

# Do CAPM or APT is Better in Predicting Sharia Stock Return?

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## Abstract

*Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory are two basic models for understanding the relationship between stock return and risk in assessing shares traded in the capital market. The purpose of this study is to understand whether CAPM or APT is better and more accurate in predicting the return of sharia stocks traded in the Indonesia capital market. This study uses secondary data gathered from the official website of Indonesia Capital Market. In the way to achieve the research objective, this study using mean signed prediction error to verify which method is more accurate in predicting sharia stock return in Jakarta Islamic Index (JII) 30 for the period of 2015 – 2019 which sample was taken from 14 companies by using a purposive sampling technique. The result of this study indicate that the APT method is more suitable and accurate using by investors in estimating the return of sharia stocks that are registered in the Jakarta Islamic Index (JII) 30.*

**Keywords:** CAPM, APT, expected return, sharia stock, JII 30.

## Introduction

The demand and supply of shares are influenced by many factors consist of internal and external factors of the company. Stocks that too volatile can lead to a higher investment risk for the investors. According to the investment theory, the higher the risk level of a stock, then the higher the return indicated by investors (Faure, 2013). If an investor takes a risk, the investor expects a return following the possible risks that will be faced (Hartono, 2015). Generally, the rate of return received by the investors will be directly proportional to the risks that will be faced by the investors. In the way to understand how the determination of the relevant risk on an asset, and how the connection between risk. And expected return, a balance model is needed, which is a risk-return asset relationship model when the market is in equilibrium. In general, two famous basic models are using by investors, which is the Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) (Megginson, 1997).

Sharpe developed CAPM in 1964 by explaining the relationship between the expected rate of return of a risky asset and the risk of that asset in an equilibrium market condition. CAPM is a portfolio theory development put forward by Markowitz (1952) by introducing new terms, namely systematic risk, and specific risk, or called unsystematic risk (Megginson, 1997). In the CAPM approach personal stock return affect by market risk which is the susceptiblness of stock returns to market return movements that is described by beta. Meanwhile, Ross in 1976 formulated APT as an alternative equilibrium model to assess the connection between risk and return on an asset. APT appears to overcome the weakness of the CAPM model which allows the inclusion of more than one factor to determine the return on assets other than systematic risk. APT is based on the view that the expected return on a stock is influenced by various risk factors that show the general economic condition. The APT model

assumes that every investor believes that a factorial model with a number (n) of risk factors will affect a security's return. Risk in Arbitrage Pricing Theory is defined as a stock's sensitivity to macroeconomic variables and the expected rate of return influenced by this sensitivity.

Several studies in Indonesia have attempt to verify the accuracy of the CAPM and APT approaches and the results are still mixed as research conducted by Yunita (2018) found that APT is more accurate than CAPM in specifying the prospective return of JII stocks during the period March 2014 - March 2018. Indra (2018) found that CAPM is more accurate when compared to the APT model in estimating stock returns in the consumer goods and mining sectors listed on the Indonesia Sharia Stock Index during the 2013 - 2016 periods.

This study aims are to determine how the CAPM and APT predict sharia stock registered in the JII 30 expected return, as well as define whether CAPM or APT is better and more accurate in predicting the return of sharia stocks. JII shares are still interesting to study because 62% of sharia shares are transacted on the Indonesia Stock Exchange and 56% of market capitalization comes from Islamic stocks. JII 30 is the 30 leading Islamic stocks that still attract investors to invest. Every year the stock market capitalization of JII 30 continues to increase.

## **Literature Review**

### **Portfolio Theory**

Markowitz (1952) introduced portfolio theory. Markowitz received the Nobel Prize in economics in 1990 for the invention. This discovery made Markowitz called the father of modern portfolio theory. Portfolio theory states that risk can be reduced by combining assets into a portfolio. Investors can reduce the risk of their investment by investing their funds in various stocks in some capital markets or various stocks in a capital market because the risk of individual assets will be greater than the risk of the portfolio. The basic principle is related to rational portfolio allocation, which is often represented by the phrase "don't put your eggs in one basket" (Megginson, 1997).

