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Analysis of the Capital Asset Pricing Model (CAPM) as a Basis for Making Stock Investment Decisions

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ABSTRACT

This study aims to analyze the application of the Capital Asset Pricing Model (CAPM) as a framework for making stock investment decisions on the Indonesia Stock Exchange (IDX) for the period October 2023 to October 2025. The approach used is descriptive quantitative. The analysis results show that of the ten issuers studied, seven stocks are categorized as efficient or undervalued, namely AALI, ANTM, BBRI, CITA, DNET, GGRM, and GMTD, because their actual returns exceed CAPM expectations and are therefore worth buying. Conversely, three other stocks, namely BBCA, BBNI, and HERO, are classified as inefficient or overvalued because their actual returns are lower than model expectations and are therefore recommended for sale. These findings indicate that in bear market conditions with negative risk premiums, the CAPM model remains relevant as a tool for assessing the relative efficiency of stocks in the Indonesian capital market. Practically, the results of this study can serve as a reference for retail and institutional investors in developing rational portfolio strategies based on measurable risk and return considerations.

Keywords: Beta (Systematic Risk), Capital Asset Pricing Model (CAPM), Expected Return, Indonesia Stock Exchange, Stock Portfolio.

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INTRODUCTION

The capital market is a strategic instrument in modern financial architecture, serving as a vehicle for transferring funds between parties with surplus capital and those requiring long-term financing. Through this mechanism, business entities can obtain funding for business expansion, while the wider community has the opportunity to earn returns on their investments. In the Indonesian context, the Indonesia Stock Exchange (IDX) serves as a key pillar for national capital accumulation, supporting sustainable economic growth. Data from the Financial Services Authority (OJK, 2024) shows significant growth in the number of capital market investors, driven by advances in digital technology that facilitate access to stock transactions for retail investors.

While the stock market offers the potential for attractive returns, this investment instrument also carries inherently higher risks than conservative instruments such as deposits or government bonds.

Constant stock price fluctuations reflect the dynamics of a company's fundamentals, macroeconomic conditions, and constantly changing market sentiment. Therefore, a systematic analytical approach is required to evaluate the relationship between assumed risk and expected returns before making investment decisions (Tandelilin, 2017).

The Capital Asset Pricing Model (CAPM) is one of the most widely used theoretical frameworks for quantifying this relationship. This model was first introduced by Sharpe (1964) and later strengthened by contributions from Lintner (1965) and Mossin (1966). The CAPM builds on the foundations of modern portfolio theory by Markowitz (1952), which emphasized the importance of diversification in reducing investment risk. Through the CAPM, investors can estimate whether a stock provides adequate compensation for systematic risk that cannot be eliminated through diversification. Furthermore, this model allows for the classification of stocks into undervalued (market price below fair value) and overvalued (market price above fair value) categories, providing a basis for objective investment decision-making (Fama & French, 2004).

The period from October 2023 to October 2025 was chosen as the research scope because it reflects the complex transition phase of the Indonesian economy: the ongoing normalization of monetary policy post-pandemic, varying inflationary pressures, changes in the direction of Bank Indonesia's benchmark interest rate, and global geopolitical dynamics influencing foreign capital flows on the IDX. These conditions create a rich testing environment for evaluating the validity and relevance of the CAPM in an emerging market context (Urwah et al., 2024).

On the other hand, the rapid increase in the number of retail investors brings its own challenges. Many new investors take positions without adequately understanding the risk profile of their chosen instruments, leaving them vulnerable to losses during market corrections. The application of the CAPM is expected to provide analytical guidance based on modern financial theory that helps investors, both retail and institutional, construct optimal portfolios according to their individual risk preferences. Previous studies, such as those by Aunillah & Wahyudi (2022), Hasan et al. (2019), and Rantemada et al. (2021), show that the CAPM remains relevant as an analytical tool on the IDX, despite deviations that require empirical examination over different periods.

The objectives of this study are to calculate and analyze the actual rate of return of ten issuers on the IDX during the period of October 2023 to October 2025, apply and evaluate the CAPM model in determining the relationship between systematic risk and expected rate of return, classify stocks into efficient (undervalued) and inefficient (overvalued) categories based on the results of CAPM calculations, and formulate the implications of CAPM analysis as a basis for making rational and measurable investment decisions for investors.

