

Comprehensive Analysis of Capital Asset Pricing Model and Arbitrage Pricing Theory in Stock Investment Decision Making

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Abstract

The increasingly advanced development of technology and the phenomenon of the Covid-19 outbreak, which has caused most employees to be affected by Work From Home, has led most people, especially the millennial generation or people under the age of 30, to be interested in allocating their excess funds into stock investments. This study aims to analyze the development of a multi-factor CAPM model by including volatility as an additional factor: a new approach in asset pricing with a case study of companies listed on the Indonesia Stock Exchange included in the LQ45 Index for the 2020-2023 period. The independent variables used in this study are Risk Premium (Beta), Company Size (SMB), book-to-market ratio (HML), and Stock Price Volatility. In contrast, the dependent variable used in this study is proxied by Stock Return with Excess Return. The population in this study consists of 45 companies. The sampling method uses a Purposive Sampling Technique. The analysis method used in this study is Multiple Linear Regression. The result of the study shows that the Risk Premium and Company Size variables partially have a significant positive effect on Stock Returns. The Book to Market Ratio variable partially has a negative but not significant impact on Stock Returns. Meanwhile, the Stock Price Volatility variable has a positive but insignificant effect on Stock Returns. The independent variables in this study can explain 88,61% of the factors affecting Stock Returns, while 11,39% is explained by other factors not researched in this study.

Keywords: Risk Premium, Company Size, Book To Market Ratio, Stock Price Volatility, And Stock Return

JEL CODES: J0, J2, J5

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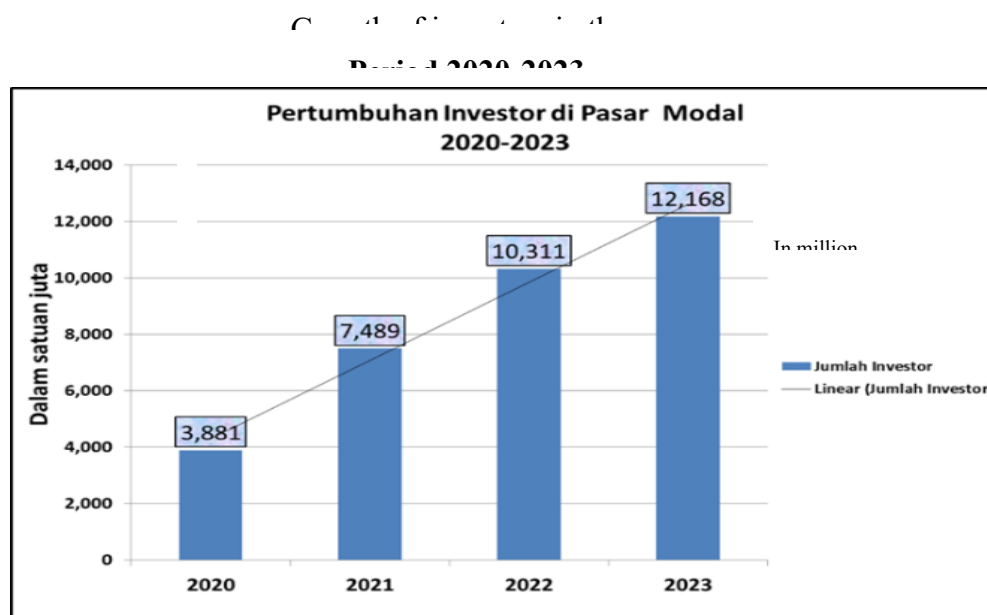
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1. Introduction

The development increasingly technology advancement have brought part big society, especially Generation millennials to allocate their excess funds have become a share. Enhancement to interest allocate funds to A share this started with many elderly society under 30 years old or the usual one called with generation millennial this experiencing the work form home (WFH) period during the pandemic, where part employee can carry out his work from house and have time as much free time as you can used For get income addition. Because only with invest capital without must follow in operate company Already Can get profit from companies invested in (Fitroh & Fauziah, 2022) .

Can seen from Figure 1.1 during for the period 2020 to 2023 the number of investors in the capital market is experiencing quite an increase significant. Moment There is diverse investment instrument options available, such as investment in real assets (property, gold, objects art, etc.) and investment in matter financial (stocks, bonds, derivatives, etc.). Important For remembered that investment No always bring profit, every alternative investment There is risks that every investor must consider and analyze thorough before make decision investment.



Source : www.ksei.co.id (data processed), 2024

Picture 1. Total Capital Market Investors for the 2020-2023 Period.

Studies case study This refers to registered companies in LQ45 Index. The LQ45 index is A index shares in it consists of the 45 issuers that have liquidity, market capitalization, and strong company fundamentals. In period time six month very The LQ45 index will do a evaluation routine For ensure is the shares contained therein Still fulfil criteria, this is what it becomes cause of the list of existing shares in LQ45 index always fickle (Ryanza, 2023). Based on phenomenon and description of the data above writer interested for make study about influence Model Three Factor Fama and French (2017), namely Risk Premium, Firm Size and Book to Market Ratio and including Stock Price Volatility as an independent variable in this research.

