Ekuitas: Jurnal Ekonomi dan Keuangan **p-ISSN 2548 – 298X**
Akreditasi No. 158/E/KPT/2021 **e-ISSN 2548 – 5024**
DOI: 10.24034/j25485024.y2024.v8.i2.6283

CAPITAL ASSET PRICING MODEL VERSUS ARBITRAGE PRICING THEORY MODEL: WHICH IS MORE ACCURATE FOR INVESTMENT?

Rosdiana
rosdianakoe01@gmail.com
Nuku University Tidore
Muhammad Irfai Sohilauw
Economic STIEM Bongaya Makassar

ABSTRAK

Industri makanan dan minuman menjadi prioritas para investor, baik domestik maupun internasional. Untuk memitigasi risiko investasi, analisis risiko dan pengembalian yang menyeluruh sangat penting, dengan menggunakan model seperti Capital Asset Pricing Model (CAPM) dan Arbitrage Pricing Theory (APT). Penelitian ini bertujuan untuk menilai keakuratan prediksi model CAPM dan APT mengenai return saham sektor makanan dan minuman. Metode penelitian menggunakan data kuantitatif dari sumber sekunder dan pendekatan penelitian deskriptif, penelitian difokuskan pada 26 sampel dari 89 populasi perusahaan makanan dan minuman yang terdaftar di Bursa Efek Indonesia (BEI) pada bulan Maretl 2020 hingga Mei 2023. Hasilnya menunjukkan bahwa model CAPM mengungguli model APT, dengan variabel return pasar muncul sebagai prediktor paling andal untuk menganalisis return saham. Pembahasan penelitian, 16 perusahaan menunjukkan return aktual positif, sedangkan 11 perusahaan menunjukkan return negatif. Penelitian ini unik karena memelopori penilaian akurasi antara model CAPM dan APT, khususnya dalam konteks perusahaan makanan dan minuman yang terdaftar di Bursa Efek Indonesia (BEI).

Kata kunci: risiko, pengembalian, investasi.

ABSTRACT

The food and beverage industry has become a focal point for investors, both domestically and internationally because it has the opportunity to provide greater returns. Mitigating investment risks with a thorough risk and return analysis is imperative, employing models like the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT). This study aims to assess the predictive accuracy of the CAPM and APT models concerning stock returns within the food and beverage sector. The research method utilizes quantitative data from secondary sources and a descriptive research approach; the study focused on 26 samples out of 89 food and beverage companies listed on the Indonesia Stock Exchange (IDX) from March 2020 to May 2023. The results indicate that the CAPM model outperforms the APT model, with market return variables emerging as the most reliable predictor for analyzing stock returns. Research discussion: 16 companies exhibited positive actual returns, while 11 experienced negative returns. This research is unique because it pioneered the assessment of accuracy between the CAPM and APT models, particularly within the context of food and beverage companies listed on the Indonesia Stock Exchange (IDX)

Key words: risk, return, investment.

INTRODUCTION

Investment is a strategy every investor employs to attain the desired level of profit or return. This, of course, is the primary allure for entrepreneurs to attract as many investors as possible. Investors possess ownership of shares in a company due to various investments made, and each investor anticipates the highest rate of return or profit. Every business encompasses systematic (non-diversifiable) and unsystematic (diversifiable) risks. The linear relationship

between risk and return signifies that higher expected returns entail greater risk (Sartono, 2010). In general, all investors tend to be averse to risk. An essential benchmark to evaluate a company's financial performance is its financial statements and stock prices. If economic reports demonstrate consistent profits for at least the last five years and share prices are high, it can be concluded that the industry/company is a viable investment prospect (Wardhania et al.,,, 2021).

The food and beverage industry is currently a favored domestic and international investment sector due to its priority in development and contribution as a cornerstone to Indonesia's manufacturing and economic growth. Lifestyle changes and elevated activity levels, particularly amongst homemakers, have led to significant annual growth in the food and beverage industry. In 2020, there were 32 industries, increasing to 72 in 2021 and 84 in 2022. This progression profoundly impacts economic growth, leading to increased Gross Domestic Product (GDP) receipts in the non-oil and gas processing industry, particularly within the food and beverage sector. The Gross Regional Domestic Product (GRDP) receipts from the food and beverage industry at current prices (in billions of rupiah) for 2020 amounted to IDR 1,057,000.70, exhibiting a 5.74% increase in 2021 to IDR 1,121,362.00 and a subsequent 9.43% increase in 2022, totaling IDR 1,238,099.10 (BPS Indonesia). While this growth positively impacts Indonesia's economy, the risks stemming from the burgeoning food and beverage industry could be detrimental to underprepared businesses facing fierce competition, affecting the expected returns for investors.

Investors can minimize accepted risk levels by conducting risk and return analyses using CAPM and APT models. The CAPM model postulates that a single factor influences stock return levels: the market risk premium (R_M). In contrast, the APT model considers several macroeconomic factors, such as Inflation, currency exchange rates, and interest rates (Alshomaly, 2018). These two models are related because the return given to investors on their investment is determined by market risk and influential macroeconomic factors such as Inflation, currency exchange rates, and interest rates.

The differences between these two models arise from research findings that show comparisons between the two, while others show no significant differences or confirm the superiority of the APT model. Yunita et al.,, (2019) studied LQ45 stocks during the 2015-2019 period and found CAPM more accurate than APT in predicting return. Lemiyana (2015) and Safitri et al., (2018) focused on Jakarta Islamic Index (JII) shares and expressed the same opinion. Other researchers (Indra, 2018; Wardhania et al.,, 2021; Komaini et al.,, 2017; Rantemada et al.,, 2021; Wahyuny and Gunarsih, 2020) reported the CAPM model's superior accuracy in predicting different stock indices, ranging from Indonesian sharia stocks to pharmaceutical stocks, MNC36 shares, and manufacturing stocks listed on the Indonesia Stock Exchange. In contrast, Hartoyo et al., (2016) found that the two models were not different after researching all IDX stocks using random sampling. Similarly, research by Ibrahim et al., (2016) and Prasetyo and Adib (2016) on LQ45 found the same results that the two models were similar for expected returns. Kisman and Restiyanita (2015), Laia and Saerang (2015), Putra et al., (2023) conducted research on IDX-listed companies in different periods, discovering that the APT model outperformed the CAPM model.

Given the context mentioned above, further research regarding comparing the two models requires reexamination due to gaps in previous studies. No prior research has exclusively focused on the food and beverage industry for 2020-2023 while investigating the variable with the greatest influence on stock returns. Therefore, researchers are motivated to examine stocks in the food and beverage industry, posing whether a significant difference exists between the CAPM and APT models in predicting stock returns and identifying the

primary predictor. This study aims to analyze disparities between the CAPM and APT models in predicting stock returns and ascertain the most influential predictor in stock return predictions. Consequently, the benefits of this research encompass 1) Guiding companies in making improved financial decisions related to stock investments, 2) Providing investors with reference material for making informed investment choices, and 3) Contributing to developing financial management knowledge and serving as a reference for future researchers.