In Markowitz's theory, an investor chooses a portfolio at time  $t - 1$  that result in a chance of return at  $t$ . This model assumes that investors are risk-averse, and when choosing between portfolios they only care about the average and variance of the returns on their investments over a period. As a result, investors choose mean-variance-efficient, which means that the portfolio; 1) minimizes the variance of portfolio returns, provides the expected returns, 2) maximizes the expected returns and provides variance. Therefore, the Markowitz approach is often called the mean-variance model (Fama & French, 2004). Markowitz's theory has not clearly stated the relationship between returns and investment risk. Therefore, Sharpe (1964) later refined this theory by developing a balance theory that connects risk and return, namely the Capital Asset Pricing Model (CAPM). This CAPM model can be used to explain that the return of a stock is a function of the risk-free rate, the required rate of return on the market portfolio (market return), and the beta coefficient (Fama & French, 2004).

### **Capital Asset Pricing Model (CAPM)**

CAPM was developed by Sharpe (1964) to refine Markowitz's (1952) portfolio theory through the development of a balance theory that links risk and returns by identifying portfolios efficient. Sharpe (1964), Lintner (1965) and Mossin (1969) introduced the standard form of CAPM separately, so this model is often referred to as the Sharpe-Lintner-Mossin CAPM. Sharpe (1964) and Lintner (1965) added two main opinions to the Markowitz model to understand portfolios that should be mean-variance-efficient (Elbannan, 2015). To be able to develop a true equilibrium asset-pricing model, it must be explained that efficient portfolio

theory and CAPM require the following assumptions: 1) all investors have the same time period, do not like risk, and will maximize their wealth by choosing a portfolio based on the average and variants of expected returns; 2) no transaction costs, income taxes, and other market imperfections; 3) several assets are perfectly divisible and all of them are marketable; 4) there are so many investors and no personal investor can affect the price of the security; 5) There are so many investors that no single investor can influence the price of securities; 6) all investors can borrow or lend money at a risk-free rate of return; 7) all asset returns are described through a normal probability distribution so that all portfolios can be described by determining their mean and variance.

CAPM is a model of the relationship between the expected rates of return of risky assets with the risk of that asset in a balanced market condition. In a state of equilibrium, the level of profit required (required return) by investors for a stock will be affected by the risk of the stock. The only calculated risk is the systematic risk or market risk as measured by beta ( $\beta$ ). In a balanced market condition, investors will select the optimal portfolio along the efficient frontier curve. These optimal portfolios represent efficient portfolios that consider the trade-off between expected returns and risk. Zubir (2013) suggests that the market equilibrium state in the CAPM model is described in two forms of relationship, namely the Capital Market Line (CML) and the Security Market Line (SML). The CML describes the link between expected returns and the total risk of an efficient portfolio in a balanced market. SML is a line of relationship between the expected rate of return of security with systematic risk (beta). CML can be used to assess the expected rate of return of an efficient portfolio, at a certain level of risk, while the SML can be used to assess the profitability of an individual asset in a balanced market condition.

### ***Arbitrage Pricing Theory (APT)***

APT is another model besides CAPM for valuing financial assets. The model developed by Ross (1976) arises based on the idea that in a competitive financial market, the arbitrage process will make two assets that have the same characteristics (such as the same risk) will give the same expected return. The arbitrage process will take place when two assets that have the same character, but the expected return on them are different, making it possible to buy an asset that is cheaper and to sell a more expensive asset. As a result, the demand for cheaper assets will increase, so that the price will increase and the supply of more expensive assets will also increase so that the price will decrease. The arbitrage process will stop when the two assets with the same characteristics have the same price (Megginson, 1997; Arifin, 2005).

APT is compiled based on five basic assumptions: 1) the capital market is in perfect competition; 2) investors have the same expectations of returns on each share; 3) these return expectations come from several ( $n$ ) factors that influence linearly; 4) the loading factor accommodates all systematic risks from assets are analyzed so that the error term is not correlated with each other in cross-sectional or time series; 5) the number of general (systematic) factors is much less when compared to the number of assets analyzed (Franke, 1984). By using factor analysis, it can be determined how many factors significantly need to be considered in predicting the return of the security. If we pay attention to the assumptions used in APT, it can be seen that the assumptions used by APT are more realistic compared to CAPM, but the ultimate goal of the comparison of accuracy between models is not whether the assumptions used are realistic or not, but how accurately the model reflects the reality. Reality is how precise a model is in predicting future stock returns (Husnan, 2015).

