

# Application of the Capital Asset Pricing Modeling (CAPM) Method to Determine Efficient and Inefficient Stock Investment Options During the COVID-19 Pandemic

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**Abstract:** The purpose of this study was to determine and analyze the application of the Capital Asset Pricing Modeling (CAPM) method in determining investment options in banking stocks during the global economic crisis due to the pandemic caused by the COVID-19 virus, as well as sorting out efficient and inefficient stocks throughout 2020. This is a banking company listed on the Indonesia Stock Exchange, for the period March- September 2020 and there are 44 listed companies. Samples were taken by purposive sampling technique of 20 companies using the criteria for the company with the highest assets. This research method uses linear regression analysis to determine the beta coefficient in the Capital Asset Pricing Modeling (CAPM) method and compared with the variable rate of return obtained. The results in this study indicate that there are 16 stocks of efficient banking companies with a rate of return more than the expected return and 4 stocks of inefficient banking companies that have a rate of return less than the expected return. Shares with the BRIS code have the highest return rate of 0.3125 and are comparable to a high beta value of 5.5139 and NISP code shares have the smallest return rate of -0.0146 and a low beta of 0.1199.

**Keywords:** Risk, CAPM, Return, Efficient Stocks, Inefficient Stocks

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## 1. Introduction

Investment is an effort made by someone by setting aside part of the income in order to benefit from the value added in the future. Investments can be made in the real sector (tangible assets) such as property and precious metals. Investments can also be made in the form of the financial sector (securities/securities) in the form of shares, bonds (debt securities), insurance, and mutual funds.

One of the ways to invest in the financial sector is in the capital market or stock exchange to buy and sell shares or bonds in it. The definition of a stock exchange according to Law No. 8 of 1995 is a party that organizes and provides a system or means to bring together offers of buying and selling securities of other parties with the aim of trading securities between them. Shares are securities that show proof of ownership of a company where investors are willing to buy securities of ownership of a company which will later be used as capital for the company.

In 2020 there was a global crisis caused by the COVID-19 virus, namely since the world health organization WHO determined the Corona Virus as the cause of the global pandemic on Wednesday, March 11, 2020, during the COVID-19 pandemic that hit the whole world, including Indonesia, since the ministry Health announced the presence of the Corona virus in Indonesia in early March, March 2, not only affecting the health sector but also extending to the economic, social, educational and other sectors. It was recorded that as of September 30, 2020, the total number of positive cases of COVID-19 reached 287,008 in Indonesia with 10,740 who died, this is based on data from the COVID-19 Task Force, this condition is of course the economic sector has decreased with the COVID-19, a policy of limiting social interaction has arisen. accompanied by workplace closures, activity and transportation restrictions that have an impact on the distribution and production of goods to prevent the spread of the Corona virus. In the volatile industry in March, it was proven that the Composite Stock Price Index

(JCI) had corrected around 30% since the beginning of 2020. The JCI during the pandemic tends to decline in line with the COVID-19 pandemic which made investors nervous because of market uncertainty and not a few investors who chose to withdraw their funds prior to the pandemic, it was noted that the JCI growth was still above 6300 but since the pandemic the JCI has fallen to below 3000 [1].

Investing in stocks, of course, everyone wants a return on every investment, what is expected is an expected return with a rate of profit that is much higher than the value invested and in the capital market the desired return is certainly directly proportional to the risk (probability) that will be faced. The greater the deviation of the expected profit level, the greater the level of risk [2]. Investors or potential investors who want to invest in shares in the capital market must be careful in choosing stocks, especially during the pandemic, where prices fluctuate and change. Investors can choose stocks by considering the returns and risks. Efficient stocks are stocks that can minimize probability and maximize expected returns, we can use one of the Capital Asset Pricing Modeling (CAPM) models, this theory was developed by the godfather of modern portfolio theory, namely Harry Markowitz.

