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Asset Pricing Analysis of Five Indonesian Banking Stocks Using the Capital Asset Pricing Model

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ABSTRACT

Investment decisions regarding stocks require consideration of the relationship between risk levels and expected returns. One approach for analyzing this relationship is the Capital Asset Pricing Model (CAPM), which enables investors to assess stock returns based on systematic risk. This study aims to analyze the pricing of five Indonesian banking stocks using the CAPM approach. The research sample consists of BBCA, BMRI, BBNI, BRIS, and BBRI stocks. The variables analyzed include stock beta, the risk-free interest rate, individual stock returns, and market returns. The results indicate that BBNI stock is undervalued, as its actual return exceeds the return estimated via CAPM. Conversely, BBCA, BMRI, BRIS, and BBRI stocks are classified as overvalued, as their actual returns are lower than the CAPM-estimated returns. The average beta value for all the stocks exceeds 1, indicating that they carry higher systematic risk than the market average. Based on these findings, CAPM serves as a useful analytical tool for evaluating the fairness of stock prices and supporting investment decision-making. BBNI stock is a potential candidate for investor consideration, given that its actual return is relatively higher than the return required under CAPM; meanwhile, the other stocks warrant further scrutiny, as their returns fall below CAPM estimates.

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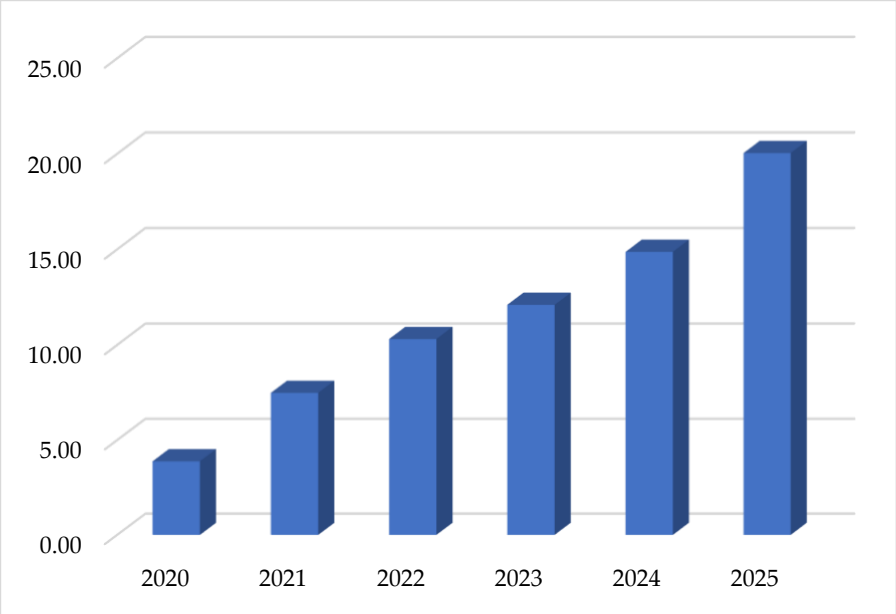
1. INTRODUCTION

Investment is the commitment of funds or capital to an asset for a specific period with the aim of generating future returns. These returns serve as compensation to the investor for the time involved, expected inflation, and the risk or uncertainty borne while the funds are invested (Reilly & Norton, 2007). Investments can be made in real assets, such as gold and property, or in financial assets, such as stocks and other securities. Among the various investment alternatives, stocks offer the potential for returns through price appreciation and dividend payments, yet they also entail risks that must be considered. Therefore, investment decisions regarding stocks should be based on an analysis that elucidates the relationship between risk and return, enabling investors to evaluate the opportunities and risks associated with their chosen stocks (Fama, 1997; Curran & Velic, 2020).

The growth in the number of capital market investors in Indonesia showed significant development during the 2020–2025 period. According to data from the Indonesian Central Securities Depository (KSEI), the number of Single Investor Identification (SID) accounts rose from 3.88 million at the end of 2020 to 7.49 million in 2021. This growth continued as the investor count surpassed the 10 million SID mark in 2022, reaching 10.31 million, before rising to 12.17 million in 2023 and 14.87 million in 2024. By the end of 2025, the number of capital market investors had further increased to 20.35 million SID accounts. This rise reflects expanding public participation in capital market investments, driven in part by easy access to information and digital-based investment services. Demographically, investors aged 30 and under continued to dominate the individual investor base, accounting for 54.23% of the total by the end of 2025 (BEI, 2025).



