



Implementation of CAPM in Determination of Stock Investment Decisions in Lq45 Index (Year 2017-2021)

Sustari Alamsyah^{1*}, Nur Isna Inayati², Fahman Nur Rahman³

¹Muhammadiyah Tangerang University, Banten, Indonesia, doni.alamsyah06@gmail.com

²Muhammadiyah Purwokerto University, Jawa Tengah, Indonesia, nurisnainayati@ump.ac.id

³Muhammadiyah Tangerang University, Banten, Indonesia, fahman296@gmail.com

*Corresponding Author: Sustari Alamsyah¹

Abstract: Errors in valuing stock securities result in losses for investors, so a careful assessment must be made so that investments are made right and profitable. The purpose of this study is to determine the stock return and risk using the CAPM method and classify and assess efficient and inefficient stocks in determining investment decisions in the 2017-2021 LQ45 index. This study uses a quantitative descriptive approach. The population in this study are companies listed on the LQ45 index. The sampling technique used purposive sampling and obtained a sample of 26 companies. The results showed that there was a negative or non-linear relationship between beta (β_i) and the expected rate of return [$E(R_i)$]. In addition, there are 16 stocks including efficient stocks and 10 stocks including inefficient stocks. The investment decision that investors must make is to buy efficient stocks and sell inefficient stocks as soon as their value declines.

Keywords: CAPM Method, Beta, LQ45 Index, Efficient Stocks.

INTRODUCTION

The capital market is a financial vehicle that provides funds from lenders to borrowers through securities trading (Adhikara, 2011). For lenders, the capital market is able to provide high returns, while for borrowers it is fast and easy to get funding without having to wait for the proceeds of the sale (Hazny et al., 2020; Simmet & Pohlmeier, 2020). Various financial instruments are traded, such as: stocks, derivatives, and bonds. Its charm is liquidity, where funds can be obtained quickly and easily, investment repositioning, portfolio diversification and securities trading liquidity (Johnstone & Tulig, 2022). Many factors affect investment in the capital market, such as: information, issues, rumors, risks, policies, politics, news, global markets, as well as analysis of market participants in their intentions to invest (Ewald et al., 2022; Johnstone, 2020; Mishra & O'Brien, 2019; Vendrame et al., 2018). The goal is to create prosperity through increasing the value of the portfolio.

One of the securities that investors are most interested in is stocks. Stocks have a high level of liquidity, because they are very easy to convert into cash through the sale of share's

(Lai & Stohs, 2021; Rui et al., 2018). The problem faced by investors in the capital market is the difficulty of determining which shares are considered the most profitable, due to the cognitive limitations of investors in analyzing and interpreting all available information (Guermat, 2014). In addition, the lack of attention of investors to the level of risk faced causes errors in stock selection, the implication is that investors suffer losses. Based on information from liputan6.com (4/7/2022), the JCI plunged in the first week of July 2022 by 3.13%, and the LQ index fell by 45 3.2%, in addition there are still 502 stocks experiencing weakness, 61 experiencing strengthening and 101 stagnant stocks.

Before making investment decisions, investors must analyze and consider all the possibilities faced (Alamsyah & Sarra, 2019). This is based on the initial objective of the investment, namely to obtain the maximum return (Harnovinsah & Alamsyah, 2017). Risk and Return are one of the factors that influence investors in making investments. Basically, the goal of investors to invest is to get a high return with the lowest possible risk. To make the right investment decisions, it is necessary to calculate the estimated return that will be obtained in the future (Alamsyah & Aulia, 2021). One of the estimation calculation methods that is considered the most objective in assessing the feasibility of an investment is by using the Capital Asset Pricing Model (CAPM) method (Mishra & O'Brien, 2019).

