# Seven Efficiency Analysis Based on the BCC Method on Sharia Equity Mutual Funds

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**Background:** The decline in conventional mutual fund performance is an opportunity for Islamic mutual funds to grow. Especially in the last few decades, there has been a growing trend in the Muslim world to try to apply Islamic (sharia) law at every step in life, including investment activities. Of course, this is in accordance with Muslim encouragement to always be involved in business activities and economic prosperity. **Aim:** The purpose of this research is to determine Islamic equity mutual funds' efficiency level using DEA's BCC method as well as to discover any differences of the efficiency among sharia equity mutual funds.  **Method:** The research method used in this study is comparative quantitative. There are nine Islamic equity mutual funds used in this research which are then the assessment of efficiency conducted using data envelopment analysis. **Result:** The result of the efficiency analysis showed that three Islamic equity mutual funds, which are BNP Paribas Pesona Syariah, Danareksa Indeks Syariah and Manulife Syariah Sektoral Amanah, happened to be efficient relatively to other Islamic equity mutual funds. Finally, the results from the Kruskal-Wallis test pointed out that there is a difference between the efficiency of Islamic equity mutual funds. **Conclusion:** From the results it can be concluded that Mandiri Investa Atraktif Syariah is the most inefficient mutual fund relative to other mutual funds. Meanwhile, there are three mutual funds that are most efficient relative to other mutual funds with the same efficiency value every year, i.e. BNP Paribas Pesona Syariah, Danareksa Indeks Syariah, and Manulife Syariah Sektoral Amanah.

**Key words:** *Efficiency Analysis, Sharia Equity Mutual Fund, BCC.*

## Introduction

Investment is a commitment to a number of funds or other resources that are being undertaken at the current time with the aim of earning a profit in the future (Tandelilin, 2001:4). Investment can be undertaken in various ways; one of them is by investing in the capital market. The capital market is one of the most important features in the world economy today. Many industries use capital market institutions as a medium to absorb investments and strengthen their financial position. Fianto (2019:633) said that its different from the study of micro economy that focused on local governments. Moreover, an investor can invest in capital markets through two ways, direct investment and funding agencies. However, investors often find it difficult to make investments directly due to the need to conduct various analysis and monitor market performance on a continuous basis, which take time. The difficulty in making these direct investments encourages the emergence of fund raising institutions.

The fund raising institutions produce products such as mutual funds, which can serve as a mediator for investors to invest. Based on the Capital Market Law number 8 Year 1995 Article 1 Section 27, a Mutual Fund is a product used to raise funds from investors to be invested in securities portfolio by an investment manager. Investments through fund raising institutions that have mutual fund products have several advantages and benefits received by investors (Bodie, et al., 2005: 103-105). *First,* there are clear bookkeeping and administration so investors can obtain clear information related to the capital invested into the company. *Second,* the diversification policies taken through the investment portfolio enable investors to minimise the risks they face. *Third,* investment decisions are taken more carefully because they are handled by professionals, so as to ensure the level of profit earned by the investors. Fourth, transaction costs are less expensive, because investors can invest in smaller amounts than by directly investing.

Under the terms of the Financial Services Authority (OJK) number 23/POJK.04/2016, based on its investment portfolio, the mutual funds are divided into four types. First, Stock Funds, which are mutual funds that invest at least 80% (eighty percent) of their assets in Equity Securities. Second, Fixed Income Funds, which are mutual funds that invest at least 80% (eighty percent) of their assets in the form of Debt Securities. Third, Money Market Funds, which are Mutual Funds that are only being invested in Debt Securities that mature in less than 1 (one) year. Fourth, Balanced Funds, which are mutual funds that invest in Equity and Debt Securities with different compositions.

