

Analysis of the Relationship of Risk and Return Using the Capital Asset Pricing Model (CAPM) Method at Kompas 100 for the 2015-2019 Period

Andini Nurwulandari

Universitas Nasional, Jakarta, Indonesia

Email: andinmanajemen@gmail.com

Abstract

This research aimed to investigate the relationship between risk and return on Kompas 100 shares using the Capital Asset Pricing Model (CAPM) approach from 2015 to 2019. The sample amounted to 52 companies registered in Kompas 100. This study used a quantitative approach. The data used includes the closing price of shares and the Composite Stock Price Index (IHSG) for 4 years (1 January 2015 - 31 December 2019) and the risk-free rate, which is calculated using the interest rate on Bank Indonesia Certificates (SBI) issued by the Bank Indonesia. The results of testing the relationship with the simple correlation coefficient of CAPM calculation, Beta, and CAPM predicted return has a significant positive relationship. If beta increases, the expected return will increase, and vice versa. If Beta goes down, the expected return will go down. Of the 52 sample companies, 33 companies deserve to be used as investment destinations and purchase their shares.

Keywords: Risk, Stock Returns, Capital Asset Pricing Model (CAPM), Investment.



A. INTRODUCTION

Economic progress in a country can be seen from the growth in the country's financial aspects (Kuznets, 1973). One thing that affects the economic growth of a country is the development of its capital market. Besides, what is of concern to many parties, especially the business community, is the capital market activities that are increasingly developing and the increasing desire of the business community to seek alternative sources of business financing besides bank financing (Choong et al., 2010). People should invest in the stock market as an alternate route. Investing in the stock market is thought to yield a high rate of return. Apart from being a forum that brings together parties who need funds (issuers) and parties with excess funds (investors), Stock market investments may also provide owners with extra revenue in the form of capital gains and dividends (Obstfeld, 1998).

In making investment decisions, two factors must be considered: the expected return and Risk (Treviño & Mixon, 2004). Investment risk is a consequence that investors must bear because future returns from investment are in conditions of uncertainty. Investors will think about maximizing the expected return from every rupiah they invest in securities. The return they get is the maximum return; investors must consider and

predict all relevant factors that will influence the potential return on their investment (Homsud et al., 2009).

Stocks are among the most attractive investment instruments because of their high mobility (Bénassy-Quéré et al., 2007). There is indeed a more significant risk if we invest money in the stock market, but it can be minimized by looking at a company's stock performance. After that, we can analyze the stocks in these companies that have an opportunity in the current economic situation. Stocks provide the possibility to get a high return rate but can also make investors incur significant losses. Risk factors that will affect the return rate in stock investment must always be detected so that all market movements can be anticipated (Kamar, 2009).

Stock return or cost of equity estimation for individual securities is critical for the return of financial decisions such as portfolio management, capital budgeting, and work assessment. The Capital Asset Pricing Model is the primary solution (CAPM). CAPM is a mechanism that describes the relationship between risk and positive and linear returns on securities (Treynor, 1961; Sharpe, 1964). The application of CAPM can be used to estimate how much profit is expected from investing in the future and how far it is likely that the actual results will deviate from the schedule so that it can be used as a basis for investors who want to invest in finding information about the rate of return and risk of company shares Lintner, 1974).

The risk measure, which is an indicator of stock sensitivity in CAPM, is indicated by the beta variable. A portfolio's Beta is an essential variable in analyzing securities or portfolios (Rahmatika, 2006). Beta is an indicator of a security's systemic risk, which cannot be eliminated by diversification. It is called systematic risk because it is triggered by causes that impact all running firms, such as global circumstances and tax policies—the greater the stock beta, the greater the risk in these shares (Natarsyah, 2000).

The compass stock index 100 is used in this analysis to evaluate the relationship between risk and return using the CAPM approach from 2015 to 2019. So that can be predicted the risk and return of shares of companies listed on Kompas 100. It is hoped that this research can be a reference for investors in analyzing the level of risk and stock returns, and for researchers, it can be a consideration for further study.

B. METHOD

This research uses a quantitative approach. Researchers chose to use this approach because, in this study, researchers would examine samples using numerical or quantitative data to test predetermined statistical hypotheses (Prasetyo & Jannah, 2019). The Indonesia Stock Exchange's publications served as data sources for this report. The closing price of shares and the Weighted Stock Price Index are among the data sources used (IHSG) for 4 years (1 January 2015 - 31 December 2019), and the risk-free rate, which is obtained from the interest rate of Bank Indonesia Certificates (SBI) published by Bank

Indonesia. The data used is secondary data, specifically data derived from Kompas 100. The companies sampled in this survey were 52 Kompas100 companies.