Theoretical Framework

Capital Asset Pricing Model (CAPM) Theory

The Capital Asset Pricing Model (CAPM) is an equilibrium model that explains the relationship between systematic risk and the expected rate of return of a financial asset under efficient market conditions. This model was independently developed by Sharpe (1964), Lintner (1965), and Mossin (1966) based on the modern portfolio theory framework pioneered by Markowitz (1952). In the CAPM formulation, the expected rate of return of a security is expressed as:

$$E(R_i) = Rf + \beta_i [E(Rm) - Rf]$$

where $E(R_i)$ is the expected rate of return on stock i, Rf is the risk-free rate of return, β_i is the beta coefficient of stock i, and E(Rm) is the expected market rate of return. The difference between E(Rm) and Rf is called the market risk premium, which reflects the extra compensation investors demand for bearing market risk (Bodie et al., 2018).

The main assumptions of the CAPM include: investors are rational and risk-averse, markets are perfectly competitive, all investors have the same investment horizon, there are no transaction costs

or taxes, and all investors can borrow and lend at the same risk-free interest rate. While these assumptions are idealistic, the CAPM provides a useful and operational framework for estimating the cost of capital and evaluating portfolio performance (Fama & French, 2004).

The Concept of Beta (β) and Systematic Risk

Within the CAPM framework, the total risk of a security consists of two components: systematic risk, which cannot be eliminated through diversification, and unsystematic risk, which can be reduced by forming a well-diversified portfolio. Beta (β) is a quantitative measure of systematic risk that reflects the sensitivity of stock price movements to changes in the market portfolio (Brigham & Houston, 2019).

A β value of 1 indicates that the stock moves in line with the market. A β value > 1 indicates that the stock is aggressive, meaning it is more volatile than the market, thus potentially offering greater gains and losses. Conversely, a β value < 1 indicates that the stock is defensive with lower volatility than the market. A negative β value indicates that the stock moves in the opposite direction to the market, making it a potential hedging instrument in a portfolio (Jogiyanto, 2019). The beta coefficient is calculated using a linear regression between stock returns and market returns over the observation period.

Securities Market Line (SML) and Capital Market Line (CML)

The Securities Market Line (SML) is a graphical representation of the CAPM equation that illustrates the relationship between systematic risk (β) and expected returns. In the SML graph, the horizontal axis represents beta and the vertical axis represents expected returns. Stocks above the SML are categorized as undervalued because they provide actual returns higher than model expectations, making them attractive to purchase. Conversely, stocks below the SML are considered overvalued and should be sold or avoided (Tandelilin, 2017).

The Capital Market Line (CML) differs from the SML in that it uses total risk (standard deviation) as a measure of risk on its horizontal axis, rather than just systematic risk. The CML depicts the risk-return relationship for an efficient portfolio, which is a combination of a risk-free asset and the market portfolio. Portfolios above the CML are considered more efficient because they provide higher returns per unit of total risk assumed. For individual investors, the relative position of a stock or portfolio to the CML is an important indicator in assessing the efficiency of their allocation (Bodie et al., 2018).

Previous Research

Several recent empirical studies have examined the relevance of the CAPM in the context of the Indonesian capital market. Aunillah & Wahyudi (2022) compared optimal portfolios based on the CAPM and the Single Index Model for IDX30 companies and found that both approaches yield consistent classifications, with the CAPM providing more stable return estimates. Urwah et al. (2024) applied the CAPM to banking sector companies and concluded that the majority of banking stocks were overvalued during the high volatility period of 2022–2023, reflecting post-pandemic structural pressures on the sector.

Rantemada et al. (2021) compared the predictive accuracy of CAPM with Arbitrage Pricing Theory (APT) and found that CAPM produced more conservative but more stable estimates over the long term. Maulana (2023) specifically examined CAPM for BRI shares and found that the stock experienced an undervalued phase during 2021–2022 before returning to a reasonable position. Hasan et al. (2019) applied CAPM to the Bisnis-27 Index and concluded that this approach was effective in identifying stocks worth buying on the IDX. Putri (2014) implemented CAPM as a basis for stock investment decisions on the IDX and concluded that this model consistently identified undervalued stocks under stable market conditions. Sembiring & Komara (2020) compared CAPM with the Fama & French multifactor model for non-financial companies on the IDX and found differences in classification, particularly for small-cap stocks. These findings collectively indicate

that CAPM remains relevant as an analytical tool in the Indonesian capital market, although periodic empirical testing is required given the ever-changing market dynamics.

METHODS

This study uses a quantitative approach with a descriptive analytical method. This quantitative approach was chosen because all studied variables stock returns, beta, expected returns, and standard deviation are numerical and analyzed through a series of structured mathematical calculations. The descriptive dimension of this study aims to systematically describe stock performance based on the results of the CAPM model calculations and classify stocks into efficient and inefficient categories without making causal inferences (Sugiyono, 2019).