Mutual funds in their development are divided into two, namely Conventional Mutual Funds and Sharia Mutual Funds. However, conventional funds in 2005 had an opaque portrait. This portrait of mutual funds happened after Net Asset Value reached its highest peak of Rp113.6

trillion in February 2005. However, the redemption waves (resale of unit participation) that occurred in the following months have brought down the NAV to the lowest level. In January 2006, NAV stood at Rp28.56 trillion, decreased by 75% from February 2005. There are several factors that led to the collapse of the mutual fund industry in 2005. *First*, the financial crisis triggered an increase in interest rates. *Second,* the application of market to market in the illiquid bond market and the non-transparency of investment managers. *Third*, a mistake in sales so that most investors did not dare to take risks.

The decline in the performance of conventional mutual funds is an opportunity for sharia mutual funds to grow. Sharia mutual funds its different from conventional mutual funds, its corresponding with Islamic financing variables and business tendencies that give affect each other (Herianingrum et al, 2019:133). The development of Islamic mutual fund products is reasonable, because in the last few decades, there has been a growing trend in the Muslim world to try to implement Islamic law (sharia) at every step in life, including Investment activities. According to Siddiqui (1994: 16), Islam is not only a religion that surrenders itself completely to the will of Allah, but also a way of life that governs a complete code of ethics for everyday human life. Muslims are always encouraged to engage in business activities and economic prosperity, as reflected in the Qur'an Surah Al Jumuah verse 10, Allah says:

تُفْلِحُونَ لَعَلَّكُمْكَثِيرً اللَّهَ وَاذْكُرُوا اللَّهِ فَضْلِ مِنْ وَابْتَغُوا الْأَرْضِ فِيفَانْتَشِرُوا الصَّلَاةُ قُضِيَتِ فَإِذَا۞۞۝

*Fa'iżā quḍiyati aṣ-ṣalāatu fāntashirū fī al-'arḍi wa abtaghū min faḍli allāhi waażkurū allaha kaṡīrāan la`allakum tuflihūna*

That means*: "And when the prayer has been concluded, disperse within the land and seek from the bounty of Allah, and remember Allah often that you may succeed"* (Department of Religious Affairs Republic of Indonesia, 2012, p.554). From that statement, the aim of this study is to determine Islamic equity mutual funds' efficiency level using DEA's BCC method as well as to discover any differences of the efficiency among sharia equity mutual funds.

**Method**

This research uses a quantitative approach. This study examines the efficiency level of Sharia equity mutual funds in Indonesia for the period 2012-2015 with the DEA model of VRS (Variable Return to Scale). Based on the hypothesis and model of research analysis, the variables used in the study are divided into input variables and output variables. In the absence of consensus among researchers on input and output variables that must be included in the DEA model, therefore the input and output variables used refer to the variables that have been used in previous studies. The input variables in this study include standard

deviation, investment manager load ratio and custodian load ratio. The output variables used in this study include annualised return and asset growth against return.

This study uses secondary data types that are quantitative in the form of daily NAV and Prospectus. All of these data are secondary data obtained by researchers indirectly through intermediate media (obtained and recorded by other parties) from the source of the official publication of investment managers of mutual funds Islamic stocks that are being studied.

The population in this study is Islamic stock mutual funds found in Indonesia. Meanwhile, the sample is part of the population whose characteristics will be estimated and considered to represent the population. In this research, sampling technique used is purposive sampling. According to Anshoridan Iswati (2009:105), purposive sampling is a technique of determining the sample with certain considerations. In order to obtain the latest research results, then this study takes a period of time from 2012 until 2015.

This research uses an analysis technique with Data Envelopment Analysis (DEA) method. The analysis of this non-parametric method is used to determine the efficiency of sharia equity mutual funds in Indonesia, as well as the sharia equity mutual funds with the highest efficiency value. In measuring the efficiency of sharia equity mutual funds, it is necessary to process the efficiency with DEA method to find the frontier formed from the sample using DEA Frontier application. Then, an ANOVA (Analysis of Variance) One-way test procedure is used to test the variability of the observations of each group and between group means, and then to draw conclusions about the average population.

**Results and Discussion**

**Anova Assumption Tests**
*Normality Test*

In obtaining the desired results, the data in the study should be tested using a statistical test, one of which is the normality test. Normality test is used to determine whether the data used is data that is normally distributed or not. In this research, Shapiro-Wilk test is used to find normally distributed data with significance level of 0.05. The hypothesis can be taken that if the value of Shapiro-Wilk significance greater than 0.05 then the data is included in the data that is normally distributed. Conversely, if the significance value is less than 0.05 then the data is not included in normally distributed data, its known from the table I.