1.2 Objective

Based on the formulation the problem above so objective study this is :

1. To analyze the influence of premium risk to excess return on the LQ45 index for the 2020-2023 period
2. To analyze the influence of firm size on excess return on the LQ45 index for the 2020-2023 period
3. To analyze the influence of the book-to-market ratio on excess return on the LQ45 index for the 2020-2023 period
4. For analyze the influence volatility price share to excess return on the LQ45 index for the 2020-2023 period

2. Literature Review

2.1. Background Theory

2.1.1. Stock Return

Return share is an achievement expected by internal investors activity. Tandelilin (2017) in study (Maramis et al., 2021) mention returns share be one possible factors motivating investors to do activity investment, and also an A rewards on the courage of investors to bear risk on the investment he made

Excess Return which is return from a asset after reduced with level flower free risk. Astuti (2012) in study (Komara et al., 2019)explains the risk free rate proxy in Indonesia is Monthly Bank Indonesia Certificate (SBI), because investors will receive the return from payment government

Formula from excess returns are :

$$\text{Excess Return} = R_i(t) - R_f(t)$$

Where :

$R_i(t)$ = Return share monthly

2.1.2. Premium Risk

Premium market risk according to Fawziah & Margasari (2016) in a study (Nugraha et al., 2022) in addition, returns from market price are reduced with a level of flower-free risk. Boedi (2021) in study say risk or the usual one known with Market risk is described by beta and has positive relationship to returns shares on the CAPM model.

Beta stock is summarized as the following: Gunakan eqation agar rumus tampil jelas

$$R_m - R_f = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Description :

R_m (Market Return) : The return of the market, calculated as the difference in current market price and the price in the previous period, divided by the previous period's price.

R_f : Risk-free rate, which represents the return on a risk-free investment.

P_t : The value of the Composite Stock Price Index (IHSG) in month t .

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Pt-1Pt-1 : The value of the Composite Stock Price Index (IHSG) in month t-1t-1.

(Astuti, 2022)

2.1.3. Firm Size

According to Putra & Merkusiwati (2016) in study (Vemberain & Triyani, 2021), size company can categorized as company big and corporate small based on the amount of assets owned, market value of shares, or level of sale company. Moeljadi (2014) in (Nurul & Stella, 2021) research says that Company Size: "Company size can be defined as effort to Asses Company based on assets, number of sales, average total sales and average total assets.

2.1.4. Book to Market Ratio

Fama and French point out results his research that book to market ratio influential to returns share. In his research (FAMA & FRENCH, 1995) interpreted a book to market ratio as " Book common equity for the fiscal year ending in calendar year t-1, divided by market equity at the end of December of year t-1".

$$\text{Book to market ratio} = \frac{\text{Book Value}}{\text{Market Value}}$$

Book Value: The value of the company's equity as reported in the balance sheet for the fiscal year ending in calendar year t-1t-1.

Market Value: The company's market capitalization at the end of December of year t-1t-1.

According to Fama and French (1995), companies with a low book-to-market ratio (<1) are considered overvalued. This is because their market value (reflecting market perception and investor optimism) is much higher than their book value (based on the company's recorded assets and equity). Similarly companies with a high book-to-market ratio (>1) are considered undervalued, as their book value exceeds their market value, potentially signaling opportunities for value investing. (Darma & Lestari (2022).

The company mentioned overvalued will own mark more books (book value). small compared to mark the market (market value), meaning the same with company the own mark book to market ratio < 1 (Darma & Lestari, 2022).

2.1.5. Stock Price Volatility

Volatility price share is something movement fluctuating price shares in the stock market, volatility used as measurement statistics for change price during periods time certain (Andriana et al., 2021). Stock Price Volatility is formulated as following:

$$\sigma = \sqrt{(1/(n-1)) * \sum \ln(R_t - R_{t-1})^2}$$

Explanation :

σ : Stock price volatility.

n : Number of observed time periods.

$\ln(R_t)$: Natural logarithm of the stock price at time tt .

$\ln(R_{t-1})$: Natural logarithm of the stock price at time t-1t-1.

This formula is used to measure stock price movements (volatility) over a given period. Volatility is calculated as the square root of the average variance of the stock's log returns, as described by Andriana et al. (2021).