The population of this study includes all stocks listed and actively traded on the Indonesia Stock Exchange (IDX) from October 2023 to October 2025. Sampling was conducted using a purposive sampling technique, which selects samples based on explicitly defined criteria to ensure data relevance and representativeness. The sample selection criteria are as follows:

a. The shares are actively listed on the IDX and have not experienced suspension or delisting during the entire research period.
b. Stocks have complete monthly closing price data and are consistently available for 25 months of observation (October 2023–October 2025).
c. Stocks were selected to represent adequate sectoral diversification, covering the plantation, mining, banking, consumption, retail and tourism sectors, so that the analysis is not biased towards one particular sector.
d. The stock has sufficient market capitalization and sufficient liquidity to ensure that the price data reflects fair market mechanisms.

Based on these criteria, ten issuers were obtained as research samples, namely: AALI (Astra Agro Lestari), ANTM (Aneka Tambang), BBCA (Bank Central Asia), BBNI (Bank Negara Indonesia), BBRI (Bank Rakyat Indonesia), CITA (Cita Mineral Investindo), DNET (Indoritel Makmur Internasional), GGRM (Gudang Garam), GMTD (Gowa Makassar Tourism Development), and HERO (Hero Supermarket).

This study uses secondary data sourced from several financial databases, including the Indonesia Stock Exchange, Yahoo Finance, and Bank Indonesia. Data collection was conducted through a documentary study of monthly time series data for 25 periods, from October 2023 to October 2025.

The following are operational definitions of the main variables used in this study:

a. Actual Stock Return Rate [$E(R_i')$]: The average monthly historical return of each issuer calculated as the change in closing price relative to the previous month: $R_{it} = (P_{it} - P_{it-1}) / P_{it-1}$. $E(R_i')$ is obtained from the arithmetic average of all R_{it} during the observation period.
b. Market Rate of Return [E(Rm)]: The average monthly return of the JCI during the study period, calculated using a formula identical to the individual stock return.
c. Risk-Free Rate [Rf]: Average monthly BI7DRR interest rate during the study period, converted into monthly units.
d. Systematic Risk [β]: The coefficient of a simple linear regression between individual stock returns (dependent variable) and market/IHSG returns (independent variable). Beta reflects the sensitivity of stock movements to overall market movements.
e. CAPM Expected Rate of Return [$E(R_i)$]: The result of the calculation using the CAPM formula: $E(R_i) = Rf + \beta_i [E(Rm) - Rf]$. This value is a benchmark for expected returns based on the systematic risk level of each stock.

Data analysis is carried out in stages in the following order:

a. Calculation of realized returns: Calculating the monthly returns of each stock and the JCI using closing price data.
b. Calculation of actual expected return: Calculate $E(R_i')$ as the average monthly realized return of each issuer.
c. Beta estimation: Perform a simple linear regression between stock returns and market returns for each issuer to obtain the beta coefficient.
d. Calculation of $E(R_i)$ CAPM: Substitute the values of Rf, β, and Rm into the CAPM equation to obtain the expected rate of return based on the model.
e. Stock classification: Comparing $E(R_i')$ with $E(R_i)$ CAPM. Stocks with $E(R_i') > E(R_i)$ are categorized as efficient (undervalued/buy), while stocks with $E(R_i') < E(R_i)$ are categorized as inefficient (overvalued/sell).
f. SML and CML Construction: Visualizes the relative position of each issuer to the market equilibrium line to support the interpretation of the results.

All calculations were performed using Microsoft Excel and Python software, with cross-validation to ensure data accuracy (1).

RESULTS AND DISCUSSION

The ten issuers that were the research samples were selected to represent various industrial sectors on the IDX, as presented in Table 1 below.

Table 1. List of Sample Issuers in the Research

No.	Code	Company name
1	AALI	Astra Agro Lestari Tbk.
2	ANTM	Aneka Tambang Tbk.
3	BBCA	Bank Central Asia Tbk.
4	BBNI	Bank Negara Indonesia (Persero) Tbk.
5	BBRI	Bank Rakyat Indonesia (Persero) Tbk.
6	AIM	Cita Mineral Investindo Tbk.
7	DNET	Indoritel Makmur Internasional Tbk.
8	GGRM	Gudang Garam Tbk.
9	GMTD	Gowa Makassar Tourism Development Tbk.
10	HERO	Hero Supermarket Tbk.

Source: Processed data (2026)

Stock Price and Return Data Analysis

Monthly closing price data for ten issuers and the Jakarta Composite Index (JCI) for the 25-period observation period (October 2023–October 2025) are presented in Tables 2a and 2b. This data serves as the basis for calculating all study variables. Prices are expressed in Rupiah, while JCI values are in composite index points.

