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Analysis of the Capital Asset Pricing Model (CAPM) Method to Determine Investment Options in LQ45 Stocks on the Indonesia Stock Exchange (IDX) for the 2019-2023 Period

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Abstract

Stock valuation is a crucial component of investment analysis, helping investors make informed decisions amid fluctuating market conditions. Despite its popularity, the Capital Asset Pricing Model (CAPM) often yields inconsistent results in practice, especially in emerging markets such as Indonesia. Previous studies have not sufficiently addressed how effectively CAPM distinguishes undervalued and overvalued stocks in the LQ45 Index, which comprises high-capitalization and liquid stocks on the Indonesia Stock Exchange (IDX). This study aims to assess the performance of CAPM in identifying mispriced stocks and guiding portfolio decisions. A total of 23 stocks were selected from the LQ45 Index based on their consistent inclusion from 2019 to 2023 and complete data availability. The analysis utilizes daily closing stock prices, the Jakarta Composite Index (JCI) as a market proxy, and the Bank Indonesia 7-Day Reverse Repo Rate as the risk-free rate. The results reveal six undervalued stocks: PT Aneka Tambang Tbk (ANTM), PT Bank Rakyat Indonesia (Persero) Tbk (BBRI), PT Bank Mandiri (Persero) Tbk (BMRI), PT XL Axiata Tbk (EXCL), PT Hanjaya Mandala Sampoerna Tbk (HMSP), and PT Media Nusantara Citra Tbk (MNCN). Meanwhile, 17 stocks are categorized as overvalued, including PT Adaro Energy Indonesia Tbk (ADRO), PT Astra International Tbk (ASII), PT Bank Central Asia Tbk (BBCA), PT Indofood CBP Sukses Makmur Tbk (ICBP), and others. These findings confirm that CAPM remains a useful tool in valuing stocks and shaping rational investment strategies. The study contributes to a better understanding of CAPM's empirical relevance in emerging capital markets and provides practical insights for investors and financial analysts.

Keywords: *Capital Asset Pricing Model; stock valuation, LQ45 Index; investment strategy; Indonesian capital market*

INTRODUCTION

The capital market in Indonesia has developed into a strategic sector that plays an important role in national economic development. Through various instruments such as stocks, bonds, and mutual funds, the capital market not only provides funding access for companies and infrastructure projects, but also offers investment opportunities for the public. In recent years, investment activities in the capital market have experienced rapid growth, driven by increasing financial literacy, technological advances, and government initiatives (Dewi Lubis et al., 2024).

Data from the Financial Services Authority shows that the stock market sector recorded a significant increase. As of December 28, 2023, the Jakarta Composite Index (JCI) stood at 7,303.89, reflecting a year-to-date increase of 6.62%. Market capitalization reached IDR 11,762

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trillion, growing by 23.82% compared to the previous year. This growth illustrates investors' rising confidence in Indonesia's economic prospects. Furthermore, the number of capital market investors rose sharply from 2.4 million in 2019 to 12.1 million by February 2023 indicating growing public interest in investing, especially among the younger generation under 40 years old.

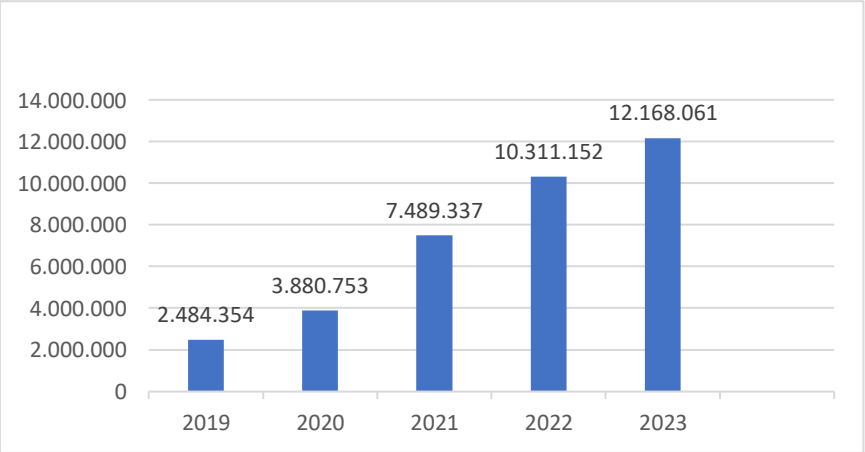

Figure 1. Growth In Capital Market Investors (*Source: www.ksei.co.id)*

Based on the results of the Indonesian Central Securities Depository data above, the growth in the number of capital market investors carried out in 2019 reached 2.4 million, then in 2020 the number of capital market investors increased by 3.8 million. Then in 2021 as much as 7.4 A higher increase in the number of investors occurred in 2021, which reached 7.4 million and continued to grow in February 2023 to 12.1 million investors. By looking at the increasing growth in the number of capital market investors, it can be concluded that Indonesia has its own attraction for investors to invest funds / capital.

Investing in the capital market is currently becoming popular among the public. The investment interest of the Indonesian people also continues to grow over time. This development is evidenced by the increasing number of investors registered in the capital market. Investors in the Indonesian capital market have continued to experience steady growth in recent years, reflecting the increasing public interest in investing in various financial instruments. Based on data recorded at the Indonesian Central Securities Depository (KSEI), the number of investors registered through the Single Investor Identification (SID) has reached 11.72 million as of September 2023. The increase in the number of investors in the last ten months was supported by the growth of mutual fund investors by 14.47% and the increase in the number of investors in Government Securities (SBN) which reached 15.45% (Indonesia, 2023).