Source: Processed by the author

Figure 1. Number of Single Investor Identification (SID) in millions

The rise in the number of investors, as illustrated in the graph, reflects increasingly broad public participation in the Indonesian capital market. This growth has also heightened the demand among investors for information and analytical tools to assist them in selecting stocks that align with their risk profiles and expected returns (Lesmana, Ganefi, & Muttaqien, 2025). A likely driver of this growth is the rising interest in investment among the younger generation, facilitated by easy access to information and trading capabilities via various digital platforms. Fintech platforms and investment marketplaces now offer a wide range of products, such as mutual funds and stocks, making investing more convenient. This development increases the need for analytical information that can assist investors in evaluating investment alternatives based on their expected return and risk exposure. Such analysis is particularly relevant to the banking sector, which represents an important component of the Indonesian capital market and includes issuers with different financial and business characteristics (Sharma, Thuraisamy, Madyan, & Laila, 2019). Investors therefore require not only information on historical stock returns but also an understanding of the underlying financial performance and risk characteristics of individual banking companies.

The banking stocks examined in this study comprise BBCA, BMRI, BBNI, BBRI, and BRIS. These five banks exhibit different financial performance characteristics during the 2023–2025 period. As presented in Table 1, credit growth varied considerably across the five banks. BMRI recorded the highest credit growth in 2024 at 19.53%, while BBNI experienced a notable increase from 7.60% in 2023 to 15.90% in 2025. BRIS also maintained relatively strong credit growth, reaching 14.49% in 2025. In contrast, BBCA's credit

growth declined from 13.94% in 2023 to 7.70% in 2025, while BBRI showed fluctuations, declining from 11.20% in 2023 to 6.97% in 2024 before recovering to 12.30% in 2025.

Table 1. Financial Performance of 5 Banks 2023-2025

Bank	Year	Credit Growth	NPL Gross	ROA	CAR
BBCA	2023	13.94%	1.90%	3.60%	29.40%
	2024	13.75%	1.80%	3.90%	29.40%
	2025	7.70%	1.70%	3.90%	29.80%
BMRI	2023	16.31%	1.02%	4.03%	21.48%
	2024	19.53%	0.97%	3.59%	20.10%
	2025	13.41%	0.96%	3.19%	20.40%
BBNI	2023	7.60%	2.14%	2.40%	21.73%
	2024	11.60%	1.97%	2.51%	21.40%
	2025	15.90%	1.90%	2.53%	20.70%
BBRI	2023	11.20%	2.95%	3.90%	27.30%
	2024	6.97%	2.78%	3.00%	26.63%
	2025	12.3%	3.29%	2.70%	23.53%
BRIS	2023	15.70%	2.08%	2.35%	21.04%
	2024	15.92%	1.90%	2.49%	21.40%
	2025	14.49%	1.81%	2.31%	22.00%

Source: Processed by the author

The differences in financial performance provide an important context for examining the behavior of their respective stocks. Strong financial fundamentals, however, do not necessarily translate directly into higher stock returns. Stock prices reflect not only current financial performance but also investors' expectations regarding future earnings, market conditions, interest rates, and systematic risk. Consequently, two banks with relatively similar business activities may exhibit substantially different stock return patterns because investors respond differently to their risk and growth prospects. This distinction provides a rationale for examining the relationship between the realized returns of the five banking stocks and their exposure to market risk.

One approach for evaluating this relationship is the Capital Asset Pricing Model (CAPM). CAPM provides a theoretical framework for estimating the expected return of an asset based on its systematic risk, represented by beta, and the market risk premium (Bodie, Kane, & Marcus, 2018; Bai & Green, 2020). Under the CAPM framework, stocks with higher beta are expected to provide higher returns as compensation for their greater sensitivity to market movements. Therefore, estimating beta and CAPM-based expected return enables investors to assess whether the return generated by a stock is commensurate with the systematic risk borne (Susanti, Astuti, & Supitriyani, 2021).

