Journal of Entrepreneurship, Management, and Industry (JEMI) Vol 07, No. 01, (2024), pp. 9-12
DOI : https://doi.org/10.36782/jemi.v7i1.2459

Investment Decision Using Capital Asset Pricing Model (CAPM) in Oil & Gas Production & Refinery Sectors

Sarastika Dwiputri[1], Jerry Heikal[2]
Bakrie University, Jakarta, Indonesia
Email Address: sarastika.dwiputri@gmail.com, jerry.heikal@bakrie.ac.id

Sumbitted : 2023-10-28 | Reviewed : 2024-01-01 | Accepted : 2024-01-03

Abstract--The primary objective of this study was to explore the utilization of the Capital Asset Pricing Model (CAPM) technique in the analysis of investment decisions, specifically within the Oil & Gas Production & Refinery Sector. Five stocks belonging to this sector were selected for examination, all of which are publicly traded on the Indonesian Stock Exchange (IDX). The study period encompassed November 2022 to October 2023, and the chosen stocks were Astrindo Nusantara Infrastruktur Tbk, Energi Mega Persada Tbk, Medco Energi Internasional Tbk, Super Energy Tbk, and Mitra Investindo Tbk. In this research, linear regression analysis was employed to determine the beta coefficient for the Capital Asset Pricing Model (CAPM) method. This allowed for a comparison between the anticipated returns and the stock market's rate of return during the observation period. The aim was to distinguish between undervalued and overvalued stocks. Data for this analysis was sourced from www.yahoo.finance.com. The findings of the study revealed that four out of the five companies within the Oil & Gas Production & Refinery Sector exceeded the expected returns, indicating that they were undervalued or considered efficient. These companies were Astrindo Nusantara Infrastruktur Tbk, Energi Mega Persada Tbk, Super Energy Tbk, and Mitra Investindo Tbk. On the other hand, Medco Energi Internasional Tbk was categorized as overvalued or inefficient.
Keywords: CAPM (Capital Asset Pricing Model), expected return, beta, undervalued, overvalued, Investment.

Introduction

Investing in the stock market is widely recognized for its potential to yield high returns. Beyond serving as a platform that connects those seeking funds (issuers) with those possessing surplus funds (investors), participating in capital market investments can also generate additional income through capital gains and dividends for investors. Furthermore, the capital market stands as a pivotal economic indicator employed by both domestic and international institutions. When making investment decisions, two critical factors demand consideration: the expected return and the accompanying risk. Investment risk is an inherent aspect that investors must bear due to the inherent uncertainty of future investment returns. Investors continually strive to maximize the anticipated return on each unit of currency invested in securities. Hence, to maximize their returns, it's essential for investors to meticulously assess and estimate all significant factors that could influence their future investment returns.

The Capital Assets Pricing Model (CAPM) can function as a valuable tool to simplify the understanding of complex issues. In predicting expected stock returns, investors commonly rely on the CAPM, a model originally introduced by Sharpe (1964), Lintner (1965), and Mossin (1969) to determine asset prices under equilibrium conditions. The CAPM delineates the relationship between risk and expected returns and is extensively employed in assessing security prices. It furnishes accurate insights into the risk-return relationship of an asset, with stock risk quantified by the beta (β) coefficient. In the CAPM framework, a higher beta coefficient signifies a greater potential return and increased risk. The expected rate of return in CAPM is established through the market return rate, risk-free return rate, and systematic risk (beta).

This study selected five stocks from the Oil & Gas Production & Refinery sector, all of which are publicly traded on the Indonesian Stock Exchange (IDX). The observation period spanned from November 2022 to October 2023, and stock selection was guided by liquidity and market capitalization considerations. By comparing actual returns with expected

ISSN: 2620-777X

returns from companies within the Oil & Gas Production & Refinery sector, the research aimed to employ the CAPM method to predict returns between November 2022 and October 2023.

Literature Review

Capital Market

The capital market has a role in supporting the implementation of national development to increase equality, growth, and stability of the national economy in an era of increasing people's welfare. A capital market is a place where investment instruments are traded. The definition of capital market is more specifically defined as activities related to the public offering and trading of securities in which buyers and sellers engage in trade (buying and selling) of financial securities such as bonds, stocks, and other types of securities, according to the definition. Individuals and institutions participate in the trade, which is conducted on an exchange. Because of the existence of this capital market, people who have extra funds can put those monies to work with the aim of earning a profit.