During the last few decades, there has been a great deal of literature discussing the development of APT theory and trying to perfect and generalize the theory proposed by Ross

such as research conducted by Chamberlain and Rothschild (1983), Grinblatt and Titman (1983), Huberman (1982), Beggs (1986) in Faff (1988) and Cetin et al. (2004). Several studies have also tried to find empirical evidence of the application of APT theory by using several predefined procedures such as Roll and Ross (1980) which include the total variance of individual stock returns and prove that the APT model is correct. Furthermore, Chen (1983) includes the return variable in the previous period and firm size, the results also support the APT theory, Brown and Weinstein (1983) introduced an indirect test on APT such as the multivariate test on CAPM with certain characteristics to determine the process of producing returns that must be met. If APT is a suitable pricing model, the results support APT (Megginson, 1997; Arifin, 2005).

In the APT model that will use in this study, there are three macroeconomic variables as risk factors, which are inflation, interest rates, and industrial production index.

### **Inflation**

Inflation is the tendency to increase the price of goods that is global in nature and occurs continuously. Inflation has a positive impact and a negative impact depending on whether or not inflation is high. If inflation occurs lightly, it has a positive effect in the sense that it can push the economy towards a better direction, namely increasing national income and making people excited to work, save, and invest. Conversely, if the inflation that occurs is very high (hyperinflation), then the economy will become chaotic. A high inflation rate is usually associated with an overheated economic condition, which means that the economy is experiencing a high demand for products that exceed the product supply capacity, so prices tend to increase. This condition will cause a decrease in the purchasing power of money and people's purchasing power (Murni, 2016). This condition will have an impact on decreasing the level of real income that investors get from their investment. Conversely, if a country's inflation rate decreases, this is a positive signal for investors as the risk of purchasing power of money decreases and the risk of decreasing real income.

Bodie (1976) states that investing in stocks can provide a good hedge from the effects of inflation because stocks are real assets. Based on this theory, the rate of return on shares should not be affected by changes in the prices of goods and services. However, inflation has caused the price of goods and services to increase and will indirectly increase the company's production costs and decrease the level of profit and in the end will affect the dividend distribution by the company (Mayfi & Rudianto, 2014). The results of research conducted by several researchers such as Fama and Schwert, 1977; Fama, 1981; Chen et al., 1986; Adrangi et al., 2002 and Al-Sharkas, 2004 found that inflation has a negative effect on stock returns.

### **Interest rate**

The interest rate is the amount of interest paid per unit of time, meaning that people have to pay for the opportunity to borrow money. The cost of borrowing money, which is measured in rupiah or dollars per year, for each rupiah or dollar borrowed, is the interest rate. According to Husnan (2009), the interest rate is the ratio of the return on several investments as a form of reward given to investors. Meanwhile, according to Sukirno (2006), the interest rate is the percentage of income received by creditors from the debtor during a certain time interval. The interest rate plays an important role in a country's economy because it greatly influences investment activities, the money supply, inflation, and others (Murni, 2016). The interest rate is an investment return obtained by investors but is a measure of the cost of capital that must be incurred by the company when using capital from investors. An interest rate that is too high will affect the present value of the company's cash flow, so that the opportunities to carry out investment activities become unattractive to take, as a result, the

company's value will decrease which will also lead to a decline in the company's stock price in the market (Brigham & Daves, 2004).

Interest rates usually have a negative relationship with stock returns, meaning that the higher the interest rate, then the lower stock returns (Adrangi et al., 2002). This statement is following the research results of Chen et al. (1986), Sabetfar et al. (2011), Er and Vuran (2012) who found that interest rates have a negative effect on the stock returns. Meanwhile, different results were found by Al-Sharkas (2004), Suartini and Mertha (2013) who found that interest rates have a positive effect on stock returns, meaning that the higher the interest rate, the higher the stock return.

### **Industrial Production Index**

The Industrial Production Index (IPI) assesses the changes of total inflation value that adjusted for the production output of producers, mining firms, electricity, water supply and the gas industry. This index usually does not include the construction industry. IPI is usually structured to measure the increase and decrease in production yield. The data is released on the Federal Reserve Bank webpage as well as in independent news feeds from Bloomberg and Reuters Thomas (Isnan, 2015).