**Table 1:** Normality test

| Group | | Shapiro-Wilk | | |
|---|---|---|---|---|
| | | Statistic | Df | Sig. |
| Efficiency | .BDSS | .835 | 4 | .181 |
| | .CIMBPIE | .838 | 4 | .191 |
| | .CSE | .630 | 4 | .001 |
| | .MIAS | .934 | 4 | .621 |
| | .PNMES | .945 | 4 | .685 |
| | .TRIMSS | .630 | 4 | .001 |

**Source:** SPSS (reworked).

In above table, SPSS output results shows that there are four four sharia equity mutual funds with the level of significance that is higher than 0.05. Meanwhile mutual funds CSE and TRIMSS have a significance of 0.001 (<0.05). Mutual funds BNPPPS, DIS and MSSA cannot be tested for normality due to the value of efficiency owned is the same every year. Based on the result of normality test, there is sharia equity mutual fund with unstandardized efficiency data, therefore ANOVA test requirement is not fulfilled. Because ANOVA test requirement is not met then alternative non-parametric analysis tool that is Kruskal-Wallis test is used.

### *Homogeneity Test*

Homogeneity test used in this research is Homogeneity of Variance test with Levene Test. In the statistical tests, the dependent variable must have the same variant in each category of independent variables. If the value of Levene test is significant (probability <0.05) then the null hypothesis that the group has a different variance will be rejected. Meanwhile, if the value of Levene is not significant (probability> 0.05) then $H_0$ accepted that the whole variant of the population is the same in the table 2.

**Table 2:** Test of Homogeneity of Variances

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 5.092 | 8 | 27 | .001 |

**Source:** SPSS (reworked).

The output of SPSS above shows that the level of significance less than 0.05. Conclusion of Levene test results above is that this research data has different population variants. Based on the homogeneity test results, it can be seen that the second ANOVA test requirement, which is that the variance of the population must be the same, is not met. Therefore, the Kruskal-Wallis test is performed.

*Kruskal-Wallis Test*

Kruskal-Wallis test is used to test non-parametrically whether there is a significant difference in efficiency between sharia equity mutual funds in the period of 2012-2015. In Kruskal-Wallis test, if the probability value is more than 0.05 (> 0.05) then $H_0$ is accepted. Conversely, if the probability value is less than 0.05 then $H_0$ is rejected. So, there are two hypotheses in this study, namely: H0: There is no difference in efficiency between sharia mutual funds period 2012-2015 and $H_1$: There are differences in efficiency between mutual funds Sharia period 2012-2015 that shows in table 3.

**Table 3:** Kruskal-Wallis TestTest Statistics

|  | Efficiency |
|---|---|
| Chi-square | 19,361 |
| df | 8 |
| Asymp. Sig. | ,013 |

**Source:** SPSS (reworked).

Table 3 presents Kruskal-Wallis test results for the efficiency of Islamic stocks mutual funds in Indonesia for the period 2012-2015. Based on Kruskal-Wallis test results, it can be seen that the level of significance is 0.013 <0.05 which means H0 is rejected or in other words there is a difference in efficiency between sharia mutual funds period 2012-2015.

*Post Hoc Test*

Post Hoc test is used after Kruskal-Wallis test and aims to know the differences between groups or in this study, among sharia equity mutual fund products. After the discovery of a significant difference in the efficiency of sharia equity mutual funds for the period 2012-2015, the Post Hoc test is needed for a more tangible verification of the difference in efficiency among sharia equity mutual fund products. Post Hoc test in Kruskal Wallis uses Mann-Whitney test. Table 4 shows the results of the Mann-Whitney Post Hoc test with the significant difference in efficiency between sharia equity mutual funds.