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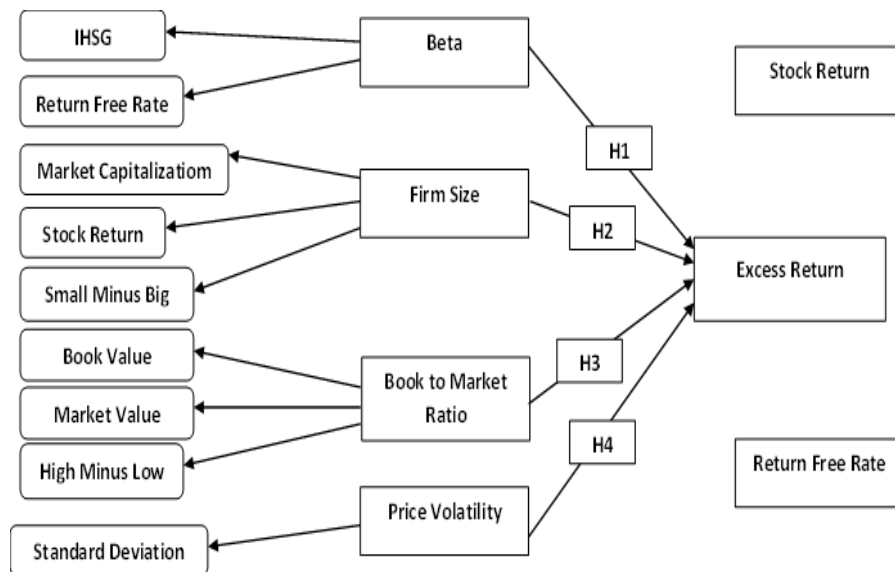
2.2. Previous Studies

The study previous contains section results from the study relevant past so that can give information related to the method research, results, and discussion used as a base comparison with the research to be done. Following a number of studies relevant past with study This is :

1. (Ryanza, 2023) in his thesis was entitled " Influence Stock Price Volatility, Overnight Return Momentum, and Firm Size on Stock Returns" (Study case registered company in LQ45 Index for the 2017-2021 Period). Year 2023. Faculty Economics and Business, Syarif State Islamic University Hidayatullah Jakarta. The results of the research state Stock Price Volatility Partial influential negative significant on Stock Returns, while Firm Size Partial influential positive significant on Stock Returns. But, in fact simultaneous Share Price Volatility and Firm Size have an influence significant on Stock Returns.
2. (Bhuntar et al., 2023) in article entitled "The Influence of Stock Trading Volume, Stock Price Volatility, Market Capitalization on Stock Returns in Trading Companies Registered Size on the Exchange Indonesian Securities (BEI) 2016-2020 Period" published in the Journal Study Economy Management and Business (JEKOMBIS), Vol. 02, No. 01, 2023. Faculty Economics, Mahaputra Muhammad Yamin University. The results of the research declare, based on analysis multiple linear regression obtain results Stock Price Volatility matters positive on Stock Returns, and on the f test, Stock Price Volatility also has an influence on Stock Returns.
3. (Dewanto & Sumiati, 2022) in article entitled "Influence Fama - French Five Factor Model of Stock Returns" published in the Journal of Risk Management and Finance, Vol. 01, No. 03, 2022. Faculty Economics and Business, Brawijaya University. The results of the research state that the market excess return variable and the book to market ratio (HML) variable have an influence positive and significant, whereas variable (SMB) has a negative and significant effect on Stock Returns.
4. (Komara et al., 2019) in article entitled "Analysis of the Three Factor Fama and French Model of Returns on the Indonesian Sharia Stock Index (ISSI) for the 2011-2014 Period" was published in the Journal Inspiration Business and Management, Vol. 03, No. 02, 2019. Faculty Economics and Business, General University Ahmad Yani. And Faculty Economics and Business, Padjadjaran University. Research result This stated that in a way Partial the Market Return variable has an effect on Return, meanwhile Firm Size and Book to Market Ratio variables do not influential on Return.
5. (Sulistiani, 2022) in thesis entitled " The Influence of Return on Equity, Book to Market Ratio, and Company Size on Stock Returns in Subsector Companies Pharmacies Registered on the IDX 2013-2020." Year 2022. Faculty Economics and Business, Pakuan University Bogor. Result of his research stated in a way Partial The variables Book to Market Ratio and Company Size have an influence significant on Stock Returns. The panel data regression test results show Book to Market Ratio and Size variables Unification own connection strong on Stock Returns with niai R - Squared of 0.7298. Whereas mark Adjusted R - Squared is 0.7298 which means donation influence the Book to Market Ratio variable, and Company Size on Stock Returns is 72.98%.

Conceptual Framework (optional)

So study This can walk in accordance with guidelines or not deviated, then design study is one possible strategy done. As for design in study this as following :



Source: Data processed researchers, 2024

Picture 2. Research Design

3. Research Method

Methodology consists of data, model development and method used. The paper can be either quantitative or qualitative. However, if the paper is quantitative, equations may appear in line with the text, if they are simple, short, and not of major importance; e.g., $a = b/c$. To set the style, type Equation in the style box. But this style only set the tab stop position. To put the equation on the right place just press tab button one time. And to type the equation number, press tab button once again from the right side of the equation.