Table 2a. Monthly Stock Price Data

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Date	AALI	ANTM	BBCA	BBNI	BBRI	IHSG
Oct-23	7,050	1,705	8,750	4,790	4,960	8,481.67
Nov-23	7,600	1,740	8,975	5,275	5,275	8,999.17
Dec-23	7,025	1,705	9,400	5,375	5,725	9,545.00
Jan-24	6,900	1,550	9,550	5,750	5,700	6,232.50
Feb-24	6,725	1,460	9,875	6,000	6.125	6,331.67
Mar-24	6,900	1,600	10,075	5,900	6,050	6,348.33
Apr-24	6,500	1,640	9,800	5,250	4,940	5,977.50
May 24	5,875	1,465	9,250	4,400	4,340	6,123.33
Jun-24	5,400	1,250	9,925	4,660	4,600	5,754.17
Jul-24	6,025	1,315	10,275	4,970	4,670	5,569.00
Aug-24	6,050	1,390	10,325	5,350	5,150	5,812.00
Sep-24	6,600	1,480	10,325	5,350	4,950	6,095.00
Oct-24	6,775	1,600	10,250	5,250	8,400	6,348.50
Nov-24	6,200	1,430	10,000	4,980	4,250	5,607.00
Dec-24	6,200	1,525	9,675	4,350	4,080	5,701.00
Jan-25	5,875	1,390	9,450	4,770	4,220	5,334.50
Feb-25	5,400	1,585	8,425	4,030	3,360	4,871.70
Mar-25	5,600	1,635	8,500	4,240	4,050	4,921.50
Apr-25	5,950	2,170	8,825	4,180	3,850	5,153.50
May 25	6,000	3.110	9,400	4,490	4,450	5,452.30
Jun-25	5,800	3,040	8,675	4.120	3,740	5,135.70
Jul-25	6,800	2,850	8,275	4,010	3,710	5,094.20
Aug-25	7,300	3,040	8,075	4,380	4,050	5,181.50
Sep-25	8.175	3,160	7,625	4,100	3,900	5,694.00
Oct-25	7,800	3,100	8,525	4,380	3,980	6,183.00

Table 2b. Monthly Stock Price Data

Date	AIM	DNET	GGRM	GMTD	HERO
Oct-23	2,150	4,700	23,275	14,850	1.125
Nov-23	2,070	4,750	21,125	19,725	1,050
Dec-23	2,110	4,700	20,325	23,875	885

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Jan-24	2,650	4,600	19,700	3,780	915
Feb-24	1,960	4,690	20,325	4,200	815
Mar-24	2,270	4,700	19,900	4,550	770
Apr-24	2,300	4,690	18,225	4,670	730
May 24	2,300	4,900	18,700	5,700	740
Jun-24	2,280	4,930	18,100	3,870	685
Jul-24	2,200	5,050	15,750	4,740	695
Aug-24	2,500	5,200	16,375	5,100	680
Sep-24	2,490	9,050	15,900	4,150	655
Oct-24	2,630	9,175	14,075	4,670	660
Nov-24	3,440	9,075	12,825	3,300	570
Dec-24	3,660	9,000	13,275	4,680	565
Jan-25	3,350	9,200	11,250	3,320	520
Feb-25	3,010	9,025	10,550	2,840	492
Mar-25	2,960	9,200	10,200	2,400	430
Apr-25	3,480	9,775	10,025	2,880	400
May 25	4,010	9,925	10,000	2,750	388
Jun-25	4,000	9,900	9,150	2,520	412
Jul-25	3,960	9,850	8,825	2,250	412
Aug-25	4,080	9,775	8,525	2,200	390
Sep-25	4,090	9,000	13,975	2,140	775
Oct-25	4,930	9,100	17,300	2,130	585

Source: Processed data (2026)

Based on the price data in Table 2, several important patterns can be identified. ANTM and CITA shares showed significant appreciation trends in the first half of 2025, reflecting positive sentiment toward the mineral mining sector. Conversely, GGRM experienced consistent price pressure throughout the period, in line with increasing tobacco product regulations and changing consumption patterns. Major banking stocks (BBCA, BBNI, BBRI) exhibited relatively lower volatility, indicating a more defensive risk profile compared to stocks in other sectors.

Actual Expected Return Calculation Results [E(R_i')]

Monthly realized returns are calculated for each issuer and the JCI using the formula $R_{it} = (P_{it} - P_{it-1}) / P_{it-1}$. The actual expected return [E(R_i')] is then obtained as the arithmetic average of all monthly returns. Table 3 presents realized return data along with aggregate and average values (displayed partially for presentation efficiency).