Using the CAPM as a balance model, investors may more easily understand how risk and return are related. In order to minimize risky investments, the CAPM is primarily used to calculate the level of expected return. Investors can also benefit from using the CAPM to estimate non-diversified risk in a portfolio and contrast it with the expected rate of return. The variable in the CAPM indicates the risk measure, which is a sign of stock sensitivity (Beta). A security's or portfolio's systematic risk in relation to market risk is measured by beta, which measures the volatility of a security's or portfolio's return to market return (Hartono, 2017: 463). The greater the of a stock, the greater the risk contained in it. Stocks with >1 means the stock is relatively sensitive to market changes, stocks with CAPM calculation is based on a balanced condition. Market equilibrium occurs when the prices of assets are at a level that can no longer provide incentives for speculative trading (Jogiyanto, 2013). Using the Capital Asset Pricing Model, beta () is a measure of stock risk (CAPM). Beta () and the indicators Market Risk (R_m), Risk Free (R_f), and Risk are used to calculate $[E(R_i)]$. In addition, various researches on investment decisions through CAPM still get mixed results such as those conducted by Topowijono and Azizah (2016), Istiqomah and Marsudi (2017), Nurmala and Aryani (2017), Dhita, Deni and Nor (2019), Anisah (2019), Sunarya (2020), and Lestari (2021) (Alqisie & Alqurran, 2021; Dessaint et al., 2021; Lai & Stohs, 2021; Paiva Martins Teixeira et al., 2022; Zhang, 2017). Based on this information, this study aims to examine the implementation of CAPM in determining investment decisions as well as efficient and inefficient stock grouping on LQ45 stocks in 2017-2021.

LITERATUR REVIEW

Prospect Theory

Several explanations have been introduced to explain prospect theory. Prospect theory was first introduced by the authors of Kahneman and Tversky (1979) who developed prospect theory to explain why someone makes certain decisions from a psychological point of view. This is in accordance with the main conclusion of Kahneman and Tversky (1979) which explains that the value function is defined in terms of gain and loss. The value function explains that in making decisions, individuals tend to be risk averse or more reluctant and play safe when in the gain domain and risk seeking or dare to take risks and uncertain things when in the loss domain.

Investation Decision

Investment, according to (Tandelilin, 2010: 2), is the commitment of a number of funds or other resources to what is being done at the present in order to reap a number of benefits in the future. Investors in making an investment decision must carry out an analysis which is generally divided into two, namely technical analysis used for short-term investments and the analysis based on data regarding historical prices that occur in the stock market (Septyanto, 2013). While fundamental analysis is used for long-term investment and the analysis is based on the condition of a company (company finances, macro/micro economic conditions, etc.).

Share

Shares are proof of ownership or participation of the holder in the company that issued the shares (issuer). According to Jogiyanto (2013:141) shares are a sign of equity participation in a limited liability company as it is known that the purpose of investors buying shares is to earn income from these shares. Shares consist of several types of shares which are divided into three views, among others, according to the method of transfer, according to billing rights, and according to trading performance. According to the method of transfer, the shares consist of bearer stocks and registered stocks. Meanwhile, according to billing rights, it consists of common stock and preferred stock. Then according to trading performance, it consists of bluechip stock, income stock, growth stock, cyclical stock, defensive stock, and speculative stock.

Capital Asset Pricing Model (CAPM)

According to Tandelilin (2010), the CAPM is one of the balance models that can identify the relationship between an asset's expected rate of return and risk in a situation when the market is balanced. CAPM is useful for estimating the cost of capital for the company and the return that investors need when investing in company assets.

Conceptual Framework

Investment decisions using the CAPM model must first find the rate of return on individual shares (R_i) for each share. Then calculate the market rate of return (R_m), which is the market profit rate obtained from the difference between the Composite Stock Price Index (JCI) for the current period and the JCI for the previous period. it calculates the systematic risk or beta (β) that comes from the relationship of the rate of return of a stock to the market rate of return. Before calculating the expected rate of return, it must first know the risk-free rate of return (R_f). The next step is to calculate the expected rate of return based on stock price index development. Based on the explanation above, the research framework of this research is as follows:

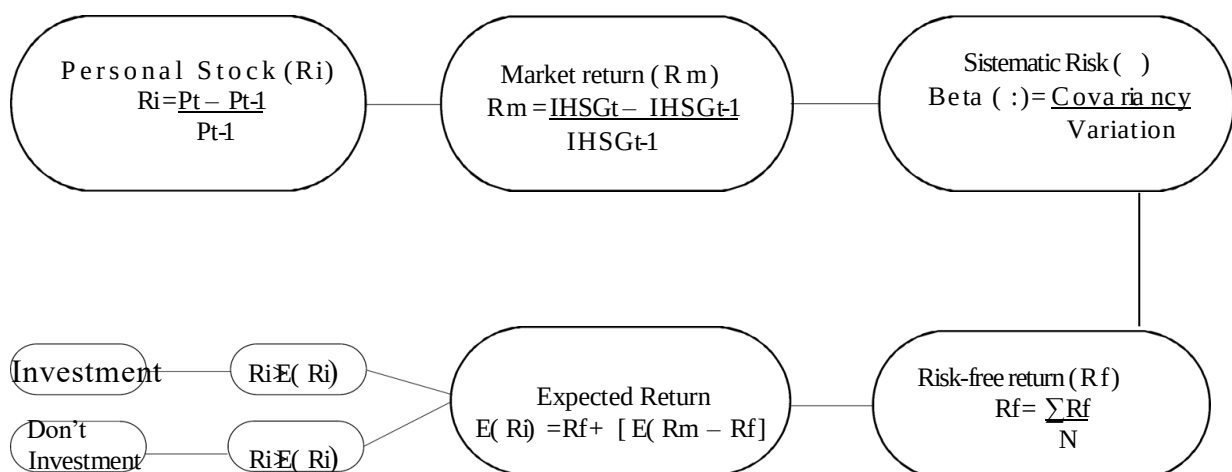


Figure 1. Research Framework

RESEARCH METHODS

This study uses a quantitative method while being descriptive. Descriptive research is a problem formulation related to the assertion of independent variables, either just on one or more variables, according to (Sugiyono, 2015). (independent variables, namely independent variables, not independent variables, because they are always paired with the dependent variable).

Methods, Types and Data Sources

The time series method is the method used in this study, the time series method is a method that is carried out by collecting company stock price data every year within a certain period of time.

Population and Sample

The research population is companies that are included in the LQ45 index in 2017-2021. The technique in taking this sample uses purposive sampling technique, the criteria: 1. Companies listed on the IDX and the LQ45 index in 2017-2021; 2. Companies that have complete closing share price data for 2017-2021; 3. The company entered the LQ45 index consecutively every 6 months during 2017-2021.

Data analysis technique

Individual Stock Returns (R_i)

Individual stock returns are the difference between the current period's stock price and the previous period's yield for investors. Mathematically, according to Jogiyanto (2013:237) stock returns are formulated as follows:

$$R_i = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Information :

- R_i = Return on Shares i in period t
- P_t = Share Price i period t
- P_{t-1} = Share Price i period t-1

Market Return Rate (R_m)

The market rate of return is the market profit rate obtained from the difference between the Composite Stock Price Index (JCI) for the current period and the JCI for the previous period. According to Jogiyanto (2013: 531) the calculation formula is as follows:

$$R_m = \frac{IHS_{Gt} - IHS_{Gt-1}}{IHS_{Gt-1}}$$

Information :

- R_m = Market Return Rate
- JCI = Market Index LQ45 period t
- JCI-1 = Market Index LQ45 period t-1

Risk-Free Rate of Return

The interest rate on government-issued securities, specifically Bank Indonesia Certificates or SBIs, is the measurement foundation for this rate of return (Cherie et al, 2014).

According to (Husnan, 2005) calculate the risk-free rate of return using the following equation:

$$R_f = \frac{\sum R_f}{N}$$

Systematic Risk or Stock Beta

Beta according to Jogiyanto (2013: 405) is a measure of the volatility of a security's return or portfolio return on market returns. According to Jogiyanto (2013: 534) the formula for the systematic risk of each security is as follows:

$$\text{Beta } (\beta) : \frac{\text{Covariansi (Return Asset, Return Market)}}{\text{Variansi (Return Market)}}$$

Expected Rate of Return

The expected rate of return is the expectation of investors or shareholders regarding the actual expected or expected level of profit (Cherie et al, 2014). According to Jogiyanto (2013: 499) the formula for calculating the expected rate of return is as follows:

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

Information :

- $E(R_i)$ = The expected rate of return of the stock
- R_f = Risk-free rate of return
- β_i = Systematic risk
- $E(R_m)$ = The market's expected rate of return

Security Market Line (SML)

The EMS chart is an analysis of the CAPM model that depicts the relationship $[E(R_i)]$ with systematic risk (β). The analysis in SML is that the greater the beta value of a stock, the greater the expected return on investment (JylhÄ, 2018).

