
THE IMPORTANCE OF INVESTMENT DECISIONS USING THE CAPITAL ASSET PRICING MODEL (CAPM) IN HEALTHCARE PROVIDER COMPANY

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Abstrak

Latar Belakang: Penelitian ini menguji Capital Asset Pricing Model (CAPM) dalam menentukan tingkat pengembalian yang dibutuhkan pada saham-saham sektor kesehatan Indonesia dengan tingkat pengembalian yang sebenarnya. Tujuan: Untuk mengetahui kecepatan yang dibutuhkan sektor kesehatan Indonesia yang dilaporkan, terutama stok rumah sakit, dari 1 Desember 2021 hingga 1 November 2022, dan membandingkannya dengan tingkat pengembalian aktual pada periode yang sesuai untuk mengidentifikasi status penilaian saham. Metode: Untuk menjadi studi empiris, kami mengadopsi penelitian analitik. Pengumpulan data berasal dari www.yahoo.finance.com dan melakukan penelitian analitik dengan CAPM Hasil: Temuan menunjukkan bahwa Capital Asset Pricing Model (CAPM) tidak memberikan perkiraan pengembalian yang tepat dari saham sektor kesehatan selama satu tahun periode penelitian karena hasilnya berbeda dengan laporan tahunan dari kelompok perusahaan rumah sakit ini. Kesimpulan Capital Asset Pricing Model (CAPM) bukanlah prediktor yang baik untuk return saham di Bursa Efek Indonesia sektor kesehatan.

Kata Kunci: CAPM, Saham Kesehatan, Risiko Sistematis, Aset Modal.

Abstract

Background: This research tests the Capital Asset Pricing Model (CAPM) in determining the required rates of return on Indonesian healthcare sectors stocks with the actual rates of return. Objectives: To find out the required speed of the Indonesia healthcare reported sector, especially hospital stocks, from December 1, 2021, to November 1, 2022, and compare them with the actual rates of return in the corresponding periods to identify the valuation status of the stocks. Methods: To be an empirical study, we adopted analytical research. The collecting data is from www.yahoo.finance.com and doing analytical research with CAPM. Results: The findings show that the Capital Asset Pricing Model (CAPM) did not give any appropriate forecast of the return from healthcare sectors stocks thought the one-year period of study because the result was different from the annual report from this group of hospital companies. Conclusions The Capital Asset Pricing Model (CAPM) is not a good predictor of stock return in the Indonesian Stock Exchange healthcare sector.

Keywords: CAPM, Healthcare Stocks, Systematic Risk, Capital Asset.

INTRODUCTION

Indonesia is the largest archipelago globally, with a total population in 2010 is 240.676 million people. (Yodi Mahendradhata, 2017) Healthcare sector was transform to get profitability from two ways. First, the hospital services must be increasing the insurance demand while reducing non- payment patient. Second, Medicare must link to reimbursements for reduce quality metrics create revenue uncertainty, with component the mix of publicly and privately insured patients. In data 2013, 31% of Indonesia's population

of more than 250 million was uninsured; 61% were government-insured, and just 8% enjoyed private health insurance. Indonesia does not rank on par with its Association of Smoothest Asian Nations (ASEAN) neighbours regarding health care based.

on the number of hospital beds, physicians, nurses, and midwives per 1,000 people. Indonesia still has the highest maternal mortality ratio in the world. (Wirtz, 2015) In 2014, the Indonesian government introduced Universal Health Coverage (UHC), locally known as JKN and administered by an agency known as BPJS. This program demonstrated its commitment to reaching the Millennium Declaration that it signed in September 2000 with 140 million participants from Indonesia's UHC system. Health education, prevention, promotion, and rehabilitation are critical parts of strengthening a nation's health care, especially in rural areas. In 2010, the urban population was 49.9% of the total. Besides the high mortality rate, Indonesia was also facing the problem of Tuberculosis, HIV/AIDS, and recently is pandemic covid-19. (Wirtz, 2015).

In the current health care situation, the leading cause of death is 55.6% comes from Non- communicable diseases and stroke (19.5%). The health care landscape in Indonesia provides investors who are engaging in economic opportunity and the chance to "do good" by improving the living standards of many people. Investors can make a significant difference in Indonesia with strategic investment, bringing in expertise, finding innovative solutions, and putting down the foundations of the future health care system. (Wirtz, 2015)

Indonesia's political situation allows foreign investors to operate the specialized hospital in a market, and only 23% of the hospital are technical, and one of them is a maternity hospital. The investor was also facing difficulties building a new hospital due to a lengthy and complicated licensing process. This barrier attracts investors to existing small hospitals with the potential for improvements. From doctors and nurses, the investor can invest in building capacity for medical training and the health system to increase their skills. A forecast GDP growth of above 5% per year and a rising middle class will drive the demand for an affordable healthcare system.