In addition, the number of equity investors also experienced a positive development with a growth of 13.27% over the same period. This growth reflects the wider public access to the capital market, which is supported by technological advances as well as various education and socialization initiatives implemented by the government and financial institutions. In addition, digitalization in the investment world also contributed significantly to the increase in the number of investors. Digital-based stock trading platforms make it easier for people to invest, both on a small and large scale (Soraya et al., 2023).

Along with the increasing number of stock investors, the Jakarta Composite Index (JCI) has a very important role as one of the main indicators in the Indonesian capital market (Citra Asmara et al., 2022). The JCI is a stock price index used by the Indonesia Stock Exchange (IDX) as a reference for investors in making investment decisions. With this index, investors can

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understand the trend of stock movements, whether it is increasing, stabilizing, or decreasing. The movement of the JCI is a major factor in the consideration of investors to determine their investment strategy, either in selling, buying, or maintaining their shares.

The relationship between the growth in the number of investors and the movement of the Jakarta Stock Exchange reflects the dynamics of an evolving capital market. The more investors participate in stock trading, the higher the level of transaction activity which affects the movement of the index. Therefore, an understanding of the Jakarta Stock Exchange is very important for investors in making optimal investment decisions in the midst of changing capital market conditions that continue to evolve.

Figure 2 Jakarta Stock Exchange
Source: investing.com

Based on this graph, it can be seen that public interest in investment is increasing. This is shown by the decline in the JCI since 2020, although it had experienced a sharp decline due to the COVID-19 pandemic. In addition, the crisis has also had a significant impact on capital markets in developing countries, especially the Indonesia Stock Exchange (IDX). The covid-19 pandemic in Indonesia directly affects the stock market reaction on the Indonesia Stock Exchange, this causes a change in trading time on the Indonesia Stock Exchange which is a negative signal and triggers investors to sell their share ownership (Annisa et al., 2019). This increase is in line with the government's efforts to encourage early financial literacy. Sri Mulyani Indrawati initiated capital market education starting from the elementary school level, with the hope that the younger generation will be more familiar and involved in stock investment. Overall, despite the global economic challenges, Indonesia's capital market showed solid performance and high optimism, supported by the increasing number of investors and the government's initiatives in strengthening people's financial literacy.

Table 1. Indonesia's Economic Growth

Year	Indonesia's Economic Growth
2019	5.02
2020	-2.07
2021	3.7
2022	5.31
2023	5,05

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Indonesia's economy has shown significant recovery in recent years. After contracting by 2.07% in 2020 due to the COVID-19 pandemic, economic growth rebounded to 3.7% in 2021, 5.31% in 2022, and reached 5.05% in 2023. This recovery was supported by improvements in various sectors, including transportation and storage, which grew by 13.96% in 2023. Along with improving economic conditions, public interest in capital market investment in Indonesia has increased significantly, particularly among younger individuals under the age of 40. This trend reflects improved financial literacy and growing confidence in the country's economic outlook (Indonesia Stock Exchange, 2023). Investment activity has also expanded in response to macroeconomic factors such as inflation, interest rates, and gross domestic product growth. Empirical studies confirm a strong long-term relationship between economic growth and stock market development, where increased economic activity stimulates financial sector expansion.

The Indonesia Stock Exchange continues to serve as a strategic platform for channeling funds into productive sectors, thereby supporting national economic growth (Financial Services Authority, 2023). Among various financial instruments, stocks remain the preferred choice for investors due to their high return potential. In determining investment decisions, investors must consider both expected returns and associated risks. A comprehensive analysis becomes essential to minimize uncertainty and improve portfolio outcomes (Marcella Trianita Abur et al., 2023). One method used to assess the relationship between risk and return is the Capital Asset Pricing Model (CAPM), which serves to measure the returns that should be received by investors based on the level of market risk (Pooja et al., 2024)

One of the most significant indices on the Indonesia Stock Exchange is the LQ45, which consists of 45 stocks with large market capitalization, high liquidity, and strong fundamentals. CAPM is particularly relevant for analyzing LQ45 stocks, as it helps investors determine whether a stock is undervalued or overvalued by linking expected returns to the level of market risk borne (Ye, 2025). The Capital Asset Pricing Model (CAPM) estimates the expected return of risky assets under market equilibrium by linking return to systematic risk (beta), based on a two-period general equilibrium framework (Habis, 2024). This makes CAPM a key tool in modern portfolio management. Stock indices like LQ45 serve strategic roles in reflecting market sentiment, measuring systematic risk, and guiding portfolio diversification (Arifin & Rudianto, 2024). By applying CAPM, investors can better assess risk and refine their investment strategies accordingly.

Based on the explanation above, the author is interested in conducting research related to determining the optimal investment choice. Therefore, this research is aimed at analyzing the optimal investment decisions using the Capital Asset Pricing Model (CAPM) by identifying undervalued and overvalued stocks in the LQ45 Index on the Indonesia Stock Exchange for the period 2019–2023. Through this approach, the study seeks to provide empirical evidence regarding the effectiveness of CAPM in supporting rational portfolio decisions, especially in the context of an emerging capital market.

