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# Effect of Free Cash Flow and Stock Trading Volume Moderated Diversification of Business Toward Stock Yield

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**ABSTRACT**

The research intents to investigate the effect of free cash flow and stock trading volume on stock returns with business diversification as a moderating variable. The problem raised is how the interaction between free cash flow, stock trading volume, and business diversification affects stock returns. The research sample consisted of 11 pharmaceutical firms existed on the Indonesian Securities Exchange during the period 2018-2022, but only 8 firms were validated so that the sample used was 40 confirmed data. The data analysis method used is multiple linear regression and moderation regression analysis (MRA). The results demonstrated that free cash flow has no substantial impact on stock yield, while stock trading volume has a substantial impact directly. However, it was found that business diversification does not restrain the free cash flow and stock trading volume effect on stock yield. The focus conclusion of this research is only stock trading volume affects stock yield. Meanwhile, free cash flow and stock trading volume do not interact with business diversification on stock yield. The implication is that investors and various interested parties need to consider the volume of stock trading in determining investment decisions, in order to obtain maximum yield.

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## Introduction

Investment is very concerned about stock returns as one of the main indicators that concern investors. Stock yield reflect the rate of return on investment that investors earn on their stock ownership. Therefore, understanding the factors that affect stock yield is very important for investors and firms in making investing decisions and firm policies[1]. The latest phenomenon related to Free Cash Flow (FCF) and Stock Trading Volume influenced by business diversification shows that companies with strong free cash flow and international diversification tend to be more resilient to market volatility. For example, Apple, which has high free cash flow, leverages its diversification strategy to buy back shares, which provides a positive boost to stock prices and investor confidence. In addition, diversification allows companies like Apple and Airbnb to remain competitive despite domestic economic pressures.

In the midst of high interest rates, a business diversification strategy also becomes key for companies to maintain a healthy cash flow and provide more stable returns. Companies like Airbnb, with their global exposure, can take advantage of the weakening US dollar to attract more international tourists, boosting revenue and free cash flow, despite economic challenges. In this situation, diversification provides greater flexibility for companies to handle market volatility. The increased trading volume of stocks in challenging market conditions also reflects significant opportunities for investors looking to capitalize on companies with globally diversified business models. For instance, stocks like Trex and Airbnb have seen a substantial surge in trading volume, indicating investor interest in companies with sustainable business strategies and strong product diversification. This trend shows that business diversification plays a crucial role in keeping stock values stable amid volatility.

The study used a free variable consisting of free cash flow. Free cash flow is the cash flow that endures after the firm pays all necessary operational and investment costs. Elevated free cash flow can be used for profitable investments or distributed as dividends, thus potentially increasing stock yield. However, excessive free cash flow can also cause

agency problems, managers tend to invest excess funds into less profitable projects for their personal interests, which can decrease firm performance and stock yield[2], [3]. Another variable used is the stock trading volume. The variable stock trading volume reflects the good liquidity of the stock and the great interest of investors in the stock. This can enhance demand and stock prices, resulting in higher stock yield[4]. However, some studies have also found that the association between stock trading volume and stock yield might vary according to market conditions and firm parameters[5].

To enumerate complexity to the study added moderation variables of business diversification. Business diversification is a condition that still allows firms to use free cash flow and stock liquidity more effectively in various business lines [6], thereby increasing stock performance and return. Research is still limited in using this variable so research still needs to be more deeply explored for business diversification variables. This research is prominent to serve a deeper understanding of the factors that affect stock yield, especially in pharmaceutical firms that have unique characteristics and challenges. The pharmaceutical industry has an important role in maintaining public health and has promising growth prospects. However, the industry also faces challenges such as elevated research and development costs, strict regulation, and fierce competition. By understanding the effect of free cash flow, stock trading volume, and business diversification on stock yield, this research can provide valuable information for investors and capital market participants in making the right investment decisions in pharmaceutical firms. In addition, the research results become input for pharmaceutical firms in managing their financial policies and business strategies to refine firm performance and stock yield. Because this domain is still limited, the study intents to investigate the effect of free cash flow, stock trading volume, moderated business diversification on stock yield in pharmaceutical firms so that it can have better implications in the future for various interested parties.