Previous studies have applied CAPM to Indonesian banking and state-related stocks, but their findings indicate that the relationship between systematic risk and stock returns is not necessarily uniform. Dwijaya, Kasim, & Fitrianingsih (2024), for example, applied CAPM to examine the efficiency of Indonesian state-owned stocks and found differences in systematic risk across the stocks studied. Salim, Rizki, and Rizal (2024) evaluated state-owned stocks during 2021–2023 using beta groupings and portfolio performance measures such as the Sharpe, Treynor, and Jensen indices. Other studies have examined fundamental determinants of stock prices, while Kaluge, Hascaryani, Angraeni, & Kaluge (2025) demonstrated that beta dynamics, investor behavior, and information asymmetry may influence stock returns in the Indonesian market. These findings suggest that the relationship between risk and return in Indonesian equities may not always conform uniformly to CAPM predictions.

Based on this context, there remains a need for empirical analysis that directly compares realized returns with returns required by CAPM across individual banking stocks with different financial characteristics. Such an approach is important because a stock with strong financial performance or a

relatively high historical return does not necessarily provide adequate compensation for the systematic risk assumed by investors. Therefore, this study aims to analyze the asset pricing characteristics of five Indonesian banking stocks, namely BBCA, BMRI, BBNI, BRIS, and BBRI, during the 2020–2025 period using the CAPM approach. The analysis estimates the beta and CAPM-based expected return of each stock and compares the expected return with the realized return to classify the stocks as relatively undervalued or overvalued within the CAPM framework. The findings are expected to provide empirical insights into the risk–return characteristics of Indonesian banking stocks and support investment decision-making based on the relationship between realized return and systematic risk.

2. METHODS

This study employs a quantitative approach to assess the fairness of stock prices. Five Indonesian banking stocks were selected as the sample: BBCA, BMRI, BBNI, BRIS, and BBRI. The variables used as inputs in this study include stock returns, the JCI return (as a proxy for market return), and the Bank Indonesia Certificate (SBI) interest rate (as a proxy for the risk-free asset). The data used is secondary data in the form of a monthly time series spanning 2020 to 2025. This data was obtained from various financial data providers, such as id.investing, Yahoo Finance, and BPS.

Stock price valuation was conducted using the Capital Asset Pricing Model (CAPM). Introduced by Sharpe (1964), Lintner (1965), and Mossin (1966), this model describes the linear relationship between an asset's expected return and its systematic risk under equilibrium conditions. In the context of CAPM, a stock's expected return is mathematically defined by the following equation:

$$E(r_i) = r_f + \big(E(r_m) - r_f\big)\beta_i \tag{1}$$

where $E(r_i)$ is expected return of stock-i, r_f is risk-free rate, $E(r_m)$ is expected return of market index, and β_i is systematic risk of stock- i. The quantity $E(r_m) - r_f$ represents the market risk premium, reflecting the additional rate of return above the risk-free rate that investors demand as compensation for bearing the risk associated with investing in a risky asset or market portfolio.

Beta represents a stock's sensitivity relative to the market index. Beta is calculated by dividing the covariance of the stock return and the market return by the variance of the market return.

$$\beta_i = \frac{Cov(r_i, r_m)}{\sigma_m^2} \tag{2}$$

The relationship between expected return and stock beta can be illustrated by the Security Market Line:

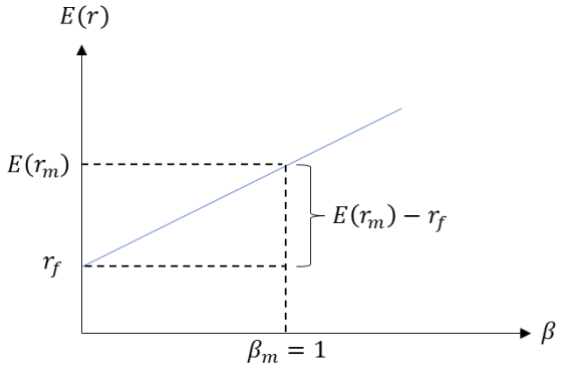


Figure 2. The Security Market Line

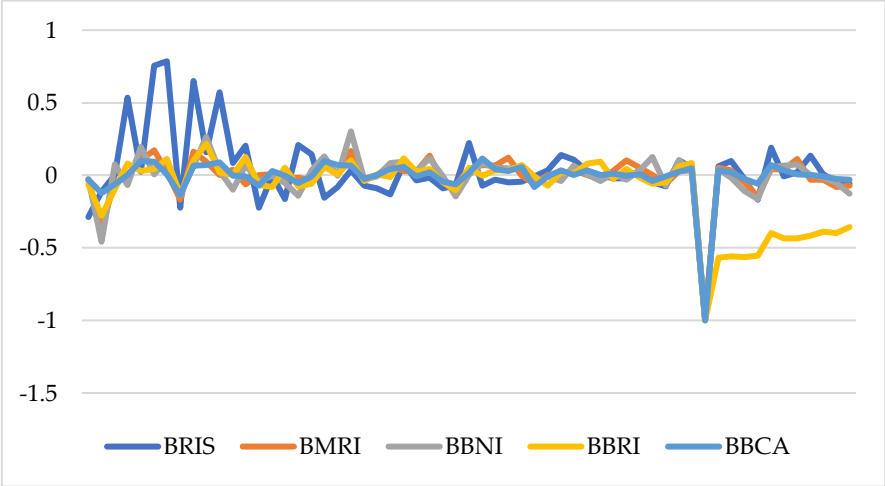
The market beta is equal to 1 because the market serves as the benchmark against which it is measured. Based on statistical formulas, the covariance of an asset with itself, divided by that asset's variance, will always yield a value of 1.

To determine whether a stock is undervalued, we compare the estimated real return (or the investor's expected return derived from fundamental analysis) with the minimum required rate of return calculated using the CAPM formula (Lesmana, Muttaqien, Firjatullah, & Choerunnisa, 2024). A stock is considered undervalued (inexpensive/efficient) if the realized return or individual return (r_i) exceeds the expected return or required rate of return ($E(r_i)$) based on its level of systematic risk. An undervalued stock is priced by the market below its potential return commensurate with its risk, suggesting a potential for the price to rise toward its fair value. On the SML graph, an undervalued stock is positioned above the line, indicating that it offers a higher return relative to its systematic risk. The best decision for an investor regarding this stock is to buy.

3. FINDINGS AND DISCUSSION

Findings

The stock return rate, which reflects the profit earned by investors over an investment period, is calculated using a simple method. First, we take the stock's closing price for a specific month and subtract the closing price from the previous month. Next, the result of this subtraction is divided by the stock's closing price for the month under analysis. This method allows us to effectively evaluate the return rate of individual stocks.



Source: Processed by the author

Figure 3. The Rate of Return

Based on the monthly returns obtained, the average actual return is calculated using the arithmetic mean, that is, by summing all the returns and dividing the total by the number of periods.

Table 2. Actual Average Return

No	Stock	Average Return
1	BBCA	-0.90%
2	BMRI	-0.77%
3	BBNI	-0.83%
4	BRIS	3.43%
5	BBRI	-9.53%

Source: Processed by the author

A distinct performance gap is evident among banking stocks. BRIS was the only stock to record a positive average return of 3.43%, whereas BBCA, BMRI, and BBNI posted negative returns that were relatively close to one another, specifically −0.90%, −0.77%, and −0.83%, respectively. This indicates that, despite operating within the same sector, each stock elicited a different market response during the observation period. Notably, BBRI exhibited an average return of −9.53%, significantly lower than the others, suggesting a pattern of return movements characterized by greater extremes. Overall, these findings highlight performance heterogeneity among banking stocks; consequently, investment evaluations should not rely solely on average returns but must also take into account the specific risk characteristics and movement patterns of each stock.

