Stock Making Investment Decisions Using the Capital Asset Pricing Model (CAPM) Analysis of the Business Index-27 on the Indonesian Stock Exchange

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Abstract

The purpose of this study is to measure the ability of the Capital Asset Princing Model (CPAM) in analyzing investment decision making by predicting the risk and return that will be obtained by investors and helping investors in choosing efficient and inefficient stocks. CAPM is a measuring tool that can be used to determine the level of risk and return obtained and evaluate the rate of return on investment. The purposive sampling technique is used in selecting samples to be used in the study, namely companies listed on the Indonesia Stock Exchange and their shares are consistently included in the Bisnis-27 stock index. The stock criteria used in selecting efficient stocks, namely when individual return results exceed the expected return. The results of this study indicate that there are 8 stocks that meet the efficiency criteria, namely ADRP, AKRA, AMRT, BBNI, BMRI, INKP, JSMR, and PGAS with individual returns results exceed the expected returns. In investment decisions, stocks that are included in these efficient stocks are the priority stocks that investors should buy. Based on the analysis, there is a non-linear relationship between systematic risk and expected stock returns, making an important contribution to investment decision making in the Indonesian stock market.

Keywords: Capital Asset Princing Model (CPAM), Stock, Return, Business-27 Index

1. Introduction

The Indonesian capital market, as one of the rapidly growing markets in Southeast Asia, has attracted the interest of many domestic and international investors (Lipsey & Sjöholm, 2011). In this context, making smart and efficient investment decisions is the key to investors' success in achieving optimal profits.

Facing these challenges, many investors rely on fundamental and technical analysis as the basis for investment decision-making. However, in the context of globalization and market uncertainty, the need for more sophisticated risk and return measurement models is becoming increasingly urgent. Investors are required to identify promising investment opportunities, with the hope of achieving optimal returns while minimizing the involved risks. One way to assist investors in assessing and selecting investments in the capital market is through the application of equilibrium models that consider the risk and expected return levels of an asset (Sharpe, 1964).

One model that is the focus of research in this regard is the Capital Asset Pricing Model (CAPM), which serves as a framework for connecting the expected return level of an asset with the associated risk, in the context of balanced market conditions. The main objective of CAPM is to assist investors in identifying and selecting stocks that have acceptable risks, while maximizing the expected return level (Ho et al., 2011). By using CAPM, investors are expected to depict complex market conditions, reduce investment risks, and project possible return levels.

Rational investors tend to choose stocks considered efficient. Efficient stocks can be determined by selecting a certain expected return rate, then minimizing their risks or minimizing a certain risk level, and then maximizing their expected return (Jensen, 1969). CAPM also assists investors in measuring unavoidable risks in a stock portfolio, and comparing them with return rate predictions. The relationship between risk and return rates in CAPM is expressed through the β (Beta) variable, which is an indicator of a stock's sensitivity to market changes.

This research will use data available on the Indonesia Stock Exchange (IDX), with a focus on stocks listed in the Business-27 index. The Business-27 index comprises 27 selected company stocks officially launched by the Indonesia

Stock Exchange in collaboration with Bisnis Indonesia newspaper. The main objective of this research is to analyze optimal investment choices in Business-27 index stocks on IDX, using the Capital Asset Pricing Model (CAPM) approach to evaluate the involved risks and return rates.

2. Literature Review

2.1. Investment

According to Jappely & Padula (2013), investment is the postponement of current consumption to be put into productive assets over a certain period of time. With productive assets, the delay in current consumption to be invested in productive assets will increase total utility. Meanwhile, Aharoni (2015) reveals that investment is a commitment to a number of funds or other resources made at this time, with the aim of obtaining a number of benefits in the future.

2.2. Stock

Stock are defined as a sign of participation or ownership of a person or entity in a company (Hansmann, 2000). Another meaning of shares is a share of ownership in a company. Based on the two definitions above, a conclusion can be drawn that the definition of shares is proof / a sign of investor ownership of a company.

2.3. Stock Return

Stock return is the level of profit that will be obtained by investors who invest their funds in the capital market. This stock return can be used as an indicator of trading activities in the capital market. According to Jappely & Padula (2013) return is the result obtained from investment return can be in the form of realized return that has occurred or expected return that has not occurred but which is expected to occur in the future. Stock Returns can be written with the formula:

$$R_{it} = \frac{P_t - P_{t-1}}{P_t} \tag{1}$$

where,
R_{it} : The rate of return of individual stock *i* at time *t*.
P_t : The closing price of individual stock *i* at time *t*.
P_{t-1} : The closing price of individual stock *i* at time t-1.