Previous research scrutinized the impact of free cash flow, stock trading volume, business diversification on stock yield, but there are research gaps that need to be explored further. Firms with elevated business diversification have a stronger free cash flow effect

on stock yield than firms with low business diversification. That is, business diversification allows firms to use free cash flow more effectively and productively in various business lines, thereby increasing performance and return stock [7]. Several previous studies conducted research on the Indonesian Securities Exchange on non-manufacturing and manufacturing firms, using variable stock trading volume, business diversification, free cash flow on firm performance [8]. Research on pharmaceutical firms, examining the effect of return on equity and debt to equity on firm worth[9]. [10] in her dissertation examines manufacturing firms on the Indonesian Securities Exchange for the 2019-2021 period. The research investigates business diversification and holdings of cash: A Study on Non-monetary Firms Existed on the Indonesian Securities Exchange from 2006 to 2015 [11]. In America, research on firms, found that business diversification and firm liquidity influence financial decisions [6]. Referring to previous research, the independent and moderation variables are what distinguishes this study. The study scrutinized the effect of free cash flow, moderated stock trading volume on business diversification in pharmaceutical firms. The research model is still limited and more complex by using moderation of business diversification, to enumerate repertoire and information for those interested in achieving optimal investment.

## Method

The study population used pharmaceutical firms existed on the Indonesian Securities Exchange for the period 2018-2022, in www.idx.co.id. The study found a total of 11 pharmaceutical firms existed as public firms, but there were two firms that were new firms. Therefore, the sample that meets the criteria is 8 firms to be used as valid data in research. Then the number of samples tested is 40 samples. The data are collected referring to the criteria. Analysis of research is using purposive sampling techniques [12]. The research determines the criteria consisting of, firms are always existed during the period 2018-2022 without exception, firms always report financial statements regularly without exception, then, financial statements end in the period December 31, and firms that are not

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firms that are existed for the first time on the Indonesian Securities Exchange. The study used two regressions to analyze the research hypothesis. The first regression analysis examines the effect of each variable of free cash flow and stock trading volume on stock yield. Here's the resulting equation:

Model 1 : $Y = \alpha + \beta 1X1 + \beta 2X2$ ……(1)

Further, testing the interaction between free cash flow and business diversification on stock yield and testing the interaction between the consequences of stock trading volume and business diversification on stock yield. Statistical analysis tools using SPSS. Starting with regression testing followed by moderation regression. Secondary data were employed in the research. The research took material from the Indonesian Securities Exchange website which provides financial statements of pharmaceutical firms openly. Here's the resulting equation:

Model 2 : $Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3M + \beta 4X1*M + \beta 5X2*M$ ……...(2)

The research model figure 1 illustrates that variable X represents an independent variable consisting of free cash flow and trading volume, W represents a moderation variable, namely business diversification, Y represents stock return.

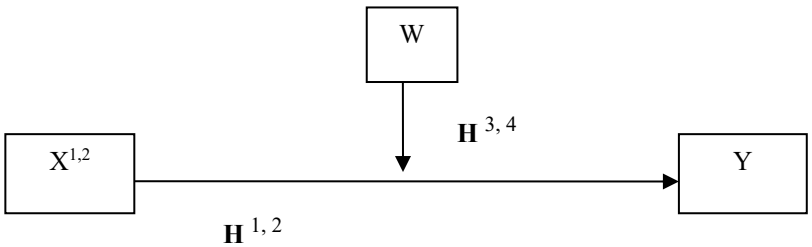


**Figure 1.** Research Model with moderation

Referring to the conceptual research in figure 1 above, the study tested the hypothesis namely:

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H1 : Is there an effect of free cash flow on stock yield ?

