([Jogiyanto, 2017](#)).

The results of [Novera's \(2013\)](#), research show that dividend policy has no effect on stock beta. The research results of [Caecilia & Cahyadi \(2014\)](#), also show that the dividend payout ratio has no effect on stock beta. Research conducted by [Kustini & Pratiwi \(2011\)](#), found that the dividend payout ratio has a negative effect on stock beta. Based on this description, the hypothesis proposed is:

*H3: Dividend Payout has a negative effect on the systematic risk (beta) of stocks.*

The COVID-19 pandemic, which caused the economic crisis, certainly has negative sentiments toward the capital market, which means that the risk of investing in stocks is higher. If a company has a high financial leverage ratio, it indicates that the profit is lower than the fixed costs, causing greater financial risk. As a result of this, the company's prospects will decrease, thus making investors less interested in investing in companies that have low returns.

Research conducted by [Aygoren et al. \(2016\)](#); [Beltrame et al. \(2018\)](#), shows that there is an effect of the Financial Leverage ratio on the systematic risk (beta) of stocks. This statement is supported by research conducted by [Beaver et al. \(1970\)](#); [Iqbal et al. \(2015\)](#); [Nainggolan & Solikhah \(2016\)](#); [Rizal & Pringgabayu \(2018\)](#); [Sulistia et al. \(2020\)](#), which shows that Financial Leverage has a positive effect on the systematic risk (beta) of stocks. Research conducted by [Alfiani et al. \(2018\)](#), found that interest rates can moderate or strengthen the relationship between stock beta and stock price. In addition, [Alfiani et al. \(2018\)](#), also found that exchange rates can moderate or weaken the relationship between stock beta and stock price.

The existence of the COVID-19 pandemic increases the risk of investing. The greater the level of financial leverage of the company, the higher the financial risk, coupled with the condition of the COVID-19 pandemic, which can increase the systematic risk of stocks. This will cause the company's prospects to decline, the impact of which will affect stock prices. Changes in stock prices will be followed by changes in stock returns. The greater the variation (change) in stock returns, the greater the stock beta. Based on this, the hypothesis proposed is as follows.

*H4: The COVID-19 pandemic strengthened the influence of Financial Leverage on the systematic risk (beta) of stocks.*

The condition of the COVID-19 pandemic which caused the economic crisis certainly has negative sentiment towards the capital market, which means that the risk for investing in stocks is higher. Therefore, investors tend to make considerations in determining their investment decisions to minimize risks and maximize their profits. The relevance of this theory is the relationship between firm size and systematic risk (beta) of stocks, investors will tend to choose companies that have low risk while still considering good returns. The larger the size of the company, the greater the opportunity for the company to obtain higher profits, thus the risk borne by the company will be lower.

Research conducted by [Aygoren et al. \(2016\)](#); [Puspitaningtyas, 2017](#); [Karakus \(2017\)](#); [Beltrame et al. \(2018\)](#), shows that there is an influence between the firm size variable and the systematic risk (beta) of stocks. This statement is supported by research conducted by [Beaver et al. \(1970\)](#); [Iqbal et al. \(2015\)](#); [Kurniawati et al. \(2016\)](#); [Agustin et al. \(2019\)](#); [Rita et al. \(2019\)](#), stated that firm size has a negative effect on the systematic risk (beta) of stocks. Research conducted by [Alfiani et al. \(2018\)](#), found that interest rates can moderate or strengthen the relationship between stock beta and stock price. In addition, [Alfiani et al. \(2018\)](#), also found that exchange rates can moderate or weaken the relationship between stock beta and stock price.

During the COVID-19 pandemic, investors preferred to invest in companies with large firm sizes. Because the larger the size of the company, the greater the opportunity for the company to obtain higher profits, thus the risk borne by the company will be lower. So that in the midst of the COVID-19 pandemic, investors will feel more secure investing in companies with larger firm sizes. Companies that have good prospects in the long term will cause the company stocks to remain attractive to investors so that the stock price is relatively high and stable. If the price fluctuation is small, it means that the change in the return on the relevant stock is also small. The smaller the change in stock returns, the smaller the company's stock beta. Based on the description above, the hypothesis that can be formulated is as follows ([Jermias, 2008](#); [Dang et al., 2018](#); [Redding, 1997](#); [Andini & Sukartha, 2020](#)).