3.1. Data

Types of data used by researchers in study This namely sourced secondary data from the Stock Exchange Indonesia, published by the party third and recognized by the State.

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Secondary data is data that has been there is and has been collected by researchers For makes it easier study. Secondary data used in study This namely historical data price closing share company and reports finance included companies to in LQ45 index during period 2020 to with in 2023.

3.2. Sample and Procedure

Population in study This is companies on the LQ45 index listed on the Indonesia Stock Exchange for the 2019-2023 period. Method taking sample used in this research that is technique purposive sampling. Purposive sampling is technique determination of sample data with consideration certain (Sugiyono, 2017). Population research used in this research is registered company in the LQ45 Index list for 4 years consisting of successively of 45 shares companies listed on the Indonesian Stock Exchange are appropriate with future period researched. Selection technique sample this use method purposive sampling, criteria in research this that is as following :

1. Companies listed on the Indonesian Stock Exchange in LQ45 Index for the 2020-2023 period.
2. Internal company LQ45 index for the 2020-2023 period which has price data closing (close price) is appropriate with period study .
3. Internal company The LQ45 index for the 2020-2023 period is published report finance monthly (monthly) on the Indonesia Stock Exchange website during period study.

3.3. Data Analysis

This research use method analysis regression multiple. Analysis regression multiple own objective for measure and show direction regulator between independent variable (Ghozali, 2018). Equality analysis regression multiple in study this is as following :

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Information :

Y = Excess Return

α = Konstanta

X₁ = Beta (Premi Risiko)

X₂ = Size (Small Minus Big)

X₃ = Book to Market Ratio (HML)

X₄ = Share Price Volatility

$\beta_1 - \beta_4$ = Coefficient Regression

e = Degrees Error

3.4. Hypothesis testing

Test this done with see mark coefficient and significance from each variable independent in influence variable dependent. Hypothesis testing this is what it will be made base in state is results study support hypothesis Good or No.

Accuracy function regression sample in appraise mark actual can be measured from Goodness of fit his. Statistically, at least This can be measured from mark t statistics, value F statistics,

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and values coefficient determination. Calculation statistics called significant in a way statistics if statistical test value is at in area critical (area where H_0 is rejected). On the contrary called No significant when conducting statistical tests is at in area where H_0 is accepted (Ghozali, 2016).

a. Significant Test Partial (t Test)

The t test was used for test coefficient regression in a way individual. The t statistical test is basically show how much far influence One variable explainer or independent individually in explained variation variable dependent (Ghozali, 2016). Comparison between mark probability t-statistic with level significance (α) 0.05, for know influence significant or no.

b. Coefficient Test Determination (R^2)

Size coefficient determination used in testing This For set level accuracy analyst optimal regression. For see percentage between influence variable independent to variable dependent so used coefficient determination R-squared (R^2). For know mark from coefficient determinant use formula as following :

$$Kd = R^2 \times 100 \%$$

Information :

Kd = Coefficient Determination

R^2 = Coefficient Correlation

If value Adjusted R-square (R^2) is obtained is 0.1234, that is variable independent can explain changes up and down variable dependent by 12%.

4. Findings and Discussions

4.1. Results

4.1.1. Statistics Descriptive

Analysis statistics are used to give a description general of each independent variable in research that includes the average value (mean), value maximum (max), and standard deviation, as well as for measuring data distribution with skewness and kurtosis of each variable. Following is a table that displays the results statistics descriptive in a study this :

Table. 1 Descriptive Statistics of Variables

Statistik	X1	X2	X3	X4	Y
Mean	0.004933	0.104938	-0.197208	3.221.206	0.013608
Median	0.001650	0.053350	-0.381950	3.203.750	0.018300
Maximum	0.158100	3.843.600	2.707.000	3.531.900	0.203900
Minimum	-0.315700	-1.587.000	-2.580.000	2.909.400	-0.308100
Std. Dev.	0.077230	0.951833	1.015.428	0.130204	0.085888
Skewness	-1.294.949	1.346.918	0.314078	-0.207954	-0.927852

Kurtosis	7.451.071	6.485.356	3.360.491	3.027.731	5.910.790
Jarque-Bera	5.357.512	3.880.993	1.019.067	0.347498	41.083
Probability	0.000000	0.000000	0.591831	0.840508	0.000140
Sum	0.236800	5.037.000	-9.466.000	1.546.179	0.653200
Sum Sq. Dev.	0.280334	4.258.132	4.846.140	0.796793	0.346705
Observations	48	48	48	48	48

Source: Data processed researchers , 2024

Statistics Descriptive

Premium risk is the difference from the average (average) monthly return monthly IHSG shares with a risk-free monthly rate. Can see from Picture 4.1, the premium risk own mark minimum of -0.315700 shows the weighted average value lowest JCI return in the month March 2020 and the value maximum of 0.158100 shows the weighted average value The lowest JCI return was in November 2020, mean from premium risk of 0.004933 which means trend mark market return is at the point 0.004933 and value standard deviation show distribution of premium data risk of 0.077230.