Capital Asset Pricing Modeling (CAPM) is one method that can be used to predict the return to be obtained by considering the risks to be faced. According to [2] CAPM is a model that can explain the balance between the level of systematic risk and the level of return required by securities. Systematic risk is the risk caused by changes in the overall market and this risk can be measured by beta (the sensitivity level of changes in market returns with security returns). [2] "The beta coefficient obtained by regressing past stock returns with market returns is called historical beta." The use of the Capital Asset Pricing Modeling (CAPM) method in investing is expected to help investors predict the expected return as much as possible by analyzing historical returns and market conditions in a complex manner. Uncertain and changing market conditions, this is what will form a risk to be faced by an investor. The CAPM concept allows us to obtain information about the real picture of the relationship between risk and return to determine investment decisions in stocks that are worth buying (efficient stocks) or avoiding (inefficient stocks).

The application of the Capital Asset Pricing Modeling (CAPM) method during this pandemic is considered effective by using historical data which is then compared between systematic risk and the rate of return that has occurred for an effective investment decision-making policy. Previous research using the Capital Asset Pricing Modeling (CAPM) method for stock investment choices. [3] Regarding the application of the CAPM method to banking stocks in making stock investment decisions show that from 38 (thirty eight) samples, there are 25 (twenty five) efficient stocks and 13 (thirteen) inefficient stocks. Likewise, [4] which uses the CAPM method on banking stocks, concludes that from the 40 (forty) samples used, it is obtained 31 (thirty one) shares of efficient companies and 9 (nine) of inefficient shares.

Based on the explanation above, the background of this research is the application of the Capital Asset Pricing Modeling (CAPM) method on stocks in selecting and determining stock investments during the COVID-19 pandemic in order to be able to determine the choice of efficient company shares in order to get maximum profit by considering the risks that will be faced and it is also hoped that the results of this study can be a reference for making investment decisions, especially during this pandemic by knowing which stocks are efficient and which are inefficient.

This research will be carried out and collect data on the Indonesia Stock Exchange which will later be written down with the IDX. Stocks on the IDX are divided into nine sectors and related information on stock market performance can be seen on the official website of the Indonesia Stock Exchange, namely [www.idx.co.id](http://www.idx.co.id). This research was conducted in one of the finance sectors, namely companies engaged in the financial sector, financing institutions, insurance, securities companies, and investment companies. This sector is considered to help maintain the country's economic stability during this pandemic, especially the banking sector. Because banking company shares are considered stocks that have an influence on the Composite Stock Price Index (CSPI), this can be seen from 4 banking stocks that are included in the Big Cap criteria (highest market capitalization) and of course they can still survive during this pandemic. In addition to having good fundamentals, the banking sector shares are considered to be equally affected by the pandemic, but the banking sector in Indonesia can still survive because one of them is the policy from the OJK to banks to restructure so that during the pandemic people still believe in banks and there is a possibility can also buy shares because they believe in providing capital for banks.

The purpose of this study is to find out and analyze which banking stocks are efficient and inefficient during the COVID-19 pandemic according to the Capital Asset Pricing Modeling (CAPM) method.

## 2. Literature Review

### 2.1. Understanding Capital Market

The capital market is a place for various parties (especially company) to sell stocks and bonds [5]. The proceeds from the sale will be used as additional funds or to strengthen the company's capital. [6] said the capital market is a mediation place between buyers and sales with the risk of profit and loss. The capital market is a means for companies to increase capital for long-term funding needs by selling shares or issuing bonds.

From the theory above, it can be concluded that the capital market is a place or means to conduct transactions to sell or buy stocks and bonds with the risk of profit and loss. To attract public interest, the capital market must be efficient, and the capital market can be said to be efficient if the level of liquidity is high so that there are many transactions in it because of the ease of selling or buying [5]. The capital market

also functions as a channel for funds from investors in the form of individuals, households, companies, or the government to parties in this case companies or governments who need funds or lack funds in their needs.

## 2.2. Understanding Shares

Shares are proof of ownership of capital/funds in a company company in the form of paper clearly stated nominal value, company name and followed by rights and obligations explained to each owner [5].

There are 2 types of shares, namely common stock and preferred stock. Both of these stocks in the broad sense are still the same but only from the dividend income can be different where ordinary shareholders get dividends once a year and preferred shareholders get dividends quarterly or quarterly. And in terms of liquidity, of course, common stock is more liquid and can be sold at any time, unlike preferred stock, it can only be sold at a certain time.

