

## Analysis Comparative Method Shari'a Compliant Asset Pricing Model

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**Abstrak.** Pandangan peneliti terhadap model CAPM tidak sesuai dengan ekonomi syariah karena terdapat elemen  $R_f$  sebagai instrumen yang mengandung elemen kepentingan, sehingga diperkenalkan model modifikasi CAPM berbasis syariah yaitu SCAPM. Penelitian ini bertujuan untuk menganalisis perbedaan metode SCAPM menurut Tomkins & Karim (1987) SCAPM non  $R_f$ , Ashker (1987) SCAPMZ, Shaikh (2010) SCAPM NGDP, dan Hanif (2011) SCAPMI. Teknik pengambilan sampel yang digunakan adalah purposive sampling dan diperoleh 19 sampel. Analisis data yang digunakan adalah perhitungan Mean Absolute Deviation (MAD), Mean Square Error (MSE), dan koefisien determinasi. Hasil perhitungan Mean Absolute Deviation (MAD) dan Mean Square Error (MSE) menjelaskan bahwa terdapat perbedaan dari model SCAPM tanpa risk free rate, SCAPMZ, SCAPM NGDP, dan SCAPMI. Sementara itu, SCAPMI memiliki kekuatan penjelas terbaik dibandingkan empat model SCAPM lainnya. Investor syariah dan konvensional disarankan untuk menggunakan pemodelan SCAPMZ dalam memprediksi return saham.

**Kata kunci:** SCAPM, SCAPMZ, NGDP, SCAPMI

**Abstract.** *The researcher's view of the CAPM model is not in accordance with the Islamic economy because there is an  $R_f$  element as an instrument that contains an interest element, so a modified model of CAPM based on sharia is introduced, namely SCAPM. This study aims to analyze the differences in the SCAPM method according to Tomkins & Karim (1987) SCAPM non  $R_f$ , Ashker (1987) SCAPMZ, Shaikh (2010) SCAPM NGDP, and Hanif (2011) SCAPMI. The sampling technique used was purposive sampling and obtained 19 samples. Data analysis used is the calculation of Mean Absolute Deviation (MAD), Mean Square Error (MSE), and the coefficient of determination. The results of the calculation of Mean Absolute Deviation (MAD) and Mean Square Error (MSE) explain that there are differences from the SCAPM models without risk free rate, SCAPMZ, SCAPM NGDP, and SCAPMI. Meanwhile, SCAPMI has the best explanatory power than the other four SCAPM models. It is recommended that Islamic and conventional investors use SCAPMZ modeling in predicting stock returns.*

**Keywords:** SCAPM, SCAPMZ, NGDP, SCAPMI

### Introduction

The lack of ability of investors led them to miscalculate return and risk. In order to assess return levels and risk, it can use the estimated model capital asset pricing model (CAPM) made famous by Markowitz (1995). Hanif (2011) argued that the CAPM was incompatible with the Islamic economic system because of  $R_f$  (risk free) as one of the ribawi instruments that conflict with the religion of Islamic doctrine or Islamic principles. And in Islam riba is a deed that must be abandoned. One modification that can be made is by the establishment of a CAPM model according to Islamic principles because as a Muslim investor, sharia compliance is of the highest importance.

In the research, these will be used as SCAPM (Shari'a Compliant Assets Pricing Model)

or which is known as the modified models of the Capital Assets Pricing Model (CAPM). SCAPM (Shari'a Compliant Assets Pricing Model) is a model to predict the level of stock returns in accordance with Islamic principles because SCAPM assumes that usury (interest) does not apply in the Islamic economic system. One method is the SCAPM method according to Tomkins & Karim (1987) by eliminating the  $R_f$  element. According to Sadaf and Andlebb (2014) there are three options that can be used to replace the value of the risk free rate ( $R_f$ ), namely the level of zakat Ashker (1987), the level of Gross Domestic Product (GDP) Sheikh (2010) and replacing the value with the inflation rate Hanif (2011).