Table 1 Operational Measurement of Research Variables

No	Variable	Definition	Measurement	Scale
1	R_i	The return rate on shares is related to the expected return, and this result is obtained from the price development and the individual stock price index.	$R_i = \frac{P_t - P_{t-1}}{P_{t-1}}$	Ratio
	R_M	The market rate of return is derived from the market portfolio. Market portfolios include all common stocks that exist in an economy and have other forms of investment.	$R_m = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}$	Ratio
3	R_f	Investment risk occurs in investments whose returns in the future are in a condition of uncertainty.	$R_f = \frac{SBI_t}{12}$	Ratio
4	B	Beta is a significant variable, as a measure of systematic Risk (Risk that cannot be eliminated through diversification) of a security or portfolio against market risk.	$\beta_i = \frac{\sigma_{iM}}{\sigma_M^2}$	Ratio
5	$E(R_i)$	The estimated return rate for i-securities calculated using CAPM or the SML (Security Market Line) equation is the risk-free return rate plus a risk premium.	$E(R_i) = R_f + \beta_i(E(R_m) - R_f)$	Ratio

C. RESULT AND DISCUSSION

1. Rate of Return on Individual Shares (R_i)

As investors expect significant stock returns and small risks on invested funds. It turns out that this requires a precise and accurate analysis process to help investors make investment decisions. The stock returns use fluctuations from the closing stock price at

the end of each month (monthly closing price) in several public companies (Sudiyatno & Suharmanto, 2011).

According to the author's study's conclusions using the CAPM, the method shows that in 2011 the average individual return was 0.077266786 with the highest personal return 1.431192661 at Sentul City Tbk and the lowest individual return -0.073608618 at Bank Bukopin, Tbk. In 2016 the average individual return was 0.178997014 with the highest personal return 1.424242424 at Bank Mandiri (Persero), Tbk and the lowest individual return -0.077945084 from Timah (Persero), Tbk. In 2018 the average individual return was -0.065177844 with the highest personal return 0.444444444 for the Panin Life, Tbk company and the lowest individual return -0.008130081 for the company Japfa Comfeed Indonesia, Tbk. In 2014 the average individual return was 0.237577166, with the highest return of 2.375 PT. PP (Persero), Tbk and the lowest return of -0.082568807 Adaro Energy, Tbk.

2. Market Rate of Return (R_m)

By watching the stock index's rise and fall, we will decide whether the market is bullish (increasing) or bearish (decreasing). Stock indices assist investors in making decisions on whether or not to engage in the stock market. IHS Kompas100 was formed from the movement of all Kompas100 shares on the Indonesia Stock Exchange. IHS Kompas100 is used to determine the market return (R_m).

According to the equation, the estimated equity return to be earned from investors is 0.006550373 per year. From 2015 to 2019, the lowest market return value was -0.008012639 in October 2018, and the highest market return was 0.076478532 in October 2019. The positive average return value shows positive market sentiment and increases even though the movement is powerful.

The results of the research conducted by the author using the CAPM method show that in 2015 the average market return was 0.000323255 or 0.0323% with a minimum market return of -0.091166916 or -9.116% in January and a maximum market return of 0.076478532 or 7.647% in the month. October. In 2016 the average market return was 0.008343531 or 0.8343%, with a minimum market return of -0.097156528 or -9.715% in May and a maximum market return of 0.054977513 or 5.497% in September. In 2018 the average market return was -0.001964165 or -0.196%, with a minimum market return of -0.09519108 or -9.519% in August and a maximum market return 0.083237803 or 8.232% in February. In 2019 the average market return was 0.019498871 or 1.949%, with a minimum market return of -0.008012639 or -0.801% in October and a maximum market return 0.053505778 or 5.35% in February.

3. The risk-free rate of return

A Bank Indonesia Certificate is one of the risk-free investments in Indonesia (SBI). Since it is released and guaranteed by the government, investors face no risk when investing in this asset (Bank Indonesia). The government's interest rate determines the

return that borrowers will get. The monthly SBI interest rate is used to measure the return on this risk-free asset.

Based on the above calculations, as can be seen, the average risk-free return on investments received by borrowers is 0.059563, or 5.96 percent per year or 0.496 percent per month, which includes a minimum interest rate of 0.0382 or 3.82% in February and March. 2016 and the maximum interest rate is 0.0736 or 7.36% in May and June 2015. This risk-free affects the return rate of the CAPM model.