Classification of Efficient and Inefficient Stocks as an Investment Decision

Comparing individual returns to the predicted rate of return allows for the evaluation of efficient and inefficient stocks. A stock that is efficient has an individual rate of return that is higher than the projected rate of return and is above the SML line $[R_i > E(R_i)]$. In contrast, inefficient stocks have individual returns that are lower than the SML line and less than the expected rate of return $(R_i < E(R_i))$.

RESULTS AND DISCUSSION

Object of Research

The object of this research is a company listed on the Indonesia Stock Exchange and listed on the LQ45 Index for the 2017-2021 period. The LQ45 index is a collection of the best stocks traded in the capital market and consists of 45 issuers in terms of liquidity. The recorded LQ45 index was selected based on other predetermined criteria. Stock exchange is carried out every 6 months, namely February and August, which means that in 1 year there are 2 changes to the LQ45 Index.

Table 1. Sample Selection Process

No	Criteria	Total
1	The company is listed on LQ45 Index from 2017-2021.	45
2	Companies that have complete closing price data for 2017-2021.	45
3	The company entered the LQ45 Index consecutively every 6 months during 2017-2021.	(19)
Total Shares According to Criteria		26

Data analysis**Individual Shares of Return (Ri)**

The results of the calculation of individual stock returns from 26 LQ45 Index stocks used as research samples are:

Table 2. List of Individual Returns (Ri)

No	Companies	Stock Code	Ri
1	PT Adaro Energy Tbk.	ADRO	0,011813
2	PT AKR Corporindo Tbk.	AKRA	-0,002856
3	PT Telekomunikasi Indonesia (Persero) Tbk.	TLKM	0,002894
4	PT Aneka Tambang (Persero) Tbk.	ANTM	0,030489
5	PT Bank Mandiri (Persero) Tbk.	BMRI	0,009066
6	PT Kalbe Farma Tbk.	KLBF	0,003830
7	PT Bank Central Asia Tbk.	BBCA	0,016259
8	PT Bank Negara Indonesia (Perseo) Tbk.	BBNI	0,009704
9	PT Bank Tabungan Negara (Persero) Tbk.	BBTN	0,011378
10	PT Bank Rakyat Indonesia (Persero) Tbk.	BBRI	0,012882
11	PT Bukit Asam Tbk.	PTBA	0,008539
12	PT Astra International Tbk.	ASII	-0,001757
13	PT Indofood Sukses Makmur Tbk.	INDF	-0,001817
14	PT Vale Indonesia Tbk.	INCO	0,020605
15	PT Indofood CBP Sukses Makmur Tbk.	ICBP	0,002124
16	PT Jasa Marga (Persero) Tbk.	JSMR	0,004911
17	PT United Tractors Tbk.	UNTR	0,004420
18	PT Perusahaan Gas Negara Tbk.	PGAS	-0,000668
19	PT Bumi Serpong Damai Tbk.	BSDE	-0,005462
20	PT Media Nusantara Citra Tbk.	MNCE	-0,001574
21	PT Gudang Garam Tbk.	GGRM	-0,007666
22	PT H.M. Sampoerna Tbk.	HMSP	-0,019697
23	PT Semen Indonesia (Persero) Tbk.	SMGR	0,002439
24	PT Unilever Indonesia Tbk.	UNVR	-0,009682
25	PT Wijaya Karya (Persero) Tbk.	WIKA	-0,001694
26	PT PP (Persero) Tbk.	PTPP	-0,006167

In Table 2. Individual Stock Returns it can be seen that the company with the highest stock return is PT Aneka Tambang (Persero) Tbk (ANTM) with a Ri value of 0.030489 and the lowest Individual Stock Return is PT H.M. Sampoerna Tbk (HMSP) with a Ri value of -0.019697.