THEORETICAL REVIEW

Capital Asset Pricing Model (CAPM)

The world of investment is tempting because it can provide returns greater than expected if investors can provide appropriate analysis in assessing investments. One of the balance models used in this assessment is the Capital Asset Pricing Model (CAPM), first introduced by Markowitz in 1952 and then developed by Sharp in 1964. CAPM has become a benchmark for modern finance because, with this model, investors can determine which portfolio. Optimal means a portfolio investment that can provide an optimum and minimum risk. This model also gives investors an understanding of how to calculate or estimate the rate of return and determine the relevant investment risk, as well as the relationship between return and risk in a balanced market situation. Several assumptions in the CAPM suggest that investors will choose investments that provide a greater rate of return and avoid high-risk investments because investors generally do not like risk. Investors have the same risk-free interest rate, no transaction costs and no inflation (Desiyanti, 2017).

The CAPM assumption is considered unrealistic when related to the current situation because not all information can be known by the general public, especially investors; there is confidential information, so it is not for public consumption. Likewise, with risk-free interest, transaction costs, and Inflation, which are still valid today, but with CAPM analysis, it is hoped that investors will get an idea of the relationship between risk and realistic return in the complex investment world. The relationship between risk and return on securities inefficient portfolios and individual assets is described in the following security market line (SML).

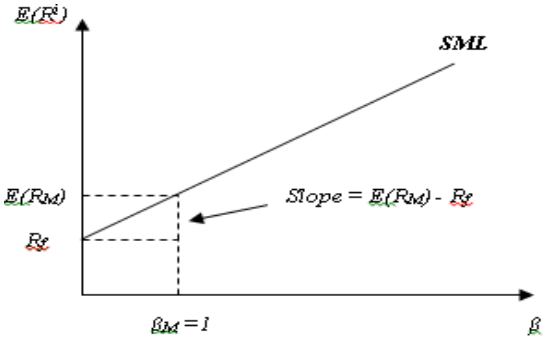

Figure 1
Security Market Line (SML)
Source: Husnan (2015)

Figure 1 shows that in the comparative analysis between actual return (R_i) and expected return $(E(R_i))$, several variables are related to each other, namely market return (R_M), risk-free interest (R_f) and systematic risk (β) and the basis for investment selection is determined by the relevant risk level, namely systematic risk because this risk cannot be diversified. Therefore, the SML line has a positive direction, which means that return and risk have a linear relationship.

The relationship between expected returns and systematic risk is formulated in the CAPM equation (Fama and French, 2004; Akpo et al.,, 2015):

$E(R_i) = R_f + \beta_i[E(R_M - R_f)], i = 1 \ldots N$ ….(1)

where $E(R_i)$ = Expected rate of return, R_f = Risk-free return, β_i= Beta coefficient of an asset or a portfolio, and $E(R_M)$ = Expected return on the market portfolio.

There are additional assumptions that complement the weaknesses of the CAPM balance model, which several parties have criticized. Namely, the first assumption pertains to equilibrium pricing, setting the asset price at $t-1$ to calculate the asset return

from $t-1$ to t. Another assumption imposes the same Rf on all investors, as illustrated in the following figure 2.

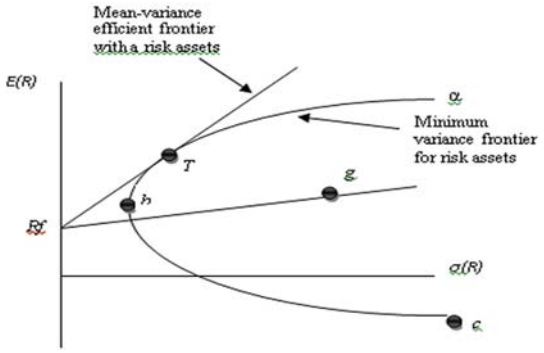

Figure 2
Investment Opportunities
Source: Fama and French (2004)

Figure 2 illustrates that the abc curve, mean variance-efficient, minimizes various risks at α given level of return. The point R_f indicates the combination of a risk-free loan and a positive investment R_f to g. The expected risk and return for a minimum variance portfolio can be seen at points a and T so that the greater the volatility, the greater the risk and the mean-variance-efficient region is at point b and above along abc, because at this point maximizes income. Several studies have successfully validated the CAPM's accuracy in predicting the expected rate of return, making it a valuable analytical tool for maximizing profits (Yunita et al.,, 2019; Gea and Silalahi, 2022; Prasetyo and Adib, 2016; Wahyuny and Gunarsih, 2020).

Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory (APT) was developed by Ross (1978) to evaluate the risk and return associated with various investments. This model analyzes the potential risk level assumed by each investor against the expected return, considering several macroeconomic variables such as economic conditions, Indonesia's interest rates, and currency exchange rates that allow investors to diversify and mitigate non-systematic risk (Neill, 2021). Previous research comparing the CAPM model and the APT model has indicated that the APT model tends to be more accurate in predicting returns than the CAPM model. For instance, research conducted by Kisman and Restiyanti (2015) on the IDX for 2008-2010 demonstrated the superior accuracy of the APT model.

The implementation of APT uses the law of the one-price concept so that investors who invest in assets with the same characteristics are not permitted to sell them at different prices. It is called arbitrage or arbitrage if investors do this to get greater returns. So, arbitrage is the process of obtaining greater returns without risk from investing in identical securities or assets. For example, investors buy assets/securities at low prices and then sell them again after the price increases. The APT model is still based on the CAPM model. Still, the APT model considers macroeconomic factors when calculating the expected return on share I at time t. Therefore, beta in the CAPM scope shows sensitivity to market returns, while beta in APT shows sensitivity to a factor. The APT equation is (Husnan, 2015):

$$R_i = E(R_i) + \beta_{i1}F_1 + \beta_{i2}F_2 + \cdots + \beta_{in}F_n + \varepsilon_1 \quad \text{.....(2)}$$

Where:

$$E(R_i) = \lambda_0 + \beta_{i1}\lambda_1 + \beta_{i2}\lambda_2 + \cdots + b_i n\lambda_n + \varepsilon_1$$

or:

$$E(R_i) = R_f + \beta_{1i}[E(F_1) - R_f] + \beta_{2i}[E(F_2) - R_f] + \cdots + \beta_{ni}[E(F_n) - R_f$$

Where: $E(F_i)$ is expected return on the stock i, $R_f = \lambda_0$ is risk-free, $\beta_{ni} = b_{ni}$ is sensitivity return factor n on the stock iI, $\lambda_n = [E(F_n) - R_f]$ is the premium of the factor n

Risk

Risk is the possibility of a loss investors will receive for several investments (Ibrahim et al.,, 2016). The modern portfolio theory put forward by Markowitz explains that risk and return have a unidirectional relationship so that the greater the risk borne by investors, the greater the rate of return obtained (Rasyad, 2022; Alwi et al.,, 2022; Suryanarayana, 2021; Giva, 2015; Akpo et al.,, 2015). However, Markowitz further revealed that if risk is

considered a problem for investors who do not like risk, risk can be minimized by investing in an optimal stock portfolio or diversification, even though not all risks can be eliminated. The risk that can be eliminated by diversification is unsystematic risk, and the risk that cannot be eliminated by diversification is systematic, as shown in the following figure 3 (Husnan, 2015).