Literature Review

Capital Asset Pricing Model

Capital Asset Pricing Model is CAPM is an equilibrium model where according to (Yang, 2025)by using the equilibrium model we will be able to understand how investors behave as a whole, as well as the mechanism of price formation and market returns in a simpler form. The equilibrium model can also help us understand how to determine the relevant risk of an asset, as well as the relationship between risk and expected return of an asset when the market is in equilibrium.

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The level of portfolio efficiency is based on the largest expected return with the smallest risk. This can be done by estimating the return of an individual security and determining how much risk is estimated, using an estimation model, namely the Capital Asset Pricing Model (CAPM). The use of CAPM has provided a basis for many investors in understanding the risk problem studied using beta (β), a model that has been used and used in various studies. The purpose of using CAPM is to see the relationship between return and risk, but it can also be used to determine the price of a capital asset, taking into account all the characteristics of the asset. What is meant by the characteristics of the asset is risk (Sudiarti & Doni, 2024)

Return

Return is the result expressed as a percentage of the initial investment capital. Income from stock investment is obtained through profits from stock buying and selling activities. If an investor makes a profit, it is called a capital gain, while if he experiences a loss, it is called a capital loss (Jumintang & Utami, 2022). According to Adriani and Nurjihan (2020), stock returns are income calculated based on a percentage of the initial capital invested. The profit from stock investment comes from the difference between the selling and buying prices of shares, where if it generates profit it is called capital gain, while if it loses it is called capital loss (Nur et al., 2024). Return can be calculated using a certain formula.

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

Where:

P_t = stock price in period t

P_{t-1} = stock price in the previous period (t-1)

Market Return

Market Return is the market rate of return on investment that reflects the average return earned by investors from all assets traded within a certain period. Market Return is calculated based on changes in asset prices in a market index, such as the Jakarta Composite Index, as well as dividends received by investors (Oktavioni, 2018). The author uses the following formula:

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

Where:

IHSGt = Market price on day t

IHSGt-1 = Market price on day t-1

Systematic Risk

Systematic Risk is risk that is affected by changes in the overall market and cannot be eliminated through diversification. One measure of Systematic Risk is Beta, which indicates the responsiveness of a security to market movements (Ross et al., 2010). Beta is calculated by dividing the covariance between asset returns and market returns by the market variance (Fadilah et al., 2023). The higher the Beta, the greater the systematic risk the asset bears, making it an

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important indicator in assessing an investment's exposure to market fluctuations. The following formula is used by the author:

$$\beta i = \frac{\sigma_{im}}{\sigma^2{}_m}$$

Where:

Bi = Beta

σim = covariance

σ2 = market variance

Risk Free Rate

Risk Free Rate is the rate of return on an investment that is not affected by market fluctuations or default risk. In Indonesia, the Risk Free Rate is generally represented by the BI 7-Day Reverse Repo Rate set by Bank Indonesia, as a reference for interest rates on deposits, government bonds, and other financial instruments (Urwah et al., 2024).The author uses the following formula

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

Where:

Rf = risk free rate

n = time period

Expected Return

Expected return is the amount of profit that investors expect to get in a future period of time, based on an analysis of the risks and potential returns of the investment made (Kusumaningrum et al., 2024). Expected return on an asset refers to the level of profit that investors expect to earn in a certain period in the future. The calculation of this value consists of the risk-free rate, which is the rate of return on investments that are considered not risky, which generally uses government bonds (treasury bills) as a reference because they have a very low probability of default. In addition, the expected return also includes the risk premium, which is the difference between the average market return and the risk-free investment return (Antoro & Muchlis, 2024). Here is the formula that the author uses:

$$E(R_i) = \frac{\sum R_{it}}{n}$$

Where:

Rit = stock return in period t

n = time period

Security Market Line

The Security Market Line (SML) is a line that illustrates the relationship between the systematic risk of an asset, as measured by beta, and the expected return of that asset. This line shows the balance between the level of risk and expected return of a stock, so it is often referred to as the Security Market Line (SML) (Suhandi, 2024). The Security Market Line (SML) is used to identify

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whether an asset is undervalued or overvalued. The calculation process starts with determining the rate of return of the risky asset, where the Capital Asset Pricing Model (CAPM) is used to predict future returns. In this analysis, both real rates of return and systematic risk should be part of the consideration in the valuation of an asset. If the estimated rate of return of a security is above the SML, then the asset is categorized as undervalued. Conversely, if the expected rate of return is lower than the SML, then the asset is classified as overvalued (Gracia Nazaretha Nauli br Silitonga & Aziz, 2023).

METHOD

This research uses a descriptive method, which aims to explain various related variables, such as the individual rate of return (Ri), the risk-free rate of return (Rf), the market rate of return (Rm), beta risk (β), and the expected rate of return [$E(Ri)$]. The analysis is carried out scientifically by applying the Capital Asset Pricing Model (CAPM) approach. The research object refers to the subject under study in order to obtain relevant and accurate information. In this study, the object analyzed is the LQ45 Index. The data used are financial reports for the last five years, namely the 2019-2023 period, which are obtained from secondary sources through the official website www.idx.co.id. The unit of analysis used in this study is a group, namely companies that are members of the LQ45 Index on the Indonesia Stock Exchange in the 2019-2023 period. The type of data studied is quantitative data. The data studied in the form of stock prices incorporated in the LQ45 index, the Composite Stock Price Index (JCI) and the risk-free interest rate (BI Rate). The data source in this study uses secondary data. The data used is in the form of a list of stock prices (closing price) incorporated in LQ45, JCI data and interest rates obtained by researchers from the official website, namely www.finance.yahoo.com, www.idx.co.id, www.ksei.co.id, www.ojk.go.id and www.bi.go.id.