This study aims to analyze the differences that exist in the Shari'a Compliant Asset Pricing Model (SCAPM) method according to Tomkins & Karim (1987) which removes the  $R_f$  element from the CAPM formula because they consider  $R_f$  to contain an element of interest (risk free rate) which is prohibited by sharia. , Shari'a Compliant Asset Pricing Model (SCAPM) according to Ashker (1987) replaces the element of risk free rate with a percentage of zakat rate which is 2.56% or equal to  $(\text{Percentage of Zakat} / 1 - \text{Percentage of Zakat})$ , Shari'a Compliant Asset Pricing The model (SCAPM) according to Shaikh (2010) he proposes a relationship between debt and Nominal Gross Domestic Product, so that assuming that the level of NGDP/NPDB will replace the element of risk freerate in calculating the level of return expected by investors, and Shari' a Compliant Asset Pricing Model (SCAPM) according to Hanif (2011) explains that the  $R_f$  component consists of two things, namely the real  $R_f$  and the cost of inflation. Rill  $R_f$  represents the time value of money which means making money into a commodity, so it is prohibited in the Shari'a because it is the implication of interest.

The second  $R_f$  related to inflation in sharia there is no prohibition that explains that inflation is not allowed. Hasanah & Mas pupah (2017) This study shows that the Sharia Asset Pricing Model on Demand (SCAPM) is a modification of the Capital Asset Pricing Model (CAPM) model, which has been explained that one of the basic assumptions of the CAPM is that there is no inflation. So in this study, researchers did not use inflation but replaced the inflation factor with the rate of return for Bank Indonesia Sharia Certificates (SBIS).

## Research Methods

The method used in this research is a comparative descriptive method with a quantitative approach. In this study, the population used is all company shares listed on the Jakarta Islamic Index for the 2017-2019 period. The sampling technique in this research is non-probability sampling with purposive sampling technique. So the samples obtained in accordance with the sampling criteria in this study were 19 companies. The type of data used in this study is secondary data. Secondary data in this study is the closing stock price (closing price).

Period 2017 – 2019, Inflation, Gross Domestic Product, Jakarta Islamic Index, Jakarta Islamic

Composite Index.

Data analysis techniques used in this study are:

Calculating the actual return of selected JII shares ( $R_i$ )

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

Calculating the level of market profit (market return)

$$E(R_m) = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}} \dots\dots\dots 2)$$

Calculating the beta ( $\beta_i$ ) of a stock (systematic risk)

$$\beta_i = \frac{Cov(R_i, R_m)}{Var(R_m)} \text{ ATAU } \beta_i = \frac{\sigma_{iM}}{\sigma^2 M} \dots\dots\dots 3)$$

Calculating zakat rate

The formula used to calculate zakat is as follows (Ashker, 1987)

$$\text{Zakat} = \frac{\text{Tingkat Zakat (Zakat Rate)}}{(1 - \text{Tingkat Zakat})} \dots\dots\dots 4)$$

Inflation rate

In calculating the inflation rate, this study uses changes in the consumer price index

$$I = \frac{IHK_t - IHK_{t-1}}{IHK_{t-1}} \dots\dots\dots 5)$$

Shari'a compliant asset pricing model formula according to Tomkins and Karim (1987)

$$E(R_i) = \beta_i \cdot E(R_m) \dots\dots\dots 6)$$

According to Ashker (1987) the formula for the Shari'a compliant asset pricing model

$$E(R_i) = Z + \beta_i \cdot [E(R_m - Z)] \dots\dots\dots 7)$$

Shari'a compliant asset pricing model formula according to sheikh (2010)

$$E(R_i) = NGDP + \beta_i \cdot [E(R_m - NGDP)] \dots\dots\dots 8)$$

Shari'a compliant asset pricing model according to Hanif (2011)

$$E(R_i) = I + \beta_i \cdot [E(R_m - I)] \dots\dots\dots 9)$$

The stages of data analysis in this study are as follows:

Calculating the expected rate of return from each SCAPM model, namely SCAPM Non Rf, SCAPMZ, SCAPM NGDP, and SCAPMI.