**Table 4:** Post Hoc Mann-Whitney Test

|  |  | Mann-Whitney U | Wilcoxon W | Z | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| BNPPPS | CIMBPIE | 2.000 | 12.000 | -1.984 | .047 |
|  | MIAS | .000 | 10.000 | -2.460 | .014 |
|  | PNMES | 2.000 | 12.000 | -1.984 | .047 |
| CIMBPIE | DIS | 2.000 | 12.000 | -1.984 | .047 |
|  | MSSA | 2.000 | 12.000 | -1.984 | .047 |
| CSE | MIAS | .000 | 10.000 | -2.366 | .018 |
| DIS | MIAS | .000 | 10.000 | -2.460 | .014 |
|  | PNMES | 2.000 | 12.000 | -1.984 | .047 |
| MIAS | MSSA | .000 | 10.000 | -2.460 | .014 |
| MSSA | PNMES | 2.000 | 12.000 | -1.984 | .047 |

**Source:** SPSS (reworked).

Based on the Mann-Whitney Post Hoc test it can be seen that there are significant efficiency differences among the following mutual funds: a. CIMBPIE Mutual Funds with BNPPPS, DIS and MSSA Mutual Funds; b. MIAS Mutual Fund with BNPPPS, CSE, DIS and MSSA Mutual Funds; c. PNMES Mutual Fund with BNPPPS, DIS and MSSA Mutual Funds. Mann-Whitney Post Hoc test results prove that there is a significant difference from the efficiency of Islamic stock mutual funds as well as proves the hypothesis that there are differences in efficiency between sharia equity mutual funds for the period of 2012-2015.

**Discussion**

Based on the standard deviation (risk) analysis, BDSS mutual funds have the highest average deviation standard during the period 2012-2015 at 0.0426. The higher the standard deviation of a mutual fund, the riskier the funds are. Referring to the financial statements of BDSS mutual funds in 2012-2015, the high standard deviation value is due to the fact that the percentage of equity securities in the BDSS mutual fund portfolio for four years is very high at 95%, and the rest is the effect of money market instruments. Therefore, with the high percentage of equity securities in BDSS mutual funds, the Net Asset Value (NAV) of these mutual funds can be said to be volatile and influenced by the movement of the stock market that becomes the benchmark, which is ISSI. In contrast, CSE mutual funds have the lowest average deviation rate during the period 2012-2015 at 0.0348. This is because the portfolio in these mutual funds contains only 79.5% equity effect over a four year span.

**Table 5:** Average Standard Deviation from Sharia Equity Mutual Funds in Indonesia for 2012-2015 Period.

| Mutual Funds | Average Standard Deviation |
|---|---|
| BDSS | 0.0426 |
| BNPPPS | 0.0391 |
| CIMBPIE | 0.0406 |
| CSE | 0.0348 |
| DIS | 0.0356 |
| MIAS | 0.0401 |
| MSSA | 0.0386 |
| PNMES | 0.0390 |
| TRIMSS | 0.0416 |

**Source:** SPSS (reworked).

In the discussion of risk (standard deviation), there is one aspect that cannot be separated, that is return. Return describes the percentage of increase or decrease in the value of mutual funds, in this case NAV, at a certain period. Returns in this study are represented by the annualised return of each sharia mutual fund in the form of cumulative return. In general, high returns are accompanied by high risks. This is in accordance with the sharia principles of returns and risks which state that risk always follows every expectation of return or return on investment (Dzajuli, 2006: 103). The following Table 6 shows the total annualised return of each sharia equity mutual fund in Indonesia during the period of 2012-2015:

**Table 6:** Total Annualised Return (Loss) of Sharia Equity Mutual Funds in Indonesia for 2012-2015 period.

| Mutual Funds | Total Annualised Return |
|---|---|
| BDSS | 0.1762 |
| BNPPPS | 0.2299 |
| CIMBPIE | 0.0583 |
| CSE | 0.2941 |
| DIS | 0.1359 |
| MIAS | 0.1131 |
| MSSA | 0.0460 |
| PNMES | (0.0287) |
| TRIMSS | 0.0579 |