[12] [13] explained that excessive free cash flow can cause agency problems, where managers tend to invest excess funds into less profitable projects to satisfy their personal interests. This has an impact on declining firm performance and has a negative impact on stock yield. On the other hand, elevated free cash flow can also be used for profitable investments or distributed as dividends to shareholders, thus potentially increasing stock yield. Research by [14] found that there is an impact on free cash flow and stock yield. [15] found elevated free cash flow can also be considered a positive alert by investors that the firm has good financial performance and promising prospects. This can enlarge investor interest in the firm's shares and ultimately encourage an enlarge in stock yield.

H2 : Is there any effect of stock trading volume on stock yield ?

Research [16] explains that elevated stock trading volume reflects good stock liquidity. Liquid stocks are more attractive to investors because they can be easily traded in the market. Research conducted found that increasing stock trading volume can enlarge stock liquidity and attract more investors, which in turn can enlarge stock yield [17]. A elevated volume of stock trading can be considered a positive signal by investors that the stock is in demand and has good prospects. This can enlarge demand for stocks and encourage an enlarge in stock prices, which in turn can enlarge stock yield[18], [19]. Research by [20] found on pharmaceutical firms in Indonesia found that stock trading volume has a positive relationship with stock yield. Other studies show that stock trading volume affects the stock yield of manufacturing firms in manufacturing firms on the Vietnam stock exchange [21].

H3 : Is there an interaction between free cash flow and business diversification on stock yield ?

Research explains that business diversification affects the utilization of free cash flow by firms. Research finds that diversified firms perform better in using free cash flow efficiently, because they have more profitable investment opportunities in various business lines[22]. Other research finds diversified firms can hold less cash just in case because

They are in a better position for funding internal projects using operational cash flows [23]. Research also explains that diverse organizations have much more cash than independently firms. Because they have evolved their financial flow. Even in firms with limited finances, enlarged levels of diversification through cash flow correlation shepherd to higher cash. These findings indicate that the agency intends to use internal financing to cover its expenses when the firm experiences financial constraints [11].

H4 : Is there an interaction between stock trading volume and business diversification on stock yield ?

Research illustrates that business diversification can enlarge firm value and stock yield. The firm found diversification to be related to risks that investors consider [24]. Research indicates that stock liquidity, as assessed through trading volume, has a favorable influence on stock yield. Research has also found liquid stocks tend to have higher yield. Research also adds that business diversification can affect stock yield, movements can enlarge firm value but it could also be the other way around, research still needs to dig deeper into the situation [25].

## Results and Discussion

### Classical Assumption Test

Classical assumptions in linear regression are important to ensure the model produces accurate, unbiased, and efficient coefficient estimates. Assumptions such as linearity, no autocorrelation, homoscedasticity, no multicollinearity, and residual normality are necessary to maintain the accuracy and stability of the estimate. If these assumptions are not met, the regression results can be biased, the significance test becomes invalid, and the interpretation of the regression coefficient can be erroneous.

By fulfilling classical assumptions, we can ensure that the model is capable of providing valid statistical test results and accurate confidence intervals. This is important in improving the reliability of the model in predicting and analyzing similar new data. Thus, classical assumptions help ensure that the results of regression analysis are

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trustworthy and useful for informed data-driven decision-making[26].

**Normality Test**

**Tabel 1.** Normality Test

| No | Kolmogorov Smirnov | Caption | |
|---|---|---|---|
| 1 | 0.2000 | > 0.05 | Material normal |

Source: processed data, 2023

The normality test shown in table 1 of the material detected normal. It is proven that the results of Kolmogorov Smirnov's test are larger than 5%. Meaning, with normally distributed residuals, the interpretation of regression results becomes stronger, the confidence interval is more precise, and the model prediction becomes more reliable. In addition, models that meet the assumptions of normality are easier to generalize to similar new data, improving the model's reliability in future analysis and predictions.

