

Stock risk and return before and during the Covid-19 pandemic

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Received 18 July 2023

Revised 19 July 2023

Accepted 19 July 2023

Published online 20 July 2023

DOI: 10.58784/cfabr.39

ABSTRACT

Based on the type of data used, this study uses a quantitative approach, which places an emphasis on testing theory through measuring study variables with numbers and conducting data analysis with statistical procedures. One of the models used to estimate the rate of return is the Capital Asset Pricing Model (CAPM). The purpose of this study is to examine the level of risk and stock returns during the Covid-19 pandemic using the CAPM method in firms listed on the Indonesia Stock Exchange (IDX) and to examine differences in the level of risk and stock returns before and during the Covid-19 pandemic in firms listed on the Indonesia Stock Exchange. Determination of the sample using the purposive sampling method. There are 488 firms on the IDX that meet the criteria, with 98 firms classified as high-risk firms and 390 firms classified as low-risk. The results showed that there were no significant differences in risk and stock returns in high-risk firms before and during the pandemic in 2020, 2021, and 2022. There is a significant difference in risk and stock returns in low-risk firms before and during the pandemic in 2021, while there is no significant difference before and during the pandemic in 2020 and 2022. There is a significant difference in risk and stock returns in high and low-risk firms before and during the 2021 pandemic, while there is no significant difference before and during the 2020 and 2022 pandemics.

Keywords: risk-return; CAPM; efficient market hypothesis
JEL Classification: G11; G12; G14

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1. Introduction

The Indonesian economy in 2020 experienced deflation or a drastic decline compared to the previous year. This was due to the Indonesian economy experiencing unstable movements. Changes have taken place since the

beginning of 2020 which was influenced by the global Covid-19 pandemic. On March 11, 2020, the World Health Organization (WHO) officially declared the coronavirus outbreak (Covid-19) a global pandemic (Zhang et al., 2020). Goodell (2020) presents a comprehensive

literature survey on the economic impact of natural disasters such as nuclear war, climate change, or other disasters. This study shows that the pandemic has had a broad impact on financial markets including banking, insurance, and other financial sectors.

The study of Zhang et al. (2020) concludes that financial markets have seen dramatic movements on an unprecedented scale. The capital market as an investment destination and as a source of capital support for firms going public has experienced a very significant impact due to the pandemic. Investors tend to worry about investment risks during the Covid-19 pandemic, which has an impact on investment interest in go-public firms. Rational investors invest funds in efficient stocks, namely stocks that have high returns with minimal risk. Return and risk have a linear relationship, meaning that the higher the expected return, the higher the risk that must be borne by investors on the investment made, and vice versa.

Several market equilibrium models link risk and return, for example, the Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT), multi-factors model, and so on. CAPM is a model of balance between risk and return developed by Sharpe (1964), Lintner (1965), and Mossin (1966). The CAPM as a balance model can provide convenience by simplifying the picture between returns and risks. The CAPM as a balance model can provide convenience in simplifying the picture between risk and return by considering risk-free. The Covid-19 pandemic, which caused changes in investment interest, is interesting for study in relation to risk and stock returns before and during the pandemic.

2. Literature review

The return and risk are two things that cannot be separated in the investment world. Return and risk have a positive

relationship (Hartono, 2017). The higher the expected return, the higher the risk that is born by investors. The standard form of the CAPM extract was first developed separately by Sharpe (1964), Lintner (1965), and Mossin (1966), so this model is often referred to as the Sharpe-Lintner-Mossin form of the Capital Asset Pricing Model (Hartono, 2017). The CAPM is a model used to determine the required return of an asset. The Capital Asset Pricing Model is a model that describes systematic risk by using beta to link risk and return. The main objective of implementing the CAPM is to determine the level of expected return while minimizing risky investments. The CAPM can help investors calculate risk that cannot be diversified within a portfolio and compare it with the predicted rate of return. According to the concept of the CAPM, the only factor that influences stock returns is market risk.