Investment

Investment involves deferring immediate consumption in order to allocate funds into productive assets for a specific duration. By directing resources into productive assets, the act of delaying current consumption contributes to an overall increase in utility. As per the KBBI (Kamus Besar Bahasa Indonesia), investment is described as the act of committing capital into a business or project with the intention of generating a financial return.

Stocks Investment

Stock investment represents a financial market instrument that signifies an individual's or a business entity's involvement in the capital of a corporation or limited liability company. Stocks typically serve the dual purpose of seeking income and facilitating long-term investments. Furthermore, these stock investments entail the entrusted management of assets or capital deposits by the company, and they are frequently earmarked for specific future objectives.

Return of Investment

Return is the yield derived from an investment, typically expressed as an annual percentage rate. Stock return signifies the profit level achievable by investors who allocate their funds in the capital market. This stock return serves as an indicator of trading activities within the capital market. Return is essentially the outcome stemming from an investment. Returns can manifest as realized returns that have already transpired or anticipated returns that are yet to occur but are expected in the future. The anticipated return represents the profit investors expect to gain in the future, which, in this case, has not materialized as of now. Total return over a specific period encompasses capital gains (or losses) and dividends, in addition to the ratio of periodic cash receipts relative to the investment's price throughout that same period (Jogiyanto, 2009).

Risk of Investment

Investment risk may be described as the variance between the anticipated outcome (expected return) and its actual realization. The greater the disparity, the elevated the level of risk. Regarding the return's definition, a share's return represents the outcome achieved from an investment, computed by comparing the current period's share price with that of the previous period. This can be expressed through the following formula:

$$Rit = \frac{Pt - Pt-1}{Pt-1}$$

ISSN: 2620-777X

Beta

Beta (ß) is employed to assess the level of volatility or variation in returns between a specific stock and the overall market within a defined timeframe. Beta, serving as a systematic risk metric, plays a pivotal role in influencing portfolio returns, as each investment's performance is contingent on its beta, which gauges the fluctuation in returns concerning the market's performance. The formula for determining beta using the single index approach is outlined as follows:

$$\beta i = \frac{n \Sigma R_i R_m - \Sigma R_i \Sigma R_m}{n \Sigma R_m^2 - (\Sigma R_m)^2}$$

Capital Asset Pricing Model (CAPM)

When investors aim to assess the profit potential of their portfolio, they require analytical tools. Sharpe (1964) introduced a Capital Asset Pricing Model (CAPM) focused on the evaluation of individual assets. This theoretical framework is constructed on the basis of simplifying assumptions concerning investors and financially viable investment prospects. When assets are combined into a portfolio, it serves to diminish unsystematic risk, leaving only systematic risks to be valued. In a state of equilibrium, the expected return of each asset (E(Ri)) is essentially a linear function of its systematic risk.

CAPM proves valuable for investors as it aids in quantifying systematic risk and allows for a comparison with the expected return in a stable economic environment. An efficient investment embodies a particular level of risk matched with a corresponding potential for maximum rewards or a specific return level coupled with a minimized risk. For instance, if two investment opportunities yield identical returns but exhibit varying degrees of risk, rational investors would opt for the option with the lower risk level. The CAPM formula is expressed as follows:

$$(R_i) = R_f + ß*(R_m - R_f)$$

Data Observation

The research sample consists of five companies from the Oil & Gas Refinery Production sector that were publicly traded on the Indonesian Stock Exchange during the period spanning from 2022 to 2023. In this quantitative research, a purposive sampling method is employed, involving the selection of a non-random sample based on specific criteria tailored to the research's objectives. The stipulated criteria include that the selected Oil & Gas Refinery Production companies must operate within the Oil & Gas sector and have available data covering a one-year period from November 2022 to October 2023, as detailed in the table provided.