**Multicollinearity Test**

**Tabel 2.** Multicollinearity Test

| No | Variabel | Colinier | VIF | |
|---|---|---|---|---|
| 1 | Free cash Flow | 0.988 | 1.012 | No multicollinearity |
| 2 | Stock trading volume | 0.988 | 1.012 | No multicollinearity |

Source: processed data, 2023

Table 2 shows that no multicollinearity occurred in the material tested. Refer to collineating tolerance results smaller than 10% and VIF values smaller than 10. If the data are not exposed to multicollinearity, that is, each independent variable in the regression model has a unique contribution in explaining the dependent variables without any strong linear influence or dependence between them. This allows for a more stable and consistent estimation of regression coefficients, as well as results in more valid significance test results (p-values) for each variable. Thus, the interpretation of coefficients becomes clearer, where each coefficient shows a change in a dependent variable caused by one unit of change in that independent variable, without being affected by other independent

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variables. Finally, models that are free of multicollinearity tend to provide more accurate predictions and more reliable results.

**Heteroscedasticity test**

In the following, figure 2 displays an irregular distribution of points, so the decision is that heteroscedastic does not occur.

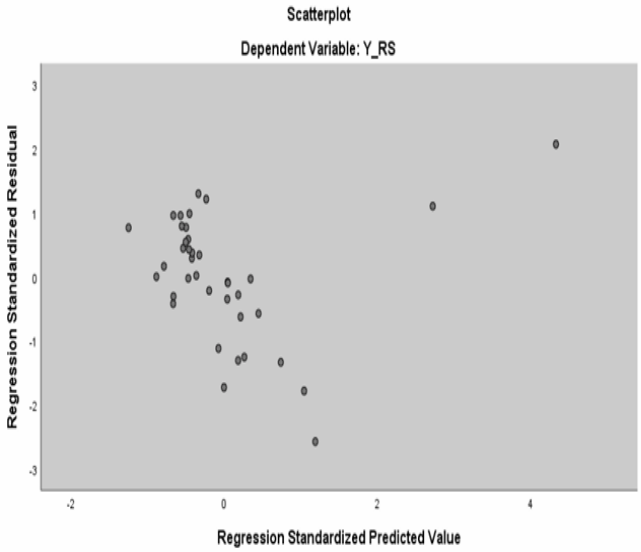


**Figure 2.** Heteroskedastic Test

**Autocorrelation Test**

Table 3 shows material indicated not to have autocorrelation referring to test results that show durbin watson results less than 2. Meaning, in the absence of heteroscedasticity, the results of the significance test (p-value) on the independent variable are more valid, and the confidence interval for the regression coefficient is more accurate. Overall, homoscedasticity ensures more stable model predictions and improves the reliability of model interpretation and generalization.

**Tabel 3.** Autocorrelation Test

| No | Variables | Durbin Watson |
|---|---|---|

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| | | | |
|---|---|---|---|
| 1 | Model summary | 1.751 | No autocorrelation |

Source: processed data

**The relationship of free cash flow to stock trading volume to stock return**

The initial step of the study begins with performing a regression test X against Y. Table 4 gives regression test information X to Y.

**Tabel 4.** Regression test X to Y

| Information | Coefficient | Significant | Result |
|---|---|---|---|
| Constanta | 0.215 | | |
| Free cash flow (X1) | 0.517 | 0.445 | No effect |
| Stock Trading Volume (X2) | 0.383 | 0.000 | Effected |

Source: processed data

Equation 1: $Y = 0.215 + 0.517X1 + 0.383X2$ ……..(3)