Holstein and Litzinger (2008) discussed how European and Canadian health care systems began to focus on cost containment after moving to make health care services available universally. In Indonesia, 58% population is a participant in the UHC system. The costs containment efforts typically preceded efforts to expand those covered. Regardless, the market segment for the private hospital is still a big market for the investor. The covid-19 pandemic that started in March 2020 has increased the uncertainty for the capital market because of the difference between the future trend of asset prices and people's expectations. This uncertain condition was followed by high demand for new medical equipment like Personal Protective Equipment was highly needed during the pandemic. Still, this condition must follow with the proper asset valuation. For this condition, Capital Asset Pricing Models (CAPM) is a one-selected method to determine the relationship between the expected rate of return of assets in the securities market and risky investments. (Chuyan Wang, 2021)

After pandemic covid-19, the investor also needs to be aware of their cost of capital, particularly stocks. There is widespread agreement that the CAPM is a good predictor of share price movements in stock markets in finance. In developing economies era, it necessarily needs to validate stock markets. The investors need to get a solution for the mystery surrounding the issue of share price movement with examine the relevance of CAPM in the Indonesian healthcare industry, especially in the hospital business. The specific aim is to apply the CAPM to the Indonesian healthcare sector data and, from the results, infer whether healthcare sector stocks returns were correctly estimated, under, or

overestimated at the time of the forecast. In addressing this objective, the study seeks to answer the question: From the perspective of the CAPM, are the subject-firms stocks returns correctly valued, undervalued, or overvalued by the CAPM? To hazard a guess, from the standpoint of the CAPM, the returns of the subject-firms stock were not correctly valued.

RESEARCH METHODS

Data Collection Technique

Data was collected from the Indonesian Capital Market Directory (ICMD) from 2021 to 2022. The data source is used to find information about interest rates during the study period, closing prices of shares, and composite share price indices. The research location was at the Indonesia Stock Exchange (IDX). We download from www.yahoo.finance.com.

Analysis Technique

Calculate the Return Rate of Individual Shares (R_i), income received in dividends or income from changes in market prices from stock trading transactions calculated within one year.

Computation Methodology

The expected return as implied by the Capital Asset Pricing Model (CAPM) will be derived and compared with the actual return from each firm to ascertain whether the stock is appropriately valued, undervalued, or overvalued. It is necessary to derive the value for each variable in the CAPM equation to accomplish this.

Estimating the Expected Rate of Return

Adjust for risk rate for each of the firms will be determined using the capital asset pricing model (CAPM) to know the risk-free rate and the return on the whole market portfolio, the required rate of return on a risky asset will depend upon its beta coefficient, it tells us that the necessary rate of return on investment is equal to the risk-free rate plus a fraction (or multiple) or the market risk premium where the asset's beta coefficient represents the fraction (or multiple).

- To calculate the market rate of return is based on the Stock Price Index (CSPI), by the formula:

$$X = R_m = \frac{JCI(t_1) - JCI(t_0)}{JCI(t_0)}$$

Description:

$X = R_m$ = Market Rate of Return (R is based on the stock price

index) $JCI(t_1)$ = composite stock price Index period now

$JCI(t_0)$ = composite stock price Index period ago

- Calculate Rate of Return of Individual Stocks

Calculate the rate of return of individual stock based on the Closing Stock Price, with the formula:

$$Y = R_i = \frac{HS_i(t_1) - HS_i(t_0)}{HS_i(t_0)}$$

Description:

$Y = R_i$ = Rate of return of each company. (R is based on the advantages of individual stocks 1 each of the company)

$HS_i(t_1)$ = the closing Price of the individual stock is the present

period $HS_i(t_0)$ = the closing Price of the individual stocks last

period

Estimation of Risk-Free Rate (Rf)

The risk-free rate is that which could be earned on some zero-risk asset. Assets that have strictly zero risk are, in practice, used in Indonesia's 10-year bond yield history were used to represent the risk-free rate of interest. This is because the interest payable on any of the two is fixed. The government is unlikely to default, and if the bill or bond is held to redemption, its maturity value is also specific.