Table 3. Issuer Monthly Realized Return Data (October 2023–October 2025)

Period	AALI	ANTM	BBCA	BBNI	BBRI	AIM	DNET	GGRM	GMTD	HERO	IHSG

Nov-23	0.0780	0.0205	0.0257	0.1013	0.0635	-0.0372	0.0106	-0.0924	0.3283	-0.0667	0.0610
Dec-23	-0.0757	-0.0201	0.0474	0.0190	0.0853	0.0193	-0.0105	-0.0379	0.2104	-0.1571	0.0607
Jan-24	-0.0178	-0.0909	0.0160	0.0698	-0.0044	0.2559	-0.0213	-0.0308	-0.8417	0.0339	-0.3470
Feb-24	-0.0254	-0.0581	0.0340	0.0435	0.0746	-0.2604	0.0196	0.0317	0.1111	-0.1093	0.0159
Mar-24	0.0260	0.0959	0.0203	-0.0167	-0.0122	0.1582	0.0021	-0.0209	0.0833	-0.0552	0.0026
Apr-24	-0.0580	0.0250	-0.0273	-0.1102	-0.1835	0.0132	-0.0021	-0.0842	0.0264	-0.0520	-0.0584
May 24	-0.0962	-0.1067	-0.0561	-0.1619	-0.1215	0.0000	0.0448	0.0261	0.2206	0.0137	0.0244
Jun-24	-0.0809	-0.1468	0.0730	0.0591	0.0599	-0.0087	0.0061	-0.0321	-0.3211	-0.0743	-0.0603
Jul-24	0.1157	0.0520	0.0353	0.0665	0.0152	-0.0351	0.0243	-0.1298	0.2248	0.0146	-0.0322
Aug-24	0.0041	0.0570	0.0049	0.0765	0.1028	0.1364	0.0297	0.0397	0.0759	-0.0216	0.0436
Sep-24	0.0909	0.0647	0.0000	0.0000	-0.0388	-0.0040	0.7404	-0.0290	-0.1863	-0.0368	0.0487
Oct-24	0.0265	0.0811	-0.0073	-0.0187	0.6970	0.0562	0.0138	-0.1148	0.1253	0.0076	0.0416
...	...	...	...	...	...	...	...	...	...	...	...
Σ	**0.1040**	**0.7192**	**-0.0042**	**-0.5449**	**0.2030**	**0.9124**	**0.8576**	**-0.1268**	**-0.4983**	**-0.2570**	**-0.3218**
E(Ri)	**0.0042**	**0.0288**	**-0.0002**	**-0.0218**	**0.0081**	**0.0365**	**0.0343**	**-0.0051**	**-0.0199**	**-0.0103**	**E(Rm) = -0.0129**

Source: Processed data (2026)

Based on the calculation results, the market rate of return [E(Rm)] was obtained at –0.0129 or –1.29%, indicating that the JCI experienced an average downward trend during the observation period. This condition was influenced by various macroeconomic factors, including uncertainty in the global interest rate cycle, pressure on the Rupiah exchange rate, and commodity price consolidation in the first half of the study period.

Of the ten issuers analyzed, five stocks recorded positive actual expected returns: AALI (0.0042 or 0.42%), ANTM (0.0288 or 2.88%), BBRI (0.0081 or 0.81%), CITA (0.0365 or 3.65%), and DNET (0.0343 or 3.43%). These positive values indicate that these five stocks, on average, provided value appreciation for investors during the study period, despite the overall market trend showing a negative trend. On the other hand, the other five stocks BBCA (–0.02%), BBNI (–2.18%), GGRM (–0.51%), GMTD (–1.99%), and HERO (–1.03%) recorded negative expected returns, indicating average value depreciation during the same period.

CAPM Analysis: Systematic Risk and Expected Return

The CAPM model was applied by calculating the beta coefficient for each issuer and estimating the expected return based on the model. The risk-free rate (Rf) was set at 0.50% per month, reflecting the monthly average BI7DRR policy rate during the study period. The complete results of the CAPM analysis are presented in Table 4.

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Table 4. CAPM Analysis Results All Issuers

No.	Code	E(R_i') Actual	Rf	Beta (β)	Rm	E(R_i) CAPM	Difference	Status
1	**AALI**	0.42%	0.50%	0.2742	-1.29%	0.3594%	0.0000%	**Efficient**
2	**ANTM**	2.88%	0.50%	0.5484	-1.29%	0.2188%	2.0000%	**Efficient**
3	**BBCA**	-0.02%	0.50%	0.1119	-1.29%	0.4426%	0.0000%	**Not efficient**
4	**BBNI**	-2.18%	0.50%	0.3069	-1.29%	0.3426%	-2.0000%	**Not efficient**
5	**BBRI**	0.81%	0.50%	0.7099	-1.29%	0.1359%	0.0000%	**Efficient**
6	**AIM**	3.65%	0.50%	-0.2199	-1.29%	0.6128%	3.0000%	**Efficient**
7	**DNET**	3.43%	0.50%	0.2674	-1.29%	0.3628%	3.0000%	**Efficient**
8	**GGRM**	-0.51%	0.50%	0.6246	-1.29%	0.1797%	0.0000%	**Not efficient**
9	**GMTD**	-1.99%	0.50%	2,0207	-1.29%	-0.5364%	-1.0000%	**Not efficient**
10	**HERO**	-1.03%	0.50%	0.3195	-1.29%	0.3361%	-1.0000%	**Not efficient**