*H5: The COVID-19 pandemic strengthens the effect of firm size on the systematic risk (beta) of stocks.*

The COVID-19 pandemic, which caused the economic crisis, certainly has negative sentiment towards the capital market, this means that the COVID-19 pandemic has information content. In the conditions of the COVID-19 pandemic, investors will prefer to invest in companies that have good prospects, one of the indicators is a company with a dividend policy. Investors assume that if a company always increases dividends, the company is considered to be in good condition and vice versa ([Kustini & Pratiwi, 2011](#)). Dividend payments are considered to be less risky than capital gains ([Kustini & Pratiwi, 2011](#)). Thus, a company that pays a high dividend ratio will have less risk than holding it in the form of retained earnings.

The results of [Novera's \(2013\)](#), research show that dividend policy has no effect on stock beta. The research results of [Caecilia & Cahyadi \(2014\)](#), also show that the dividend payout ratio has no effect on stock beta. Research conducted

by Kustini & Pratiwi (2011), found that the dividend payout ratio has a negative effect on stock beta. Research conducted by Alfiani et al. (2018), found that interest rates can moderate or strengthen the relationship between stock beta and stock price. In addition, Alfiani et al. (2018), also found that exchange rates can moderate or weaken the relationship between stock beta and stock price. The impact of the COVID-19 pandemic will encourage investors to invest in companies with higher dividend policies. This means that the effect of the dividend payout ratio on stock beta is strengthened by the COVID-19 pandemic situation. Based on the description, the hypothesis proposed is as follows.

*H6: The COVID-19 pandemic strengthens the effect of the dividend payout ratio on the systematic risk (beta) of stocks.*

## 2 Materials and Methods

The population in this study are all LQ-45 index companies listed on the IDX. The sample in this study is a company belonging to the LQ-45 index listed on the Indonesia Stock Exchange (IDX) for the period 2018 – 2022 which fits the sample selection criteria in this study. The sampling technique used in this research is a nonprobability sampling method with a purposive sampling technique.

The LQ-45 index is updated every 6 months, namely at the beginning of February and August. The list of companies included in the LQ-45 index uses official data from the Indonesia Stock Exchange via [www.idx.co.id](http://www.idx.co.id). Based on observations that have been made of all LQ-45 companies, only 23 companies are listed on the Indonesia Stock Exchange which were in a row during the 2018-2022 observation period. To avoid outliers in the research data, the samples used in this study were 23 companies.

The systematic risk of this stock (beta) is calculated using a single index model with an adjusted beta value. Financial leverage measures the ratio between the funds provided by the company and the funds originating from the company's credit using the Debt To Equity Ratio (DER). Firm size is a measure of the size of a company as indicated by the natural logarithm of the company's total assets at the end of the year. The Dividend Payout Ratio (DPR) is the ratio between the dividends distributed and the net profit earned. The COVID-19 pandemic is categorized by nominal data, before the COVID-19 pandemic was coded 0, and during the COVID-19 pandemic was coded 1. For the limitations, the period 2018 – 2019 was the period before the COVID-19 pandemic, and the period 2020 – 2022 was the period during the COVID-19 pandemic. The hypothesis testing used in this study includes the coefficient of determination test (Adjusted R Square), hypothesis testing (t-test), moderation test of the Sub-Group method, and Chow test.

## 3 Results and Discussions

*Hypothesis testing*

*Test the coefficient of determination*

The results of the test for the coefficient of determination are presented in Table 1.

Table 1  
Coefficient of determination

Model	R	R Square	Model Summary	
			Adjusted R Square	Std. Error of the Estimate
1	0,733	0,537	0,464	0,27359

Secondary Data, 2023

Based on the results of the coefficient of determination test, it shows that if the adjusted R Square value is 0.464 or 46.4%, the company value variable can be explained by the variables financial leverage, firm size and dividend payout ratio, which are moderated by the COVID-19 pandemic. While the remaining 53.6% is influenced by other variables outside the research.