Size in research This proxied with Small Minus Big (SMB) obtained from calculation mark market capitalization, value market capitalization is obtained with method close price (price shares) multiplied with outstanding share (amount share circulating). Based on Figure 4.1, explained that mark minimum of -1.58700 shows from 43 samples company majority including in category small market capitalization in month December 2023 and value maximum of 3.843600 shows from 43 samples company majority including in category big market capitalization in month December 2020. Mean value variable size showed with the figure 0.104938 shows trend SMB value of the company that became sample study is at the point 0.104938 and value standard deviation show the spread of SMB variable data is 0.951833.

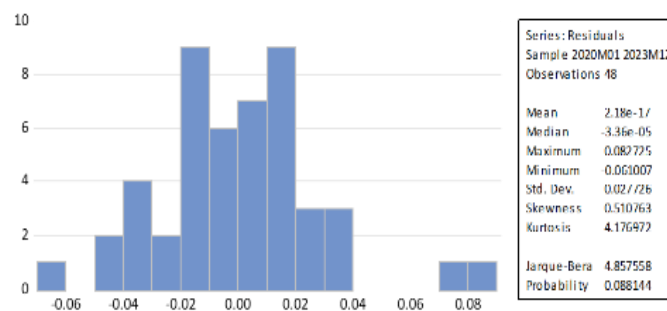
Book to market ratio is ratio book value equity (value book) against close price (price shares) of the company and proxied with high minus low (HML). Book to market ratio has mark minimum of -2.580000 which means 43 samples company majority own mark book to market ratio (Low BE/ME) in the month December 2020 and value maximum amounting to 2.707000 which means 43 samples company majority own mark book to market ratio (High BE/ME) in November 2020. Mean value of -0.197208 shows trend HML value of the company that became sample study is at the point -0.197208 and standard deviation show variable data distribution book to market ratio at 1.015428.

Volatility price share is measurement statistics For fluctuation price share during period certain ones can determine pattern expected return from a share. Based on Figure 4.1, explained that variable volatility price share own mark minimum amounting to 2.909400 which shows that from 43 samples company own level change price lowest in May 2022 and value maximum of 3.531900 shows that from 43 samples company own level change price highest in the month January 2021. The mean value is 3.221206 trend mark volatility price share from the company that became sample study is at the point 3.221206 and standard deviation show variable data distribution volatility price share is at 0.085888.

Excess return is variable proxied dependencies with $(R_i - R_f)$ in the Fama -French Three Factor Model. Based on Figure 4.1, explained that variable excess returns own mark minimum of -0.308100 occurred in the month March 2020, This possibility big caused exists phenomenon the Covid-19 outbreak that made part company No Can maintain price shares , and give impact many investors are hesitant to invest Because its height uncertainty expected return. Maximum value amounting to 0.203900 was recorded in November 2020, a phenomenon this happen because from beginning start The Covid -19 outbreak occurred in 2019 learning at the company cor Can stabilize return price the shares so that uncertainty returns already can minimized and capable attract investors to return invest. The mean value of 0.013608 shows trend mark excess returns from the company that became sample study is on point 0.013608 and standard deviation show variable data distribution excess returns is at 0.085888.

4.1.2. Test Assumptions Test

a. Normality test



Source: Data processed researchers, 2024

Picture. 3 Normality Test Result

Hypothesis :

H_0 = Normally distributed residuals

H_1 = Residual no normally distributed

Normality test needed for know normal data distribution or no. On research this is a normality test using the Jarque-Bera test (JB Test). Analysis results show that mark probability JB Test amounting to 0.088144. Data distribution is said to be normal if mark probability $> \alpha$, level significance used namely 5%. In the output results above probability value equal to $0.088144 > 0.05$, then H_0 accepted, H_1 rejected. This means the distribution of residual data used in research This is normal or fulfil assumption normality.

b. Mmulticollinearity Test

Table. 2 Multicollinearity Test Result

	Risk Premium	Size	Book to Market Ratio	Stock Price Volatility
Risk Premium	1.000000	0.354138	0.246459	-0.333442
Size	0.354138	1.000000	0.170247	-0.213939
Book to Market Ratio	0.246459	0.170247	1.000000	-0.268169

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Stock Price Volatility	-0.333442	-0.213939	-0.268169	1.000000
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Source: Data processed researchers , 2024