Operational Definition of Variables and Indicators

A variable is an attribute or trait or value of people, objects or activities that have certain variations set by researchers to study and then draw conclusions.

Table 2. Operational Definition of Variables and Indicators

Variables	Sub Variables	Indicator	Scale
Capital Asset Pricing Model (CAPM)	• Stock return • Stock risk	• Stock realized return • Market return • Expected market return • Stock beta • Rf Risk free rate • Security Market Line	Ratio

Sample Withdrawal Method

The population used in this study are shares of go public companies listed on the Indonesia Stock Exchange and included in the LQ45 Index group for the research period, namely 2019-2023. The sampling technique in this study used purposive sampling. Purposive sampling is a sampling technique with certain considerations or criteria. The sampling criteria are:

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Table 3. Sampling Method

No	Criteria	Number of Companies
1	Companies listed on the Indonesia Stock Exchange for the period 2019-2023	45
2	Companies that are consistently included in the LQ45 Index for the period 2019-2023	23
3	Companies that have complete historical stock price data for the period 2019-2023	23

The research population is the whole of the objects to be examined in this study, the population is all LQ45 indexed companies listed on the IDX during the 2019-2023 study.

Table 4. Research Population

No.	Code	Company Name
1	ADHI	PT. Adhi Karya (Persero) Tbk
2	ADRO	PT. Adaro Energy Tbk
3	AKRA	PT. AKR Corporindo Tbk
4	ANTM	PT. Aneka Tambang Tbk
5	ASII	PT. Astra Internasional Tbk
6	ASRII	PT Alam Sutera Realty Tbk
7	BBCA	PT Bank Central Asia Tbk
8	BBNI	PT Bank Negara Indonesia (Persero) Tbk
9	BBRI	PT Bank Rakyat Indonesia (Persero) Tbk
10	BBTN	PT Bank Tabungan Negara (Persero) Tbk
11	BKSL	PT Sentul City Tbk
12	BMRI	PT Bank Mandiri (Persero) Tbk
13	BSDE	PT Bumi Serpong Damai Tbk
14	CPIN	PT Charoen Pokphand Indonesia Tbk
15	ELSA	PT Elnusa Tbk
16	EXCL	PT XL Axiata Tbk
17	GGRM	PT Gudang Gudang Tbk
18	HMSP	PT H.M Sampoerna Tbk
19	ICBP	PT Indofood CBP Sukses Makmur Tbk
20	INCO	PT Vale Indonesia Tbk
21	INDF	PT Indofood Sukses Makmur Tbk
22	INDY	PT Indika Energy Tbk
22	INKP	PT Indah Kiat Pulp & Paper Tbk
23	INTP	PT Indocement Tunggal Prakarsa Tbk
24	ITMG	PT Indo Tambangraya Megah Tbk
25	JSMR	PT Jasa Marga (Persero)
26	KLBF	PT Kalbe Farma
27	LPKR	PT Lippo Karawaci Tbk
28	LPPF	PT Matahari Departement Store Tbk
29	MEDC	PT Medco Energi Internasional Tbk
30	MIKA	PT Mitra Keluarga Karyasehat Tbk
31	MNCN	PT Media Nusantara Tbk
32	PGAS	PT Perusahaan Gas Negara (Persero) Tbk
33	PTBA	PT Bukit Asam Tbk
34	PTPP	PT PP (Persero) Tbk

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35	SCMA	PT Surya Citra Media Tbk
36	SMGR	PT Semen Indonesia (Persero) Tbk
37	SRIL	PT Sri Rejeki Isman Tbk
38	SSMS	PT Sawit Sumbermas Sarana Tbk
39	TLKM	PT Telekomunikasi Indonesia (Persero) Tbk
40	TPIA	PT Chandra Asri Petrochemical Tbk
41	UNTR	PT United Tractor Tbk
42	UNVR	PT Unilever Indonesia Tbk
43	WIKA	PT Wijaya karya (Persero) Tbk
44	WSBP	PT Waskita Beton Precast Tbk
45	WSKT	PT Waskita Karya (Persero) Tbk

Based on the sample withdrawal criteria above, there are 23 companies out of 45 companies indexed in LQ45 that will be sampled in this study.