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*t-test*

The results of the t-test are presented in Table 2.

Table 2  
t-test

Model	B	t	Significant
Financial Leverage (X1)	0,144	2,669	0,015
Firm size (X2)	-0,019	-0,628	0,538
Dividend Payout Ratio (X3)	-0,589	-2,698	0,014

Secondary Data, 2023

- 1) The first hypothesis states that financial leverage has a positive effect on the systematic risk (beta) of stocks. The results of the t-test in Table 2 show that financial leverage has a significance value of 0.015 and a positive coefficient value of 0.144. A significance value of  $0.015 < 0.05$  indicates that H0 is rejected and H1 is accepted. These results indicate that financial leverage has a positive effect on the systematic risk (beta) of stocks. The greater the leverage value, the greater the beta value. The results of this study support the Investment Theory which states that every security will generate returns and risks. Investors tend to choose companies that have a low financial leverage ratio because it indicates that the company has been able to pay off the company's debt thereby reducing stock risk.
- 2) The second hypothesis is that firm size has a negative effect on the systematic risk (beta) of stocks. The results of the t-test in Table 2 show that firm size has a significant value of 0.538 and a negative coefficient value of -0.019. A significant value of  $0.538 > 0.05$  indicates that H0 is accepted and H2 is rejected. These results indicate that firm size has no effect on the systematic risk (beta) of stocks. Firm size is not the main indicator for investors in assessing the systematic risk (beta) of a company's shares before examining more deeply the sources of funding for the company's assets. In this condition, investors in investing do not only see large total assets, investors also need to pay attention to optimizing the use of total assets in operations to reduce stock price risk.
- 3) The third hypothesis is that the dividend payout ratio has a negative effect on the systematic risk (beta) of stocks. The results of the t-test in Table 2 show that the dividend payout ratio has a significant value of 0.014 and a negative coefficient value of -0.589. A significant value of  $0.014 < 0.05$  indicates that H0 is rejected and H3 is accepted. These results indicate that the dividend payout ratio has a negative effect on the systematic risk (beta) of stocks. Companies that pay a high dividend ratio indicate that the company has less risk than holding it in the form of retained earnings (Zimmerman, 1983; Jiang et al., 2017; Krieger et al., 2021; Asmussen & Taksar, 1997).

*Sub-group method moderation test*

Data analysis using the moderation test of the Sub-Group method requires the Chow Test to determine the moderating variable of the Sub-Group method. The Chow test is carried out by comparing the calculated F values and F tables. If the calculated F value  $>$  F table, the moderating variable used can moderate the effect of the independent variable on the dependent variable.

Table 3  
F-Value

Sum of Squares Residual Total	4,737
Sum of Squares Residual 1 (before)	2,369
Sum of Squares Residual 2 (during)	1,609
Sum of Squares Residual (before + during)	3,978
n1	23
n2	23
k	2
df1	2

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df2	42
F table (df1,df2)	3,22

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Secondary Data, 2023

$$F \text{ Value} = \frac{(4,737 - 3,978) / 2}{(3,978) / (23 + 23 - 2 * 2)}$$

$$F \text{ Value} = 4,007$$

Based on the results of the F-Table and F-Values, the result is that the F Count value (4.007) > F Table (3.22). This shows that the COVID-19 pandemic moderates the effect of financial leverage, firm size, and the dividend payout ratio on stock systematic risk (Beta).

Furthermore, the results of the moderation test using the Sub-Group method are presented in Table 4.

Table 4  
Moderation test results for the sub-group method

Variable	Coefficient Before (0)	Sig (0)	Coefficient During (1)	Sig (1)
Financial Leverage (X1)	0,115	0,120	0,132	0,024
Firm Size (X2)	-0,104	0,067	-0,010	0,697
Dividend Payout Ratio (X3)	-0,329	0,196	-0,538	0,038

Secondary Data, 2023

Based on Table 4 the results of the moderation of the Sub-Group method for each variable can be explained as follows.