Intercept = 0.215. This value is the value of Y when both X1 and X2 are zero. Coefficient X1 = 0.517: This value indicates a change in one unit in X1 will affect Y, the other is constant. Each time X1 increases by one unit, Y increases by 0.517. Coefficient X2 = 0.383: this value indicates a change in one unit in X2 will affect Y, the other is constant. Each time X2 increases by one unit, Y increases by 0.383. The equation describes the influenced Y of X1 and X2 by adding the contribution of each independent variable along with a constant value (intercept). Referring to the regression test table above, the results illustrate that the free cash flow variable with a significant value of 0.445 (> 0.05) which means free *cash flow* has no impact on *stock* yield. That is, the situation or condition of the firm's free cash flow does not affect stock yield. The results of the study are consistent with research [27],[28]. Research states that free cash flow has no effect on *stock* yield. However, the findings of the research are not aligned with the research [29][30]. The research states that free cash flow affects stock yield. The variable significance value of

stock trading volume of 0.000 (< 0.05) means that stock trading volume has a significant impact on stock yield. That is, the activity of stock trading volume can give an indication of the movement of stock yield or be an indicator for investors to assess the condition of stock yield. The results of the study are consistent with the research [31],[32]. However, the outcomes of the research are not in accordance with research [33] which found stock trading volume had no impact on stock yield.

## Discussion

The research used manufacturing firms engaged in pharmaceuticals existed on the Indonesian Securities Exchange. The study used material from 2018 – 2022. The research intents to examine the interaction between the free cash flow variable and trading volume with the business diversification variable as a moderation to stock yield. The study used purposive sampling techniques with specific requirements to determine valid samples to be tested representing each variable.

**Tabel 5**. Descriptive Analysis

| Information | N | Minimum | Maximum | Mean | Std Dev |
|---|---|---|---|---|---|
| Free cash Flow (X1) | 39 | -1,0780 | 0,2715 | -0,306712 | 0,2353207 |
| Stock Trading Vol (X2) | 39 | 0,0020 | 1,2465 | 0,184759 | 0,3093364 |
| Unit Diversification (W) | 39 | 0,2621 | 0,9277 | 0,489845 | 0,1872972 |
| Stock Yield (Y) | 39 | -0,7769 | 3,9242 | 0,086343 | 0,7991406 |

Source: Data processed, 2023

Based on table 5 above, the sample used 39 pharmaceutical firms. The variable free cash flow (X1) has a range of values from -1.07 to 0.27. The average value of X1 is -0.30, below the standard deviation of 0.23. That is, the free cash flow variable (X1) displays the

average value of free cash flow is smaller than the level of material distribution. A standard deviation higher than the mean means that there is a large distribution of material variables or that there is a fairly large gap between the lowest and highest free cash flow material. The variable stock trading volume (X2) obtains a range of values from 0.002 to 1.24. The average value of such material is 0.18. The value of the standard deviation is a gauge of the degree of material segregation, is 0.30. In this case, the average value (0.18) is less than the standard deviation value (0.30). That is, X2 shows the mean worth of the stock's trading volume less than the amount of material dissemination. Stock trading volume material shows significant variation between minimum and maximum X2 material. A fairly high gap between the lowest and highest values indicates a significant difference in stock trading activity.

The business diversification variable (W) obtained a range of values from 0.26 to 0.92. The average value of such material is 0.48. While the standard deviation value, which is a measure of the level of material distribution, is 0.18. In this case, the average value (0.48) is greater than the standard deviation value (0.18), indicating the presence of significant variations in the material. That is, the variable W displays the average value of business diversification greater than the level of distribution of the material. A standard deviation value lower than the mean value demonstrates a relatively small spread in the material variable. In other words, there is little variation or difference between the material M with the lowest and highest values in the variable W. From 39 samples of stock return material (Y) shows the minimum value is -0.77 and the maximum value is 3.92. The mean value of Y material is 0.08. The standard deviation, which measures the distribution rate of Y material, is 0.799. In this case, the mean value of Y is 0.08 less than the standard deviation value is 0.799 which indicates a significant variation in the Y material.

**The relationship of free cash flow and stock trading volume moderated business diversification to stock yield**

The next step, the study conducted a regression test X moderated W against Y. Table 6 provides regression test information of interaction X to Y.