Table 5. Sampling Criteria

No.	Code	Company Name
1	ADRO	PT. Adhi Karya (Persero) Tbk
2	ANTM	PT. Aneka Tambang Tbk
3	ASII	PT. Astra Internasional Tbk
4	BBCA	PT Bank Central Asia Tbk
5	BBNI	PT Bank Negara Indonesia (Persero) Tbk
6	BBRI	PT Bank Rakyat Indonesia (Persero) Tbk
7	BBTN	PT Bank Tabungan Negara (Persero) Tbk
8	BMRI	PT Bank Mandiri (Persero) Tbk
9	EXCL	PT XL Axiata Tbk
10	HMSP	PT H.M Sampoerna Tbk
11	ICBP	PT Indofood CBP Sukses Makmur Tbk
12	INCO	PT Vale Indonesia Tbk
13	INDF	PT Indofood Sukses Makmur Tbk
14	INTP	PT Indocement Tunggal Prakarsa Tbk
15	KLBF	PT Kalbe Farma
16	MNCN	PT Media Nusantara Tbk
17	PGAS	PT Perusahaan Gas Negara (Persero) Tbk
18	PTBA	PT Bukit Asam Tbk
19	SMGR	PT Semen Indonesia (Persero) Tbk
20	TLKM	PT Telekomunikasi Indonesia (Persero) Tbk
21	UNTR	PT United Tractor Tbk
22	UNVR	PT Unilever Indonesia Tbk
23	WIKA	PT Wijaya karya (Persero) Tbk

Source: www.idx.co.id data processed, 2025

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Data Collection Methods

In this research, data is obtained from indirect sources, namely secondary data by collecting data using non-participant observation methods, which are methods of observing, recording, and downloading any data needed based on documents accessed through www.idx.co.id and www.finance.yahoo.com. Meanwhile, data sources and information regarding literature studies are obtained from previous studies, scientific journals, and books relevant to this research. The period of this data collection is 2019-2023.

The data analysis stage in this study was carried out using the Capital Asset Pricing Model (CAPM) method, this method is to determine the return and risk in making investment decisions, for calculations carried out using the Microsoft Excel program to determine the return and risk using the Capital Asset Pricing Model.

RESULTS AND DISCUSSION

Based on the description of the research methodology described in the previous chapter, the following are the results of data collection that has been carried out by researchers. In this study, the unit to be analyzed is the LQ45 indexed companies listed on the Indonesia Stock Exchange. The data used in this study comes from the official website of the Indonesia Stock Exchange, Yahoo Finance, Indonesia Central Securities Depository.

LQ45 indexed companies listed on the Indonesia Stock Exchange in 2019-2023 are 45 companies. However, after sampling by purposive sampling, a sample was obtained that met the criteria in the study, namely 23 companies. With the data collection method carried out, namely through library references and via the internet by downloading on the official website of the Indonesia Stock Exchange (www.idx.co.id) and (www.yahoo.finance.com). The criteria or considerations used by researchers in selecting samples are as follows:

1. Companies listed on the Indonesia Stock Exchange for the period 2019-2023
2. Companies that are consistently included in the LQ45 Index for the period 2019-2023
3. Companies that have complete historical stock price data for the 2019-2023 period.

Based on the above considerations, researchers only use 23 companies out of 68 LQ45 indexed companies listed on the Indonesia Stock Exchange. The following are 23 LQ45 indexed companies listed on the Indonesia Stock Exchange:

Table 6. Data Collection Result

No.	Code	Company Name
1	ADRO	PT. Adhi Karya (Persero) Tbk
2	ANTM	PT. Aneka Tambang Tbk
3	ASII	PT. Astra Internasional Tbk
4	BBCA	PT Bank Central Asia Tbk
5	BBNI	PT Bank Negara Indonesia (Persero) Tbk
6	BBRI	PT Bank Rakyat Indonesia (Persero) Tbk
7	BBTN	PT Bank Tabungan Negara (Persero) Tbk
8	BMRI	PT Bank Mandiri (Persero) Tbk
9	EXCL	PT XL Axiata Tbk
10	HMSP	PT H.M Sampoerna Tbk
11	ICBP	PT Indofood CBP Sukses Makmur Tbk

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12	INCO	PT Vale Indonesia Tbk
13	INDF	PT Indofood Sukses Makmur Tbk
14	INTP	PT Indocement Tunggal Prakarsa Tbk
15	KLBF	PT Kalbe Farma
16	MNCN	PT Media Nusantara Tbk
17	PGAS	PT Perusahaan Gas Negara (Persero) Tbk
18	PTBA	PT Bukit Asam Tbk
19	SMGR	PT Semen Indonesia (Persero) Tbk
20	TLKM	PT Telekomunikasi Indonesia (Persero) Tbk
21	UNTR	PT United Tractor Tbk
22	UNVR	PT Unilever Indonesia Tbk
23	WIKA	PT Wijaya karya (Persero) Tbk

Stock Returns and Risk Using the Capital Asset Pricing Model (CAPM) Method

The ability to estimate the return of an individual security is very important and required by investors. To be able to estimate the return of a security, an estimation model is needed. Therefore, the presence of the Capital Asset Pricing Model (CAPM) that can be used to estimate the return of a security is considered very important in the financial sector. CAPM aims to determine the expected return of a risky investment. In addition, CAPM can help in calculating the risk that cannot be diversified in a portfolio and comparing with the rate of return. The stages in research using the Capital Asset Pricing Model method are as follows:

Individual Stock Rate of Return Analysis (Ri)

Table 7. Daily Return Data of LQ45 Shares for the 2019-2023 Period

Stock Code	**(Ri)**
ADRO	0.00096
ANTM	0.00118
ASII	-0.00009
BBCA	-0.00010
BBNI	-0.00001
BBRI	0.00059
BBTN	-0.00028
BMRI	0.00022
EXCL	0.00037
HMSP	0.00142
ICBP	0.00016
INCO	0.00067
INDF	0.00007
INTP	-0.00023
KLBF	0.00027
MNCN	0.00086
PGAS	-0.00017
PTBA	-0.00012
SMGR	-0.00015
TLKM	0.00022
UNTR	0.00015
UNVR	-0.00059
WIKA	-0.00119

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The data above shows how much the LQ45 individual stock returns are. The company with the largest individual stock return is HMSP stock while the company with the smallest individual stock return is WIKA stock. HMSP shares have an individual stock return of 0.00142 while WIKA shares have an individual stock return of -0.00119. Based on the results of the calculation of the return of 23 stocks above, the stock that has the largest return is HMSP stock, which is 0.00142 or 0.14%, this is due to internal company factors or company fundamentals.