Calculate the Mean Absolute Deviation (MAD) value, and the Mean Square Error (MSE) value.

$$\text{MAD} = \frac{\sum [R_i - E(R_i)]}{n} \quad \text{MSE} = \frac{\sum ((R_i - E(R_i))^2)}{n} \dots\dots\dots 10)$$

## Results and Discussion

### Results

**Table 1. Descriptive Statistics**

	Minimum	Maximum	Mean	Std. Deviation
Actual Return	-0,0005	0,0255	0,0033	0,0067

Market Return	-0,0034	0,0037	0,0002	0,0015
Beta	-3,2985	1,9119	0,5448	1,3802
Zakat	0,0256	0, 0256	0, 0256	0,0000
Inflation	0,0001	0,0001	0,0001	
Nominal Gross Domestic Product	0,0001	0,0001	0,0001	

Source: Processed secondary data

In calculating the stock return rate of the Non Rf SCAPM model, the highest (0.0042) found in the company is TLKM. While the level of stock return that has the lowest value of (-0.0167) is found in the UNTR company. In addition, it also shows that JII shares have stock returns of ADRO (0.0005), AKRA (-0.0026), ANTM (0.0018), ASII (0.0004), BSDE (0.0004), EXCL ( 0.0006). KLBF (0.0003), PGAS (-0.0007), PTPP (0.0003), TPIA (-0.0008), ICBP (0.0002), CTRA (0.0005), INCO (0.0002) , INDF (0.0003), PTBA (0.0003), UNVR (-0.0088), WIKA (0.0007).

In the SCAPMZ equation, a substitute variable is used, namely Zakat, which is obtained from the annual Zakat value of 2.56% divided by 12 months of 0.0021 (0.21%) per month. The highest level of stock return (0.0051) found in the company is ANTM. While the level of stock return that has the lowest value of (-0.0077) is found in the UNTR company. ADRO (0.0001), AKRA (0.0004), ASII (-0.0002), BSDE (-0.00000), and EXCL (-0.0000). Likewise, several companies, namely TLKM (0.0023), KLBF (-0.0002), PGAS (0.0032), PTPP (-0.0006), TPIA (0.0010), ICBP (0.0006), INCO (0.0002), INDF (0.0000), PTBA (0.0006), UNVR (0.0014), WIKA (0.0002).

From the results of the calculation of stock returns using the NGDP SCAPM method using the Nominal Gross Domestic Product (NGDP) level as a substitute for the risk free rate (Rf) element, the highest stock return rate of (0.0041) found in the company is TLKM . While the lowest level of stock return is (-0.0161) which is found in the UNTR company. ADRO companies have stock returns of (0.0005), AKRA (-0.0024), ANTM (0.0020), ASII (0.0004), BSDE (0.0004), and also EXCL (0.0005 ). Likewise with several companies, namely KLBF (0.0003), PGAS (0.0004), PTPP (0.0003), TPIA (-0.0006), ICBP (0.0002), CTRA (0.0004), INCO (0.0002), INDF (0.0002), PTBA (0.0003), UNVR (-0.0083), WIKA (0.0006).

The calculation of stock returns using the SCAPMI method which uses the inflation rate as a substitute for the element of risk free rate (Rf), the highest stock return rate of (0.0041) is found in the company, namely TLKM. While the lowest level of stock return is (-0.0162), which is found in the UNTR company. For ADRO companies (0.0005), AKRA has a stock return of (-0.0024), ANTM (0.0020), ASII (0.0004), BSDE (0.0004), and also EXCL (0.0005 ). Likewise with several companies, namely KLBF (0.0003), PGAS (0.0004), PTPP (0.0003), TPIA (-0.0007), ICBP (0.0002), CTRA (0.0004), INCO (0.0002), INDF (0.0002), PTBA (0.0003),

UNVR -0.00843 (-0.0084), WIKA (0.0007).