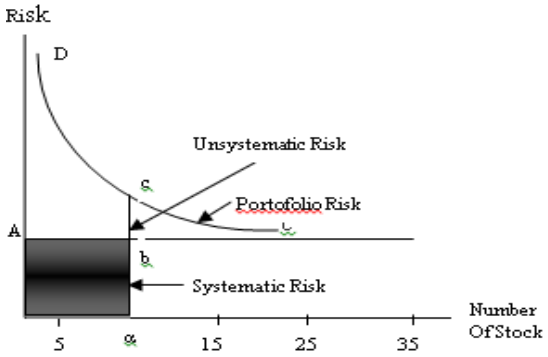

Figure 3
Risk Reduction by Diversification
Source: Husnan, 2015

The main measure of investment industry risk is the standard deviation, which indicates how much an investment will fluctuate from its average return (Pacho, 2014).

Return

Returns are the returns obtained by investors in the form of actual returns (R_i) and expected returns ($E(R_i)$). An actual return is a return that will occur, and an expected return is a return that is likely to happen in the future (Sartono, 2010). The returns are adjusted to the investment amount from each investor and the company's income (Nadyayani et al.,, 2021; Rosdiana, 2023). High returns affect investor confidence, and company value will increase (Ibrahim et al.,., 2022; Hongkong, 2017).

Hypothesis

Hypothesis 1 (H_1): The CAPM model provides accurate predictions
Hypothesis 2 (H_2): The CAPM model yields better predictions than the APT model.

RESEARCH METHODS

Types And Time Of Research

The research begins with observing data from companies that have gone public on the Indonesian Stock Exchange (IDX) to determine the type of research. This research is quantitative because the data presented is actual data in numbers or values without adding or subtracting existing data. The advantage of quantitative methods is that the data is clear and accurate, can be used to estimate or predict, measure the interaction of two or more variables and simplify the reality of complex and complicated problems in a model. Regarding research methods, the quantitative descriptive method was chosen as the main approach because quantitative descriptive is a method that explains the actual situation based on existing facts and is supported by data in the form of numbers which are used to create a systematic, factual and accurate picture of existing phenomena (Ferdinand, 2014).

The research time was four years because the stock price data presented via the official IDX website at the time of data collection only used four years, namely March 2020-May 2023. This period is considered relevant for research because the stock prices presented in that period can be used to calculate stock returns using the CAPM and APT models.

Research Data Source

The research data source comprises secondary data, including stock prices, inflation rates, Indonesian interest rates, and currency exchange rates obtained from reputable online platforms: www.idx.co.id, www.finance.yahoo.com, and www.bi.go.id. These platforms were chosen for their comprehensive and accurate data presentation, being the official websites of the Indonesian Stock Exchange and Bank Indonesia. Steps were taken to ensure the accuracy and reliability of the data, including selecting data from company reports via the official IDX website, verifying the data for each company under study, and adjusting com-

pany data to align with the research observation period. Secondary data was preferred for this variable due to its availability in numerical form through online research data collection sources. In contrast, other variables, such as economics and politics, must provide the detailed, complete, and accurate data required for this research.

Population

Overall, the research population comprises 89 industries registered on the IDX, making it easier to collect research data.

Sample

The research sample was determined based on predetermined criteria to ensure its representativeness and provide accurate and reliable results. Consequently, researchers opted for a non-probability sampling technique using purposive sampling. The criteria for sample selection were companies in the food and beverage industry that consistently reported their share prices for four consecutive years on the Indonesia Stock Exchange (BEI) from March 2020 to May 2023. Consequently, out of 89 industries, only 26 met the criteria, while the remaining 63 companies/industries were excluded due to incomplete data reported during the specified period.

Data Collection Procedures

The steps taken to carry out the collection procedures to ensure consistent and accurate data are as follows: 1. Collect share price data by: (a) Open the link www.idx.co.id, then select Market Data -> Statistical Reports -> Statistics -> choose the year of observation. (b) Downloading all data according to the research period (month or year). (c) Gathering stock price data for all companies under study. (d) Inputting stock price data into Microsoft Excel. 2. Collect IHSG data via www.finance.yahoo.com by entering ^JKSE in the Yahoo finance search box -> Historical data -> selecting the period. 3. Collect inflation data via the link www.bi.go.id, then select Inflation -> choosing the period. 4. Collect data on Indonesian interest rates via www.bi.go.id by selecting BI-rate -> choosing the period. 5. Collect exchange rate data via https://www.bi.go.id/id/statistik/information-kurs/transaksi-bi/default.aspx -> selecting the period.

After collecting all the research data, the next step is to input it into Microsoft Excel, calculate it using the formulas of the CAPM and APT models, and then analyze it using SPSS software.

Research Instruments

The research instrument used Microsoft Excel and SPSS software to test whether significant differences existed between the CAPM and APT models in the food and beverage industry on the IDX. SPSS software is also used to find out which variables have the greatest influence on stock returns. The variables to be tested are market risk, Inflation, exchange rates and interest rates.

Analysis Techniques

Analysis of research data processing carried out in several stages, namely:

The formula for Calculating The CAPM

$$E(R_i) = R_f + \beta_i[E(R_M - R_f)], i = 1 \dots N$$

Several factors related to the calculation of the CAPM formula are:

Calculating the actual stock return(R_i) is:

$$R_i = \frac{P_t - P_{t-1}}{P_{t-1}} \quad \dots\dots\dots\dots\dots\dots (3)$$

Where: R_i = Stock return rate, P_t = Stock price period t (now), P_{t-1} = Stock Price Period $t - 1$ (previous)

Calculating Risk-Free Return (R_f):

$$R_f = \frac{\bar{X}_{SBI}}{N} \quad \dots\dots\dots\dots\dots\dots\dots\dots (4)$$

Where: R_f = Risk-Free Profit Rate, $\bar{X}$ = Average Risk-Free rate of return, N = Time (Month) in one year.

Calculating Return Market (R_M):

$$R_M = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}} \quad \dots\dots\dots\dots\dots\dots (5)$$

R_M = Market Profit Rate, $IHSG_t$ = Composite stock price index for the current period, $and\ IHSG_{t-1}$ = IHSG for the previous year.

R_M = Market Profit Rate, $IHSG_t$ = Composite stock price index for the current period, $and\ IHSG_{t-1}$ = IHSG for the previous year.