Based on the results of research using the CAPM method by the author, it shows that the risk-free (risk-free return asset) for the average per year is 0.06565 or 6.565%, with a minimum interest rate of 0.0504 or 5.04% in December and a maximum interest rate of 0.0778 or 7.78% in August in 2015. For 2016 the average per year was 0.044242 or 4.42%, with a minimum interest rate of 0.0382 in February and March and a maximum interest rate of 0.0488 or 4.88% in January. In 2017, the average annual rate was 0.057925 or 5.79%, with a minimum interest rate of 0.0484 or 4.84% in January and a maximum interest rate of 0.0722 or 7.22% in December. In 2014, the average interest rate per year was 0.070433 or 7.043%, with a minimum interest rate of 0.0685 or 6.85% in October and a maximum interest rate of 0.0723 or 7.23% in January.

From the results of previous calculations, it can be seen that the value of R_f is more minor than $E(R_m)$. The difference between the two is 0.001586373 (0.006550373-0.004964). This means that during the 2015-2016 period, it will be more profitable to invest in Kompas100 shares in the capital market than investing in SBI shares because Kompas100 provides a higher return than the return given by SBI. This shows that the declining share price did not significantly affect the demand for capital market investment, followed by the decline in SBI interest rates in 2016. However, back to each investor's preferences in choosing the desired form of investment because it should not be forgotten that the capital market also contains risks that are not found in SBI.

4. Systematic risk (β)

The beta coefficient (β) of a stock indicates a security's or portfolio's systemic risk concerning market risk. Beta is an indicator of how often asset prices fluctuate in combination with declining and rising market prices (Sugiharto, 2011). In CAPM, securities stock beta measures the sensitivity of a stock to the market portfolio. A well-diversified portfolio only has systematic Risk (Maryanne, 2009). The beta value of a portfolio is determined by dividing the covariance between the yield on securities I and the market price by the market return volatility. Covariant shows a description of the relationship between individual stock returns and market returns, and vice versa. If a particular market return is sensitive to all the slightest market changes, then β will show a high value ($\beta > 1$). If the stock return shows a stable value even though the market changes, then β will have a fixed value ($\beta = 1$). Meanwhile, return with less sensitivity than market changes, then β will show a low deal ($\beta < 1$).

Centered on the author's study's conclusions using the CAPM approach, it shows that the movements are not patterned. This may be the result of market conditions, one of which is reflected in the fluctuating JCI.

The beta index of these stocks can be grouped into three groups, namely:

- a. Stocks that have a beta greater than one ($\beta > 1$) means that the business's systematic risk exceeds the market's systematic risk, and the equity price exceeds the market return.
- b. Stocks that have a beta smaller than one ($\beta < 1$), meaning that the company's systematic risk is more minor than market risk and stock returns are more petite than market returns.
- c. Stocks that have a beta equal to 1 ($\beta = 1$), meaning that the company's systematic risk is similar to market risk and stock returns are comparable to market returns.

The results showed that for companies with a beta greater than one ($\beta > 1$), there are 25 companies, which means that they get a high systematic risk from market risk. The expected return will be greater than the current market return. Companies with a beta smaller than 1 ($\beta < 1$) have 27 companies, which means that these companies have a more negligible systematic risk than market risk. The expected return will be smaller than the current market return.

