Stock analysis based on the CAPM as a basis for making investment decisions (studies in the infrastructure sector for the 2021-2022 period)

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Abstract. One approach investor can use in choosing stocks worth investing in is the Capital Asset Pricing Model (CAPM). This study aims to analyze infrastructure sector stocks that are eligible to invest based on the CAPM for the 2021-2022 period. The population of this research is shares of infrastructure sector companies in 2021-2022. The number of samples in this study was 50 stocks, using the purposive sampling method. The data analysis technique used was a simple regression test. This study's results show that from January 2021 to December 2022, 26 stocks were aggressive, while only 20 stocks had a significant beta value. Then, 22 stocks that generate positive excess returns (undervalue) and 20 stocks that have a linear relationship between return and risk. The criteria used to value stocks use Yohantin's (2009) research model. So, it can be concluded that in this study, two stocks are worth investing in, namely Paramita Bangun Sarana Tbk (PBSA) and Smartfren Telecom Tbk (FREN) shares.
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Keywords: Stock Analysis, Capital Asset Pricing Model.

a.   Introduction

Investment is the act of allocating a certain amount of funds with the expectation of generating profits in the future. Investments in the form of securities can be made in the money market or the capital market. Typically, investors engage in investments to achieve high returns. The profit level obtained in the capital market, particularly in the form of securities such as stocks, is generally higher than the profit level in the money market [1].

Eleven industrial sectors were on the Indonesia Stock Exchange (BEI) in 2021-2022. Here is the data on the average growth of stock prices in the industrial sectors from 2021-2022. Subsequent paragraphs, however, are indented.

Table 1. Average Growth of Stock Prices in Industrial Sectors, 2021-2022.

Industrial Sector	Average Annual Close Price		Growth
	2021	2022	
Energy	2,419.1831	2,333.6842	-3.5342%
Basic Materials	1,353.0860	1,101.4688	-18.5958%
Industrials	1,377.4074	1,465.5714	6.4007%
Consumer Non-Cyclicals	1,762.9592	1,534.0088	-12.9867%
Consumer Cyclicals	823.2197	697.9577	-15.2161%
Healthcare	3,501.3043	2,451.0714	-29.9955%
Financials	1,796.5048	1,637.2642	-8.8639%
Properties and Real Estate	951.3375	1,027.3059	7.9854%
Technology	4,189.9286	2,691.4412	-35.7640%
Infrastructures	1,140.4393	1,333.8710	16.9612%
Transportation and Logistic	590.5000	368.2000	-37.6461%

According to Table 1, the average stock price growth in 2021-2022, the infrastructure sector had a higher growth rate than other industrial sectors, amounting to 16.96%[2]. This indicates that, in terms of stock prices, the stocks belonging to the infrastructure industry performed better than other industrial sectors. This can attract investors to allocate their funds to the infrastructure sector.

One model that investors can use to determine which stocks to choose is the Capital Asset Pricing Model (CAPM)[1]. According to research conducted by [3], CAPM can be used to predict which stocks are worthy of investment [Isnurhadi, 2014]. The research results state that there is significant statistical accuracy in the Capital Asset Pricing Model (CAPM) in predicting stock returns [4] found that the CAPM model is more accurate than the Arbitrage Pricing Theory (APT) model in predicting stock returns.

The Capital Asset Pricing Model (CAPM) was introduced by [5–7] [5] as an equilibrium model that determines the relationship between return and risk that investors can expect. According to CAPM, the level of risk and the level of return have a positive and linear relationship. The measure of risk, which indicates the sensitivity of a stock within CAPM, is represented by the variable β (beta). The larger the β of a stock, the greater the risk associated with it [1].

According to [8], CAPM provides a useful framework for understanding the relationship between risk and return. [9] state that CAPM can effectively explain the variation in stock returns. [10] emphasizes the importance of beta in CAPM and how the proper use of beta can assist investors in measuring risk and making investment decisions.

The purpose of using CAPM is to accurately predict the relationship between the risk of an asset and the expected return. Therefore, CAPM can be used to estimate the profitability of a security, which is considered crucial. The CAPM concept assumes that the capital market is efficient, meaning that investors can buy and sell stocks at any time [11]. Additionally, CAPM can be used as one of the models to implement corporate financial strategies through informed investment decision-making. According to Lili, financial strategy is crucial for companies in enhancing firm value.