Calculating beta (β):

$$\beta_i = \frac{Cov(R_i R_m)}{Var(R_m)} \quad \text{..... (6)}$$

or

$$\beta_i = \frac{\sigma_i M}{\sigma^2 M}$$

Where: β_i = Systematic risk level of each stock, $\sigma_i M$ = Covariance between stock income and market income, $\sigma^2 M$ = Market Variance

The formula for Calculating The APT Model**.**

Following the previous explanation, the expected return value for food and beverage industry stocks listed on the IDX for March 2020 - May 2023 uses three variables: Inflation, exchange rates (exchange rate), and Indonesia's interest rate. Thus, the formula used to calculate the expected return model APT is the formula (Husnan, 2015).

$$E(R_i) = R_f + (F_{Inf} - R_f)\beta_{Inf} + (F_{ExRate} - R_f)\beta_{ER} + (F_{IIRate} - R_f)\beta_{ER}$$

Several factors related to the calculation of the APT formula are: 1. The (R_i) calculation in APT is the same as the CAPM. 2. Calculating Risk-Free Return (R_f) is the same as the CAPM model. 3. Calculating the stock beta (β_i) of the APT model is different from calculating the stock beta of the CAPM model, where the CAPM model uses the sensitivity of stock returns (R_i) market returns (R_M) while the APT model uses the sensitivity of stock returns (R_i) to factor (F) (Sartono, 2010; Husnan, 2015) so the formula is:

$$\beta_i = \frac{Cov(R_i R_F)}{Var(R_F)} \quad \text{.....(7)}$$

Or

$$\beta_i = \frac{\sigma_i F}{\sigma^2 F}$$

Where: β_i= Systematic risk level of each stock, $\sigma_i F$ = Covariance between stock income and factor income, $\sigma^2 F$ = faktor Variance

Calculate the surprise factor (R). The sur-prise factor calculation subtracts the actual value from the expected value (Wahyuny and Gunarsih, 2020). This study uses three factors: Inflation, exchange rates, and Indonesian interest rates, as previously con-ducted by Wahyuny and Gunarsih (2020). Actual Inflation is obtained from the current inflation value less the previous inflation value and then divided by the last value of Inflation, while the expected inflation value is obtained using the exponential smoothing method with the formula:

$$Y_t = \alpha Y_{t-1} + (1-\alpha)F_{t-1} \quad \text{.....(8)}$$

Where:

Y_t = Estimated value at time t

α = Specified alpha value (0 < α < 1)

Y_{t-1} = Actual value before t

F_{t-1} = Estimated value before t

The following is to calculate the Expected return for each factor with the formula:

Inflation Factor (F_{inf}):

$$F_{inf} = Inflation_{Actual} - Inflation_{Expected} \quad \text{..... (9)}$$

$$Inflastion_{\ Actual} = \frac{inflasi_t - inflasi_{t-1}}{inflasi_{t-1}}$$

Exchange Rate Factors (F_{ExRate}):

$$F_{ExRate} = ExRate_{Actual} - ExRate_{Expected} \quad \text{..... (10)}$$

$$Exchang\ Rate_{Actual} = \frac{Exchange\ Rate_t - Exchange\ rate_{t-1}}{Exchange\ rate_{t-1}}$$

Indonesian interest rate factors (F_{IIRate})

$$F_{IIRate} = IIR_{ateActual} - IIRate_{Expected} \quad \text{..... (11)}$$

$$IIRate_{Actaul} = \frac{IIRate_t - IIRate_{t-1}}{IIRate_{t-1}}$$

Determination of the accuracy of the CAPM versus APT Model.

In considering the accuracy, this study uses the model of Mean Absolute Deviation (MAD) with the condition that the smaller the MAD value, the more precise the model is (Sartono, 2010). The formula for calculating MAD is:

$$MAD = \sum|R_i - E(R_i| \quad \text{.....(12)}$$

Where:

MAD = Mean absolute deviation

R_i = Actual stock returns

$E(R_i)$ = expected stock return

Multiple Regression Analysis.

At this stage, an independent sample test was performed using SPSS to find better stock return predictions 25.

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$.(13)

Where:

Y = Dependend variable
$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ = Model parameters
X_1, X_2, X_3, X_4 =Independend variable
ε = Standard Error

ANALYSIS AND DISCUSSION

This study uses monthly closing price data for the period March 2020 to May 2023, so the total sample size is 26 industries. To calculate the expected rate of return, the CAPM model uses the market return variable (R_M), while the APT model uses the Inflation (F_{inf}), exchange rate (F_{ER}) and Indonesian interest rates (F_{IIR}) variables. For the best prediction, multiple linear regression is used.

Expected Return Capital Asset Pricing Model (CAPM).

Calculating the expected return on the CAPM model uses the formula that was stated earlier, namely the formula in equation 5, by taking into account the actual stock return (R_i), risk-free return (R_f), market return (R_M), and stock beta (β_i). The calculation results of each of these equations are presented in the following table 1.

Table 1
Expected Return CAPM Model

No	STOCK CODE	R_i	R_M	R_f	β_i	$E(R_i)$
1	ADES	0.0821	0.0118	0.0416	0.5196	0.0261
2	AISA	0.0148	0.0118	0.0416	1.0086	0.0115
3	ALTO	-0.0491	0.0118	0.0416	0.5267	0.0259
4	BTEK	0.0000	0.0118	0.0416	0.0000	0.0416
5	BUDI	0.0358	0.0118	0.0416	0.4100	0.0294
6	CAMP	0.1080	0.0118	0.0416	-3.8119	0.1554
7	CEKA	0.0198	0.0118	0.0416	0.5068	0.0265
8	CLEO	0.0144	0.0118	0.0416	0.6585	0.0220
9	COCO	-0.0214	0.0118	0.0416	-0.5256	0.0573
10	DLTA	-0.0053	0.0118	0.0416	0.8674	0.0157
11	FOOD	0.0147	0.0118	0.0416	0.5768	0.0244
12	GOOD	-0.0003	0.0118	0.0416	0.5705	0.0246
13	HOKI	-0.0381	0.0118	0.0416	0.7700	0.0186
14	ICBP	0.0066	0.0118	0.0416	-0.4837	0.0561
15	IKAN	-0.0194	0.0118	0.0416	0.9028	0.0147
16	INDF	0.0050	0.0118	0.0416	-0.1158	0.0451
17	KEJU	0.0178	0.0118	0.0416	0.5395	0.0255
18	MLBI	-0.0042	0.0118	0.0416	1.0402	0.0106
19	MYOR	0.0141	0.0118	0.0416	-0.0718	0.0438
20	PSDN	0.0000	0.0118	0.0416	0.0000	0.0416
21	ROTI	0.0026	0.0118	0.0416	0.1479	0.0372
22	SKBM	-0.0005	0.0118	0.0416	0.8487	0.0163
23	SKLT	0.0185	0.0118	0.0416	0.1509	0.0371
24	STTP	0.0201	0.0118	0.0416	0.8858	0.0152
25	TBLA	0.0102	0.0118	0.0416	1.2688	0.0037
26	ULTJ	0.0011	0.0118	0.0416	-0.1001	0.0446

Source: Processed Data (2023)

Table 1 reveals that there are only 5 (five) stocks whose average actual return was greater than the expected return [$R_i > E(R_i)$], namely ADES, AISA, BUDI, STTP, and TBLA stocks; this means that these stocks provide a minimum return value of the expected return so that they are worth buying and making investments in. Meanwhile, the other 21 stocks have an average actual return value lower than the expected return [$R_i < E(R_i)$], so these stocks will provide a return that is smaller than the expected return and are not suitable as a place of investment.