### **Hypothesis Development**

Investors in investing activities certainly expect a certain return on their investment. In investing beside to obtaining profits in the future by calculating the expected return, investors must also pay attention to the risks they bear. Therefore, investors must be able to choose alternatives to make investment decisions. Investments that offer a high level of expected return with a certain level of risk or investments that offer a certain return with a low level of risk. The equilibrium model can help investors in assessing an asset and how the mechanism of price formation and market returns is in a simpler form. The equilibrium model can also be used to understand how to specify the pertinent risk to an asset, as well as the link between risk and expected return. The balance model that can be used by investors is CAPM and APT. CAPM was built by Sharpe (1964) to refine Markowitz's (1952) portfolio theory through the development of a balance theory that links risk and return by identifying portfolios that must be efficient if asset prices are clear for all markets. Sharpe (1964), Lintner (1965) and Mossin (1969) introduced the standard form of CAPM separately, so this model is often referred to as the Sharpe-Lintner-Mossin CAPM (Fama & French, 2004). Sharpe (1964) and Lintner (1965) added two main assumptions to the Markowitz model to identify portfolios that should be mean-variance-efficient (Elbannan, 2015). This model applies to equilibrium (balanced) conditions. In a state of equilibrium, the level of profit required (required return) by investors for a stock will be affected by the risk of the stock. The risk that is calculated is only systematic risk or market risk as measured by beta ( $\beta$ ).

Ross (1976) formulated Arbitrage Pricing Theory (APT), which is an alternative equilibrium model to assess the relationship between risk and return on an asset. APT appears to overcome the weakness of the CAPM model which allows the inclusion of more than one factor to determine the return on assets other than systematic risk. APT is based on the view that the expected return on a stock is influenced by various risk factors that show the general economic condition. The model developed by Ross (1976) arises based on the idea that in a competitive financial market, the arbitrage process will make two assets that have the same characteristics (such as the same risk) will give the same expected return. The arbitrage process will take place when two assets that have the same character but have different expectations of return, make it possible to buy an asset that is cheaper and to sell an asset that is more expensive. As a result, the demand for cheaper assets will increase so that the price

will increase and the supply of more expensive assets will increase, so that the price will decrease. The arbitrage process will stop when the two assets with the same characteristics have the same price (Megginson, 1997; Arifin, 2005).

Several studies have tried to test the accuracy of the CAPM and APT models and the results are still mixed as research conducted by Alshomaly and Masa'deh (2018) found that APT is more accurate than CAPM in estimating stock returns in the financial, industrial, and service sectors. Leković and Stanišić (2018), said that CAPM is easy to use and is able to provide better predictive results. Yunita (2018) found that APT was more accurate than CAPM in determining the expected return of JII shares during the period of March 2014 - March 2018. Indra (2018) found that CAPM was more accurate than the APT model in estimating stock returns in the consumer goods and mining sectors registered in the Indonesia Sharia Stock Index (ISSI) during the period 2013 - 2016. Furthermore, research conducted by Hartoyo (2016) found that CAPM was more accurate in predicting the return of shares of companies listed on the Indonesia Stock Exchange for the period of January 2010 - December 2013 with a sample of 399 companies.

Refer to the above explanations, the research hypotheses can be formulated as follows:

Hypothesis 1: The CAPM and APT models used in estimating sharia stock returns registered in JII 30 provide different calculation results

Hypothesis 2: The CAPM and APT models provide the different results of calculating the expected return and the actual return of sharia shares registered in JII 30.

Hypothesis 3: The CAPM and APT models have different levels of accuracy in predicting sharia stock returns registered in JII 30.

### **Research Method**

This research type is applied research with a quantitative approach. The data used in this study is secondary data taken from the official website of the Indonesian capital market. The data gathered from IDX statistics, financial, and company annual reports. This research also uses the necessary additional information obtained from articles, journals, textbooks, etc. This research uses a combination of cross-section data with time-series data or also known as panel data. In the way to achieve the research objectives, we use sharia stock that were listed on the Jakarta Islamic Index (JII) 30 of the Indonesia capital market during the period 2015 - 2019 with a total population of 30 companies and those selected as samples were 14 companies by using a purposive sampling technique.