## 2.3. Understanding Investment

Investment is a delay in current consumption" for use in efficient production over a period of time [6]. The definition of investment "a form of delaying consumption in the present to obtain consumption in the future, which contains an element of uncertainty risk so that compensation is needed for the delay"[7]. The purpose of investing is to gain future profits by setting aside current consumption.

Financial investment is divided into 2 types, namely direct investment and indirect investment. Direct investment is the direct purchase of financial assets that can be traded in the money market, capital market, or derivative market. Indirect investment is the same as direct investment but through an intermediary investment company so it is called indirect. An investment company is a company that provides financial services by selling its shares to the public and use the funds obtained to invest in its portfolio.

## 2.4. CAPM

CAPM is a model that describes the relationship between risk and expected return [8]. "CAPM is a method used as an investor's point of view in observing various market reactions" [5].

This CAPM method is used to analyze the relationship between risk and expected return as well as the break-even price (equilibrium) which will be used by investors to assess the risk and income that will be obtained in investment decisions.

## 2.5. Efficient Stock Grouping Based on CAPM

Efficient stocks are stocks with a level of individual returns are greater than the expected rate of return [ $R_i > E(R_i)$ ] [6]. From this statement, an efficient or inefficient investment decision can be made as follows:

### 1. Efficient Stock

The decision on efficient shares made by investors is to buy these shares. Because it has a return that is greater than the expected return.

### 2. Inefficient Stocks

The decision taken by investors is to avoid the stock by not buying it, or selling the stock if it is already owned before the stock price drops. Because the rate of return is smaller than the expected rate of return, of course the stock is not in demand and the price will automatically fall.

## 3. Conceptual Framework

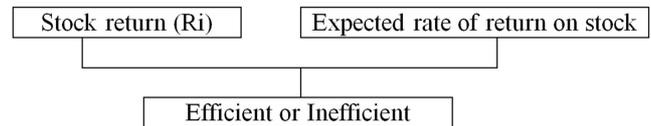


Figure 1. Conceptual framework.

## 4. Research Methodology

This type of research uses descriptive research. "research done"to find out independent variables, either one or more variables without making comparisons, or connecting one variable with another variable" [9].

The location of this research was carried out on the Indonesia Stock Exchange (IDX) through the official website of the Indonesia Stock Exchange (IDX) which was accessed through [www.idx.co.id](http://www.idx.co.id). The type of data used in this research is quantitative data. The quantitative data in this study are the financial statements of banking companies listed on the Indonesia Stock Exchange during the pandemic period, namely March - September 2020. The data source of this research is secondary data. Secondary data in this study is data obtained from the publication of quarterly financial statements of banking companies that contain information about the use of the Capital Asset Pricing Modeling (CAPM) method related to returns and risks from the company's shares as research samples on the Indonesia Stock Exchange (IDX) during the study period.

The population in this study is the shares of banking companies listed on the Indonesia Stock Exchange (IDX) during 2020. It was recorded that on 18-January-2020 there were 44 (forty four) banking stocks on the IDX [10]. Sampling in this study used a purposive sampling technique, namely a sampling technique with certain criteria. The criteria chosen by the researcher are 20 (twenty) shares with the largest assets.

The method used in this research is descriptive analysis. By analyzing the data obtained and then describing or describing the data collected using statistics. The following are the stages of research analysis:

1. Calculating the Individual Stock Return ( $R_i$ ).
2. Calculating the risk-free rate of return using the interest rate from the Bank Indonesian (RF).
3. Calculating the market rate of return ( $R_m$ ).
4. Calculating the level of systematic risk of each stock ( $\beta_i$ ).
5. Calculating the expected rate of return  $E(R_i)$ .
6. Classification of stocks between efficient and inefficient.

## 5. Results and Discussion

### 5.1. Individual Stock Return Rate ( $R_i$ )

The results of the analysis of the rate of return of each stock during the same period determined, namely March - September 2020. In this calculation of the 20 (twenty) samples used only 11 (eleven) stocks that provide dividends during March - September. Because not all of the bank companies studied distributed dividends, the researchers decided not to use dividends in calculating stock returns.