Expected Return Arbitrage Pricing Theory (APT) Model

Calculating [$E(R_i)$] of the APT, this study uses the formula from equation (2), which has previously calculated the average value of the actual return (R_i), risk-free return (R_f), inflation factor (F_{inf}), exchange rate factor (F_{ER}), and Indonesian interest rate factor (F_{IIR}). The following table is the result of calculations from each of these formulas.

Table 2
Expected Return APT Model

No	STOCK CODE	Actual Return (Ri)	Free Risk (Rf)	Ex Inflasi E(Final)	Ex Ex. Rate E(Fexrate)	Ex IIRate E(FIIR)	Beta Inflasi βinfl	Beta Ex. Rate βExrate	Beta IIRate βIIrate	Ex. Retn APT E(Ri)
1	ADES	0.0821	0.0416	-0.0044	-0.0041	0.0223	0.0561	0.2238	0.2407	0.0358
2	AISA	0.0148	0.0416	-0.0044	-0.0041	0.0223	0.4575	-0.4071	-0.1871	0.0420
3	ALTO	-0.0491	0.0416	-0.0044	-0.0041	0.0223	-0.1103	-1.3780	-0.3459	0.0665
4	BTEK	0.0000	0.0416	-0.0044	-0.0041	0.0223	0.0000	0.0000	0.0000	0.0416
5	BUDI	0.0358	0.0416	-0.0044	-0.0041	0.0223	0.4831	0.3119	-0.1126	0.0302
6	CAMP	0.1080	0.0416	-0.0044	-0.0041	0.0223	0.0628	2.6987	-1.4554	0.0089
7	CEKA	0.0198	0.0416	-0.0044	-0.0041	0.0223	-0.1139	-0.4934	-0.5210	0.0542
8	CLEO	0.0144	0.0416	-0.0044	-0.0041	0.0223	-0.1274	-0.5150	0.7286	0.0467
9	COCO	-0.0214	0.0416	-0.0044	-0.0041	0.0223	0.1162	-0.7061	0.2385	0.0490
10	DLTA	-0.0053	0.0416	-0.0044	-0.0041	0.0223	0.0484	-0.1307	-0.2800	0.0447
11	FOOD	0.0147	0.0416	-0.0044	-0.0041	0.0223	-0.2652	0.3822	-0.1283	0.0407
12	GOOD	-0.0003	0.0416	-0.0044	-0.0041	0.0223	-0.4749	-0.7285	0.0810	0.0595
13	HOKI	-0.0381	0.0416	-0.0044	-0.0041	0.0223	0.0475	-0.6090	-0.1494	0.0511
14	ICBP	0.0066	0.0416	-0.0044	-0.0041	0.0223	-0.0463	-0.1762	-0.1370	0.0459
15	IKAN	-0.0194	0.0416	-0.0044	-0.0041	0.0223	-0.9483	0.1747	-0.4293	0.0563
16	INDF	0.0050	0.0416	-0.0044	-0.0041	0.0223	-0.1193	0.2562	-0.2638	0.0412
17	KEJU	0.0178	0.0416	-0.0044	-0.0041	0.0223	-0.2308	0.4337	-0.2445	0.0401
18	MLBI	-0.0042	0.0416	-0.0044	-0.0041	0.0223	0.1005	-0.7271	-0.2477	0.0527
19	MYOR	0.0141	0.0416	-0.0044	-0.0041	0.0223	-0.0062	-0.0360	0.6728	0.0379
20	PSDN	0.0000	0.0416	-0.0044	-0.0041	0.0223	-0.4564	-1.4288	-0.4090	0.0730
21	ROTI	0.0026	0.0416	-0.0044	-0.0041	0.0223	0.0867	0.3856	0.2289	0.0329
22	SKBM	-0.0005	0.0416	-0.0044	-0.0041	0.0223	0.2276	-1.5950	0.5709	0.0587
23	SKLT	0.0185	0.0416	-0.0044	-0.0041	0.0223	0.0390	-0.5687	-0.7061	0.0542
24	STTP	0.0201	0.0416	-0.0044	-0.0041	0.0223	-0.2399	0.7593	-0.1430	0.0347
25	TBLA	0.0102	0.0416	-0.0044	-0.0041	0.0223	-0.1920	1.0834	-0.4864	0.0312
26	ULTJ	0.0011	0.0416	-0.0044	-0.0041	0.0223	-0.1512	-0.0991	-0.2591	0.0471

Source: Processed Data (2023)

Table 2 shows that there are only 3 (three) companies whose actual return value is above the expected return value $[R_i > E(R_i)]$, namely ADES, BUDI and CAMP. In comparison, the other 23 companies have actual return values less than the expected return value $[R_i < E(R_i)]$, which means that only the three companies are suitable for investment, so their shares are worth buying. This result is different from the CAPM model, where the CAPM has five companies whose actual return value is above the expected return value$[R_i > E(R_i)]$, including ADES, AISA, BUDI, STTP, and TBLA

Mean Absolute Deviation (Mad) in the CAPM And APT Methods

The model accuracy level was calculated using MAD CAPM and MAD APT. As the formula in equation 12, the result is as follows table 3.

The calculation results show MAD CAPM < MAD APT with a value of 0.0299 < 0.0474, so predicting stock returns is better using the CAPM model (Wati and Hariyanto, 2018; Safitri et al.,, 2018; Sindhuarta et al.,, 2023; Susanti et al.,, 2021).

Independent Sample Test MAD CAPM And MAD APT

An independent sample test was carried out to ascertain whether the MAD CAPM and MAD APT have significant differences in the accuracy of the two models.

One of the conditions that must be met before carrying out the independent sample test is that the data must be normally distributed (Ferdinand, 2014). The data is said to be normal if the significance value of the normality test is greater than 0.05 (sig> 0.05) and abnormal if it is less than 0.05 (sig <0.05). Following are the results of the MAD CAPM and MAD APT normality tests using the Kolmogorov-Smirnov and Shapiro-Wilk.