Risk free or known by the rate of return risk-free refers to the rate of return of financial assets without risk. Interest rate securities issued by the government is the basis of measurement used, hereinafter referred to as the Certificate of Bank Indonesia (SBI). The formula used is:

$$Rf = \frac{\sum_{t=1}^n \text{the Level of Interest Rates on SBI}}{n}$$

Description:

Rf = Return-Free Risk

\sum SBI = value of SBI
n = number of data

Theory and Calculation

The CAPM was developed by Sharpe, Lintner, and Mossin (1964) as the expected return on the market, usually to determine a cost of equity. Beta measures the company's risk or asset in question relative to the market. It states that the return on any investment or portfolio is related to the riskless rate of return and the expected return on the market in a linear fashion. It shows the relationship between the expected return of a security and its unavoidable systematic risk: (Ahmad Musodik, 2021)

$$Re = Rf + \beta(Rm - Rf)$$

Re = Expected rate of return on a security or a portfolio

Rf = Risk-free rate of return, Rm = Expected market rate of return

β = Systemic risk of the deposit (the beta) relative to the market.

The Capital Asset Pricing Model (CAPM) formulates the expected – or minimum required – a rate of return on a company's equity. While CAPM has been challenging, it remains the most practical approach available to determine the cost of equity. The CAPM only assumes one source of systematic risk: market risk. The perceived limitations of the model arise in large part from problems in applying the model because systematic risk cannot be diversified and has to be a hedge. In equilibrium, it is compensated by a risk premium. The stock market exposes investors to a certain degree to market risk, and investors will be paid (proportional to your risk exposure). The real risk was decomposed into two components: systematic risk – related to Rm and unsystematic risk.

RESULTS AND DISCUSSION

Table 1. List of 6 Companies of Health Care Provider Industry listed on Indonesia stock exchange (BEI)

No	Stock Name	Code
1	PT Siloam International Hospitals Tbk.	SILO
2	PT Diagnos Laboratorium Utama Tbk	DGNS
3	PT Mitra Keluarga Karyasehat Tbk.	MIKA
4	PT Prodia Widyahusada Tbk.	PRDA
5	PT Royal Prima Tbk.	PRIM
6	Sarana Meditama Metropolitan Tbk	SAME

Source: www.yahoo.finance.com

Result of Analysis of Rate of Return of Individual Stocks

Return of individual stocks (R_i) can be calculated by reducing the stock's price this month with the share price of the previous month and comparing it with the stock price the month before. Following the individual stock's return calculation, five healthcare companies were listed on the stock exchange for December 1, 2021 – to November 1, 2022.

Table 2. Return of Individual Stocks 6 Companies in the Healthcare Industry

No	Stock Name	Code	R_i
1	PT Siloam International Hospitals Tbk.	SILO	0.069994
2	PT Diagnos Laboratorium Utama Tbk	DGNS	-0.89132
3	PT Mitra Keluarga Karyasehat Tbk.	MIKA	0.207702
4	PT Prodia Widyahusada Tbk.	PRDA	-0.48247
5	PT Royal Prima Tbk.	PRIM	-0.10361
6	Sarana Meditama Metropolitan Tbk	SAME	-0.1662

Source: Data processed by Microsoft Excel

Based on Table 2, it can be seen that share rate return (R_i) and the highest in PT. Mitra Keluarga Karya Sehat, Tbk is equal to 0.207702 and the lowest on PT. Diagnos Laboratorium Utama, Tbk that is equal to - 0.89132

Result of Analysis of Calculation of Systematic Risk of Individual Stocks and Expected Return

Table 3. Result of Analysis of Calculation of Systematic Risk of Individual Stocks and Expected Return

No	Stock Name	Code	CAPM
1	PT Siloam International Hospitals Tbk.	SILO	6.45%
2	PT Diagnos Laboratorium Utama Tbk	DGNS	2%
3	PT Mitra Keluarga Karyasehat Tbk.	MIKA	4.20%
4	PT Prodia Widyahusada Tbk.	PRDA	3.85%
5	PT Royal Prima Tbk.	PRIM	6.70%
6	Sarana Meditama Metropolitan Tbk	SAME	7.43%

Source: Data processed by Microsoft Excel

It calculated the asset's beta measures how sensitive its returns to a market are. When beta is zero, it indicates no correlation with the benchmark; one indicates a stock has

the same volatility as the market, more than one suggests a stock is more volatile than its benchmark, and less than one is less volatile than the benchmark. (Brenyah, 2017)

Based on the calculation above, the stock can be classified by comparing the R_i , R_e (CAPM), and CAPM. If the value of $R_i > R_e$, then the shares can be classified as a stock that has a value undervalue. Whereas if the value of $R_i < R_e$, the shares can be classified as a stock with an overvalue. Here are presented the data classification of stock six companies of the healthcare industry listed on the stock exchange as follows:

Table 4. Classification of Stock and Recommendation

No	Stock Name	R_i	R_e	Decision
1	PT Siloam International Hospitals Tbk.	6.99%	6.45%	Buy
2	PT Diagnos Laboratorium Utama Tbk	-86.90%	2%	Sell
3	PT Mitra Keluarga Karyasehat Tbk.	23.76%	4.20%	Buy
4	PT Prodia Widyahusada Tbk.	-49.16%	3.85%	Sell
5	PT Royal Prima Tbk.	-10.30%	6.70%	Sell
6	Sarana Meditama Metropolitan Tbk	-17.30%	7.43%	Sell

Source: Data processed by Microsoft Excel

Based on table 4, there are 2 company was classified as overvalue, is PT. Siloam International Hospitals Tbk and PT. Mitra Keluarga Karyasehat Tbk.