5. Expected Return E (Ri)

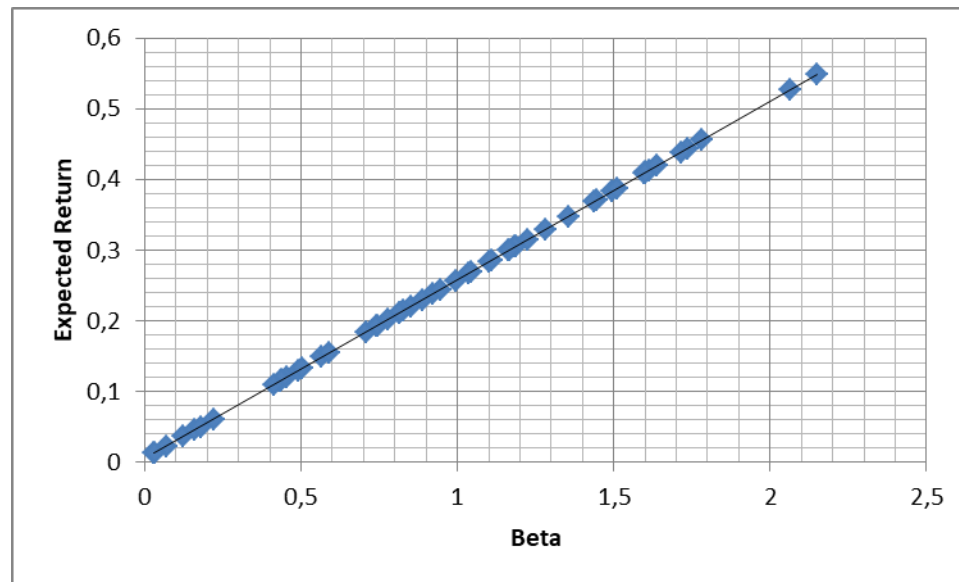
Investors can calculate the relationship between risk and return by using the Capital Assets Pricing Model (CAPM) approach to evaluate feasible investment opportunities based on previous estimates, with returns determined by the number of risk-free return assets with the disparity between stock returns and average returns, market cost, and risk-free return on assets. The risk premium is the difference between the average stock yield and the risk-free return on assets.

Centered on the conclusions of the author's study using the CAPM approach shows that PT. Energi Mega Persada, Tbk has an indicated CAPM profit level of 0.548336 with a risk level of 2.149814, the highest risk level among the 52 sample companies. Investors having the characteristics of a Risk Seeker will choose to invest in the shares of PT. Energi Mega Persada, Tbk because it has the highest E (Ri) even though it also has a high level of risk, investors with these characteristics like a high level of risk with a high rate of return. Meanwhile, the one with the lowest profit level is PT Astra Agro Lestari, Tbk, which is 0.012255 with a risk level of 0.028846, which is the lowest risk level among the 52 sample companies. Investors having the characteristics of a Risk Averter will choose to invest in PT. Astra Agro Lestari, Tbk, has the lowest E (Ri) with a low level of Riskrisk because investors with these characteristics are reluctant to invest.

6. Security Market Line (SML)

The CAPM is expressed graphically in SML. The SML line denotes the relationship between the rate of return and the risk of all investments. For individual securities, the

additional expected return is due to the additional risk of individual securities as measured by Beta (Dybig & Ross, 1985). The depiction of the relationship between the risk value beta (β) and the expected rate of return $E(R_i)$ from 52 sample companies in order from the smallest to the most significant value is presented below:



Gambar 1: Security Market Line

The picture above shows that a significant return follows a greater systematic risk. Likewise, A low systemic risk, on the other hand, is accompanied by a low return. The word "Defense Market Line" refers to the relationship between risk and return.

According to the author's study's findings using the CAPM process, there is a link between risk and return. The amount of return on other transactions would be on the Defense Market Line based on their Beta. The higher the beta value, the higher the estimated rate of return on investment.

7. Efficient Stock Grouping

Efficient stocks are stocks that provide a return on the company's shares more outstanding than the expected rate of return or $[(R_i) > E(R_i)]$. Efficient stock grouping as the basis for investment decisions from companies that are used as research samples in the table below

Table 2 Efficient Stock Grouping and Investment Decisions

No	Code	R_i	$E(R_i)$	Evaluation	Decision
1	AALI	0.11976	0.01226	Efficient	Undervalue
2	ADRO	-0.5684	0.14833	Not efficient	Overvalue
3	AKRA	1.23256	0.40903	Efficient	Undervalue
4	ANTM	-0.5214	0.30455	Not efficient	Overvalue