Market Rate of Return Analysis (Rm)

The market rate of return is the rate of return or change in the stock price value index in a market as a whole.

Table 8. Market Return Data 2019-2023

Average	**0.00008**

From the results of the average market return during the study period, the Indonesian capital market generated a market return of 0.00008. Despite the small movement, the Indonesian capital market still shows positive market sentiment in each sector.

Individual Stock Systematic Risk Analysis (β)

Beta is a measure of the sensitivity of a security to the market portfolio.

Table 9. Beta Data of Indexed LQ45 Companies for the Period 2019-2023

Stock Code	Beta
ADRO	1.370000000
ANTM	1.370000000
ASII	0.530000000
BBCA	0.380000000
BBNI	0.840000000
BBRI	0.600000000
BBTN	1.190000000
BMRI	0.570000000
EXCL	0.400000000
HMSP	0.390000000
ICBP	0.030000000
INCO	0.960000000
INDF	0.110000000
INTP	0.600000000
KLBF	0.240000000
MNCN	0.690000000
PGAS	0.870000000
PTBA	0.050000000
SMGR	0.680000000
TLKM	0.300000000
UNTR	0.220000000

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UNVR	0.170000000
WIKA	1.060000000

Based on the stock beta data, the companies with the largest systematic risk are ADRO and ANTM, each with a beta of 1.37. This indicates that if the JCI rises by 1%, the share price of these two companies is expected to rise by 1.37, and conversely if the JCI falls by 1%, the share price is also expected to fall by 1.37. The systematic risk of these two stocks is greater than the market risk. On the other hand, the company with the smallest systematic risk is ICBP, with a beta of 0.03. This means that changes in the JCI barely affect ICBP's share price, so it has a much smaller systematic risk than the market risk.

Stocks with betas close to 1, such as WIKA (1.06) and BBTN (1.19), show stock price movements that are relatively in line with the JCI movement, albeit slightly more volatile. Meanwhile, stocks such as BBCA (0.38), TLKM (0.30), and UNVR (0.17) show lower sensitivity to changes in the JCI, meaning that the systematic risk of these stocks is smaller than the market. Other stocks, such as PGAS (0.87), INCO (0.96), and MNCN (0.69), have betas below 1, indicating that their price movements are still influenced by the JCI, but with lower volatility than the market. PTBA (0.05) and INDF (0.11) fall into the category of stocks with very small beta, so changes in the JCI only have a very minimal impact on their prices. Overall, this data provides a clear picture of the systematic risk level of each stock, which is important for investors to consider in constructing a portfolio based on their risk tolerance and expectations of market conditions.

Risk-Free Asset Rate of Return (Rf) Analysis

Risk-free rate is one of the important components used in the Capital Asset Pricing Model method.

Table 10. Data Risk Free Rate Periode 2019-2023

No.	Month	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023
1	January	6,0000	5,0000	3,7500	3,5000	5,7500
2	February	6,0000	4,7500	3,5000	3,5000	5,7500
3	March	6,0000	4,5000	3,5000	3,5000	5,7500
4	April	6,0000	4,5000	3,5000	3,5000	5,7500
5	May	6,0000	4,5000	3,5000	3,5000	5,7500
6	June	6,0000	4,2500	3,5000	3,5000	5,7500
7	July	5,7500	4,0000	3,5000	3,5000	5,7500
8	August	5,5000	4,0000	3,5000	3,7500	5,7500
9	September	5,2500	4,0000	3,5000	4,2500	5,7500
10	October	5,0000	4,0000	3,5000	4,7500	6,0000
11	November	5,0000	3,7500	3,5000	5,2500	6,0000
12	December	5,0000	3,7500	3,5000	5,5000	6,0000
	Average	5,6250	4,2500	3,5208	4,0000	5,8125
	5-Year Average		4,6417			

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Maximum	6,0000
Minimum	3,5000

Based on the BI 7-Days Reverse Repo Rate (BI7DRR) interest rate data published by Bank Indonesia during the period 2019 to 2023, there is a trend that shows changes in interest rates in response to economic conditions. In 2019, the average annual interest rate was recorded at 5.6250%, with the maximum rate reaching 6.0000% and the minimum 5.0000%.