The results of the calculation and analysis of the rate of return for each stock every month during the specified period, namely March - September 2020 [11]. It shows that of the 20 (twenty) stocks sampled, 17 (seventeen) stocks gave positive returns above 0 and 3 the stock has a negative return below 0. The company's shares of Bank BRI Syariah Tbk (BRIS) have an average level of the highest return of 0.3125. Bank OCBC NISP Tbk (NISP) has the lowest average return of -0.0146. The following are the results of the calculation of Individual Stock Returns ( $R_i$ ) which are shown in the table below.

Table 1. Individual Stock Return Rate ( $R_i$ ) Period 2020.

Code Share	$R_i$
BRIS	0,3125
BBKP	0,1660
BBTN	0,0954
BTPN	0,084
BNII	0,0739
BJBR	0,0371
BJTM	0,0356
SDRA	0,0351
BBNI	0,0312
BNGA	0,0292
BNLI	0,0234
BMRI	0,0156
PNBN	0,0139
BDMN	0,0138
MEGA	0,0126
BBRI	0,0052
BBCA	0,0003
BSIM	-0,0072
MAYA	-0,0119
NISP	-0,0146

### 5.2. Risk-Free Rate of Return ( $R_f$ )

Based on the analysis during the research period, the interest rate set by Bank Indonesia (BI) [12] tended to be stable and the average was 4.2500 and in March to May the highest interest rate was recorded at 4.5000 because the government hopes to absorb public money so that inflation does not occur, in July to September the interest rate was low, which was recorded at 4,0000 because the government wants the money to be distributed to the public so that deflation does not occur and the country's economy is running again.

### 5.3. Market Return Rate ( $R_m$ )

Based on research during the March-September pandemic period through analysis Changes in the Composite Stock Price Index (JCI) [13] obtained an average of 0.0118 and the highest

return in July was 0.049790 this was due to the opening of the mall for the first time since it was closed due to the COVID-19 pandemic. And the smallest return in September was recorded at -0.070335 this This was caused by many foreign investors withdrawing their funds due to the scandals of giant banks suspected of being involved in money laundering and the planned lockdown in Europe.

### 5.4. Systematic Risk Level ( $\beta_i$ )

The results of the analysis during the study of 20 (twenty) stock samples, obtained the average beta of 1.9582 through regression calculations with the MS application. Excel with slope formula. Bank BRI Syariah Tbk (BRIS) company shares have the highest beta of 5.5139 and Bank OCBC NISP Tbk's (NISP) shares have the lowest beta of 0.1199.

This shows how sensitive changes in stock returns are to changes in market returns. The greater the beta number of the stock, the more sensitive or easy it is to change the stock return along with changes in market returns. And vice versa, if the beta number of the stock is smaller, it is not too sensitive or not easy to change the stock return along with changes in market return, meaning that the sensitivity to the market is small. In addition to showing beta sensitivity, in this case it also shows the risks that investors will face in order to get the expected profit. In this case, it is evident from the large returns that also have a large risk, such as stocks with the BRIS code having the highest return of 0.3125, which is comparable to the beta (risk) which is also the highest, which is 5.5139. This also applies to low returns, of course the risk is also low, as is the case with stocks with the NISP code which have the lowest return of -0.0146 with the lowest risk level of 0.1199.

The following are the results of the calculation of the beta of each stock shown in table 2.

Table 2. Systematic Risk Level ( $\beta_i$ ) Period 2020.

Code Share	$\beta_i$
BRIS	5,5139
BBTN	3,8079
BBKP	3,4588
BJBR	2,8238
BDMN	2,6195
BJTM	2,602
BNII	2,5132
BMRI	2,2518
BTPN	1,9425
BBNI	1,8589
BNLI	1,6439
BNGA	1,6366
BBCA	1,6038
PNBN	1,2033
BBRI	1,153
SDRA	1,1455
MAYA	0,5977
BSIM	0,5397
MEGA	0,1288
NISP	0,1199

### 5.5. Expected Rate of Return

The results of the analysis during the study of 20 (twenty)

stock samples, obtained an average of -3.9680 through the calculation of the formula  $Y1 = X2 + i(X3 - X2)$ . Company shares of Bank OCBC NISP Tbk (NISP) have the highest value of 3.7420 and shares of Bank BRISyariah Tbk (BRIS) have the lowest value of -17.5087. The following is the result of calculating the expected rate of return for each stock shown in table 3.