Table 3
Value MAD CAPM And MAD APT

No	STOCK CODE	MAD CAPM	MAD APT
1	ADES	0.0560	0.0463
2	AISA	0.0033	0.0272
3	ALTO	0.0750	0.1156
4	BTEK	0.0416	0.0416
5	BUDI	0.0064	0.0056
6	CAMP	0.0475	0.0990
7	CEKA	0.0067	0.0344
8	CLEO	0.0075	0.0323
9	COCO	0.0787	0.0704
10	DLTA	0.0210	0.0500
11	FOOD	0.0097	0.0260
12	GOOD	0.0248	0.0597
13	HOKI	0.0568	0.0893
14	ICBP	0.0494	0.0392
15	IKAN	0.0341	0.0757
16	INDF	0.0401	0.0362
17	KEJU	0.0077	0.0224
18	MLBI	0.0147	0.0569
19	MYOR	0.0297	0.0239
20	PSDN	0.0416	0.0730
21	ROTI	0.0346	0.0303
22	SKBM	0.0168	0.0592
23	SKLT	0.0186	0.0358
24	STTP	0.0050	0.0145
25	TBLA	0.0064	0.0210
26	ULTJ	0.0435	0.0460
	Avarage	**0.0299**	**0.0474**

Source: Processed Data (2023)

Table 4
Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
MAD_CAPM	0.128	26	.200*	0.918	26	0.040
MAD_APT	0.131	26	.200*	0.941	26	0.143

Source: Processed Data (2023)

Table 5
Test of Normality (Transformation)

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
MAD	CAPM	.158	26	.095	.926	26	.062
	APT	.087	26	.200*	.950	26	.236

Source: Processed Data (2023)

Table 6
Independent Samples Test

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MAD	Equal variances assumed	6.617	.013	-2.836	50	.007	-.63240	.22300	-1.08031	-.18449
	Equal variances are not assumed.			-2.836	44.748	.007	-.63240	.22300	-1.08161	-.18319

Source: Processed Data (2023)

When using Kolmogorov Smirnov, the normality test in table 4 shows the CAPM MAD of 0.200 is greater than 0.05 (normal), and the normality value using Shapiro-Wilk is 0.040 less than 0.05 (abnormal). Meanwhile, the normality test for MAD APT using Kolmogorov-Smirnov is 0.200 (normal), and the normality value using Shapiro Wilk is 0.143 (normal). Therefore, an independent sample test cannot be carried out because one sample is not normal, so data transformation must be carried out for samples that are not normal, namely MAD CAPM. The following table shows the results of the normality test after data transformation.

The results in table 5 are normality results after data transformation. For the MAD CAPM and MAD APT samples using Kolmogorov-Smirnov, it is 0.95 and 0.200, while the Shapiro-Wilk are 0.062 and 0.236. Thus, it meets the normality criteria because the value exceeds 0.05 and can be continued to the next process

The independent sample test results show in table 6, that the significant value (2-tailed) of the MAD CAPM and MAD APT of 0.007 is less than the value of α = 0.05 (0.007 <0.050), so the CAPM model and the APT model are two different models when used to analyze returns investment (Hussein and Mohammed, 2023).

The next process is to perform multiple linear regression analysis on the return market variable (R_M), inflation factor (F_{inf}), exchange rate factor (F_{ExRate}), and Indonesian interest rate factor (F_{IIRate}) to stock returns. It is indicated by beta (β) and its significance level to determine the best predictor in estimating stock returns at a value of α = 5% (0.05).

The results of data analysis using an investment analysis balance model to answer

problems and prove hypotheses at the research site from Maret 2023 to May 2023 reveal that out of 26 companies, there are 16 companies with positive actual returns ($R_i > 0$). These companies include ADES, AISA, BUDI, CAMP, CEKA, CLEO, FOOD, ICBP, INDF, CHEESE, MYOR, BREAD, SKLT, STTP, TBLA, and ULTJ. On the other hand, 11 different companies experienced negative actual returns ($R_i < 0$), such as ALTO, BTEK, COCO, DLTA, GOOD, HOKI, FISH, MLBI, PSDN, and SKBM. However, when comparing the actual return (R_i) values with the expected return [$E(R_i)$] values, the CAPM and APT models yield different outcomes. In the CAPM model, five companies have actual returns greater than expected returns[$R_i > E(R_i)$], namely ADES, AISA, BUDI, STTP, and TBLA. Meanwhile, in the APT model, only three companies fall into this category, specifically ADES, BUDI, and CAMP.

Table 7
SPSS Analysis on CAPM Model Coefficients

Model		β	SE	$Beta$	t	$Sig.$
1	(Constant)	-0.011	0.008		-1.288	0.210
	R_market	0.600	0.188	0.545	3.185	0.004

a. Dependent Variable: RETURN
Source: Processed Data (2023)

Table 8
SPSS Analysis on APT Model Coefficients

Model		β	SE	$Beta$	$Sig.$
1	(Constant)	0.058	0.033	1.783	0.088
	F_inf	-0.567	0.358	-0.238	-1.585	0.127
	F_Exrate	-0.535	0.132	-0.679	-4.051	0.001
	F_IIRate	0.038	0.619	0.010	0.062	0.951

a. Dependent Variable: RETURN
Source: Processed Data (2023)

Considering the disparity between the CAPM (table 7) and APT (table 8) models in predicting stock returns, conducting a Mean Absolute Deviation (MAD) analysis is necessary to assess both models' accuracy, which helps investors make informed decisions when selecting stocks for investment. Based on the calculated results of the MAD analysis, it becomes evident that the MAD CAPM value is 0.0299, while the MAD APT value is 0.0474. The Difference between the values of the two models is only 0.0175, suggesting that there is no significant difference between them. Nonetheless, some argue that accuracy should be evaluated based on the smallest value, implying that a smaller value corresponds to higher accuracy (Sartono, 2010). Therefore, H_1 is accepted.

To address the research's second hypothesis (H_2), which aims to determine whether there exists a significant difference between the CAPM and APT models for food and beverage from April 2020 to May 2023, an independent sample test was conducted using both models. The results demonstrate a significant difference in accuracy between the CAPM and APT models. The variable with the most dominant effect is the return market (R_M), leading to the acceptance of H_2.

The outcomes of this study align with some findings from prior research conducted across various industrial sectors and companies listed on the Indonesia Stock Exchange (IDX) in the last decade. These findings indicate that the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT) models exhibit significant differences in predicting stock returns (Indra, 2018; Wardhania et al.,, 2021; Yunita et al.,, 2019; Gea and Silalahi, 2022; Wahyuny and Gunarsih, 2020). Similar results were obtained by Komaini et al., (2017), who researched the Consumer Goods Industry Sector listed on the IDX for 2016-2017 and 2009-2014, respectively.