The efficient market hypothesis is one of the most influential modern financial theories, with the assumption that all relevant information is reflected in security prices when these securities are traded. The concept of the efficient market hypothesis is based on the random walk model (Bleaney, 1998), which argues that the information available on the market is random and unpredictable, so that investors are unable to make predictions or views regarding future profits. Fama (1970) provides an understanding that the concept of an efficient market means that current stock prices reflect all available information. Efficiency in the capital market occurs when there is market capability in the speed and accuracy of reactions to achieve a price balance that fully reflects the overall availability of information (Suganda, 2018). The CAPM is a development of the portfolio theory proposed by Markowitz (1952) by introducing new terms, which are systematic risk and specific risk, or

unsystematic risk. Meanwhile, prospect theory shows that people will have an irrational tendency to be more reluctant to risk gains than losses. Based on their nature, investors have two types of attitudes, which are classified as rational and irrational. Investors who have a rational attitude are investors who only focus on the relationship between risk and expected return, while investors who have an irrational attitude are investors who focus not only on rational attitudes but on cognitive and emotional biases, in other words. Decisions made are not based on really mature considerations. In a losing situation, a person will tend to be more willing to take risks than in a successful situation. Kahneman and Tversky (1979) named this person's behavior as risk aversion behavior and risk seeking behavior. Based on their nature, investors have two types of attitudes, which are classified as rational and irrational.

Mahardika and Suandi (2021) find that when the first Covid-19 outbreak occurred in Indonesia, there was a market reaction in the tourism, transportation, textiles, medical devices, pharmaceuticals, and food and beverage sectors. Maneenop and Kotcharin (2020) state that there are differences in airline stock returns before and after the announcement regarding Covid-19. Manurung (2019) and Romieo et al. (2022) find that there are differences in stock returns before and after events, both economic and non-economic events, as indicated by changes in stock returns. Hundal et al. (2019) explain that the average beta of 90 stocks over the 5-year period was 0.64. This indicates that, in general, the hypothetical portfolio, which includes 90 stocks, is less volatile than the market. Particularly when the market index (which in this case is the OMX Helsinki-GI, including all stocks listed on the Helsinki stock exchange) changes by 10%, the hypothetical portfolio changes by 6.4% in the same direction. During the

2012–2016 period, the average beta of these stocks increased by 0.11 from 2013 to 2014. This is the only significant change in beta to observe.

3. Research method

The data analysis used in this research is the difference test using the Wilcoxon signed rank test based on the results of stock valuation using the CAPM approach. The sample method applied is the purposive sampling method, which is a non-probability sampling technique. Purposive sampling, namely the selection of samples that are not random, is obtained by using certain considerations. In this study, the sample selected based on the following criteria:

- a. Go-public firms listed on the Indonesia Stock Exchange (IDX)
- b. Firms listed from January 1, 2019 to December 31, 2022.
- c. Firms that are not subject to stock suspension at the time the data is collected

Based on the determination of the sample, there were 488 firms that met the criteria, while 348 did not meet the detailed criteria, 303 firms were newly registered in the range, and 45 firms are suspended. This study uses stock data for 4 years, with details of 1 year before and 3 years during the Covid-19 pandemic. The steps used in data analysis to make investment decisions are as follows:

- a. Collecting data before and during the Covid-19 pandemic event
- b. Calculating realized returns, market returns, and risk-free returns
- c. Calculating beta (β) and error variance (VAR ER) for each stock
- d. Determine the level of high and low-risk by using the Capital Asset Pricing Model (CAPM) approach.
- e. Comparing stock returns using different tests before and during the

Covid-19 pandemic by using the Wilcoxon signed rank test

- f. Analyzing results in relationship with financial theory and also with previous evidence.

The individual stock return rate or the expected profit rate is the desired rate of return by investors on the investment they make. The formula to calculate the rate of return for an individual stock is as follows.

$$R_{it} = \frac{P_i - P_{i-1}}{P_{i-1}}$$

The market rate of return is the expected return from the market portfolio, which in this study uses transportation and logistics firms. The formula for calculating the market rate of return is as follows.

$$R_{mt} = \frac{P_{mi} - P_{mi-1}}{P_{mi-1}}$$

The risk-free rate of return is a certain rate of return with a beta risk (β) equal to zero. The risk-free rate of return is the interest rate by Bank Indonesia. The formula used to calculate the risk-free rate of return is as follows.

$$R_f = \sum \frac{R_f}{N}$$

The expected Rate of Return According to CAPM is the rate of return expected by investors in the future from investment assets made. This mathematical equation is known as the CAPM.

$$E(R_i) = R_f + \beta_i (E(R_{mt}) - R_f)$$

The model is made in the form of a regression based on CAPM is in the form of the following equation.

$$R_{it} - R_f = a_i + \beta_i (R_{mt} - R_f) + e_{it}$$

The Wilcoxon signed rank test was carried out to find out the differences in a study with different treatments or conditions. The Wilcoxon signed rank test is carried out if the data is not normally distributed. The z statistics for Wilcoxon signed rank test is calculated as follows.

$$Z = \frac{T - \frac{n(n+1)}{4}}{\sqrt{\frac{n(n+1)(2n+1)}{24}}}$$

Sig. (2-tailed) is less than 0.05, so there is a difference if the significance is more than 0.05, so there is no difference.