Market Return Rate (Rm)

The results of the calculation of the market rate of return (Rm) during the research period from 2017-2021 are:

Table 3. Market Return Results

Month	Rm				
	2017	2018	2019	2020	2021
Jan		0,024430	0,057228	-0,048784	-0,024506
Feb	0,017496	-0,004956	-0,031637	-0,088551	0,035933
Mar	0,032295	-0,085978	0,012862	-0,214205	-0,044414
Apr	0,020867	-0,047003	0,000285	0,032570	-0,010036
Mey	0,018007	-0,005029	-0,035759	0,017081	-0,005684
Jun	0,020800	-0,046792	0,031621	0,041842	-0,049288
Jul	-0,003621	0,027416	0,008353	0,061902	-0,025815
Aug	0,003336	0,019264	-0,026085	0,026376	0,052792
Sep	0,002159	-0,006020	-0,027728	-0,105607	0,032534
Okt	0,013048	-0,024709	0,017239	0,072373	0,064727
Nov	-0,000060	0,047344	-0,028451	0,117090	-0,022686
Dec	0,087919	0,016835	0,060252	0,058694	0,000462
Total					0,140029
Average					0,002373

Source: Data processed by researchers, 2022

Risk-Free Rate of Return

The following is the calculation of the risk-free rate (Rf) during the 2017-2021 research period, namely:

Table 4. Risk Free Rate Results

Month	Interest Rate				
	2017	2018	2019	2020	2021
Jan	4,75%	4,25%	6,00%	5,00%	3,75%
Feb	4,75%	4,25%	6,00%	4,75%	3,50%
Mar	4,75%	4,25%	6,00%	4,50%	3,50%
Apr	4,75%	4,25%	6,00%	4,50%	3,50%
Mey	4,75%	4,75%	6,00%	4,50%	3,50%
Jun	4,75%	5,25%	6,00%	4,25%	3,50%
Jul	4,75%	5,25%	5,75%	4,00%	3,50%
Aug	4,50%	5,50%	5,50%	4,00%	3,50%
Sep	4,25%	5,75%	5,25%	4,00%	3,50%
Okt	4,25%	5,75%	5,00%	4,00%	3,50%
Nov	4,25%	6,00%	5,00%	3,75%	3,50%
Dec	4,25%	6,00%	5,00%	3,75%	3,50%
Total					2,7675
Rf					0,04613

Source: Data processed by researchers, 2022

Systematic Risk or Stock Beta

The results of the calculation of systematic risk (β) by dividing the stock covariance with the market variance. The results of the systematic risk of 26 companies sampled during the 2017-2021 research period are:

Table 5. Results of Stock Systematic Risk

No	Companies	Stock Code	β
1	Adaro Energy Tbk.	ADRO	0,855
2	AKR Corporindo Tbk.	AKRA	1,318
3	Telekomunikasi Indonesia (Persero) Tbk.	TLKM	0,621
4	Aneka Tambang (Persero) Tbk.	ANTM	1,691
5	Bank Mandiri (Persero) Tbk.	BMRI	0,625
6	Kalbe Farma Tbk.	KLBF	0,548
7	Bank Central Asia Tbk.	BBCA	0,814
8	Bank Negara Indonesia (Persero) Tbk.	BBNI	1,817
9	Bank Tabungan Negara (Persero) Tbk.	BBTN	2,145
10	Bank Rakyat Indonesia (Persero) Tbk.	BBRI	1,290
11	Bukit Asam Tbk.	PTBA	0,666
12	Astra International Tbk.	ASII	1,119
13	Indofood Sukses Makmur Tbk.	INDF	0,400
14	Vale Indonesia Tbk.	INCO	1,140
15	Indofood CBP Sukses Makmur Tbk.	ICBP	0,188
16	Jasa Marga (Persero) Tbk.	JSMR	1,318
17	United Tractors Tbk.	UNTR	0,606
18	Perusahaan Gas Negara Tbk.	PGAS	2,104
19	Bumi Serpong Damai Tbk.	BSDE	1,313
20	Media Nusantara Citra Tbk.	MNCE	1,446
21	Gudang Garam Tbk.	GGRM	0,768
22	H.M. Sampoerna Tbk.	HMSP	0,894
23	Semen Indonesia (Persero) Tbk.	SMGR	1,125
24	Unilever Indonesia Tbk.	UNVR	0,382
25	Wijaya Karya (Persero) Tbk.	WIKA	2,109
26	PP (Persero) Tbk.	PTPP	2,710
Total			30,011
Average			1,154