In the way to understand the important role of risk-free assets in the Capital Asset Pricing Model (CAPM), investors can choose a combination of the selected portfolio and risk-free assets, so to be able to estimate the expected return on sharia stock of JII 30 the following formula can be used:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f]$$

Arbitrage Pricing Theory (APT) assumes that investors believe a security's return will be determined by a factorial model with  $n$  risk factors. The risk factors used in this study are macroeconomic variables, namely inflation, interest rates and industrial production indices. To be able to estimate the expected return on sharia stock of JII 30, the APT model can be formulated as follows:

$$E(R_i) = \alpha_0 + \beta_{inflation} F_{inflation} + \beta_{BI\ rate} F_{BI\ rate} + \beta_{IPI} F_{IPI} + e$$

All variables used in this research and their measurements can be seen in Table 1:

Table 1. Research Variables and Measurements

Research Variables	Definition	Measurements
Stock Actual Return (R <sub>i</sub> )	Stock return is the main factor that influences the investment pattern made by investors, where investors always like high returns on investment in the capital market (Hiriyappa, 2008)	Return = [(P <sub>1</sub> – P <sub>0</sub> )] / P <sub>0</sub> where P <sub>0</sub> : Share purchase price P <sub>1</sub> : Share selling price
Market Return (R <sub>M</sub> )	Market return is the rate of return based on the development of the market index, the choice of market index does not depend on a theory but is more dependent on empirical results (Hartono, 2016)	R <sub>M</sub> = JCI <sub>t</sub> – JCI <sub>t-1</sub> / JCI <sub>t-1</sub> where JCI <sub>t</sub> : Jakarta Composite Index <i>current year</i> JCI <sub>t-1</sub> : Jakarta Composite Index <i>previous year</i>
Risk Free Return (R <sub>F</sub> )	Risk free is the rate of return obtained from investing in risk free assets (Hartono, 2016)	The SBI return set by Bank Indonesia
Beta (β)	Beta is a relative measure of the non-diversifiable risk index of the movement of return on assets in response to changes in market returns (Gitman, 2009)	$\beta_i = \frac{\sigma_{i,M}}{\sigma_M^2}$ where β: Beta (systematic risk) σ <sub>i,M</sub> : Covarians stock return to market σ <sub>M</sub> <sup>2</sup> : Varians stock return
Surprise factor of Inflation (F Inflation)	Inflation is the tendency to increase the price of goods which is general in nature and occurs continuously (Murni, 2016)	F <sub>inflation</sub> = <i>Actual</i> Inflation – <i>Expected</i> Inflation
Surprise factor of Interest Rate (F Interest Rate)	The interest rate is the ratio of the return on a number of investments as a form of reward given to investors (Murni, 2016)	F <sub>BI rate</sub> = <i>Actual</i> BI rate – <i>Expected</i> BI rate
Surprise Factor of Industrial Production Index (F Industrial Production Index)	The industrial production index (IPI) is an index that measures the growth of various industrial sectors in an economy such as mining, manufacturing and so on (Singh dkk, 2016)	F <sub>IPI</sub> = <i>Actual</i> IPI – <i>Expected</i> IPI

To compare the actual return and the expected return value on macroeconomic factors, a forecasting method for the expected macroeconomic risk is used. The forecast will use the Autoregressive Integrated Moving Average (ARIMA) model.

Statistical test using the Wilcoxon test (*Paired Sample Test*) perform to find out the difference between sharia stock actual return and expected return of JII 30 between the two

models used in this study (CAPM & APT). The basis for making the decision to accept or reject H0 on the Wilcoxon signed-rank test is as follows: 1) if the probability value (Asymp. Sig.) <0.05 then H0 is rejected and Ha is accepted, which means that there is a difference in the data being tested; 2) if the probability value (Asymp. Sig.) > 0.05 then H0 is accepted and Ha is rejected, which means that there is no difference in the data tested.

Mann Whitney Test (Independent Sample Test) conduct a test for the comparative significance and two independent samples (unpaired). In this different test, the samples used do not have to be the same in number. According to Sugiyono (2017), the Mann Whitney test is part of non-parametric statistics, so there is no requirement that research must be normally distributed. The mean test used the Independent Samples T-Test for non-parametric statistics (Mann Whitney U-Test) with a significance level of 0.05. The Mann Whitney test criteria are as follows: 1) if the significance value <0.05 then H0 is rejected and Ha is accepted, which means that there are differences in the data tested from the different samples used; 2) if the significance value > 0.05 then H0 is accepted and Ha is rejected, which means that there is no difference in the data tested from the different samples used.