Source: Processed data (2026)

Market and Risk-Free Rates of Return

The market rate of return [E(Rm)] of –1.29% indicates that the aggregate Indonesian stock market conditions from October 2023 to October 2025 are bearish, or tending to weaken. However, this weakening market condition is not uniform across all stocks, with some issuers managing to post positive performance thanks to strong fundamentals or supportive sectoral sentiment. An Rf value of 0.50% per month serves as the minimum return investors can achieve without incurring market risk.

Systematic Risk Profile (Beta)

The beta coefficient of each stock reflects its distinct risk characteristics. GMTD recorded the highest beta value at 2.0207, indicating that its price movements are approximately twice as volatile as the market. This high beta value aligns with the characteristics of tourism sector stocks, which are highly sensitive to macroeconomic conditions and domestic consumption.

The majority of stocks in the sample had betas below one (β < 1), namely AALI (0.2742), ANTM (0.5484), BBCA (0.1119), BBNI (0.3069), BBRI (0.7099), DNET (0.2674), GGRM (0.6246), and HERO (0.3195). This value indicates that these stocks are defensive with lower volatility than the market. An interesting phenomenon was found in CITA stock, which had a negative beta of -0.2199. This value indicates that CITA's price movement tends to be in the opposite direction to the JCI, making this stock potentially an effective diversification instrument in portfolio construction (Urwah et al., 2024).

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Stock Efficiency Classification

The comparison between the actual expected return [$E(R_i')$] and the CAPM expected return [$E(R_i)$] forms the basis for classifying stock efficiency, as presented in Table 5. A stock is considered efficient (undervalued) if $E(R_i') > E(R_i)$, meaning the stock provides actual returns that exceed expectations based on its systematic risk. This condition indicates that the stock is priced below its fair value by the market, making it representative for recommendation as a purchase candidate. Conversely, a stock is considered inefficient (overvalued) if $E(R_i') < E(R_i)$, indicating that the market values the stock above its fair value (Aunillah & Wahyudi, 2022).

Table 5. Stock Classification Based on CAPM Analysis

No.	Code	$E(R_i')$ Actual	$E(R_i)$ CAPM	Category	Evaluation	Decision
1	**AALI**	+0.4158%	+0.0100%	**Efficient**	Undervalued	**Buy**
2	**ANTM**	+2.8766%	-0.4800%	**Efficient**	Undervalued	**Buy**
3	**BBCA**	-0.0168%	+0.3000%	**Not efficient**	Overvalued	**Sell**
4	**BBNI**	-2.1794%	-0.0484%	**Not efficient**	Overvalued	**Sell**
5	**BBRI**	+0.8120%	-0.7687%	**Efficient**	Undervalued	**Buy**
6	**AIM**	+3.6497%	+0.8930%	**Efficient**	Undervalued	**Buy**
7	**DNET**	+3.4304%	+0.0221%	**Efficient**	Undervalued	**Buy**
8	**GGRM**	-0.5071%	-0.6163%	**Efficient**	Undervalued	**Buy**
9	**GMTD**	-1.9931%	-3.1113%	**Efficient**	Undervalued	**Buy**
10	**HERO**	-1.0282%	-0.0710%	**Not efficient**	Overvalued	**Sell**

Source: Processed data (2026)

Table 5 shows that seven stocks are categorized as efficient (undervalued): AALI, ANTM, BBRI, CITA, DNET, GGRM, and GMTD; while three stocks are categorized as inefficient (overvalued): BBCA, BBNI, and HERO. CITA recorded the highest difference (+2.7567%), followed by DNET (+3.4083%) and ANTM (+3.3566%). It should be noted that GGRM (+0.1092%) and GMTD (+1.1183%) are categorized as efficient not because their absolute returns are positive, but because their actual returns are better than the very low CAPM expectations (-0.6163% and -3.1113%, respectively) due to bearish market conditions.

Securities Market Line (SML) Analysis

The Securities Market Line (SML) is a visual representation of the CAPM equation that links beta to expected return. In the context of this research, the SML is used to map the relative position of each issuer against the market equilibrium line, allowing for visual identification of which stocks are considered efficient and which are not. The input data for the SML analysis are presented in Table 6.