The multicollinearity test aims to know whether there is or is not a correlation between independent variables. According to Wiyono (2011) the study (Sadria, 2018) mention that in the multicollinearity test, if the mark correlation between variables exceeds the value of 0.90, then there is symptom multicollinearity. In a study, this is a multicollinearity test using matrix correlation if the mark correlation between variables exceeds the value of 0.90, then there is symptom multicollinearity. Based on results analysis all over independent variable in research this, value correlation between variable premium risk with size of 0.354138, value correlation between variable premium risk with book to market ratio of 0.246459, value correlation between variable premium risk with volatility price share of -0.333442, value correlation between variable size with book to market ratio of 0.170247, value correlation between variable size with volatility price share of -0.213939, value correlation between variable book to market ratio with volatility price share of -0.268169. Entire mark correlation between variable on own mark not enough of 0.90 then concluded free from symptom multicollinearity.

c. Heteroskedasticity Test

Table. 3 Heteroskedasticity Test Result

Heteroskedasticity Test Glejser

**Null hypothesis:
Homoskedasticity**

F-statistic	0.280957	Prob. F(4,43)	0.8887
Obs*R-squared	1.222555	Prob. Chi-Square(4)	0.8744
Scaled explained SS	1.273994	Prob. Chi-Square(4)	0.8658

Source : Data processed researchers , 2024

Hypothesis :

H_0 = No There is symptom heteroscedasticity

H_1 = Yes symptom heteroscedasticity

According to Wiyono (2011) in study (Sadria, 2018) state that heteroscedasticity test show exists inequality variant from residuals for all observations in the regression model. On research This testing heteroscedasticity use Glejser Test with results analysis Prob value. Chi-Square of Obs *R-squared is $0.8744 > 0.05$ so H_0 accepted, H_1 rejected. This means that the independent variable is free from heteroscedasticity or nature homoscedasticity.

d. Autocorrelation Test

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Table. 4 Autocorrelation Test Result

Breusch-Godfrey Serial Correlation LM Test			
Null hypothesis: No serial correlation at up 2 lags			
F-statistic	1.137.080	Prob. F(2,41)	0.3307
Obs*R-squared	2.522.514	Prob. Chi-Square(2)	0.2833

Source : Data processed researchers , use E-views 12 , 2024

Hypothesis :

H_0 = No There is problem autocorrelation

H_1 = There is a problem autocorrelation

An autocorrelation test is done to know if there is or no correlation between variables used in a study. Autocorrelation test in research uses the Breusch-Godfrey Serial Correlation LM Test. Autocorrelation test results in research This that is mark Prob.Chi -Square of Obs *R-square is $0.2833 > 0.05$ so H_0 accepted, H_1 rejected, which means this research is free from autocorrelation.

4.1.5. Analysis Multiple Linear Regression Result

Table. 5 Analysis Multiple Linear Regression Result

Dependent Variable: Y

Method: Least Squares

Date: 07/21/24 Time: 11:35

Sample: 2020M01 2023M12

Included observations: 48

Source :	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Data
	C	-0.068498	0.113845	-0.601672	0.5508	
	X1	0.978475	0.061661	15.868580	0.0000	
	X2	0.016955	0.004790	3.539407	0.0010	
	X3	-0.001540	0.004399	-0.350050	0.7280	
	X4	0.023344	0.035332	0.660702	0.5123	

processed researchers , 2024

In figure 4.6 above show results equality multiple linear regression as following :

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$$R_i - R_f = -0,068498 + 0,978475 \cdot X_1 + 0,016955 \cdot X_2 - 0,001540 \cdot X_3 + 0,023344 \cdot X_4$$

Based on results equality regression that, then can explained that influence premium risk, proxied size with SMB, and volatility price share is positive to returns shares under research This proxied with excess return meanwhile proxied book to market ratio with HML no influential positive to returns share or excess returns.

Premium risk, proxied size with SMB, and volatility price share influential positive to returns proxied shares with excess return, shows that the more tall mark premium risk, size, and volatility price shares, then the more returns are also high shares that will obtained from registered company in share LQ45 Index on the Indonesian Stock Exchange for the 2020-2023 period. But matter this compare backwards with variable proxied book to market ratio with HML where variable this own connection negative to returns shares, which means the more big mark ratio book to market something company so will the more small returns shares that will obtained and increasingly small ratio book to market something company so will the more big returns shares that will obtained.