Research related to stock analysis based on CAPM has been conducted by [12], stating that out of 100 samples, 25 stocks are considered efficient as Ri > E(Ri). There is a linear relationship between systematic risk and expected return[13]. [13] found that there are 15 undervalued company stocks, as they have a higher individual stock return than the expected return. The recommended decision for undervalued stocks is to buy them[14]. [14] states that out of 15 selected stocks for the research sample, 9 are considered efficient. Investors are advised to buy and sell efficient stocks when the stock prices increase[15]. [15] identifies 6 stocks that are classified as efficient. Additionally, [16] states that out of the 15 company stocks analyzed, 14 fall into the category of efficient stocks. Investors are advised to buy these undervalued stocks[17]. [17] found that out of 37 samples, 21 stocks are considered efficient as their individual returns exceed the expected returns. [18] concludes that out of 22 samples, only 8 stocks are suitable for investment due to their $\beta > 1$, positive excess return, and significant positive relationship between systematic risk and expected return. [11] reports that out of 18 samples, 8 stocks are considered efficient as Ri > E(Ri). [19] states that out of 19 samples, 14 stocks are undervalued. Finally, [1] finds that out of 9 samples, only 5 stocks meet the criteria for investment, including $\beta > 1$, positive excess return, a linear correlation between risk and return, and significant β value. Conversely, [20] found that out of 15 samples, 5 emitters are worth investment due to being undervalued.

Based on the background mentioned, this study aims to analyze infrastructure industry stocks worthy of investment based on the CAPM from 2021 to 2022.

b.   Methods

This research utilizes a quantitative research approach, specifically descriptive and associative research. The data for this study is secondary data obtained from Yahoo Finance (www.finance.yahoo.com) and Bank Indonesia (www.bi.go.id). The required secondary data for this research includes the closing prices of company stocks, Bank Indonesia Certificate interest rates, and the Composite Stock Price Index. The data used in this study is monthly. The unit of analysis is companies listed in the infrastructure industry sector from 2021 to 2022.

The variables used in this study are stock return (Ri) and market return (Rm). The population in this study consists of all stocks listed in the infrastructure industry sector from 2021 to 2022, totaling 62 issuers. The sampling technique used in this research is purposive sampling. The criteria for sample selection are as follows:

1. The sample consists of companies listed in the infrastructure industry sector consecutively from 2021 to 2022.
2. The sample includes companies that have published monthly closing prices from 2021 to 2022.

Based on the abovementioned criteria, a sample of 50 issuers was obtained.

The data analysis used in this research is quantitative data analysis using statistical software, specifically SPSS version 25. To assess good investment choices for investors to allocate capital in specific stocks, they should meet the following criteria [21]. The

stock is an aggressive stock ($\beta > 1$), *the excess return* is positive (+) or E(Ri) > E(Rj)**,** there is a linear relationship between risk and stock *returns***,** and beta (β) is significant**.** This research uses the classical assumption test (heteroscedasticity test, autocorrelation test, and normality test) and data stationarity test (unit root test).

c.   Results And Discussion

The data processing process is conducted using SPSS version 25 based on the above method. The criteria used to evaluate stocks as the basis for investment decision-making are stocks with a beta greater than 1, indicating aggressive stocks that generate positive excess returns (+) or undervalued stocks [E(Ri) > E(Rj)], the presence of a linear relationship between stock risk and return; and the generation of a significant beta (β). Paramita Bangun Sarana Tbk (PBSA) and Smartfren Telecom Tbk (FREN) are the stocks that meet the criteria. This means these two stocks are considered aggressive stocks with significant beta values. The results indicate that these two stocks have a higher sensitivity to market fluctuations, resulting in higher returns and risks than the market. Subsequently, these two stocks have a significantly positive excess return, meaning that these two stocks have an expected return value greater than the required return. Then, the two stocks exhibit a positive linear relationship, indicating a positive correlation between the return and risk of these two stocks. This means that as the return increases, the risk also tends to increase, and vice versa.

In this study, the heteroscedasticity test was conducted using the White Test. The p-value of obs R-square is 0.2177. So, it can be concluded that this research is free from heteroscedasticity because the obsR-square p-value (0.2177) is greater than the significance level α (0.05). Then, the autocorrelation test in this study is conducted using the Breusch-Godfrey method (Lagrange Multiplier Test (LM)). This study is free from autocorrelation as it yields a Chi-Square p-value of 0.4625, which is greater than the significance level of 0.05. This study uses the Jarque-Bera method to test the normality of residuals. , the Probability value is 0.747260, which is greater than the significance level of 0.05. This indicates that the residuals are normally distributed. Meanwhile, the data stationarity test results indicate that the value is 0.000, indicating that the data in this study is stationary because the p-value of 0.000 is less than α 0.05. In other words, the data in this study is free from cointegration and spurious regression.

d.   Conclusions

This study concludes that based on the analysis of infrastructure sector stocks using the Capital Asset Pricing Model during the period 2021-2022, two stocks are suitable for investment, namely Paramita Bangun Sarana Tbk (PBSA) and Smartfren Telecom Tbk (FREN). Therefore, the results of this study can be used as a recommendation for investors in making stock investment decisions. Furthermore, the results of the classical assumption tests in this study indicate that it is free from autocorrelation and heteroskedasticity, and the residuals are normally distributed. Additionally, this study is also free from cointegration and spurious regression.