1. Discussion

CAPM is the primary asset pricing model widely used in the financial investing fields. Most market participants use CAPM to decide their portfolio composition and other investment decisions, risky price assets and estimate the expected return. In CAPM, a lot of factors could bring an impact. The beta of funds is higher than the beta of stocks, meaning that funds move closer to the market, which can be impacted by chosen industry. In the healthcare industry, the beta would be higher, which will affect the test result. Besides, the external factor may cause inconsistencies since CAPM has some inherent limitation that impacts test results. CAPM may not represent the whole holding company and not depict a comprehensive picture. CAPM is also not testable unless the exact composition of the market portfolio is known. (Peng, 2021) Furthermore, inconsistency with CAPM may be caused by the existing factor, beta, which does not reward some of the risks, and factors from the firm size and the value of the stock. From Nwani's study, beta hardly explains the variation of the security return, and beta plays an insignificant role as a pricing factor.

The regression test result consistently considers the difference between the actual return and the expectation at the average real level. Therefore, the application of CAPM may misguide the investors to have a false expectation of the stock movement and bring wrong investment decisions.

Capital Asset Pricing Model (CAPM) using Python

For one-year period, CAPM is not rejected. Beta is linearly related to the return, consistent with CAPM predictions. According to CAPM, the value of α is expected to be zero, and it is very random and cannot be predicted. From linear regression, the equation is in the form of $y = mx + b$. To implement its function to calculate the linear regression, we must import NumPy and pandas to

deal with data and use matplotlib to visualize. For the linear regression model, we import from sklearn. Get the data from excel that we download from www.yahoo.finance.com,

get the value of the closed stock, and calculate the return from each stock (6 hospital stocks that we select are SILO, DGNS, MIKA, PRDA, PRIM, and SAME. For visualization, according to CAPM, there should be some relation between the stock performance and market performance. As seen from the plot, the stock performance mimics the market performance and can be compared.

CONCLUSION

Investors use CAPM when they want to assess the fair value of a stock and need to compensate in two ways: time value of money and risk. So, when the level of risk changes or other factors in the market make an investment riskier, they will use the formula to help re-determine pricing and forecast expected returns. The findings were confirmed by regression analysis applied to average returns and beta coefficients of five stock portfolios. As expected, the empirical showed a negative slope for the negative beta portfolios. Constructing portfolios from all available market shares makes the research representative of the whole market. Regression was applied to portfolios for which the absolute beta value was found to validate the CAPM assumptions, according to which market equilibrium is influenced by the risk-free return, the return on the entire market, and the stock portfolio's systematic risk measured by the beta coefficient. (Wolski, 2009)

The findings show that the Capital Asset Pricing Model (CAPM) did not give any appropriate forecast of the return from healthcare sectors stocks thought the one-year period of study because the result was different from the annual report from this group of hospital companies. Therefore, the Capital Asset Pricing Model (CAPM) is not a good predictor of stock return in the Indonesian Stock Exchange healthcare sector.

BIBLIOGRAFI

1. Yodi Mahendradhata, L. T. (2017). The Republic Indonesia Health System Review. *Asia Pasific Observatory on Health System and Policies*.
2. Wirtz, T. (2015). *Ripe for investment: the Indonesian health care industry post introduction of universal health coverage*. Jakarta: EY Indonesia.
3. Wolski, R. (2009). THE INFLUENCE OF NEGATIVE BETA ASSETS ON THE EMPIRICAL SML IN THE POLISH CAPITAL MARKET. *Folia Oeconomica Stetinensia*.
4. Chuyan Wang, Z. W. (2021). Using Fama-French Five-factors Model to Analyze the Impact of COVID-19 on U.S. Medical and Health Industries. *Advances in Economics, Business and Management Research, volume 203*.
5. Peng, S. (2021). The Validity of CAPM: A Critical and Conclusive Study with Empirical Evidence from the UK Security Market. *Advances in Economics, Business and Management Research, volume 203*.
6. Ahmad Musodik, A. P. (2021). Investment decision by using Capital Asset Method Pricing Model (CAPM) . *Asian Management and Business Review*, 165-175.
7. Brenyah, B. (2017). *CAPM Analysis: Calculating stock Beta as a Regression with Python*. Ds Biz.)



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