Certain researchers argue that the reason behind the CAPM model's higher accuracy than the APT model is its recognition as a benchmark in modern finance, widely adopted since the early 1960s. Additionally, the CAPM model employs only the market return variable as an independent factor, and stock earnings are more likely to be influenced by overall stock market returns. On the

contrary, the APT model begins by assuming that security returns are linked to multiple unknown risk factors. Moreover, the APT model has been less extensively employed in investment environments. While the CAPM model explicitly reflects systemic risk impacting the market. Meanwhile, the APT model does not specify systematic factors affecting risk and return, which requires investors to exercise caution when identifying these unestablished risk factors (Desiyanti, 2017).

CONCLUSION AND SUGGESTIONS

The results of data analysis, as shown by the Mean Absolute Deviation (MAD) analysis conducted on food and beverage companies listed on the IDX, conclude that the CAPM model offers higher accuracy than the APT model. The independent sample test further verifies a significant difference in accuracy between the CAPM and APT models, and the regression analysis showed that market returns were the best predictor of actual stock returns. Consequently, researchers recommend that investors utilize the CAPM model to analyze and predict expected rates of return.

The theoretical implications of the research results show that the CAPM model is more accurate than the APT model. Therefore, to carry out an investment analysis, it is recommended that the CAPM model be used. Practical implications, as input for Food and Beverage companies registered on the IDX, out of the 26 sampled companies analyzed for stock return using the CAPM and APT models, only five companies showed actual returns greater than expected returns ($R_i > E(R_i)$). For investors, this study informs that to predict the return rate of an investment, the Capital Asset Pricing Model (CAPM) is more accurate compared to the Arbitrage Pricing Theory (APT) model. Hence, it is recommended that the CAPM model be used. For academics, the research findings can enrich knowledge, expand references, and serve as a reference for conducting relevant research.

This research is limited to a few variables: stock prices, Inflation, Indonesian interest rates, and currency exchange rates. These variables were chosen due to their direct availability via official sources linked to the Indonesian Stock Exchange. Consequently, the research is constrained by a limited time frame. While these variables offer valuable insights, it's important to acknowledge that this study may only partially capture other factors that need to be considered when making investment decisions. Investors should supplement these findings with additional analyses and market research to understand investment prospects comprehensively.

REFERENCE

Akpo, E. S., S. Hassan, and B. U. Esuike. 2015. Reconciling The Arbitrage Pricing Theory (APT) And The Capital Asset Pricing Model (CAPM) Institutional And Theoretical Framework. *International Journal of Development and Economic Sustainability* 3(6): 17–23. http://www.eajournals.org/wp-content/uploads/Reconciling-the-Arbitrage-Pricing-Theory-APT-and-the-Capital-Asset-Pricing-Model-CAPM-Institutional-and-Theoretical-Framework.pdf.

Alshomaly, I. 2018. The Capital Assets Pricing Model & Arbitrage Pricing Theory : Properties and Applications in Jordan. *Modern Applied Science Journal* 12(11): 330–337. https://doi.org/10.5539/mas.v12n11p330.

Alwi, M., M. Ali, and F. R. Rahim. 2022. Analysis of Investment Risk and Return (The Case of Life Insurance of PT. Jiwasraya). *Hasanuddin Journal of Bussiness Strategy (HJBS)* 4(1): 73–84. https://garuda.kemdikbud.go.id/documents/detail/2609932.

Desiyanti, R. 2017. *Teori Investasi Dan Portofolio*. Cetakan ke 2. Bung Hatta University Press. Padang.

Fama, E. F. and K. R. French. 2004. The Capital Asset Pricing Model: Theory

and Evidence. *Journal of Economic Perspectives* 18(3): 25–46. https://pubs.aeaweb.org/doi/pdfplus/10.1257/089533004216243O.

Ferdinand, A. 2014. *Metode Penelitian Manajemen*. Edisi 5. Badan Penerbit Universitas Diponegoro. Semarang.

Gea, J. N. and D. Silalahi. 2022. Perbandingan Capital Asset Pricing Model dan Arbitrage Pricing Theory dalam Memprediksi Return Saham LQ45 yang Terdaftar di Bursa Efek Indonesia (Periode 2018-2020). *Jurnal Manajemen Dan Bisnis (JMB)* 22(2): 516–529. https://ejournal.ust.ac.id/index.php/JIMB_ekonomi/article/view/2150.

Giva, S. I. G. 2015. The Relationship between Risk and Return for Firms Listed at the Nairobi Securities Exchange. *A Research Project Submitted in Partial Fulfilment of the Requirements for the Award of the Degree of Master of Business Administration*. School of Business, University of Nairobi.

Hartoyo, P. 2016. Perbandingan Pengujian Capital Asset Pricing Model dan Arbitrage Pricing Theory: Analisis Pengaruh Faktor Fundamental Keuangan dan Faktor Makro Ekonomi terhadap Return Saham di Bursa Efek Indonesia. *Indonesian Treasury Review: Jurnal Perbendaharaan, Keuangan Negara Dan Kebijakan Publik* 1(1): 51-56. https://doi.org/10.33105/itrev.v1i1.60.

Hongkong. H. 2017. The Effect of Earning per Share and Return on Equity on Stock Price (Study on Listed Banks). *Jurnal Accountability* 06(2): 20–25. https://doi.org/10.32400/ja.24807.6.2.2017.20-25.

Husnan, S. 2015. *Dasar-Dasar Teori Portofolio dan Analisis Sekuritas*. Edisi 5. UPPN STIM YKPN. Yogyakarta.

Hussein, Z. A. and M. J. Mohammed. 2023. Accuracy of Capital Asset Pricing Model and Arbitrage Pricing Theory in Predicting Stock Return. *Journal of Namibian Studies* 2: 1539–1563. https://doi.org/10.59670/jns.v33i.801

Ibrahim, I. M., N. Norisanti, and R. D. M. Danial. 2022. The Effect of Return on Investment, Net Profit Margin, and Debt to Equity Ratio on Stock Prices. *Management Studies and Entrepreneurship Journal* 3(3): 1460-1468. https://doi.org/10.37385/msej.v3i3.575.

Ibrahim, M. I., J. Titaley, and T. K. Manurung. 2016. Analisis Keakuratan Capital Asset Pricing Model (CAPM) dan Arbitrage Pricing Theory (APT) dalam Memprediksi Expected Saham pada LQ45. *d'CARTESIAN: Jurnal Matematika dan Aplikasi* 6(1): 30-44. https://doi.org/10.35799/dc.6.1.2017.15837.

Indra, Y. A. 2018. Comparison of the Accuracy of Capital Asset Pricing Model and Arbitrage Pricing Theory Method in Predicting Stock Price (Study on Company Sector of Consumption Goods and Mining Sectors Listed in Sharia Sharia Share Index (ISSI) Period 2013-2016). *Journal of Economic, Business and Accounting (COSTING)* 1(2): 2597–5234. https://doi.org/10.31539/costing.v1i2.223.

Kisman, Z, and M. S. Restiyanita. 2015. The Validity of Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) in Predicting the Return of Stocks in Indonesia Stock Exchange 2008-2010. *American Journal of Economics, Finance and Management* 1(3): 184–189. https://info.trilogi.ac.id/repository/assets/uploads/MNJ/4ded3-the-validity-of-capm.pdf.