e.   Acknowledgments

References

1.   Yohantin, Y. Penggunaan Metode CAPM Dalam Menilai Risiko dan Return Saham Untk Menentukan Pilihan Berinvestasi Pada Saham Jakarta Islamic Index Periode Januari 2004-Desember 2008 Di Bursa Efek Indonesia. (2009).
2.   www.idx.co.id.
3.   Komara, E. F. Pengujian Validitas Empiris Capital Asset Pricing Model (CAPM) Di Jakarta Islamic Indeks (JII) Periode 2011-2014. *J. Ekon. Manaj. Akunt.* **13**, 158–172 (2016).
4.   Lemiyana. Analisis Model CAPM dan APT Dalam Memprediksi Tingkat Return Saham Syariah (Studi kasus Saham di Jakarta Islamic Index). *I-Finance* **1**, 1–20 (2015).
5.   Sharpe, W. F. Capital Asset Prices: A Theory Of Market Equilibrium Under Conditions Of Risk. *Source J. Financ.* **19**, 425–442 (1964).
6.   Lintner, J. The Valuation of Risk Assets and The Selection of Risky Investments in Stock Portfolios and Capital Budgets. *Rev. Econ. Stat.* **47**, (1965).
7.   Mossin, J. Equilibrium in a Capital Asset Market. *Econometrica* **34**, 768 (1966).
8.   Chen, nai-fu, Richard, R. & Ross Stephen. Economic forces and the stock market revisited. *J. Bus.* **59**, 129–144 (1986).
9.   Black, F., Jensen, Michael, C. & Scholes, M. The Capital Asset Pricing Model: Some Empirical Tests. in *Studies in The Theory of Capital Markets, M. C.* (preanger publishers, 1972).
10.   Black, F. Beta and Return. *J. Portf. Manag.* **20**, 8–18 (1993).
11.   Hidayati, A. A., Suhadak & Nengah, S. Analisis Capital Asset Pricing Model (CAPM) Terhadap Keputusan Investasi Saham (Studi pada Perusahaan-perusahaan Sektor Perbankan di BEI tahun 2009-2011). *J. Adm. Bisnis* **9**, 1–7 (2014).
12.   Sekarwati, H. & Margasari, N. Penggunaan Metode Capital Asset Pricing Model Dalam Menentukan Keputusan Berinvestasi Saham (Studi Pada Saham Indeks Kompas 100 di Bursa Efek Indonesia). 425–433 (2015).
13.   Putra, M, D, H. & Yadnya, I, P. Penerapan CAPM sebagai pertimbangan dalam Pengambilan Keputusan Investasi Saham. *E-Jurnal Manaj. Unud* **5**, (2016).
14.   Haidiati, D., Topowijono & Azizah, D, F. Penerapan Metode CAPM Sebagai Dasar Pengambilan Keputusan Investasi Saham Studi Kasus Pada Perusahaan yang terdaftar di Indeks IDX30 Periode Juli 2012 - Juni 2015. *J. Adm. Bisnis* **37**, (2016).
15.   Yulianti, R., Topowijono & Azizah, D, F. Penerapan Metode CAPM untuk Menentukan Kelompok Saham-Saham Efisien. *J. Adm. Bisnis* **38**, (2016).

16.   Kurniawan, F, A., Raden, R, H. & Devi, F, Z. Penerapan Metode CAPM untuk Penentapan Kelompok Saham-Saham Efisien Studi Kasus Pada Perusahaan Industri Barang Konsumsi yang Terdaftar di Bursa Efek Indonesia Periode 2011-2013. *J. Adm. Bisnis* **24**, 1–6 (2015).

17.   Saputra, W. D., Suhadak & Azizah, D. F. Penggunaan Metode Capital Asset Pricing Model (CAPM) Dalam Menentukan Saham Efisien (Studi pada Saham-Saham Perusahaan yang Terdaftar di Indeks Kompas100 Periode 2010-2013). *J. Adm. Bisnis* **25**, 1–7 (2015).

18.   Putra, R. A. D. *Analisis Risiko dan Return Dengan Menggunakan Metode CAPM Untuk Menentukan Pilihan Berinvestasi Pada Saham LQ-45 di Bursa Efek Indonesia*. (2014).

19.   Nasuha, R., Dzulkirom, M. & A, Z. Z. Analisis Metode Capital Asset Pricing Model Dalam Upaya. (2012).

20.   Ramli, A. Risk dan Return Saham Perusahaan Industri Barang Konsumsi di Bursa Efek Indonesia. *Jurnal Aplikasi Manajemen* vol. 8 1090–1097 (2010).

21.   Ross, A, S., Westerfield, R, W. & Jordan, B, D. *Fundamentals of Corporate Finance*. (McGraw-Hill, 2010).