In addition, the Mean Signed Prediction Error test is also used to see the level of bias of an estimated value to its actual value. In MSPE, the difference is more or less considered, so the deviation value can be positive or negative. Small MSPE has a small degree of bias (Francis et al., 2000).

$$MSPE = \frac{1}{m} \sum_{i=1}^m \frac{(V - P_i)}{P_i}$$

where

Pi = Actual stock price

V = Expected stock price

m = Sample amount

## Results and Discussion

### Research Results

#### Calculation Result of Sharia Stock Actual Return

The actual return is calculated using the company's stock price in the capital market at the end of each month and the end of the year (closing price). The end of month data will be used as the basis for calculating the beta value that will be used in the CAPM model, while the year-end stock price data will be used as a comparison of expected return with actual return for the two methods used in this study. The monthly return calculation data is not displayed because it is too much, so that what is displayed in the results of this study is only the annual actual return for five years, for each sharia company registered in the JII 30, which is the research sample.

For more details on the growth of the actual sharia stock returns of each company during the 2015-2019 period can be seen in the Table 2:

Table 2. Calculation result of sharia actual return for the period of 2015 – 2019

No.	Firm Code	Year					Average
		2015	2016	2017	2018	2019	
1	ADRO	-0,504808	2,291262	0,097345	-0,346774	0,279835	0,363372
2	AKRA	0,741505	-0,163763	0,058333	-0,324409	-0,079254	0,046482
3	ASII	-0,191919	0,379167	0,003021	-0,009036	-0,158055	0,004636

4	BSDE	-0,002770	-0,025000	-0,031339	-0,261765	0,000000	-0,064175
5	ICBP	0,028626	0,272727	0,037901	0,174157	0,066986	0,116079
6	INDF	-0,233333	0,531401	-0,037855	-0,022951	0,063758	0,060204
7	KLBF	-0,278689	0,147727	0,115512	-0,100592	0,065789	-0,010050
8	LPKR	0,014706	-0,304348	-0,322222	-0,479508	-0,078740	-0,234023
9	LSIP	-0,301587	0,318182	-0,183908	-0,119718	0,188000	-0,019806
10	PGAS	-0,542500	0,034608	-0,383803	0,211429	0,023585	-0,131336
11	SMGR	-0,296296	-0,195175	0,079019	0,161616	0,043478	-0,041472
12	TLKM	0,083770	0,281804	0,115578	-0,155405	0,058667	0,076882
13	UNTR	-0,023055	0,253687	0,665882	-0,227401	-0,212980	0,091227
14	UNVR	0,145511	0,048649	0,440722	-0,187835	-0,057269	0,077955
Average		-0,097203	0,276495	0,046728	-0,120585	0,014557	

Source: Indonesia Stock Exchange Statistics, processed data

The data shows that the highest average of sharia actual return in the sample of this study reached 27.65% in 2016, meaning that the average sharia stock experienced an increase in return of 27.65% and the lowest reached (12.06%) in 2018 which means experiencing on average decreased by 12.06%.

#### **Calculation Results of Sharia Stock Expected Return with Capital Asset Pricing Model (CAPM)**

The calculation of expected return using the CAPM approach will use several variables, such as market return, risk-free return, and beta. Beta is a single risk factor that will affect the expected return of investors in the CAPM model. The results of the calculation of sharia expected return using the CAPM method can be seen in Table 3:

Table 3. Calculation result of sharia expected return by using CAPM method for the period of 2015 – 2019

No.	Firm Code	Year					Average
		2015	2016	2017	2018	2019	
1	ADRO	-0,097610	0,208623	0,267700	0,021133	-0,034252	0,073119
2	AKRA	0,001273	0,151481	0,150172	-0,091293	-0,053871	0,031552
3	ASII	-0,288249	0,190805	0,237044	-0,039114	0,003913	0,020880
4	BSDE	-0,305278	0,208537	0,160459	-0,045536	0,001751	0,003986
5	ICBP	0,111329	0,170394	0,193710	-0,018847	0,056033	0,102524
6	INDF	-0,108551	0,184578	0,223246	-0,051113	0,040555	0,057743
7	KLBF	-0,098096	0,190728	0,149111	-0,061176	0,006673	0,037448
8	LPKR	3,508415	0,201230	-0,102168	-0,031819	0,092542	0,733640
9	LSIP	-0,164438	0,085634	0,120619	-0,060449	0,051314	0,006536
10	PGAS	-0,311791	0,166582	0,240514	-0,053170	-0,018585	0,004710
11	SMGR	-0,179497	0,162830	0,208878	-0,214526	-0,039928	-0,012449
12	TLKM	-0,093511	0,157590	0,180820	0,073563	0,037922	0,071277
13	UNTR	-0,079966	0,156279	0,152701	0,039573	0,005115	0,054740
14	UNVR	-1,740594	0,170338	0,307484	-0,007020	0,027185	-0,248521
Average		0,010960	0,171831	0,177878	-0,038557	0,012598	