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**Tabel 6**. Interaction regression test X moderated W to Y

| Information | Coefficient | Significant | Outcome |
|---|---|---|---|
| Constanta | 0.775 | | |
| Free cash flow (X1) | 0.517 | 0.509 | |
| Stock Trading Volume (X2) | 0.383 | 0.350 | |
| Business diversification (W) | 1.342 | 0.502 | Not interacting |
| Interaction X1 dan W | 2.848 | 0.324 | Not interacting |
| Interaction X2 dan W | 2.432 | 0.761 | Not interacting |

Source: Data processed

Equation 2 : Y = 0.775 + 0.517X1 + 1.342X2 + 2.848 X1W+ 2.432X2W …….(4)

Intercept = 0.775. this value is the value of Y, when the independent variable is zero. Coefficient X1 = 0.517, this value indicates a change of one unit in x1 affects Y, everything else is constant. When x1 increases by one unit, Y increases by 0.517. The coefficient X2 = 1.342, this value indicates that the change of one unit in x2 affects Y, everything else is constant. When x2 increases by one unit, Y increases by 1.342. The coefficient X1WX =2.848, this value indicates the change of one unit in x2 affects Y, everything else is constant. When x2 increases by one unit, Y increases by 2.848. Coefficient X2WX= 2.432 this value indicates a change of one unit in x2 affects Y, everything else is constant. When x2 increases by one unit, Y increases by 2.432. The equation describes Y being affected by X1, X2, X1WX, and X2WX by adding the contribution of each independent variable along with a constant value (intercept).

Referring to the results of the interaction test of each variable, the importance of the causal link on free cash flow and business diversification is 0.324 > 0.05. Research shows that business diversification is inadequate to abate the effect of the variable free cash flow on stock yield. That is, business diversification does not interact with the variable free cash flow on stock yield. The significance value of the interaction variable between stock trading volume and business diversification of 0.761 > 0.05, in conclusion, business diversification is not able to abate the effect of stock trading volume variables on stock yield. That is, there is no interaction between the two variables on stock yield.

The research findings provide new contributions for pharmaceutical firms' manufacturing firms. Means, the findings show that there is no interaction between the variable of business diversification as moderation with the variable of free cash flow and stock trading volume. That is, research findings show that business diversification variables are unable to describe the difference in the influence of independent variables consisting of free cash flow and stock trading volume. Business diversification is usually done to reduce risk and enlarge income stability, but does not always mean an enlarge in free cash flow. Free cash flow is cash that is available following a firm has paid all of its operating and investment expenses. Therefore, even though a firm has a variety of business lines, it does not mean that they will have more free cash flow[24]. Another reason, investors may focus more on revenue growth, profitability, or other macroeconomic factors[34],[35]. Stock trading volume and business diversification variables did not interact between the two variables on stock yield. That is, risk mitigation in business diversification does not make a difference in the level of stock trading volume.

## Conclusion

The study concluded that adding moderation variables with business diversification proxies to free cash flow variables and stock trading volume did not provide color or difference. The study found that only stock trading volume has an influence on the stock yield of pharmaceutical firms in Indonesia. The finding is that research explains that diversifying the business does not necessarily provide an enlarge in free cash flow or an enlarge in stock trading volume. Means, the movement of business diversification is not able to provide a difference, sharpen or weaken the influence of stock trading volume on the firm's stock return. The implications of the research findings are for companies to focus more on stock trading volume considering that only stock trading volume is proven to have an effect on stock yields. Therefore, it should focus more on factors that can increase the liquidity and trading volume of their stocks. Diversification does not provide the expected profits. Therefore, pharmaceutical companies need to re-evaluate their diversification strategies and ensure that the move is based on comprehensive market and financial analysis. For future research, it is necessary to follow up research using longer periods,

different types of firms to see the impact of each of the same variables. It can even add moderation variables from macroeconomic factors to inform deeper and detailed research findings. The implication is that investors and various important parties need to consider stock trading volume in determining investment decisions, in order to obtain optimal stock yield.

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