4.1.6. Hypotesis Test Result

a. T test (Partial)

Table. 6 T Test Result

Dependent Variable : Y

Method Least Squares

Date: 07/21/24 Time:
11:35

Sample: 2020M01
2023M12

Included Observations:
48

Variable	Coefficient	Std. Erro	t-Statistic	Prob.
C	-0.068498	0.113845	-0.601672	0.5506
X1	0.978475	0.061661	15.86858	0.0000
X2	0.016955	0.004790	3.539.407	0.0010
X3	-0.001540	0.004399	-0.350050	0.7280
X4	0.023344	0.035332	0.660702	0.5123

R-squared 0.895792 Mean dependent var 0.013608

Adjusted R-squared 0.886098 S.D. dependent var 0.085888

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S.E. of regression	0.028987	Akaike info criterion	-4.145638
Sum squared resid	0.036129	Schwarz criterion	-3.950721
Log likelihood	104.4953	Hannan-Quinn criter.	-4.071978
F-statistic	92.40916	Durbin-Watson stat	2.364498
Prob(F-statistic)	0.00000		

Source : Data processed researchers , 2024

Based on Picture 4.7 results analysis partially (t-test) shows that of the 4 independent variables, 3 independent variables have influence positive to variable stock returns or excess returns. Three of the independent variables are premium risk, size, and volatility price shares; the variable book-to-market ratio has No influential positive on stock returns or excess returns.

b. Coefficient Determination

Table. 7 Coefficient Determination Result

Dependent Variable : Y

Method Least Squares

Date: 07/21/24 Time:
11:35

Sample: 2020M01
2023M12

Included Observations:
48

Variable	Coefficient	Std. Erro	t-Statistic	Prob.
C	-0.068498	0.113845	-0.601672	0.5506
X1	0.978475	0.061661	15.86858	0.0000
X2	0.016955	0.004790	3.539.407	0.0010
X3	-0.001540	0.004399	-0.350050	0.7280
X4	0.023344	0.035332	0.660702	0.5123

R-squared	0.895792	Mean dependent var	0.013608
Adjusted R-squared	0.886098	S.D. dependent var	0.085888
S.E. of regression	0.028987	Akaike info criterion	-4.145638

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Sum squared resid	0.036129	Schwarz criterion	-3.950721
Log likelihood	104.4953	Hannan-Quinn criter.	-4.071978
F-statistic	92.40916	Durbin-Watson stat	2.364498
Prob(F-statistic)	0.00000		

Source : Data processed researchers , using E-views 12, 2024

Coefficient determination is one of the statistical value that can be used For measure how much far the model used For connect between variable dependent and independent in estimate equality regression. Based on Picture 4.8 is obtained coefficient test results determination (Adjusted R-square) of 0.88, This show that variable premium risk, size (SMB), book to market ratio (HML), and volatility price share capable explain influence to returns share amounting to 88.61% while the remaining 11.39% explained by other variables that are not used in the research model this. Variable other can form factor external as well as internal, namely momentum, profitability, and so on. Study This only using 4, 3 factors among them is factors formulated by Eugene Fama and Kenneth French (1992) viz premium risk, company size, and book to market ratio (BE /ME) as well as 1 factor others who become factor addition that is volatility price share.

Discussion

Previous research highlights the need to understand the strengths, weaknesses, and relevance of different models. The Capital Asset Pricing Model (CAPM), introduced by Sharpe (1964) and Lintner (1965), explains the relationship between systematic risk (beta) and the expected return of stocks. This model is simple and widely used, but it has been criticized for not considering other risk factors beyond beta. In contrast, the Arbitrage Pricing Theory (APT), developed by Ross (1976), adopts a multi-factor approach, allowing for the analysis of various influences such as inflation, interest rates, and specific industry risks. Previous studies indicate that CAPM is more relevant in stable and efficient market conditions, whereas APT performs better in dynamic and complex markets.

Empirical studies such as those by Black, Jensen, and Scholes (1972), support the use of beta in CAPM to predict stock returns. Fama and French (1992) found that beta alone is insufficient to explain return variations. Other factors such as firm size and the book-to-market ratio, have been shown to have significant influence. In the property sector CAPM often struggles to account for specific risks, such as changes in government policies or interest rate fluctuations, which are better captured by APT. Research by Chen, Roll, and Ross (1986) further reinforces APT's advantage by demonstrating that macroeconomic variables play a critical role in influencing stock returns although the implementation of APT requires careful selection of factors appropriate to specific markets.

Risk, firm size, and market volatility are essential aspects of investment analysis. CAPM focuses solely on systematic risk (beta), while APT incorporates non-systematic risks, which are often significant particularly in the property sector. Studies by Banz (1981) and Fama & French (1993) reveal that smaller firms tend to generate higher returns but also exhibit greater volatility. In the property sector, smaller firms are more vulnerable to macroeconomic risks. Market volatility also greatly impacts risk premiums. While CAPM does not explicitly account for this impact, APT is flexible enough to include volatility as one of its risk factors.

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Previous research concludes that CAPM is more suitable for simplified approaches in efficient markets, whereas APT is more relevant for analyzing dynamic and complex sectors such as property. CAPM offers simplicity in application but lacks the flexibility to address complex risk structures. Conversely APT provides a more in-depth analysis of various risk factors, albeit with greater data and analytical requirements. In property investment decisions, combining both models can offer a more comprehensive perspective. This analysis can be further strengthened by incorporating recent empirical data to test the relevance of risk factors in CAPM and APT, while also accounting for market volatility through approaches like Value at Risk (VAR).