The results of the calculation of the Mean Absolute Deviation (MAD) value can show that there are differences between the four SCAPM models, namely SCAPM Non Rf, SCAPMZ, SCAPM NGDP, and SCAPMI. The four models have differences because they have different average MAD values. Among them MAD SCAPM Non Rf has an average value of 0.0081, MAD SCAPMZ has an average value of 0.0072, MAD SCAPM NGDP has an average value of 0.0080, and MAD SCAPMI has an average value of 0,0028. This shows that there are differences in the accuracy of each model.

The results of the calculation of the Mean Square Error (MSE) value can be seen that there are differences between the two SCAPM models, namely SCAPM Non Rf, and SCAPMZ, because the average MSE value of the two models is different. SCAPM Non Rf has an average MSE of 0.0029 and SCAPMZ has an average MSE of 0.0017. This indicates that there is a difference in the accuracy of the two SCAPM models. Meanwhile, there is no difference between SCAPM NGDP and SCAPMI because the two models have the same average MSE value of 0.0028. This shows that there is no difference in the accuracy of the two SCAPM models. In addition, judging from the average MSE value of the four SCAPM models, the most feasible and accurate model for estimating the JII stock return is the SCAPMZ model.

The results of Adjusted R2 show that of the four models, namely SCAPM Non Rf, SCAMPZ, SCAPM NGDP, and SCAPMI which has the lowest average value of the coefficient of determination (Adjusted R2) is SCAPMZ with a value of 0.2302, which has an explanatory power that can be seen from excess return market to Zakat is 23.02%.

The coefficient of determination (Adjusted R2) of SCAPM Non Rf is 0.2473, which means that the excess return market against the SCAPM Non Rf method is able to explain the JII stock return variable of 24.73%, while as much as 76.62% is explained by other factors outside the study. SCAPMI has a coefficient of determination (Adjusted R2) and has the highest explanatory power among the four SCAPM models, which is 28.92% (0.2892). It is also higher than the NGDP SCAPM which is only 28.84% (0.2884).

## Discussion

The results of the calculation of the Mean Absolute Deviation (MAD) value explain that there are differences in the average MAD value of the four SCAPM models. That is, the Non Rf SCAPM model has an average MAD value of 0.0081, the SCAPMZ model has an MAD average value of 0.0072, the NGDP SCAPM model has an MAD average value of 0.0080, and the SCAPMI model has an average value. – the average MAD is 0.0028. Based on the results of the Mean Squared Error (MSE) calculation, it can be seen that there are differences in the MSE values in the four SCAPM models, with the average MSE value for the Non Rf SCAPM model

of 0.0029, the average MSE value of the SCAPMZ model of 0.0017, for the SCAPM model NGDP and SCAPMI have the same MSE average value of 0.0028. Anri (2010) explained that the model which has a smaller MSE mean is more precise/accurate than the model which has a larger MSE average.

Meanwhile, based on the results of the Coefficient of Determination Analysis that the SCAPMI model has the highest explanatory power among SCAPM Non Rf, SCAPMZ, SCAPM NGDP, SCAPMI is 28.92% and higher than SCAPMZ which is only 23.02%. This indicates that the SCAPMI model is more profitable accompanied by greater risk, according to the classic high risk high return principle. This means that the higher the level of risk in an investment, the higher the rate of return that will be received, both long term and short term. This is also in line with the results of research conducted by Effendi (2016) the results obtained are based on the results of explanatory power analysis, SCAPMI (Shari'a Compliant Asset Pricing Model Inflation) is more optimal with an average R-square of 0.889 compared to the SCAPMZ model (Shari 'a Compliant Asset Pricing Model Zakat) 0.712 and SCAPM (Shari'a Compliant Asset Pricing Model) without risk free rate with R-square 0.630.