Table 1: Data Sample Observation

Samples: Stocks in Oil & Gas Refinery Production		
No	**Company Name**	**Code**
1	Astrindo Nusantara Infrastruktur Tbk	BIPI
2	Energi Mega Persada Tbk	ENRG
3	Medco Energi Internasional Tbk	MEDC
4	Super Energy Tbk	SURE
5	Mitra Investindo Tbk	MITI

Source: www.yahoo.finance.com

ISSN: 2620-777X

Research Methodology

To investigate the influence of the excess return market on the return of the stock, this research uses CAPM Model using Microsoft excel and phyton tools.

The following are the data analytics techniques in order:

- Calculate the return of individual stocks (Ri)
- Calculate the return of market (RM)
- Calculate the return-free risk (Rf)
- Calculate β (level systematic risk of the individual stocks)
- Calculate the expected return using the CAPM Model

Results and Findings

The calculation of the Individual Stock Return Rate (Ri) yields results by subtracting the share price for the current month from the share price in the preceding month and then comparing it to the share price in the previous month. The following presents the outcomes of the computation of individual stock returns for a selection of five stock samples from Indonesian Oil & Gas Production & Refinery Companies over the timeframe of November 2022 to October 2023. This calculation was conducted utilizing monthly closing price data, with the data sourced from Yahoo Finance.

Table 2. The monthly return of individual stocks (Ri) for the Period of Nov'22 to Oct'23

Monthly Return	CODE				
	BIPI	ENRG	MEDC	SURE	MITI
IndividualStock (Ri)	0.0492576	0.0292824	-0.0127835	0.0222115	0.0033316

As shown in the table above, it is evident that Astrindo Nusantara Infrastruktur Tbk stock exhibits the highest return, while Medco Energi Internasional Tbk stock displays the lowest return.

The IHSG serves as the market index employed in this study to compute market returns (Rm), as it is recognized for its ability to encompass all stock transaction activities on the IDX (Indonesia Stock Exchange). In contrast, for the risk-free rate (Rf), a one-year Government Bond was utilized to determine the Rf.

Table 3. The calculation of Market Return JKSE Period of Nov'22 – Oct'23

Return	CODE				
	BIPI	ENRG	MEDC	SURE	MITI
IndividualStock (Ri)	0,5910911	0,3513889	-0,1534022	0,2665379	0,0399797
Market Return (RM)	0,0244398	0,0244398	0,0244398	0,0244398	0,0244398
Risk-Free Return (Rf)	0,0579000	0,0579000	0,0579000	0,0579000	0,0579000

ISSN: 2620-777X

The link between stock returns and market returns becomes apparent through the computation of Beta. Beta reveals the connection between a stock's return rate and the magnitude of market returns, as it is derived from the ratio of the covariance of stocks with market fluctuations. Furthermore, the CAPM methodology emphasizes the importance of taking Beta into account when assessing a stock because it influences both the volatility in stock prices and the magnitude of the anticipated return.

Below are the outcomes of the systematic risk assessment for the five stocks belonging to Oil & Gas Production & Refinery Companies in this research.

Table 4. The calculation of Systematic Risk of Stock (βi) Period of Nov'22 – Oct'23

Return	CODE				
	BIPI	**ENRG**	**MEDC**	**SURE**	**MITI**
Beta (ßi)	0,8638331	2,0983570	3,0888397	0,0075775	3,5476369

The systematic risk assessment results indicate that Mitra Investindo Tbk has the highest Beta (β), while Super Energy Tbk has the lowest Beta. It's noteworthy that all five companies in question exhibit positive Beta values, implying that Astrindo Nusantara Infrastruktur Tbk, Energi Mega Persada Tbk, Medco Energi Internasional Tbk, Super Energy Tbk, and Mitra Investindo Tbk tend to follow the general trend of the Market Return (RM).

Among them, Energi Mega Persada Tbk, Medco Energi Internasional Tbk, and Mitra Investindo Tbk possess Beta values exceeding 1, suggesting that these stocks move at a swifter pace compared to the market, classifying them as aggressive stocks. On the other hand, Astrindo Nusantara Infrastruktur Tbk and Super Energy Tbk are categorized as defensive stocks as their Beta values are less than 1.

Expected rate of return [E(Ri)] is the amount of profit expected by investors from stock investments made. The CAPM method is used to calculate the expected rate of return using the variables risk free rate of return (Rf), market rate of return (Rm), and systematic risk (β). The results of calculating the expected rate of return from the 5 company shares can be seen in table 5 below.