Company name Expected rate of return

The results of the calculation of the expected rate of return from the 26 companies sampled in this study are:

Table 6. Expected Return Results

No	Stock Code	Rf	β_i	E(Rm)	E(Rm)-Rf	$\beta_i * [E(Rm)-Rf]$	E(Ri)
1	ADRO	0,04613	0,855	0,002373	-0,043752	-0,037424	0,008701
2	AKRA	0,04613	1,318	0,002373	-0,043752	-0,057678	-0,011553
3	TLKM	0,04613	0,621	0,002373	-0,043752	-0,027175	0,018950

No	Stock Code	Rf	β_i	E(Rm)	E(Rm)-Rf	$\beta_i \cdot [E(Rm)-Rf]$	E(Ri)
4	ANTM	0,04613	1,691	0,002373	-0,043752	-0,073990	-0,027865
5	BMRI	0,04613	0,625	0,002373	-0,043752	-0,027351	0,018774
6	KLBF	0,04613	0,548	0,002373	-0,043752	-0,023969	0,022156
7	BBCA	0,04613	0,814	0,002373	-0,043752	-0,035619	0,010506
8	BBNI	0,04613	1,817	0,002373	-0,043752	-0,079516	-0,033391
9	BBTN	0,04613	2,145	0,002373	-0,043752	-0,093826	-0,047701
10	BBRI	0,04613	1,290	0,002373	-0,043752	-0,056422	-0,010297
11	PTBA	0,04613	0,666	0,002373	-0,043752	-0,029143	0,016982
12	ASII	0,04613	1,119	0,002373	-0,043752	-0,048937	-0,002812
13	INDF	0,04613	0,400	0,002373	-0,043752	-0,017487	0,028638
14	INCO	0,04613	1,140	0,002373	-0,043752	-0,049863	-0,003738
15	ICBP	0,04613	0,188	0,002373	-0,043752	-0,008235	0,037890
16	JSMR	0,04613	1,318	0,002373	-0,043752	-0,057668	-0,011543
17	UNTR	0,04613	0,606	0,002373	-0,043752	-0,026506	0,019619
18	PGAS	0,04613	2,104	0,002373	-0,043752	-0,092046	-0,045921
19	BSDE	0,04613	1,313	0,002373	-0,043752	-0,057445	-0,011320
20	MNCE	0,04613	1,446	0,002373	-0,043752	-0,063270	-0,017145
21	GGRM	0,04613	0,768	0,002373	-0,043752	-0,033590	0,012535
22	HMSP	0,04613	0,894	0,002373	-0,043752	-0,039128	0,006997
23	SMGR	0,04613	1,125	0,002373	-0,043752	-0,049205	-0,003080
24	UNVR	0,04613	0,382	0,002373	-0,043752	-0,016691	0,029434
25	WIKA	0,04613	2,109	0,002373	-0,043752	-0,092282	-0,046157
26	PTPP	0,04613	2,710	0,002373	-0,043752	-0,118550	-0,072425
Total							-0,113767
Average							-0,004376

Source: data processed by researchers, 2022

Security Market Line (SML)

The link between the size of systematic risk (beta) and the expected rate of return is depicted graphically in the Security Market Line (SML) or Securities Market Line (GPS) of the CAPM model. The 26 businesses that served as research samples are represented in the following EMS chart.