**Source:** SPSS (reworked).

Based on the above table, it can be seen that within a period of four years, CSE mutual fund recorded a total annualised return of 29.41%. This is consistent with the high standard deviation (risk) of CSE mutual fund over four years, as well as a high percentage of equity securities portfolios. However, return of sharia equity mutual funds in the period 2012-2015 experienced a negative return as a whole. This happened in 2013 and 2015. In 2013, the negative return of sharia equity mutual funds was due to the rise in inflation and interest rate (BI Rate). Referring to the Central Bureau of Statistics (BPS) release, inflation reached 0.12% in November 2013 (MoM) and 8.37% YoY (Year-on-Year). Also, in 2013 there was a rise in the BI Rate by five times from 5.75% to 7.5%.

Therefore, it can be concluded that in 2013 investors were more interested in investing in SBIS or other risk-free instruments. Furthermore, the decline in the return of sharia equity mutual funds in general or on average in 2015, which amounted to 17.72%, was caused by several factors. The decline in return of sharia equity mutual funds was closely related to the decline of equity securities, or in this case was ISSI (Indonesia Sharia Stock Index). By 2015, the ISSI index weakened 14.28% from its opening in the early of the year at 169.23 to the closing in the end of the year at 145.06. The weakening of the capital market was caused by the decision of the U.S. central bank to raise its benchmark interest rate by 25 basis points, causing capital outflow from the Indonesian capital market.

Based on capital market statistics of 2015 released by OJK, since August 2015 there had been an outflow of foreign funds from the Indonesian capital market, as much as Rp9.8 trillion. Overall, in 2015 there was a capital outflow of foreign funds in the Indonesia Stock Exchange of Rp22.5 trillion. Sharia equity mutual funds are said to be relatively efficient if their efficiency value is equal to 1 (one) or 100 if in percent. Conversely, if the value of the efficiency is less than 1 (one) then the mutual fund is considered relatively inefficient. Table 7 shows the minimum, maximum, average and standard deviation of the efficiency of sharia equity mutual funds in Indonesia for 2012-2015 periods.

**Table 7:** The Efficiency Value of Sharia Equity Mutual Funds in Indonesia for the Period of 2012-2015.

| Mutual Funds | Minimum Efficiency | Maximum Efficiency | Average of Efficiency | Standard Deviation of Efficiency |
|---|---|---|---|---|
| BDSS | 65.30 | 100.00 | 88.25 | 16.36 |
| BNPPPS | 100.00 | 100.00 | 100.00 | 0.00 |
| CIMBPIE | 38.80 | 100.00 | 79.15 | 28.78 |
| CSE | 92.50 | 100.00 | 98.12 | 3.75 |
| DIS | 100.00 | 100.00 | 100.00 | 0.00 |
| MIAS | 4.50 | 85.20 | 51.77 | 36.24 |
| MSSA | 100.00 | 100.00 | 100.00 | 0.00 |
| PNMES | 31.10 | 100.00 | 60.70 | 30.92 |
| TRIMSS | 56.20 | 100.00 | 89.05 | 21.90 |

**Source:** SPSS (reworked).

Based on the above table, it can be seen that there are three mutual funds that recorded efficient values for four consecutive years, namely BNP Paribas Pesona Syariah (BNPPPS), Danareksa Indeks Syariah (DIS) and Manulife Syariah Sektoral Amanah (MSSA) mutual funds. Then followed by Cipta Syariah Equity (CSE) mutual fund with average efficiency for four years of 98.12%. In the third rank is TRIM Syariah Saham (TRIMSS) mutual fund with an average efficiency of 89.05%. Then, followed by mutual funds Batavia Sharia Fund Shares (BDSS) mutual fund with an average value of efficiency that is equal to 88.25%. In the next rank, there is CIMB-Principal Islamic Equity Growth Syariah (CIMBPIE) mutual fund with an average efficiency value for four years of 79.15%. Mutual Fund PNMES with an average value of efficiency of 60.70% is ranked sixth. In the last rank is mutual fund that has not been efficient for four consecutive years, that is Mandiri Investa Atraktif Syariah (MIAS) mutual fund with an average efficiency value of 51.77%.