Komaini, D. D., R. M. Mardani, and B. Wahono. 2017. Perbandingan Penerapan Model Capital Asset Pricing Model (CAPM) dan Arbitrage Pricing Theory (APT) dalam Memprediksi Return Saham (Studi pada Perusahaan Sektor Industri Barang Konsumsi yang Terdaftar di BEI Periode 2016-2017). *Jurnal Riset Manajemen* 8(18): 163–176. https://jim.unisma.ac.id/index.php/jrm/article/view/4647.

Laia, K. and I. Saerang. 2015. The Comparison between Accuracy of Capital Assets Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) in Stocks Investment on Exchange National Private Banking Listed on Indonesian Stock Exchange. *Jurnal EMBA* 3(2): 247–257.

Lemiyana. 2015. Analisis Model CAPM dan APT dalam Memprediksi Tingkat Return Saham Syariah (Studi Kasus Saham di Jakarta Islamic Index). *I-Finance: A Research Journal on Islamic Finance* 1(1): 1–20. https://doi.org/10.19109/ifinance.v1i1.304.

Nadyayani, D. A. D. and A. A. G. Suarjaya. 2021. The Effect of Profitability on Stock Return. *American Journal of Humanities and Social Sciences Research (AJHSSR)* 5(1): 695–703. https://www.ajhssr.com/wp-content/uploads/2021/01/ZZZC21501695703.pdf.

Neill, M. O. 2021. The Validity of the Capital Asset Pricing Model in the Modern Irish Market. *Masters Thesis*. National College of Ireland. Dublin. https://norma.ncirl.ie/5492/1/markoneill.pdf.

Pacho, F. 2014. Capital Asset Pricing Model (CAPM) Testability and its Validity in Stock Market: Evidence from Previous Literatures. *Research Journal of Finance and Accounting* 5(21): 192-198. https://core.ac.uk/download/pdf/234630301.pdf.

Prasetyo, D. C. and N. Adib. 2016. Perbandingan Keakuratan CAPM dan APT dalam memprediksi return saham perusahaan di Jakarta Islamic Index (Periode 2010-2014). *Jurnal Ilmiah Mahasiswa FEB Universitas Brawijaya* 4(1): 1-22. https://jimfeb.ub.ac.id/index.php/jimfeb/article/view/2455.

Putra, Y. P., H. Setiorini, and C. Suhendra. 2023. Analisis Keakuratan Capital Asset Pricing Model dan Arbitrage Pricing Theory dalam Memprediksi Return Saham (Studi pada Perusahaan LQ 45 di Bursa Efek Indonesia Periode 2016-2020). *EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis* 11(1): 839–848. https://doi.org/10.37676/ekombis.v11i1.3254.

Rantemada, C. J. R., F. A. O. Pelleng, and J. V. Mangindaan. 2021. Analisis Perbandingan Keakuratan Metode Capital Asset Pricing Model (CAPM) dan Arbritage Pricing Theory (APT) dalam Memprediksi Return Saham. *Produktivity Journal* 2(7): 567–570. https://ejournal.unsrat.ac.id/index.php/productivity/article/view/37316.

Rasyad, M. I. 2022. Analysis of Capital Asset Pricing Model (CAPM) on Health Sector Stocks as a Growing Sector During the Pandemic. *Jurnal Ilmiah Econosains* 20(1): 13-22. https://doi.org/10.21009/2012022.2.

Rosdiana, R. 2023. Analysis of Capital Asset Pricing Models : Evidence from the Bank Sector on the Indonesia Stock Exchange (IDX). *International Journal of Business and Economic Studies* 5(1): 1–15. https://doi.org/10.54821/uiecd.1242635.

Ross, S. A. 1978. A Simple Approach to the Valuation of Risky Streams. *The Journal of Business* 51(3): 453–475. http://www.jstor.org/stable/2352277

Safitri, E., D. Utami, and P. I. Sari. 2018. Perbandingan Keakuratan Capital Assets Pricing Model (CAPM) dan Arbitrage Pricing Theory (APT) dalam Menentukan Pilihan Berinvestasi pada Saham Jakarta Islamic Index (JII). *Jurnal Ilmu Manajemen* 8(1): 59-72. https://doi.org/10.32502/jimn.v8i1.1557.

Sartono, A. 2010. *Manajemen Keuangan Teori dan Aplikasi*. BPFE Universitas Gadjah Mada. Yogyakarta.

Sindhuarta, S. J., R. A. Husni, and T. Samosir. 2023. Comparison Analysis between Accuracy of CAPM and APT Models in Predicting Return of IDX-30 Stocks during Covid-19 Pandemic. *INDIKATOR: Jurnal Ilmiah manajemen dan Bisnis* 7(1): 48–58. https://dx.doi.org/10.22441/indikator.v7i1.15992.

Suryanarayana, K. 2021. A Study on Risk and Return and Their Relation to Various Investments. *Test: Engineering & Management Journal* 83(may-june 2020): 10691-10694. https://www.researchgate.net/publication/348994450_A_study_on_Risk_and_Return_and_their_relation_in_various_investments.

Susanti, E., N. Ervina, E. Grace, and S. Simatupang. 2021. The Accuracy of Balance Model in Predicting Stock Investment During The Covid-19 Pandemic on LQ 45 Index. *Organum: Jurnal Saintifik Manajemen dan Akuntansi* 04(02): 215-227. https://doi.org/10.35138/organum.v4i2.193.

Wati, A. S. and W. Hariyanto. 2018. Comparison of the Accuracy of Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) in Predicting LQ45 Stock Returns. *Indonesian Journal of Law and Economics Review* 1(4): 1–16. https://doi.org/10.21070/ijler.v2i2.88

Wardhaniah, R., I. Nurhayati, and R. S. Aminda. 2021. Analisis Perbandingan Keakuratan Metode CAPM dan APT dalam Memprediksi Return Saham Farmasi Terdaftar di BEI Periode Tahun 2019-2021. *Inovator: Jurnal Manajemen* 11(3): 408-412. https://doi.org/10.32832/inovator.v11i3.8284.

Wahyuny, T. and T. Gunarsih. 2020. Comparative Analysis of Accuracy between Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) in Predicting Stock Return (Case Study : Manufacturing Companies Listed on the Indonesia Stock Exchange for the 2015-2018 Period). *Journal of Applied Economics in Developing Countries* 5(1): 23–30. https://doi.org/10.20961/aedc.v5i1.53442.

Yunita, I., T. T. K. Gustiyana, and D. Kurniawan. 2019. Accuracy Level of CAPM and APT Models in Determining the Expected Return of Stock Listed on LQ45 Index. *Journal Of Applied Management* 18(4): 797–807. http://dx.doi.org/10.21776/ub.jam.2020.018.04.17.