Source: Indonesia Stock Exchange Statistics, processed data

The data shows that the highest average expected return of sharia stocks during the 2015 - 2019 period occurred in 2017, which reached 17.79%, and then in 2016, it reached 17.18%. Meanwhile, the lowest average expected return occurred in 2018, which decreased by 3.9%.

**Calculation Results of Sharia Stock Expected Return with APT**

The expected return calculation of sharia stocks by using the APT model will use three macroeconomics variables, that is inflation, interest rates and industrial production index. For this macro variable, it is used which is calculated from the difference between the actual value and the expected value. Expected value is the forecast value of each macro variable calculated using the ARIMA method (Box Jenkins). The calculation result of sharia stock expected return using the APT model can be seen in the Table 4:

Table 4. Calculation result of sharia expected return by using APT method for the period of 2015 – 2019

No.	Firm Code	Year					Average
		2015	2016	2017	2018	2019	
1	ADRO	0,006362	0,022433	0,027916	0,032410	-0,001872	0,017450
2	AKRA	-0,064843	-0,103975	-0,098934	-0,207587	-0,175722	-0,130212
3	ASII	-0,174709	-0,162054	-0,200990	-0,164859	-0,203271	-0,181177
4	BSDE	0,014484	-0,005931	-0,114042	-0,016975	-0,005445	-0,025582
5	ICBP	-0,063309	0,014797	-0,177400	-0,186220	-0,219596	-0,126345
6	INDF	-0,131984	0,013186	-0,186999	-0,200633	-0,151098	-0,131505
7	KLBF	-0,149029	0,000006	-0,199214	-0,206528	-0,157801	-0,142513
8	LPKR	0,004988	-0,015692	0,002867	0,012132	0,004233	0,001706
9	LSIP	0,011883	0,002999	0,003619	0,000923	0,000997	0,004084
10	PGAS	-0,102943	0,008067	-0,112267	-0,057798	-0,044546	-0,061897
11	SMGR	-0,429443	0,034678	-0,400410	-0,314553	-0,226120	-0,267170
12	TLKM	-0,016529	0,006754	-0,040210	-0,048052	-0,076171	-0,034842
13	UNTR	-0,567701	0,601518	-0,523967	-0,521643	-0,675526	-0,337464
14	UNVR	-0,628397	0,093039	-1,106017	-1,164669	-1,310980	-0,823405
Average		-0,163655	0,036416	-0,223289	-0,217432	-0,231637	

Source: Indonesia Stock Exchange Statistics, processed data

The data shows that the highest average expected return of sharia stocks by using the APT method during the period 2015 - 2019, occurred in 2016 which reached 3.6%, while the lowest was in 2019, which decreased by 23.16%.

**Different Test Results of Actual Return and Expected Return of CAPM and APT Methods using Wilcoxon Signed Rank Test**

Each method that has been used in estimating sharia stock returns during the period 2015 - 2019 need to test to prove that both of method have different calculation results from the actual return, we use the Wilcoxon test for paired samples (Paired Sample Test) with the following results:

Table 5. Wilcoxon signed rank test result for CAPM method

**Test Statistics<sup>a</sup>**

	Expected Return - Actual Return
Z	-1.805 <sup>b</sup>

Asymp. Sig. (2-tailed)	.071
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- a. Wilcoxon Signed Ranks Test  
b. Based on negative ranks.

Source: Indonesia Stock Exchange Statistics, processed data

The test results show that there is no difference between expected return and actual return on sharia shares registered in JII 30 by using CAPM method.

Table 6. Wilcoxon signed rank test result for APT method

**Test Statistics<sup>a</sup>**

	Expected Return - Actual Return
Z	-3.093 <sup>b</sup>
Asymp. Sig. (2-tailed)	.002

- a. Wilcoxon Signed Ranks Test  
b. Based on positive ranks.