- 1) The fourth hypothesis states that the COVID-19 pandemic strengthens the effect of financial leverage on stock systematic risk (beta). Table 4 shows that the value of the current coefficient (1) is greater than the value of the previous coefficient (0) (0.132 > 0.115) and the significance value (1) (0.024 < 0.05) indicates that there is an effect of financial leverage (X1) on systematic risk (beta) of stocks (Y). This shows that financial leverage (X1) has more influence on the systematic risk (beta) of stocks (Y) during the COVID-19 pandemic so H0 is rejected and H4 is accepted. Economic uncertainty due to the COVID-19 pandemic raises investment risks. The greater the company's financial leverage level, the higher the company's financial risk, reinforced by the conditions of the COVID-19 pandemic which tend to increase the systematic risk (beta) of shares.
- 2) The fifth hypothesis states that the COVID-19 pandemic strengthens the effect of firm size on the systematic risk (beta) of stocks. Table 4 shows that the significance value before (0) (0.067 > 0.05) and the significance when (1) (0.697 > 0.05) does not show any effect between firm size (X2) on systematic risk (beta) stock (Y). This shows that the COVID-19 pandemic did not moderate the effect of firm size (X2) on systematic risk (beta) of stocks (Y) so H0 was accepted and H5 was rejected. Investors during the COVID-19 pandemic tended to be more careful in analyzing the market and making investment decisions. So that economic uncertainty is responded to in a more complex way from various indicators not only the total assets of the company which are presented in general. This investor examines in more depth the optimization of asset utilization in relation to the company's efforts to create profits and also considers the sources of funding for the company's assets.

The sixth hypothesis states that the COVID-19 pandemic strengthens the effect of the dividend payout ratio on the systematic risk (beta) of stocks. Table 4 shows that the value of the coefficient (1) is greater than the value of the previous coefficient (0) (-0.538 > -0.329) and the significance value (1) (0.038 < 0.05) indicates that there is an effect of the dividend payout ratio (X3) on the systematic risk (beta) of stocks (Y). This shows that the dividend payout ratio (X3) has more influence on the systematic risk (beta) of stocks (Y) during the COVID-19 pandemic so H0 is rejected and H6 is accepted. The impact of the COVID-19 pandemic will encourage investors to invest in companies with higher dividend policies. The results of this study support the investment theory which states that investors are required to think rationally in choosing the level of return they want with the level of risk that exists in each security. So investors

will consider higher company dividend policies, with higher returns in dealing with the impact of the COVID-19 pandemic (Bei & Wijewardana, 2012; Lakonishok & Shapiro, 1986; Gençay et al., 2005; Yasa et al., 2020).

#### 4 Conclusion

Based on the theoretical point of view, the contribution of this study found that. The variables of financial leverage and dividend payout ratio have an effect on the systematic risk (beta) of stocks, but firm size has no effect on the systematic risk (beta) of stocks. On the other hand, the COVID-19 pandemic variable was able to strengthen the effect of financial leverage and dividend payout ratio on the systematic risk (beta) of stocks but was unable to moderate the effect of firm size on the systematic risk (beta) of stocks. The results of this study support the theory that investment in each security will generate returns and risks. The economic downturn due to the COVID-19 pandemic has become a new challenge for investors in maintaining their investments so that they always provide maximum returns. So investors tend to consider financial fundamentals and macroeconomic variables as measured by financial leverage, firm size, and dividend payout ratio in minimizing the increasing systematic risk (beta) of stocks as a result of the COVID-19 pandemic.

This research has practical implications for investors as a tool in assessing and analyzing their investment in certain companies. With knowledge and insight into the systematic risk (beta) of stocks, it is hoped that investors will be more thorough and be able to detect possible risks when investing in certain companies. For users of financial statements and subsequent research, the results of this study are expected to add insight, reference, and contribute as material for consideration and evaluation in assessing the systematic risk (beta) of stocks.

##### *Conflict of interest statement*

The authors declared that they have no competing interests.

##### *Statement of authorship*

The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

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