Table 3. Expected Rate of Return.

Code Share	(Rf)	(RM)	$\beta_i$	$E(R_i)$ $R_f + \beta_i (R_m - R_f)$
NISP	4,25	0,0118	0,1199	3,7420
MEGA	4,25	0,0118	0,1288	3,7040
BSIM	4,25	0,0118	0,5397	1,9624
MAYA	4,25	0,0118	0,5977	1,7168
SDRA	4,25	0,0118	1,1455	-0,6049
BBRI	4,25	0,0118	1,153	-0,6366
PNBN	4,25	0,0118	1,2033	-0,8499
BBCA	4,25	0,0118	1,6038	-2,5472
BNGA	4,25	0,0118	1,6366	-2,6863
BNLI	4,25	0,0118	1,6439	-2,7170
BBNI	4,25	0,0118	1,8589	-3,6238
BTPN	4,25	0,0118	1,9425	-3,9827
BMRI	4,25	0,0118	2,2518	-5,2938
BNII	4,25	0,0118	2,5132	-6,4016
BJTM	4,25	0,0118	2,602	-6,7776
BDMN	4,25	0,0118	2,6195	-6,852
BJBR	4,25	0,0118	2,8238	-7,7178
BBKP	4,25	0,0118	3,4588	-10,3966
BBTN	4,25	0,0118	3,8079	-11,8884
BRIS	4,25	0,0118	5,5139	-17,5087

### 5.6. Stock Class

After finding the value of the return from the stock ( $R_i$ ) and the expected return  $E(R_i)$  then the next step is to classify the shares with the criteria if  $(R_i) > E(R_i)$  then the stock is called efficient and vice versa if  $(R_i) < E(R_i)$  then the stock is called inefficient. The results of the evaluation of research stocks are presented in the following table:

Table 4. Stock Class.

Code Share	X1	Y1	Evaluasi Saham
BRIS	0,3125	-17,5087	Efficient
BBTN	0,0954	-11,8884	Efficient
BBKP	0,166	-10,3966	Efficient
BJBR	0,0371	-7,7178	Efficient
BDMN	0,0138	-6,852	Efficient
BJTM	0,0356	-6,7776	Efficient
BNII	0,0739	-6,4016	Efficient
BMRI	0,0156	-5,2938	Efficient
BTPN	0,0840	1,9624	Efficient
BBNI	0,0312	-3,6238	Efficient
BNLI	0,0234	-2,717	Efficient
BNGA	0,0292	-2,6863	Efficient
BBCA	0,0003	-2,5472	Efficient
PNBN	0,0139	-0,8499	Efficient
BBRI	0,0052	-0,6366	Efficient
SDRA	0,0351	-0,6049	Efficient
MAYA	-0,0119	1,7168	Not efficient
BSIM	-0,0072	1,9624	Not efficient
MEGA	0,0126	3,704	Not efficient
NISP	-0,0146	3,742	Not efficient

From the calculations and analyzes that have been carried out above, the researchers get the results that the stock with the code BRIS (Bank BRISyariah Tbk) is the most efficient stock because the return obtained exceeds the expected return.

## 6. Conclusion

In accordance with the purpose of this study, which is to find out which banking stocks are efficient and inefficient during the pandemic using the Capital Asset Pricing Modeling (CAPM) method. of the expected return (efficient) and there are 4 stocks whose return is below the expected return (inefficient).

After knowing the results above, it is concluded that the rate of return is directly proportional to the level of risk. The greater the return, the greater the risk that will be faced, and vice versa, the smaller the return, the smaller the risk that will be faced, so this shows similarities with the guidelines of the Capital Asset Pricing Modeling (CAPM) method.

## 7. Suggestion

### a. For Investors or Potential Investors

This research is expected to be used as a reference for investors or potential investors who will invest in stocks during the pandemic, especially in the banking sub-sector. Analyze further between the level of risk with the rate of return in order to get maximum results.

### b. For Further Researchers

For further researchers, it is expected to include the element of dividends in calculating the rate of return of each stock and using different samples and periods.

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