Analysis of Individual Stock Expected Rate of Return (E(Ri)

Expected return is the expected stock return in the future

Table 11. Individual Stock Daily Expected Return Data 2019-2023 Period

Stock Code	E(Ri)	Beta
ADRO	0,001	0,000729927
ANTM	0,0012	0,000875912
ASII	-0,0001	-0,00018868
BBCA	0,0000	0,00000
BBNI	-0,0001	-0,00011905
BBRI	0,0006	0,001
BBTN	-0,0003	-0,0002521
BMRI	0,0002	0,000350877
EXCL	0,0004	0,001
HMSP	0,0014	0,003589744
ICBP	0,0002	0,006666667
INCO	0,0007	0,000729167
INDF	0,0001	0,000909091
INTP	-0,0002	-0,00033333
KLBF	0,0003	0,00125
MNCN	0,0009	0,001304348
PGAS	-0,0002	-0,00022989
PTBA	-0,0001	-0,002
SMGR	-0,0002	-0,00029412
TLKM	0,0002	0,000666667
UNTR	0,0002	0,000909091
UNVR	-0,0006	-0,00352941
WIKA	-0,0012	-0,00113208

Based on the Expected Return (E(Ri)) data of stocks on the IDXQ30 index calculated using the Capital Asset Pricing Model (CAPM) method, it can be concluded that the stock with the largest Expected Return is HMSP stock with a value of 0.0014, while the stock with the smallest Expected Return is WIKA stock with a value of -0.0012.

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HMSP stock has a positive Expected Return value because its beta is low (0.003589744), which indicates its systematic risk is relatively small. In contrast, WIKA stock has a negative Expected Return due to a higher beta than other stocks (-0.00113208). This relationship indicates that HMSP stocks are expected to provide investors with profits, while WIKA stocks tend to provide potential losses. Overall, this data shows a correlation between systematic risk (beta) and Expected Return. Stocks with low beta tend to have positive Expected Return, reflecting more stable profit potential, while stocks with high beta tend to generate negative Expected Return, reflecting greater risk of loss.

Securities Market Line Analysis (SML)

The Securities Market Line is a line that depicts the relationship between systematic risk and expected return. The line connects the points or stocks and ranks the betas from smallest to largest and their expected returns.

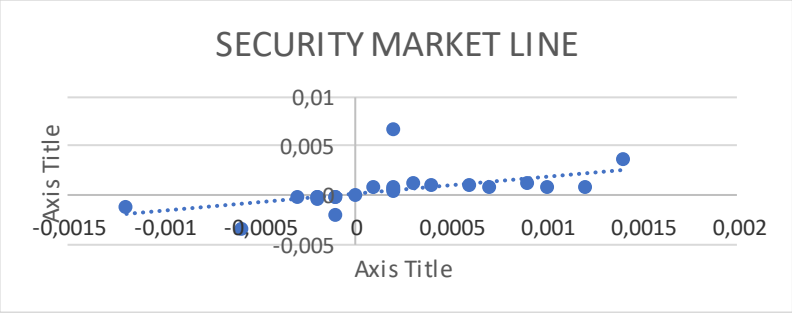

Figure 3. Securities Market Line Analysis

Based on the figure above the Security Market Line (SML) displayed, it can be seen that the trend line shows a positive slope, which is characterized by the direction of the blue dotted line that rises from left to right. This indicates a positive relationship between the systematic risk (beta) shown on the X-axis and the expected rate of return on the Y-axis. This pattern is in accordance with the basic theory of risk-return relationships in the capital market, where the higher the risk taken, the higher the expected return.

The distribution of the data points on the graph shows the variation in the position of the stocks against the SML line. Some data points appear to be above the SML line, which indicates stocks that are undervalued or provide higher returns than they should based on their risk level. Conversely, points below the SML line indicate stocks that are overvalued, where the returns are lower than they should be based on their risk level. This distribution pattern provides important implications for investors in stock selection strategies, where stocks above the SML line may be good candidates for purchase, while stocks below the SML line may need to be avoided or sold.

In a broader economic context, the positive slope of the SML suggests that while the market is still recovering from the COVID-19 pandemic, the market mechanism of compensating for risk continues to function efficiently. The variation in the position of the data points against the SML line also creates an opportunity for investors to make careful stock selection based on their position against the SML line. This shows that despite various external factors affecting the market, the basic principle of risk-return relationship is maintained, where the market provides higher compensation for greater risk.

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Analysis of Undervalued and Overvalued Stock Groups

Undervalued stocks are stocks that have an individual return value greater than the expected return value, while overvalued stocks are stocks that have an individual return smaller than the expected return. These groups of stocks will result in investment decisions for both potential investors and investors who have invested in the capital market. The decision for the overvalued stock group is to sell shares, while the undervalued group is to buy, because the share price that falls into the overvalued group is valued higher in a certain period, and vice versa for the undervalued group is valued lower than the overvalued stocks. Investors who do not yet own stocks belonging to the overvalued group may use the analysis only to find out that the stocks are overvalued. Therefore, the stock group analysis strategy can be used for investment decision making. The following are the results of data processing analysis based on the Capital Asset Pricing Model method, namely:

Table 12. Analysis of Undervalued and Overvalued

No.	Stock Code	Ri	E(Ri)	Results	
				Overvalued	Undervalued
1	ADRO	0,001	0,000729927	✓	
2	ANTM	0,0012	0,000875912		✓
3	ASII	-0,0001	-0,00018868	✓	
4	BBCA	0,0000	0,00000	✓	
5	BBNI	-0,0001	-0,00011905	✓	
6	BBRI	0,0006	0,001		✓
7	BBTN	-0,0003	-0,0002521	✓	
8	BMRI	0,0002	0,000350877		✓
9	EXCL	0,0004	0,001		✓
10	HMSP	0,0014	0,003589744		✓
11	ICBP	0,0002	0,006666667	✓	
12	INCO	0,0007	0,000729167	✓	
13	INDF	0,0001	0,000909091	✓	
14	INTP	-0,0002	-0,00033333	✓	
15	KLBF	0,0003	0,00125	✓	
16	MNCN	0,0009	0,001304348		✓
17	PGAS	-0,0002	-0,00022989	✓	
18	PTBA	-0,0001	-0,002	✓	
19	SMGR	-0,0002	-0,00029412	✓	
20	TLKM	0,0002	0,000666667	✓	
21	UNTR	0,0002	0,000909091	✓	
22	UNVR	-0,0006	-0,00352941	✓	
23	WIKA	-0,0012	-0,00113208	✓	