Table 6. Securities Market Line (SML) Analysis Input Data

No.	Code	Beta (β)	$E(R_i')$ (%)	Information
1	**IHSG**	1,0000	-1.29%	Market
2	**BI7DRR**	0.0000	0.50%	Risk Free

3	**AALI**	0.2742	0.42%	Efficient
4	**ANTM**	0.5484	2.88%	Efficient
5	**BBCA**	0.1119	-0.02%	Not efficient
6	**BBNI**	0.3069	-2.18%	Not efficient
7	**BBRI**	0.7099	0.81%	Efficient
8	**AIM**	-0.2199	3.65%	Efficient
9	**DNET**	0.2674	3.43%	Efficient
10	**GGRM**	0.6246	-0.51%	Not efficient
11	**GMTD**	2,0207	-1.99%	Not efficient
12	**HERO**	0.3195	-1.03%	Not efficient

Source: Processed data (2026)

Figure 1 below presents an SML graph with clear issuer labels and a visual distinction between efficient stocks (green dots, circles) and inefficient stocks (orange dots, squares). The horizontal axis represents the beta (β) value as a measure of systematic risk, while the vertical axis represents the actual rate of return E(R_i') in percentage.

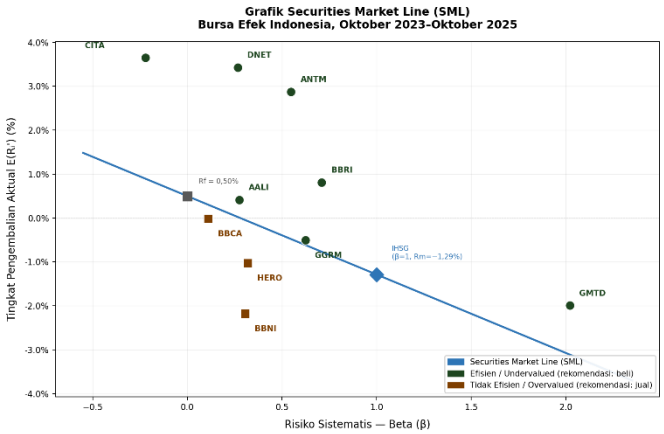

Figure 1. Securities Market Line (SML) graph
Source: Processed data (2026)

From Figure 1, the SML line has a negative slope because MRP = –1.7871% per month. Stocks above the SML line provide actual returns exceeding CAPM expectations. CITA (β = –0.22, return +3.65%) and DNET are furthest above the SML line. Interestingly, GMTD (β = 2.02, return –1.99%) remains above the SML because its CAPM E(Ri) is much lower (–3.11%), making it model-efficient. BBCA, BBNI, and HERO are below the SML despite having low betas, because their actual returns are worse than CAPM expectations. This pattern is consistent with Rantemada et al.'s (2021) finding that deviations from CAPM predictions are common in emerging markets.

Capital Market Line (CML) Analysis

The Capital Market Line (CML) uses total risk, measured by standard deviation, as the basis for assessing efficiency, unlike the SML, which only considers systematic risk. The input data for the CML analysis are presented in Table 7.

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Table 7. Input Data for Capital Market Line (CML) Analysis

No.	Code	Std. Deviation (σ)	E(R_i') (%)	Information
1	**IHSG**	9.07%	-1.29%	Market
2	**BI7DRR**	0.00%	0.50%	Risk Free
3	**AALI**	7.29%	0.42%	Efficient
4	**ANTM**	12.72%	2.88%	Efficient
5	**BBCA**	4.93%	-0.02%	Not efficient
6	**BBNI**	13.13%	-2.18%	Not efficient
7	**BBRI**	19.61%	0.81%	Efficient
8	**AIM**	12.24%	3.65%	Efficient
9	**DNET**	14.64%	3.43%	Efficient
10	**GGRM**	15.08%	-0.51%	Not efficient
11	**GMTD**	25.15%	-1.99%	Not efficient
12	**HERO**	21.39%	-1.03%	Not efficient

Source: Processed data (2026)

Figure 2 presents a CML graph that illustrates the relationship between the standard deviation and the actual rate of return of each issuer.