## Conclusion

There are differences in the SCAPM model without risk free rate (Non Rf), SCAPMZ, SCAPM NGDP, and SCAPMI. This is evidenced from the results of the calculations contained in the Mean Absolute Deviation (MAD) value.

The SCAPM model which has the highest explanatory power is the SCAPMI model which is higher than the SCAPM without risk free rate (Non Rf), SCAPMZ, SCAPM NGDP. Suggestions for investors who want to invest in the capital market, the SCAPMI model is usually used as a reference in order to get maximum results. Because SCAPMI is more profitable accompanied by greater risk, besides that inflation can be used as a benchmark for making investments without depending on risk.

## Reference

- Apriyanti, V., & Supandi, E. D. (2019). Perbandingan Model Capital Asset Pricing Model (Capm) Dan Liquidity Adjusted Capital Asset Pricing Model (Lcapm) Dalam Pembentukan Portofolio Optimal Saham Syariah. *Media Statistika*, 12(1), 86. <https://doi.org/10.14710/medstat.12.1.86-99>
- Arimarista, L. (2017). Expected Return Dan Risiko Saham LQ-45 Untuk Pengambilan Keputusan Investasi Serta Pembentukan Portofolio Optimal(Capital Asset Pricing Model). *Journal of Accounting Science*, 1(1), 62. <https://doi.org/10.21070/jas.v1i1.776>
- Atidhira, A. T., & Yustina, A. I. (2017). The Influence of Return on Asset, Debt to Equity Ratio, Earnings per Share, and Company Size on Share Return in Property and Real Estate Companies. *JAAF (Journal of Applied Accounting and Finance)*, 1(2), 128–146.

<http://www.bi.go.id>

- Cahyati, N. (2015). Analisis Portofolio Optimum Saham Syariah Menggunakan Liquidity Adjusted Capital Asset Pricing Model (LCAPM). *Jurnal Fourier*, 4(1), 59. <https://doi.org/10.14421/fourier.2015.41.59-73>
- Danial, R. D. M. (2017). *Analisis Capital Asset Pricing Model ( Capm ) Dalam Pengambilan Keputusan*. 11–18.
- Derbali, A., Khaldi, A., & Jouini, F. (2018). *Shariah-compliant capital asset pricing model : New mathematical modeling To cite this version: HAL Id: hal-01695996 Shariah - compliant capital asset pricing model : New mathematical modeling*.
- Di, S., Yang, P., Di, T., Afandi, T. Y., Pd, S., Pd, S., & Si, M. (2018). *ARTIKEL ANALISIS METODE CAPITAL ASSET PRICING MODEL ( CAPM ) SEBAGAI DASAR PENGAMBILAN KEPUTUSAN INVESTASI Oleh : PRASETYO UTOMO Dibimbing oleh : UNIVERSITAS NUSANTARA PGRI KEDIRI SURAT PERNYATAAN ARTIKEL SKRIPSI TAHUN 2018*. 02(02).
- Hanif, M., & Dar, A. J. (2013). Comparative Testing of Capital Asset Pricing Model (CAPM) and Shari'a Compliant Asset Pricing Model (SCAPM): Evidence from Karachi Stock Exchange - Pakistan. *SSRN Electronic Journal*, 1–14. <https://doi.org/10.2139/ssrn.1961660>
- Hasanah, S. M., & Maspupah, I. (2018). SCAPM (Shariah Compliant Asset Pricing Model); the Formula of Risk and Return Modification in Islamic Finance. *Al-Tijary*, 2(2), 177. <https://doi.org/10.21093/at.v2i2.686>
- Husein, F., & Hasanah, S. M. (2017). Determining the Optimum Portfolio of Sharia Stocks Using an Approach of Shariah Compliant Asset Pricing Model (SCAPM). *Journal of Economics, Business & Accountancy Ventura*, 19(3), 349–362. <https://doi.org/10.14414/jebav.v19i2.569>
- Indra, Y. A. (2018). Comparison of the Accuracy of Capital Asset Pricing Model and Arbitrage Pricing Theory Method in Predicting Stock Price (Study on Company Sector of Consumed Goods and Mining Sectors Listed in Sharia Sharia Share Index (Issi). *Journal of Economic, Business and Accounting (COSTING)*, 1(2). <https://doi.org/10.1017/CBO9781107415324.004>
- Jan, M. N., & Ayub, U. (2019). Do the fama and french five-factor model forecast well using ann? *Journal of Business Economics and Management*, 20(1), 168–191. <https://doi.org/10.3846/jbem.2019.8250>
- Khani, A., Sheshmani, M., & Mohades, A. (2017). *Studying the Expected Returns Based on Carhart Model Compared to CAPM Model and Implicit Capital Cost Model Based on Cash and Capital Flow of Growth and Value stocks 2 Theoretical Foundations and Development of Research Hypotheses*. 2(4), 61–79.
- Kozieł, D., & Kustra, A. (2018). *Cost of Equity Estimation in Fuel and Energy Sector Companies Based on CAPM*. 01008, 1–7.
- Kumar, G., & Misra, A. K. (2019). Liquidity-adjusted CAPM — An empirical analysis on Indian stock market. *Cogent Economics and Finance*, 7(1), 1–15. <https://doi.org/10.1080/23322039.2019.1573471>