5	ASII	0.40519	0.22034	Efficient	Undervalue
6	ASRI	1.0443	0.45514	Efficient	Undervalue
7	BBCA	0.82222	0.23818	Efficient	Undervalue
8	BBKP	0.55216	0.3832	Efficient	Undervalue
9	BBNI	0.5971	0.30475	Efficient	Undervalue
10	BBRI	0.98311	0.37024	Efficient	Undervalue
11	BBTN	-0.0148	0.36828	Not efficient	Overvalue
12	BDMN	-0.0456	0.19192	Not efficient	Overvalue
13	BHIT	0.93801	0.29904	Efficient	Undervalue
14	BIPI	0.77552	0.03649	Efficient	Undervalue
15	BJBR	-0.4767	0.34759	Not efficient	Overvalue
16	BKSL	0.60221	0.40984	Efficient	Undervalue
17	BMRI	0.66734	0.32885	Efficient	Undervalue
18	BMTR	1.1017	0.11984	Efficient	Undervalue
19	BSDE	1.01361	0.4434	Efficient	Undervalue
20	BWPT	-0.4537	0.11511	Not efficient	Overvalue
21	CPIN	1.07288	0.41319	Efficient	Undervalue
22	CTRA	1.72137	0.40943	Efficient	Undervalue
23	ENRG	0.36095	0.54834	Not efficient	Overvalue
24	EXCL	0.10047	0.0229	Efficient	Undervalue
25	GGRM	0.56356	0.12951	Efficient	Undervalue
26	GJTL	-0.1935	0.25639	Not efficient	Overvalue
27	INCO	0.14506	0.26716	Not efficient	Overvalue
28	INDF	0.41717	0.21455	Efficient	Undervalue
29	INDY	-1.7873	0.41903	Not efficient	Overvalue
30	INTP	0.62131	0.24413	Efficient	Undervalue
31	ISAT	-0.1206	0.21151	Not efficient	Overvalue
32	ITMG	-0.9206	0.11577	Not efficient	Overvalue
33	JPFA	0.70546	0.2837	Efficient	Undervalue
34	JSMR	0.9225	0.01356	Efficient	Undervalue
35	KIJA	1.17147	0.38674	Efficient	Undervalue
36	KLBF	1.15511	0.211	Efficient	Undervalue
37	LPKR	0.7323	0.30042	Efficient	Undervalue
38	LSIP	0.12055	0.13199	Not efficient	Overvalue
39	MEDC	0.32509	0.04592	Efficient	Undervalue
40	MNCN	1.27615	0.18394	Efficient	Undervalue
41	PGAS	0.45918	0.15464	Efficient	Undervalue
42	PNBN	0.26797	0.26854	Not efficient	Overvalue
43	PNLF	0.71746	0.43823	Efficient	Undervalue

44	PTBA	-0.3764	0.19311	Not efficient	Overvalue
45	PTPP	2.18506	0.52639	Efficient	Undervalue
46	PWON	1.15469	0.31496	Efficient	Undervalue
47	SMCB	0.20896	0.2851	Not efficient	Overvalue
48	SMRA	2.51621	0.06103	Efficient	Undervalue
49	TINS	-0.0927	0.2296	Not efficient	Overvalue
50	TLKM	0.67971	0.10936	Not efficient	Overvalue
51	UNTR	-0.1041	0.20142	Not efficient	Overvalue
52	UNVR	0.78403	0.05014	Efficient	Undervalue

Source: Processed Data

According to the table above, there are 33 firms with undervalued decisions; if securities are undervalued, the yield on actual shares is higher than the estimated return rate. Undervalued stocks should be bought or held by investors because their price will rise closer to their fair price.

And there are 19 companies with overvalued decisions. Overvalued stocks mean that the individual's rate of return is lower than the expected return. Overvalued stocks should not be bought, or shares should be sold.

8. The relationship between risk and return with the CAPM method

The CAPM approach for determining the relationship between risk and return employs a basic correlation coefficient formula to calculate the relationship between two factors, respectively Beta and expected recovery in the Capital Assets Pricing Model (CAPM) method, whether the relationship is linear and significant between the two variables.

Table 3 Pearson Correlation

Correlations			
		Beta	E(Ri)
Beta	Pearson Correlation	The relationship between risk and return using the CAPM method uses a simple correlation coefficient model to determine the relationship between two variables, namely Beta and expected return in the Capital Assets Pricing Model (CAPM) method, whether the relationship is linear and significant between the two variables.	1.000**
	Sig. (2-tailed)		.000
	N	52	52
E(Ri)	Pearson Correlation	1.000**	1
	Sig. (2-tailed)	.000	
	N	52	52

Source (Processed Data SPSS 22.0)

According to the results of table 3, there is a close relationship between return and risk. If the correlation coefficient is positive (+), the return and risk have a clear connection. The company's rise would be matched by an increase in the danger that the company must carry. In contrast, if the correlation coefficient is negative (-), there is an inverse relationship between risk and return. This ensures that the rise in risk does not accompany an increase in return, but the greater the return received, the smaller its risk. Interpretation of the magnitude of the resulting relationship or correlation can be seen in table 4.6. an assessment of whether or not there is an absolute correlation between risk and return is included in the sig (2-tailed) section. If the correlation coefficient has a positive value of 0.05, the cost and return are not substantially risky. Meanwhile, a correlation coefficient with a positive value less than 0.05 shows the risk is associated with returning.