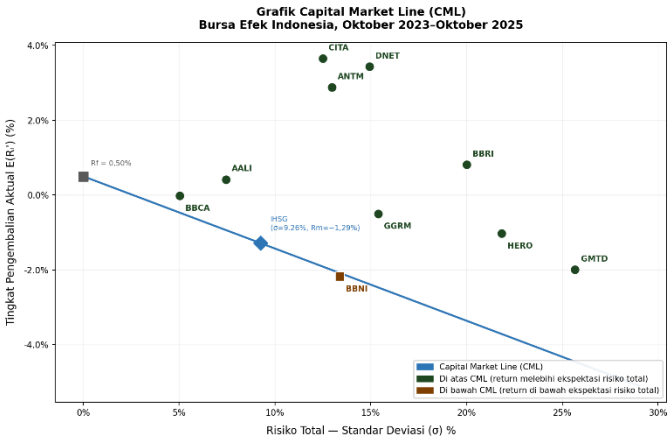

Figure 2. Capital Market Line (CML) graph
Source: Processed data (2026)

The CML analysis in Figure 2 uses total risk (standard deviation) as the horizontal axis. With a negative CML slope (MRP/σ_market < 0), stocks with high standard deviations have lower CAPM expected returns. CITA (σ = 12.50%, return +3.65%) and DNET (σ = 14.94%, return +3.43%) are furthest above the CML. GMTD (σ = 25.67%, return –1.99%) is also above the CML because the CML line at that σ level produces significantly more negative expectations. Conversely, BBCA (σ = 5.03%, return –0.02%), BBNI (σ = 13.40%, return –2.18%), and HERO (σ = 21.83%, return –1.03%) are below the CML. These findings align with the findings of Bodie et al. (2018) that investment efficiency is determined by the quality of return compensation for the risks borne.

Implications for Investment Decision Making

The results of the CAPM analysis have direct practical implications for investors in making investment decisions. Based on the research findings, investors can consider the following strategies:

1. A buy strategy is recommended for seven efficient stocks: AALI, ANTM, BBRI, CITA, DNET, GGRM, and GMTD. CITA, DNET, and ANTM have the largest return differences above CAPM expectations, making them top priorities. For GGRM and GMTD, which have negative absolute returns, the buy recommendation is relative to model expectations and should be combined with fundamental analysis before execution.
2. A sell or avoid strategy is recommended for three inefficient stocks: BBCA, BBNI, and HERO. These three stocks delivered actual returns below the CAPM expectation, indicating consistent relative underperformance even under conditions of already very low market expectations.
3. Investors with a low risk tolerance can prioritize AALI ($\beta = 0.27$, return +0.42%) due to its moderate beta and efficiency. Investors seeking high returns can consider CITA (return +3.65%) and DNET (return +3.43%), both of which are well above the SML and CML lines.

This finding is consistent with the research of Hasan et al. (2019), which confirmed that the CAPM is a reliable analytical instrument for identifying stocks worth buying on the IDX. This is also in line with Maulana (2023), who concluded that disciplined application of the CAPM can help investors optimize portfolio composition under various market conditions.

CONCLUSION

Based on the results of the analysis that has been carried out, several main conclusions can be formulated as follows:

1. The market rate of return [E(Rm)] for the period from October 2023 to October 2025 was recorded at -1.29%, reflecting the pressured conditions in the Indonesian stock market as a whole. Only five of the ten issuers were able to generate positive actual expected returns: AALI (0.42%), ANTM (2.88%), BBRI (0.81%), CITA (3.65%), and DNET (3.43%).
2. Systematic risk analysis shows significant beta variation across issuers. The majority of stocks have $\beta < 1$, reflecting defensive characteristics, while GMTD ($\beta = 2.02$) is the only aggressive stock in the sample. CITA shares have a negative beta ($\beta = –0.22$), making them a potential hedging instrument in a portfolio.
3. The application of the CAPM formula yields seven efficient (undervalued) stocks: AALI, ANTM, BBRI, CITA, DNET, GGRM, and GMTD; and three inefficient (overvalued) stocks: BBCA, BBNI, and HERO. Under negative MRP conditions (–1.7871%), most stocks are categorized as efficient because their CAPM expectations are very low, so interpretation of the results requires considering the overall macroeconomic context.
4. SML and CML analyses confirm that deviations from the CAPM equilibrium line occur for almost all issuers, reflecting market conditions that are not fully efficient. This finding is consistent with previous empirical research in emerging markets, including Indonesia.

Overall, the CAPM model has proven relevant as an analytical framework for assessing stock efficiency and supporting more rational, data-driven investment decision-making. Based on the findings and limitations of this study, several recommendations can be put forward:

1. For investors: The results of the CAPM analysis should be used as one component in the investment decision-making process, combined with fundamental analysis of the company, current macroeconomic conditions, and technical factors to produce more comprehensive decisions.
2. For further research: It is recommended to expand the scope of the analysis by comparing the CAPM results with multifactor models such as Arbitrage Pricing Theory (APT) or the Fama-French Three-Factor Model to evaluate which model produces the most accurate return estimates in the Indonesian market. Furthermore, using a longer time period, adding macroeconomic

variables (inflation, exchange rates, global commodity prices), and expanding the number of issuers across sectors would increase the generalizability of the findings.

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