- Mollik, A. T., & Bepari, M. K. (2015). Risk-Return Trade-Off in emerging markets: Evidence from Dhaka Stock Exchange Bangladesh. *Australasian Accounting, Business and Finance Journal*, 9(1), 71–88. <https://doi.org/10.14453/aabfj.v9i1.6>
- Sadaf, R., & Andleeb, S. (2014). Islamic Capital Asset Pricing Model ( ICAPM ). *Journal of Islamic Banking and Finance*, 2(1), 187–195.
- Seftyanda, B. E. (2014). ANALISIS METODE CAPITAL ASSET PRICING MODEL (CAPM) SEBAGAI DASAR PENGAMBILAN KEPUTUSAN INVESTASI SAHAM (Studi pada Seluruh Saham yang Terdaftar di BEI Periode 2010-2012). *Jurnal Administrasi Bisnis*, 17(2), 1–9.
- Sekarwati, H., & Margasari, N. (2015). *PENGGUNAAN METODE CAPITAL ASSET PRICING MODEL DALAM MENENTUKAN KEPUTUSAN BERINVESTASI SAHAM ( Studi Pada Saham Indeks Kompas 100 di Bursa Efek Indonesia )*. 1, 425–433.
- Sunan, U. I. N., & Yogyakarta, K. (2017). Analisis Saham Syariah Efisien dengan Pendekatan Shari ' a Compliant Asset Pricing Model ( SCAPM ) pada Jakarta Islamic Index ( JII ) Zainul Hasan Quthbi Pendahuluan Kegiatan investasi merupakan suatu kegiatan yang tidak bisa dilepaskan. *Economica: Jurnal Ekonomi Islam*, 8, 131–147.
- Yadnya, I. P. (2016). *PENERAPAN METODE CAPITAL ASSET PRICING MODEL SEBAGAI PERTIMBANGAN DALAM PENGAMBILAN KEPUTUSAN INVESTASI SAHAM Made Dwi Mahendra Putra 1 Fakultas Ekonomi dan Bisnis Universitas Udayana ( Unud ), Bali , Indonesia PENDAHULUAN Investasi adalah komitmen atas s. 5(12), 8079–8106.*
- Yuditya, A. R. (2015). Jurnal ilmiah. *Jurnal Ilmiah*, 10(2), 1–94. <https://doi.org/10.1017/CBO9781107415324.004>
- Zakharkina, L., & Abramchuk, M. (2018). the Correctness of the Capm-Model Application in the Ukrainian Reality in Terms of Investors Financial Security. *Baltic Journal of Economic Studies*, 4(1), 163–168. <https://doi.org/10.30525/2256-0742/2018-4-1-163-168>