The results of the research conducted by the author using the CAPM method show that the significant level is $0.000 < 0.05$, which means that the data obtained is meaningful between expected return and risk. This is in line with what is explained about CAPM, where the relationship between Beta and the expected return has a positive relationship.

This research's findings are consistent with the results of previous studies conducted by (Iqbal & Shah, 2012). According to the report, systemic risk had a significant positive impact on predicted return. If systematic risk rises, so does the anticipated rate of return.

D. CONCLUSION

According to the findings of checking the relationship with the simple correlation coefficient, a strong positive relationship between Beta and CAPM predicted return from the sample used in the CAPM measurement. If Beta increases, the expected return will increase, and vice versa. If Beta goes down, the expected return will go down. 33 company stocks are included in the efficient stock category, and 19 companies are included in the inefficient stock category from 52 research samples. The investment decision that investors must make is to buy efficient stocks and sell inefficient shares.

REFERENCES

1. Bénassy-Quéré, A., Coupet, M., & Mayer, T. (2007). Institutional determinants of foreign direct investment. *World economy*, 30(5), 764-782.
2. Choong, C. K., Baharumshah, A. Z., Yusop, Z., & Habibullah, M. S. (2010). Private Capital Flows, Stock Market And Economic Growth In Developed And Developing Countries: A Comparative Analysis. *Japan and the World Economy*, 22(2), 107-117.
3. Dybvig, P. H., & Ross, S. A. (1985). Differential Information and Performance Measurement Using A Security Market Line. *The Journal of Finance*, 40(2), 383-399.

4. Homsud, N., Wasunsakul, J., Phuangnark, S., & Joongpong, J. (2009). A Study of Fama and French Three Factors Model and Capital Asset Pricing Model in Thailand's Stock exchange. *International Research Journal of Finance and Economics*, 25(3), 31-40.
5. Iqbal, M. J., & Shah, S. Z. A. (2012). Determinants of Systematic Risk. *The Journal of Commerce*, 4(1), 47.
6. Kuznets, S. (1973). Modern Economic Growth: Findings And Reflections. *The American Economic Review*, 63(3), 247-258.
7. Lintner, J. (1975). The Valuation of Risk Assets and The Selection of Risky Investments in Stock Portfolios and Capital Budgets. In *Stochastic Optimization Models In Finance* (pp. 131-155). Academic Press.
8. Maryanne, D. M. D. (2009). *Pengaruh Nilai Tukar Rupiah, Suku Bunga Sbi, Volume Perdagangan Saham, Inflasi Dan Beta Saham Terhadap Harga Saham (Studi Empiris pada Perusahaan Sektor Perbankan Di Bursa Efek Indonesia Periode 2004-2007)* (Doctoral dissertation, program Pascasarjana Universitas Diponegoro).
9. Natarsyah, S. (2000). Analisis Pengaruh Beberapa Faktor Fundamental dan Risiko Sistemik Terhadap Harga Saham Kasus Industri Barang Konsumsi yang Go-Publik di Pasar Modal Indonesia. *Journal of Indonesian Economy and Business*, 15(3), 294-312.
10. Obstfeld, M. (1998). The Global Capital Market: Benefactor or Menace?. *Journal of Economic Perspectives*, 12(4), 9-30.
11. Prsetyo, B., & Jannah, L. M. (2019). *Metode Penelitian Kuantitatif*. Litbang Kemenkes.
12. Rachmatika, D. (2006). Analisis Pengaruh Beta Saham, Growth Opportunities, Return On Asset Dan Debt To Equity Ratio Terhadap Return Saham. *Universitas Dipanegoro Semarang*.
13. Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk. *The Journal of Finance*, 19(3), 425-442.
14. Sudiyatno, B., & Suharmanto, T. (2011). Kinerja Keuangan Konvensional, Economic Value Added, dan Return Saham. *JDM (Jurnal Dinamika Manajemen)*, 2(2).
15. Sugiarto, A. (2011). Analisa Pengaruh Beta, Size Perusahaan, DER Dan PBV Ratio Terhadap Return Saham. *Jurnal Dinamika Akuntansi*, 3(1).
16. Treviño, L. J., & Mixon Jr, F. G. (2004). Strategic Factors Affecting Foreign Direct Investment Decisions By Multi-National Enterprises In Latin America. *Journal Of World Business*, 39(3), 233-243.
17. Treynor, J. L. (1961). Market Value, Time, and Risk. *Time, and Risk* (8 August 1961).