2.4. Investment Risk

According to Benaroch (2002), investment risk is a profit that deviates from what is expected. Deviations are linear and directly proportional, the greater the deviation between the actual level of profit and the expected level of profit, the greater the risk. The relationship between risk and expected return is a unidirectional or linear relationship. The greater the risk of an investment, the greater the expected return on the investment.

2.5. Market Return

Market return is the level of profit obtained from the entire market. Market return is often used as a benchmark to measure the performance of an investment portfolio. In this context, market returns are often represented by stock market indices, such as the Jakarta Composite Index (JCI) in Indonesia (Bahtiar, 2020). Market Return can be written with the formula:

$$R_m = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}} \tag{2}$$

where,
R_m : The market rate of return for a given period.
$IHSG_t$: Composite Stock Price Index at time *t*.
$IHSG_{t-1}$: Composite Stock Price Index at time t-1.

2.6. Beta

According to Jappely & Padula (2013), beta is a measurement of volatility returns on securities or portfolios towards market returns. Beta as a systematic risk ratio tool affects portfolio returns, because each investment depends on beta which measures the variance of returns in relation to market returns. the formula for finding beta with the single index method is as follows:

$$\beta = \sum_{t-1}^{N} \frac{\left(R_i - \underline{R_i}\right)\left(R_m - \underline{R_m}\right)}{\left(R_m - \underline{R_m}\right)} \tag{3}$$

where,

β : Beta, a coefficient that measures the sensitivity of a stock's return to the market return.

R_i : The rate of return of individual stock i.

R_m : The market rate of return for a given period.

n : The number of data periods used.

2.7. Capital Asset Pricing Model (CAPM)

Sharpe (1964) revealed that the Capital Asset Pricing Model (CAPM) is a model that provides a method for assessing the relationship between risk and stock returns, assuming that investors select an optimal portfolio based on expected risk and return. Kumar et al. (2008) also contributed to the development of CAPM by emphasizing that the expected return of a stock should compensate investors for the systematic risk associated with the stock. He also highlighted the importance of beta in measuring the systematic risk of a stock. The CAPM was then formulated as follows:

$$E(R_i) = R_f + \left(R_m - R_f\right)\beta_i \tag{4}$$

where,

$E(R_i)$: Expected rate of return of individual stock i.

R_f : Risk-free rate of return.

R_m : The market rate of return for a given period.

β_i : Beta of individual stock i.

3. Materials and Methods

3.1. Materials

The object of this research is all companies that are consistently included in the Bisnis-27 Index on the Indonesia Stock Exchange in the period 2023-2024. This data is obtained from legitimate sources, namely the Indonesia Stock Exchange website and Yahoo Finance.

3.2. Methods

The method used in this research is quantitative method, which is a method used to examine secondary data and simulation data to be processed and analyzed statistically. This data will provide a factual and accurate picture of stock returns and systematic risk in companies incorporated in the Bisnis-27 Index on the Indonesia Stock Exchange for the period 2023-2024. The calculation process is carried out using the Microsoft Excel program to facilitate data processing and analysis. The following is an explanation of the stages carried out in this study:

(a) Literature Study

Materials on stocks, stock returns, investment risk, the relationship between stock returns and risk, the Capital Asset Pricing Model (CAPM) method were collected and studied from various sources used as a theoretical basis for this research.

(b) Data collection

Data from stocks that are members of the Bisnis-27 Index on the Indonesia Stock Exchange will be collected over the period June 2023 to May 2024. In addition, data on the market rate of return and risk-free rate of return will also be collected. This data can be obtained from legitimate sources, namely the Indonesia Stock Exchange website and Yahoo Finance.

(c) Determine the profitability of each stock

In this step, the rate of return for each stock will be calculated using equation (1). This involves calculating the change in the stock price over time, which will then be used for further analysis.

(d) Determine the market profit rate

The market rate of return will be calculated using equation (2). This helps in understanding the overall change in the stock market over the specified time period.

(e) Determining the Beta of the stock

A stock's beta, which is a measure of systematic risk, will be calculated using equation (3). This beta measures the sensitivity of a stock to changes in market prices, and is important in assessing the risk of a stock investment.

(f) Determine the risk-free rate of return ($\boldsymbol{Rf}$) through the monthly BI rate.

The risk-free rate of return will be calculated through the monthly BI rate. This is the rate of return that is considered to have no risk or very minimal risk, which is used as one of the components in the CAPM model calculation.

(g) Calculating the expected rate of return according to CAPM

The expected rate of return according to CAPM will be calculated using equation (4). This involves adjusting the risk-free rate of return by the systematic risk of the stock through beta, to obtain the expected rate of return of the stock.