Based on results analysis and discussion regarding “Development of the Multi-Factor CAPM Model with Enter Volatility As Factor Addition : Approach New in Asset Pricing (Study cases in companies listed on the Indonesian Stock Exchange into the LQ45 index for the period 2020-2023)”. Discussion more carry on about How test results of each independent variable against variable dependent will explained as following :

Influence Premium Risk to Stock returns

Based on results study in a way Partial premium risk influential significant to returns share. Research result This in accordance with stated hypothesis that premium risk influential positive to returns share.

Influence Firm Size against Stock Returns

Based on results research on listed companies in The LQ45 index for the 2020-2023 period shows that owning shares size company big produce more stock returns big compared to company that has more size small. Research result This in accordance with stated hypothesis that size company influential positive to returns share.

Influence Book to Market Ratio to Return share

Based on results research on listed companies in The LQ45 index in the 2020-2023 period shows results negative coefficient with mark probability > 0.05 which means that variable book to market ratio own opposite relationship direction with returns share. If ratio book to market experience increase so returns share will experience decrease, and if ratio book to market experience decline so returns share will experience increase.

Influence Stock Price Volatility towards Stock returns

Based on results study in a way Partial show that volatility price share influential positive No significant to returns share. This matter possibility caused Because changing regulations or uncertainty in policy government during the Covid-19 pandemic that can influence volatility price shares, but investors may see This as risk while others don't change prospect period long company, so stock returns No too significant affected by volatility price share.

The CAPM and APT are key components in evaluating potential returns and losses in stock investments. CAPM emphasizes systematic risk, measured by beta, which indicates the sensitivity of stock returns to overall market movements. However this approach excludes unsystematic risk or company-specific risks, which often play a significant role in certain sectors. APT offers a broader framework by considering multiple risk factors such as inflation, interest rates, and economic conditions. Meanwhile the VAR approach complements these models by focusing on downside risk, specifically the maximum potential loss over a specified period at a given confidence level.

Firm size is another critical factor in determining stock returns. Previous studies, such as Fama and French (1993) suggest that smaller firms tend to offer higher returns than larger firms, albeit with greater risk. In the property sector, smaller companies are often more susceptible to market changes, such as fluctuations in raw material prices or government policies. APT enables a deeper analysis of firm size as a risk factor, while VAR helps measure potential losses based on size. Typically, larger firms have lower VAR values due to greater diversification, compared to smaller firms that are more vulnerable to fluctuations.

Volatility in VAR premiums is also a crucial aspect of risk evaluation in investments. Volatility reflects the level of market uncertainty and impacts investors' expectations of returns and losses. In CAPM, volatility is captured through beta, which only represents risk related to overall market movements. In contrast, APT allows for a more detailed analysis of volatility risks by incorporating multiple factors affecting stock return fluctuations. Within the VAR framework, volatility premiums provide deeper insights into the likelihood of extreme losses, which is highly relevant in high-volatility sectors such as real estate. Fluctuations in this sector are often driven by changes in interest rates, government policies, or market demand dynamics, making VAR an essential tool for measuring and managing risk.

5. Conclusion

Based on analysis and discussion which has done in chapter previously has generated influence between all over independent variable, namely premium risk, size (SMB), book to market ratio (HML), and volatility price share to variable dependent that is stock returns in the research This proxied with excess return, then results research that has been done can concluded as following :

1. Variable premium risk own influence positive and significant to returns share companies listed on the Indonesian Stock Exchange in LQ45 Index for the 2020-2023 period
2. Variable size (market capitalization) of the company being proxied with small minus big (SMB) has an effect positive and significant to returns share companies listed on the Indonesian Stock Exchange in LQ45 Index for the 2020-2023 period
3. Variable proxied book to market ratio (BE/ME). with high minus low (HML) has an effect negative No significant to returns share companies listed on the Indonesian Stock Exchange in Index LQ45 for the 2020-2023 period
4. Variable volatility price share own influence positive but no significant.

5.2. Recommendation for Future Research

The title of this research is "Development of a multi-factor CAPM model by including volatility as an additional factor: a new approach in asset pricing", where the multi-factor CAPM model used in this research is the Fama and French 3 factor model which consists of 3 factors and Volatility which is used as an additional factor in this research is share price volatility. Suggestions for future researchers are to use the latest, more complete multi-factor CAPM model, such as the Fama and French 5 factor model or the more recent model, namely the Fama and French 7 factor model. The objects used in this research are companies listed on the Indonesia Stock Exchange which are included in the LQ45 Index. So that research into the development of this multi-factor CAPM model can be better reflected according to the industrial sector such as companies in the LQ45 Index in the infrastructure, utilities, and more sector in the LQ45 index.

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