The stock risk considered relevant in the CAPM is systematic risk, measured by beta, whereas non-systematic risk becomes zero due to the effects of diversification. Estimation of beta and expected return CAPM are calculated based on Equations (1) and (2). The results are as follows:

Table 3. Beta and Expected Return

No	Stock	Beta	Expected Return
1	BBCA	1.0063	0.35%
2	BMRI	1.6917	0.64%
3	BBNI	2.1963	1.00%
4	BRIS	2.6279	0.38%
5	BBRI	1.6917	-2.62%

Source: Processed by the author

Estimation results indicate that all stocks have positive beta values; BBCA has the lowest beta at 1.0063, while BRIS has the highest at 2.6279. These beta values demonstrate that the sensitivity of stock returns to changes in market returns varies among the issuers. BBCA exhibits systematic risk characteristics that most closely mirror market movements, whereas BMRI, BBNI, BRIS, and BBRI show higher sensitivity to market fluctuations, particularly BRIS and BBNI.

BBNI yielded the highest expected return at 1%, followed by BMRI at 0.64%, BRIS at 0.38%, and BBCA at 0.35%. Interestingly, this pattern does not fully align with the magnitude of the beta values. For instance, BRIS had the highest beta at 2.6279 yet an expected return of only 0.38%, whereas BBNI, with a beta of 2.1963, generated an expected return of 1%. Furthermore, BBRI had a beta of 1.6917 but yielded a negative expected return of −2.62%. These findings indicate that, within the scope of this study's estimates, high systematic risk does not automatically result in a higher expected return. When viewed alongside previous findings, the discrepancy between average actual returns and CAPM-based expected returns becomes particularly intriguing, as it reveals a gap between historical stock performance and the return theoretically required based on the stock's level of systematic risk. This gap can subsequently serve as a basis for evaluating whether each stock provides a return that adequately compensates investors for the risks borne.

To assess whether a stock is overvalued, undervalued, or fairly valued, we need to compare the actual average return in Table 2 with the CAPM expected return in Table 3.

Table 4. Asset Pricing

No	Stock	Average Return	Expected Return	Pricing Category
1	BBCA	-0.90%	0.35%	Overvalued
2	BMRI	-0.77%	0.64%	Overvalued
3	BBNI	-0.83%	1.00%	Undervalued
4	BRIS	3.43%	0.38%	Overvalued
5	BBRI	-9.53%	-2.62%	Overvalued

Source: Processed by the author

Comparing average actual returns with CAPM-based expected returns provides insight into the relative positioning of each stock in terms of market valuation. The analysis reveals that BBCA, BMRI, BRIS, and BBRI are classified as overvalued, whereas BBNI is classified as undervalued. This classification indicates that the actual returns of the first four stocks fall below the return levels required based on their systematic risk, while BBNI generates an actual return that is relatively higher than its CAPM-based expected return. These findings reinforce the conclusion that a high beta value is not necessarily accompanied by a commensurate actual return performance. Within the CAPM framework, overvalued stocks can be viewed as failing to provide adequate return compensation for the systematic risk borne by investors, whereas BBNI presents the opposite scenario. Consequently, these results highlight a discrepancy between realized investor returns and the returns theoretically required by market risk levels, a factor that can inform investment decision-making.

Discussion

The research results indicate that the five banking stocks under observation exhibited heterogeneous risk-return characteristics during the 2020–2025 period. This is evidenced by variations in actual returns, betas, and CAPM-based expected returns, as well as by the stock classifications derived from comparing these metrics. BRIS was the only stock to generate a positive average actual return, whereas BBCA, BMRI, BBNI, and most notably, BBRI, recorded negative actual returns. When compared against CAPM expected returns, BBNI was classified as undervalued, while BBCA, BMRI, BRIS, and BBRI were classified as overvalued. Thus, the study fulfills its objective of evaluating stock performance not merely based on historical returns, but also by considering the return compensation theoretically required for systematic risk. Interestingly, the findings demonstrate that a stock with a relatively high actual return is not necessarily the most attractive option from a CAPM perspective. For instance, while BRIS posted the highest actual return and the highest beta (2.6279), it was still classified as overvalued because its actual return did not exceed the return required by the model. Conversely, BBNI with a beta of 2.1963 generated a CAPM expected return of 1% and was classified as undervalued. This pattern illustrates that evaluating stocks based solely on returns can lead to different conclusions when systematic risk is factored into the analysis.