Table 5. The calculation of Expected Rate of Return E(Ri) Period of Nov'22 – Oct'23

No	Code	Rf	RM	βi	E(Ri)
					Rf+ βi*(RM-Rf)
1	BIPI	0,0579000	0,0244398	0,8638331	0,0289960
2	ENRG	0,0579000	0,0244398	2,0983570	-0,0123114
3	MEDC	0,0579000	0,0244398	3,0888397	-0,0454531
4	SURE	0,0579000	0,0244398	0,0075775	0,0576465
6	MITI	0,0579000	0,0244398	3,5476369	-0,0608045

Based on the above calculations, the stock can be classified by comparing the Ri, E(Ri). If the value of Ri > E(Ri) CAPM, the shares can be classified as a stock with a value undervalued. Whereas if the value of Ri < E(Ri) CAPM, then the shares can be classified as overvalued stocks.

Table 6. Stocks Classification and Recommendation

ISSN: 2620-777X

No	Code	Ri	E(Ri)-CAPM	Result	Share Grouping	Recommendation
1	BIPI	0,5910911	0,0289960	Ri > E(Ri)	Efficient	Buy
2	ENRG	0,3513889	-0,0123114	Ri > E(Ri)	Efficient	Buy
3	MEDC	-0,1534022	-0,0454531	Ri < E(Ri)	Inefficient	Sell
4	SURE	0,2665379	0,0576465	Ri > E(Ri)	Efficient	Buy
5	MITI	0,0399797	-0,0608045	Ri > E(Ri)	Efficient	Buy

Based on the E(Ri) calculation above, four companies that are undervalued are Astrindo Nusantara Infrastruktur Tbk, Energi Mega Persada Tbk, Super Energy Tbk, and Mitra Investindo Tbk. The four stocks can be categorized as trading efficient and feasible to be purchased. At the same time, one company that is not worth buying as they are referred to as overvalued stock is Medco Energi Internasional Tbk.

Conclusion

Based on the findings and the discussions within this study, the conclusion drawn is that the valuation of stocks in the stock market is inherently intricate due to the myriad underlying factors influencing stock value. Efficient stocks refer to stocks with individual return rates surpassing the expected rate of return, denoted as [Ri > E(Ri)]. On the other hand, inefficient stocks pertain to those with individual return values falling short of the anticipated rate of return, indicated as [Ri < E(Ri)]. A recommended action regarding inefficient stocks is to contemplate divesting these shares. Furthermore, the utilization of the CAPM Method can serve as a foundational framework for evaluating investments, benefiting both existing investors and potential investors contemplating stock investments.

Recommendation

Based on the research conducted in this study, the recommendation is as follows: Four of the Oil & Gas Production & Refinery stocks (namely, Astrindo Nusantara Infrastruktur Tbk, Energi Mega Persada Tbk, Super Energy Tbk, and Mitra Investindo Tbk) fall under the category of efficient or undervalued stocks. Consequently, it is advisable for investors to either consider purchasing or retaining these stocks. On the other hand, one company, classified as inefficient or overvalued (Medco Energi Internasional Tbk), is not recommended for purchase, and selling this stock is suggested.

References

Sri Mulyaningsih and Jerry Heikal. (2022). *Investment Decision Using Capital Asset Pricing Model (CAPM) in Indonesia's Banking.* Central Queensland University Australia, Bakrie University, Indonesia.

Alva Edison and Jerry Heikal. (2023*). Investment Decisions on Indonesia Energy Sector Companies By Capital Asset Pricing Model Model*. Master of Management, Haji Agus Salim Institute of Technology and Business Haji Agus Salim Institute of Technology and Business.

Jolanda Refanya Labora and Jerry Haikal. (2022). *The Importance of Investment Decisions Using the Capital Asset Pricing Model (CAPM) In Hospital Stock.* Central Queensland University Australia

Euis Bandawaty. (2020). *Analisis Capital Asset Pricing Model (Capm) Dalam Memprediksi Tingkat Return Saham Kompas 100 Yang Terdaftar Di Bursa Efek Indonesia (Bei) Periode 2013-2017*, Fakultas Ekonomi dan Bisnis Jurusan Manajemen Universitas Islam As-Syafi'iyah, Jakarta .

ISSN: 2620-777X