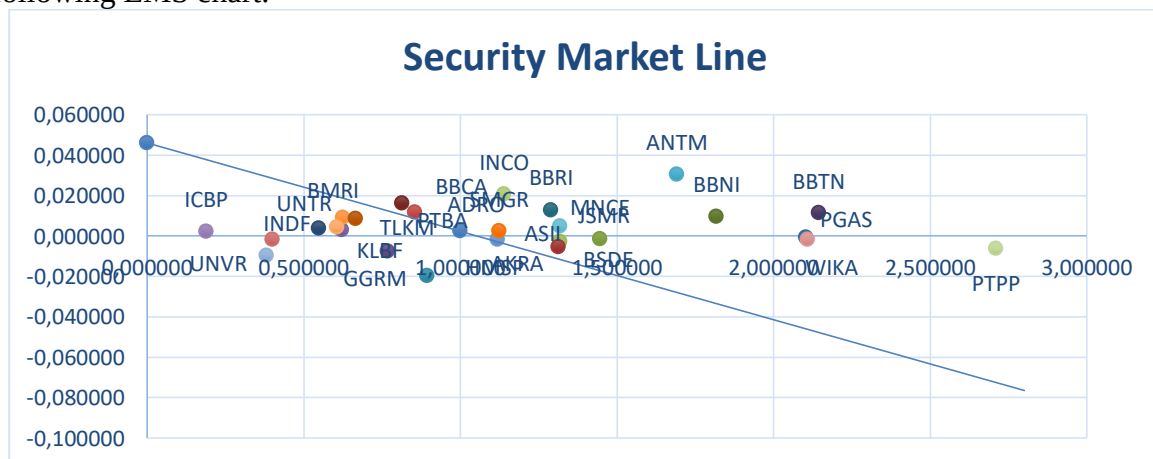


Figure 2. Security Market Line Graph

Classification of Efficient and Inefficient Stocks as an Investment Decision

Effective stocks are those having individual returns higher than the expected rate of return $[(R_i) > E(R_i)]$. While inefficient stocks are those with individual returns that are lower than the expected rate of return $[(R_i) < E(R_i)]$. The 26 stocks that made up the research sample are broken down into their efficient and inefficient stocks in the list below.

Table 7. List of Efficient and Inefficient Stocks

Stock Code	R_i	$E(R_i)$	Stock Evaluation
ADRO	0,011813	0,008701	Efficient
AKRA	-0,002856	-0,011553	Efficient
TLKM	0,002894	0,018950	Not Efficient
ANTM	0,030489	-0,027865	Efficient
BMRI	0,009066	0,018774	Not Efficient
KLBF	0,003830	0,022156	Not Efficient
BBCA	0,016259	0,010506	Efficient
BBNI	0,009704	-0,033391	Efficient
BBTN	0,011378	-0,047701	Efficient
BBRI	0,012882	-0,010297	Efficient
PTBA	0,008539	0,016982	Not Efficient
ASII	-0,001757	-0,002812	Efficient
INDF	-0,001817	0,028638	Not Efficient
INCO	0,020605	-0,003738	Efficient
ICBP	0,002124	0,037890	Not Efficient
JSMR	0,004911	-0,011543	Efficient
UNTR	0,004420	0,019619	Not Efficient
PGAS	-0,000668	-0,045921	Efficient
BSDE	-0,005462	-0,011320	Efficient
MNCE	-0,001574	-0,017145	Efficient
GGRM	-0,007666	0,012535	Not Efficient
HMSR	-0,019697	0,006997	Not Efficient
SMGR	0,002439	-0,003080	Efficient
UNVR	-0,009682	0,029434	Not Efficient
WIKA	-0,001694	-0,046157	Efficient
PTPP	-0,006167	-0,072425	Efficient

Source: Data processed by researchers, 2022

Table 7 shows that there are 16 efficient stocks and 10 inefficient stocks. The standard for making investment selections is to select efficient stocks, or stocks with individual stock returns higher than the expected rate of return $[(R_i) > E(R_i)]$. When making an investment decision, consider purchasing the shares of an efficient company, and when making an investment decision about an inefficient company, consider selling the shares.

CONCLUSIONS AND RECOMMENDATIONS

The data analysis reveals a non-linear link between systematic risk and the anticipated return on stocks. So that it can be interpreted that not all profitable stocks have a high risk, this is an input for investors if they have an adequate understanding of investing in stocks,

then they can invest in shares of companies that have low risk with high returns. In addition, there are 16 stocks which are included in the efficient stock category and 10 stocks which are included in the inefficient stock category. Contribution to investors, namely efficient stock investment decisions taken by investors is to buy these shares. An inefficient stock investment decision taken by investors is to consider selling the stock before the price drops.

Limitations and further studies

The limitations of this study are: 1) The research period was only five years. 2) the research sample is only carried out on the LQ45 Index, preferably all companies listed on the IDX are used. 3) The method used in the assessment is only CAPM, not considering other methods such as litigation risk or company liquidity. In the application of the CAPM method, it is expected to use a market index with a larger number of shares and extend the research period, so that later it will be able to increase knowledge about the CAPM method in determining efficient stock groups.

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