The table above shows stocks that belong to overvalued and undervalued stock groups. From the analysis of LQ45 stock data processing using the Capital Asset Pricing Model method, the results show that there are 17 overvalued stocks and 6 undervalued stocks. This shows that of the 23 stocks in the LQ45 research sample, more stocks are overvalued than undervalued.

Analysis of Stock Investment Decision Making

One strategy in making investment decisions is stock grouping. The grouping of stocks in this study is divided into two, namely the undervalued stock group and the overvalued stock group.

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Table 13. Analysis of Stock Investment Decision Making

No.	Stock Code	Ri	E(Ri)	Decision
1	ADRO	0,001	0,000729927	Sell
2	ANTM	0,0012	0,000875912	Buy
3	ASII	-0,0001	-0,00018868	Sell
4	BBCA	0,0000	0,00000	Sell
5	BBNI	-0,0001	-0,00011905	Sell
6	BBRI	0,0006	0,001	Buy
7	BBTN	-0,0003	-0,0002521	Sell
8	BMRI	0,0002	0,000350877	Buy
9	EXCL	0,0004	0,001	Buy
10	HMSP	0,0014	0,003589744	Buy
11	ICBP	0,0002	0,006666667	Sell
12	INCO	0,0007	0,000729167	Sell
13	INDF	0,0001	0,000909091	Sell
14	INTP	-0,0002	-0,00033333	Sell
15	KLBF	0,0003	0,00125	Sell
16	MNCN	0,0009	0,001304348	Buy
17	PGAS	-0,0002	-0,00022989	Sell
18	PTBA	-0,0001	-0,002	Sell
19	SMGR	-0,0002	-0,00029412	Sell
20	TLKM	0,0002	0,000666667	Sell
21	UNTR	0,0002	0,000909091	Sell
22	UNVR	-0,0006	-0,00352941	Sell
23	WIKA	-0,0012	-0,00113208	Sell

Based on the results of stock investment analysis using the Capital Asset Pricing Model (CAPM) approach, investment decisions are determined by comparing actual returns (Ri) and expected returns (E(Ri)). If the actual return is greater than the expected return (Ri > E(Ri)), the stock is categorized as undervalued and recommended for purchase. Conversely, if the actual return is less than the expected return (Ri < E(Ri)), the stock is categorized as overvalued and recommended for sale. Out of the 23 stocks analyzed, there are 6 stocks that are categorized as undervalued and recommended for purchase, namely PT Aneka Tambang Tbk (ANTM), PT Bank Rakyat Indonesia (Persero) Tbk (BBRI), PT Bank Mandiri (Persero) Tbk (BMRI), PT XL Axiata Tbk (EXCL), PT Hanjaya Mandala Sampoerna Tbk (HMSP), and PT Media Nusantara Citra Tbk (MNCN).

These stocks show the potential for higher actual returns compared to the returns that should be obtained based on their systematic risk, making them attractive for investment. Meanwhile, 17 other stocks are recommended for sale because they are overvalued, including PT Adaro Energy Indonesia Tbk (ADRO), PT Astra International Tbk (ASII), PT Bank Central Asia Tbk (BBCA), PT Indofood CBP Sukses Makmur Tbk (ICBP), PT Telekomunikasi Indonesia (Persero) Tbk (TLKM), and PT Unilever Indonesia Tbk (UNVR). This indicates that most stocks in the analysis do not provide optimal returns commensurate with the risks borne by investors. Thus, CAPM has proven to be effective in helping investors evaluate the fair value of stocks and establish rational investment strategies based on systematic risk exposure.

CONCLUSION

This study concludes that the Capital Asset Pricing Model method is an effective approach in evaluating the fair value of stocks and assisting in investment decision-making based on the level of systematic risk borne by investors. Out of the twenty-three stocks analyzed in the LQ45 index on the Indonesia Stock Exchange during the period from 2019 to 2023, six stocks were identified as undervalued because they had actual returns higher than expected returns. These stocks are PT Aneka Tambang Tbk (ANTM), PT Bank Rakyat Indonesia (Persero) Tbk (BBRI), PT Bank

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Mandiri (Persero) Tbk (BMRI), PT XL Axiata Tbk (EXCL), PT Hanjaya Mandala Sampoerna Tbk (HMSP), and PT Media Nusantara Citra Tbk (MNCN). These stocks are recommended for purchase as they are deemed capable of providing greater returns than the risks involved. Conversely, seventeen other stocks are categorized as overvalued because their actual returns are below the returns they should receive based on their systematic risk, so it is recommended that they be sold. The results of this study confirm that the Capital Asset Pricing Model can be used practically to help investors identify potential stocks and formulate more optimal investment strategies, especially in the context of Indonesia's dynamic capital market.

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