4. Results and Discussion

4.1. Research Results

The Bisnis-27 stock index consists of 27 stocks that are specially selected based on certain criteria. Evaluation and replacement of stocks in this index is done every six months, at the beginning of May and November.

Table 1: Companies that are consistently included in the Bisnis-27 Index Research Period

No	Stock Code	Stock Name
1	ADRO	Adoro Energy
2	AKRA	AKR Corporindo
3	AMRT	Alfaria Trijaya
4	ANTM	Aneka Tambang
5	ASII	Astra International
6	BBCA	Bank Central Asia
7	BBNI	Bank Negara Indonesia
8	BBRI	Bank Rakyat Indonesia
9	BMRI	Bank Mandiri
10	ICBP	Indofood CBP
11	INCO	Vale Indonesia
12	INKP	Indah Kiat Pulp & Paper
13	JSMR	Jasa Marga
14	KLBF	Kalbe Farma
15	MAPI	Mitra Adiperkasa
16	MIKA	Mitra Keluarga
17	PGAS	Perusahaan Gas Negara
18	SMGR	Semen Indonesia
19	TLKM	Telkom Indonesia

The calculation of individual stock returns can be done by comparing the closing price of the stock in the current month (P_t) minus the closing price of the previous month's shares (P_{t-1}), then the result is divided by the closing price of the previous month's shares (P_{t-1}).

Table 2: Individual Stock Return (R_i)

No	Stock Code	(R_i)
1	ADRO	0.244380196
2	AKRA	0.13363057
3	AMRT	0.043276456
4	ANTM	-0.262455746
5	ASII	-0.427888213
6	BBCA	0.015993826
7	BBNI	0.001648546
8	BBRI	-0.183663472
9	BMRI	0.154613058
10	ICBP	-0.123386926
11	INCO	-0.186946799
12	INKP	0.120587697
13	JSMR	0.251968377

No	Stock Code	(R_i)
14	KLBF	-0.310570829
15	MAPI	-0.23178636
16	MIKA	0.082855194
17	PGAS	0.237943897
18	SMGR	-0.473800172
19	TLKM	-0.294883597

Based on the table, it shows the individual stock returns of 19 company stocks used as research samples in the period June 2023 - May 2024. The results show that Jasa Marga (Persero) Tbk obtained the highest individual stock return (Ri) highest, which is 0.251968377. Meanwhile, Semen Indonesia (Persero) Tbk recorded the lowest individual stock return (Ri) lowest, which amounted to -0.473800172.

The market rate of return is the rate of return based on changes in the combined company's share price and nominal interest rate. The market return is obtained by calculating the difference between the current month's Bisnis-27 market index (Bisnis-27) and the previous month's index (Bisnis-27_t) and the previous month's index (Bisnis-27_{t-1}) and then divided by the previous month's index (Bisnis-27_{t-1}).

Table 3: Systematic Risk of Each Individual Stock (β_i)

No	Stock Code	(β_i)
1	ADRO	0.370615
2	AKRA	-0.02663
3	AMRT	1.059578
4	ANTM	1.067916
5	ASII	1.368925
6	BBCA	0.748485
7	BBNI	1.843927
8	BBRI	2.343079
9	BMRI	1.861752
10	ICBP	1.171862
11	INCO	-0.42667
12	INKP	0.476874
13	JSMR	1.613508
14	KLBF	-0.43179
15	MAPI	2.500052
16	MIKA	0.492849
17	PGAS	-1.05829
18	SMGR	3.327733
19	TLKM	1.41491
	Amount	**19.71868**
	Average	**1.037825**

The results of the calculation of the systematic risk of each individual stock show that the average (βi) amounted to 1.037825, where the value > 1 so that in general the 19 shares of companies that became the research sample had a high systematic risk and tended to be active or sensitive in terms of responding to changes in market prices.

Efficient stock is the state of a stock below the market price with an individual rate of return (R_i) is greater than the expected rate of return ($E(R_i)$) or [$R_i > E(R_i)$]. Meanwhile, inefficient stocks are a state of a stock above the market price with an individual rate of return smaller than the expected rate of return ($E(R_i)$) or [$R_i < E(R_i)$].