4. Result and discussion

The Indonesia Stock Exchange (IDX) applies the IDX Industrial Classification, or IDX-IC to classify listed firms. The determination of a sector, sub-sector, industry, or sub-industry is based on market exposure. The method for determining the classification of firms listed on the IDX-IC is based on the largest income reflected in the financial statements, both from audited financial reports and annual reports. IDX has the right to determine the classification of a listed company based on IDX's evaluation and justification. The object of this study is 836 listed firms on the Indonesia Stock Exchange (IDX).

Based on the CAPM of the components that have been determined, the calculation of stock beta can be done by performing a regression analysis using the SLOPE function with the help of Microsoft Excel. Table 1 shows that the beta value is greater than one ($\beta_i > 1$) mean that the systematic risk of the stock is greater than the systematic risk of the market. Beta less than 1 ($\beta_i < 1$) indicates the systematic risk of the stock is smaller than the systematic risk of the market, whereas if beta is one ($\beta_i = 1$) then the systematic risk of the stock will be the market risk.

Table 1. CAPM analysis results

	Sample
$\beta_i < 1.000$	390
$\beta_i > 1.000$	98
Total	488

There are 488 firms on the Indonesia Stock Exchange (IDX) that meet the criteria of samples, with 98 shares with a beta value of more than one and 390 shares with a beta value of less than one. Based on the classification, 98 firms are classified as high-risk, and 390 firms are classified as low-risk. The total stock return data studied was 944 days and divided into four Covid-19 periods, namely before the 2019 pandemic, during the 2020 pandemic, during the 2021 pandemic, and during the 2022 pandemic. Each period has 236 days.

Table 2 shows the result for high-risk firms. First, the result shows that significance level before and during Covid-19 in 2020 is 0.210 or greater than the value of 0.05. This shows that there is no difference in risk and stock returns. Second, the result for before and during Covid-19 in 2021 is 0.123 or greater than the value of 0.05 which means that there is no difference in risk and returns. Third, the result for before and during Covid-19 in 2022 is 0.600 or greater than the value of 0.05 which means that there is no difference in risk and stock return.

Table 2. The Wilcoxon test (high-risk)

	Z statistics	Significance
2019 - 2020	-1.254	0.210
2019 - 2021	-1.543	0.123
2019 - 2022	-0.524	0.600

Table 3 shows the results of different tests using the Wilcoxon signed ranks test for low-risk firms. First, the significance level before and during Covid-19 in 2020 is 0.584 or greater than the value of 0.05. This result means that there is no difference in risk and stock returns.

Second, the result for before and during Covid-19 in 2021 is 0.000 or smaller than 0.05. This result means that there are differences in risk and stock returns. Third, the result for before and during Covid-19 in 2022 is 0.487 or greater than 0.05 which means that there is no difference in risk and stock return.

Table 3. The Wilcoxon test (low-risk)

	Z statistics	Significance
2019 - 2020	-0.547	0.584
2019 - 2021	-3.951	0.000
2019 - 2022	-0.696	0.487

Table 4 shows the results of a different test using the Wilcoxon signed ranks test for high-risk and low-risk firms. First, the result shows that the significant level for before and during Covid-19 in 2020 is 0.293 or greater than 0.05. This shows that there is no difference in risk and returns. Second, before and during Covid-19 in 2021 is 0.001 or smaller than 0.05 which means that there are differences in risk and returns. Third, the result for before and during Covid-19 in 2022 is 0.401 or greater than 0.05 which means that there is no difference in risk and returns.

Table 4. The Wilcoxon test (high and low-risk)

	Z statistics	Significance
2019 - 2020	-0.547	0.584
2019 - 2021	-3.951	0.000
2019 - 2022	-0.696	0.487

5. Conclusion

There are no significant differences in risk and stock returns for high-risk firms before and during the 2020, 2021, and 2022 pandemics. There are significant differences in risk and stock returns for low-risk firms before and during the 2021 pandemic, while there are no significant differences before and during the 2020 and 2022 pandemics. There are significant differences in risk and stock returns for

high-risk and low-risk firms before and during the 2021 pandemic, while there are no significant differences before and during the 2020 and 2022 pandemics.

This research can be considered material for further research about risk and return assessment; additionally, further study can develop other asset valuation models and expanded the time and object by considering global policies and events.

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