These findings align with the research of Wijaya & Ferrari (2020), which demonstrates that the CAPM can be used to distinguish between efficient and inefficient banking stocks based on a comparison of actual returns and expected returns. In their study of 40 banking stocks listed on the Indonesia Stock Exchange (IDX), 31 stocks were classified as efficient because their actual returns exceeded the returns required by the CAPM. These results are also consistent with the findings of Mulyaningsih & Heikal (2022), who found that the CAPM classifies banking stocks in Indonesia as either undervalued or overvalued; specifically, two of the six digital banks studied were categorized as undervalued, while the other four were overvalued. These similarities reinforce the argument that the discrepancy between actual returns and CAPM-required returns can provide additional information for evaluating banking stock investment alternatives.

However, the results of this study cannot be fully interpreted as evidence that the CAPM explains the entirety of the variation in stock returns. Empirical literature indicates that the relationship between beta and returns is not always stable. Adrian & Franzoni (2009), for instance, demonstrate that factor loadings, or betas, can vary over time; consequently, relying on a constant historical beta may yield expected return estimates that diverge from the risk conditions faced by investors during specific periods. This is particularly relevant to the present study, as the 2020–2025 timeframe encompasses vastly different market conditions, ranging from periods of market stress to economic recovery. Regarding banking stocks specifically, Bartram et al. show that betas can undergo structural changes over time, implying that the banking sector's systematic risk is not necessarily constant. Furthermore, Viale, Kolari, & Fraser (2009) found that models incorporating factors beyond the CAPM, such as yield curve shifts, offer superior explanatory power regarding the cross-section of bank stock returns. Therefore, the "overvalued" classification in this study should be understood as a relative indication

based on the CAPM, rather than an absolute conclusion that the stock's market price is fundamentally excessive.

From a practical standpoint, the research findings indicate that investors should not rely solely on historical returns when selecting banking stocks. BBNI presents an interesting case, as its actual return exceeded the return required by the CAPM; conversely, BRIS exhibited a different phenomenon: despite having the highest actual return, its high beta resulted in a high required return, causing the stock to be classified as overvalued. These findings imply that high returns do not necessarily equate to an attractive stock from a risk-adjusted perspective. Meanwhile, the results for BBRI showing an actual return far below the CAPM-expected return, warrant cautious interpretation; the data should be cross-verified regarding return calculations, corporate action adjustments, and data consistency, given the extreme magnitude of the deviation compared to other stocks. Future research could expand the analysis by employing time-varying beta, the Fama–French model, or other multi-factor models, as well as incorporating macroeconomic variables such as interest rates and yield curve shifts. Such an approach would help determine whether the observed mispricing patterns persist when stock risk is not represented solely by market beta.

4. CONCLUSION

This study concludes that the five Indonesian banking stocks exhibit heterogeneous risk–return characteristics during the 2020–2025 period, indicating that operating within the same banking industry does not necessarily result in similar investment performance. The CAPM analysis further demonstrates that systematic risk alone does not consistently translate into higher realized returns, as differences in beta and CAPM-based expected return are not fully reflected in the historical performance of the stocks. The comparison between realized and CAPM-required returns identifies BBNI as relatively undervalued, while BBCA, BMRI, BRIS, and BBRI are classified as relatively overvalued within the CAPM framework. These findings imply that stock selection should not rely solely on historical return or financial performance, but should also consider the extent to which the realized return compensates investors for systematic risk. At the same time, the findings should be interpreted within the assumptions and limitations of CAPM, particularly because stock returns may also be influenced by firm-specific factors, macroeconomic conditions, investor behavior, and time-varying risk exposures. Future research should therefore extend the analysis by employing time-varying beta and multifactor asset pricing models, such as the Fama–French model, and by incorporating macroeconomic and firm-specific variables to obtain a more comprehensive explanation of banking stock returns. Further research is also warranted to examine whether the classification of stocks as relatively undervalued or overvalued remains stable across different market regimes and investment horizons.

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