Table 4: List of Efficient and Inefficient Stocks

No	Stock Name	Stock Code	Ri	E(Ri)	Stock Evaluation
1	Adoro Energy	ADRO	0.244380196	0.0368921	Efficient
2	AKR Corporindo	AKRA	0.13363057	0.0573728	Efficient
3	Alfaria Trijaya	AMRT	0.043276456	0.001371	Efficient
4	Aneka Tambang	ANTM	-0.262455746	0.0009411	Inefficient
5	Astra International	ASII	-0.427888213	-0.0145781	Inefficient

No	Stock Name	Stock Code	Ri	E(Ri)	Stock Evaluation
6	Bank Central Asia	BBCA	0.015993826	0.0174101	Inefficient
7	Bank Negara Indonesia	BBNI	0.001648546	-0.0390679	Efficient
8	Bank Rakyat Indonesia	BBRI	-0.183663472	-0.0648029	Inefficient
9	Bank Mandiri	BMRI	0.154613058	-0.0399869	Efficient
10	Indofood CBP	ICBP	-0.123386926	-0.0044181	Inefficient
11	Vale Indonesia	INCO	-0.186946799	0.077998	Inefficient
12	Indah Kiat Pulp & Paper	INKP	0.120587697	0.0314137	Efficient
13	Jasa Marga	JSMR	0.251968377	-0.0271881	Efficient
14	Kalbe Farma	KLBF	-0.310570829	0.0782621	Inefficient
15	Mitra Adiperkasa	MAPI	-0.23178636	-0.072896	Inefficient
16	Mitra Keluarga	MIKA	0.082855194	0.03059	Inefficient
17	Perusahaan Gas Negara	PGAS	0.237943897	0.1105627	Efficient
18	Semen Indonesia	SMGR	-0.473800172	-0.115569	Inefficient
19	Telkom Indonesia	TLKM	-0.294883597	-0.0169489	Inefficient

Based on the results of the study, it was found that out of 19 stocks, there were 8 company stocks included in efficient stocks and 11 company stocks included in inefficient stocks. The decision criteria that can be done in stock investment is to choose efficient stocks because these stocks are worth buying, and conversely eliminate inefficient stocks because these stocks can be considered for sale.

4.2. Discussion

The results of this study show that of the 19 company stocks sampled, 8 of them are classified as efficient stocks while 11 other stocks are classified as inefficient stocks. This study also proves the ability of the Capital Asset Pricing Model (CPAM) analysis to potentially support investors in making investment decisions. CPAM can estimate the anticipated rate of return on the portfolio owned by investors by taking into account the level of systematic risk that may occur so that investors can invest in the right stocks according to their investment objectives.

Each investor has its own preferences that can influence investment decisions. Investors tend to choose investments that offer or lower risk even if there are investments that offer the same return with different risks.Rational investors make investment decisions starting with analyzing the current situation; designing the optimal portfolio; developing investment policies; implementing investment strategies; monitoring and supervising the specific performance of financial managers.

The optimal portfolio varies for each investor. Determination of the optimal portfolio can be obtained using the Markowitz model or the Single Index model. The first step that can be taken to determine the optimal portfolio is to determine the efficient portfolio. An efficient portfolio can provide the largest or smallest expected return with a certain expected return.

5. Conclussion

From the results of the analysis using the Capital Asset Pricing Model (CPAM) on Bisnis-27 Index stocks, it can be concluded that there is a non-linear relationship between systematic risk and expected stock returns, making an important contribution to investment decision making in the Indonesian stock market. For example, the stock of Perusahaan Gas Negara Tbk has the lowest beta coefficient (βi) coefficient is the lowest, only -1.05829 with the highest expected return of 0.110563. This indicates that the stock has a low level of risk and tends to behave passively and is less responsive to changes in market prices. On the other hand, Semen Indonesia (Persero) Tbk stock has the highest beta coefficient (βi) coefficient, reaching 3.327733 with the lowest expected return of -0.11557. This indicates that the stock has a high level of risk, is very active, and is very responsive to price changes. Of the 19 company stocks in the research sample included in Bisnis-27, 8 stocks are categorized as efficient stocks and the remaining 11 company stocks are categorized as inefficient stocks. The shares of companies categorized as efficient stocks include ADRO, AKRA, AMRT, BBNI, BMRI, INKP, JSMR and PGAS. These stocks have an individual rate of return (Ri) is greater than the expected return value ($E(Ri)$) or [$Ri > E(Ri)$]. The investment decision that must be taken by investors is to buy these stocks. Meanwhile, there are 11 stocks that fall into the inefficient category, including ANTM, ASII, BBRI, ICBP, INCO, KLBF, MAPI, MIKA, SMGR and TLKM. These stocks have an individual rate of return (Ri) is smaller than the expected value of return ($E(Ri)$) or [$Ri < E(Ri)$]. The investment decision that investors should make is to sell the stocks before the price drops.

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