Source: Indonesia Stock Exchange Statistics, processed data

The test results for the difference between expected return and actual return using the APT approach show that there is a difference between the expected return and the actual return of sharia stocks registered in JII 30.

**Different Test Results for Expected Return Model of CAPM and APT using Mann Whitney Test**

Different tests on the expected return of the CAPM method and the expected return of the APT method were carried out using the Mann Whitney test as shown in Table 7:

Table 7. Mann Whitney test result for CAPM and APR method

**Test Statistics<sup>a</sup>**

	Prediction
Mann-Whitney U	1162.000
Wilcoxon W	3647.000
Z	-5.368
Asymp. Sig. (2-tailed)	.000

- a. Grouping Variable: Group

Source: Indonesia Stock Exchange Statistics, processed data

The results of the different test for expected return using the Mann Whitney test show that there is distinction in predictions among CAPM and APT methods on sharia stocks registered in JII 30 for the period of 2015 – 2019.

**Accuracy Test Results with Mean Sign Prediction Error (MSPE)**

The accuracy test result for the CAPM and APT methods using the Mean Sign Prediction Error (MSPE) show that the APT method has a higher level of accuracy compared to the CAPM method because it has a lower level of bias in accordance with the MSPE test provisions. For more details, see Table 8:

Table 8. Mean Sign Prediction Error (MSPE) test result

CAPM	APT
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5,270989	-1,050379
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Source: Indonesia Stock Exchange Statistics, processed data

### Discussion

Every investor who invests in financial assets needs to know how likely the risk level to be faced and the possible return that will be obtained according to the risks that will be faced. The rate of return received by investors will generally be directly proportional to the risks.

To understand how the determination of the relevant risk in an asset, & how the connection among risk & prospective return is, there are two equilibrium models that are commonly used, which is the CAPM & APT. CAPM is also known as a single factor model and APT is known as a multifactor model. Each model has its own advantages and disadvantages. This study aims is to decide how the CAPM & APT predict the sharia stock registered in JII 30 expected return and which of the two methods has the highest level of accuracy.

The test results for the difference between expected return and actual return of sharia stocks using the CAPM method show that there is no difference between expected return and actual return of sharia stocks during the 2015 - 2019 periods. Meanwhile, the different test results on the APT model show that there is a difference between the expected return of sharia shares with the actual return. This condition illustrates that the estimation of sharia stock returns is different from the actual return using the APT approach. The value of expected return can be higher or lower than the actual return value.

The different test results of the CAPM and the APT model show that the predictions result of the two methods are different for sharia stocks. These results illustrate that the CAPM approach that uses beta as a risk factor provides a different predictive outcome with the APT method which uses several macroeconomic variables, such as inflation, interest rates and industrial production indices as risk factors.

Mean Sign Prediction Error (MSPE) indicates that the APT method has a lower level of bias than the CAPM method. Its means that the ability of the APT model in estimating stock returns of sharia stock is better than the CAPM model (APT is more accurate than CAPM) because the level of bias is smaller, so it can be used by investors. These results are consistent with research conducted by a number of previous studies which stated that APT is more accurate in estimating stock returns when compared to CAPM (Alshomaly & Masa'deh, 2018; Yunita, 2018). The results of this study are inconsistent with research conducted by Leković and Stanišić, 2018; Indra, 2018 and Hartoyo 2016 who found that CAPM was more accurate than APT.

### Conclusion

The purpose of this study is to determine how the CAPM & APT predict sharia stock registered in the JII 30 expected return, as well as define whether CAPM or APT is better and more accurate in predicting the return of sharia stocks. The research results illustrate that there is no difference between expected return and actual return of sharia stocks by using CAPM approach. Meanwhile, APT method show that there is a a difference result between the expected return and actual return of sharia stock. Predicting test result between CAPM and APT method show that CAPM and APT have different predictive outcome. Accuracy test result show that APT is more accurate compared to CAPM in predicting sharia stock return registered in JII 30 for the period of 2015 – 2019.

This research still has a number of limitations that might have an impact on the research results. First, this research only is using two basic methods, which are CAPM and APT. Second, this study still uses limited sample and factors for APT model. Therefore, suggest to

the other researchers to use more methods and a wider sample, also more factors for APT method in accordance with the theory and previous research.

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