If sharia equity mutual funds experienced inefficiency, it can be said that this mutual fund has not been able to maximize the value of output with the available input. This study explains that the value of input and output of sharia equity mutual funds in Indonesia fluctuates every year. As mentioned before, fluctuations in the input value of the efficiency of sharia equity mutual funds are derived from standard deviations, RBMI ratios and RBBK ratios. However, the highest fluctuation comes from the standard deviation value because the standard deviation is one indicator of the risk closely related to the return. Return, which in this study is in the form of annualised return, also related to the composition of sharia equity mutual fund portfolio. Most of the portfolio composition of sharia equity mutual funds is an equity security in which equity securities are highly volatile in its movements. So, it is no doubt that the standard deviation of sharia equity mutual funds has high fluctuations.

So is the Ratio of Asset Growth to Return (PATR) that is related to changes in the amount of managed funds and annualised returns, After the relative efficiency of sharia equity mutual funds in Indonesia in 2012-2015 is known, Kruskal-Wallis test is conducted to find out more about efficiency difference which is significantly achieved by sharia equity mutual funds. Based on Kruskal-Wallis test results, it is known that the efficiency among sharia equity mutual funds in Indonesia for 2012-2015 period is proved to have a significant difference because the significance value is 0.013 (<0.05).

The results of the Mann-Whitney Post Hoc test show a more detailed efficiency gap that can be seen through the significance value of the mutual funds that are being compared. Differences in significance values occur between MIAS mutual funds with BNPPPS, CSE, DIS and MSSA of which it can be said that there are significant efficiency differences among these mutual funds. Similarly, a PNMES mutual fund also has significant efficiency differences with BNPPPS, DIS and MSSA. CIMBPIE mutual funds with BNPPPS, DIS and MSSA also have significant efficiency differences. In improving the efficiency of Islamic stock mutual funds, internal policy is required in the investment management company such as control and allocation of input optimally to obtain maximum output. Control and improvement can be done by minmising the sector in the equity securities portfolio and minmising the costs charged to mutual funds.

Mutual Funds MSSA is proven to be an efficient mutual fund every year because these mutual funds focus only on certain business sectors in a portfolio of equity securities that is expected to have a high potential increase in the future Similarly, DIS mutual funds, in addition to having high returns, also minmise the cost of mutual funds, where the cost of investment managers in DIS mutual funds is only a maximum of 1% (one percent). It helps to reduce the burden of the mutual fund so that it can be efficient for four consecutive years. The results of efficiency analysis of sharia equity mutual funds can be used as one of the investment considerations by investors who will invest funds in mutual funds, especially sharia equity mutual funds. Besides considering performance results using the Sharpe, Treynor and Jensen index, the value of efficiency also cannot be underestimated. This is because the efficiency assessment considers many factors not only limited to risk and return, but also consider the cost factors found in mutual funds. Mutual Funds BNP Paribas Pesona Syariah, Danareksa Indeks Syariah and Manulife Syariah Sektoral Amanah, as seen in the results of efficiency assessment, can be considered to be selected by investors to become one of their mutual fund portfolios.

**Conclusion**

Based on the results of research and discussion that has been done on the value of sharia equity mutual funds and the differences of efficiency between sharia equity mutual funds in

Indonesia for the period 2012-2015, then the conclusion that can be drawn is that based on the calculation of Islamic equity mutual funds performed by Data Envelopment Analysis (DEA), it is known that Mandiri Investa Atraktif Syariah is the most inefficient mutual fund relative to other mutual funds with BCC method in the research. Meanwhile, there are three mutual funds that are most efficient relative to other mutual funds with the same efficiency value every year, i.e. BNP Paribas Pesona Syariah, Danareksa Indeks Syariah and Manulife Syariah Sektoral Amanah.

Kruskal-Wallis test results obtained the conclusion that there are differences in efficiency between sharia equity mutual funds in Indonesia in 2012-2015. In more detail, the results of the Mann-Whitney Post Hoc test conclude that the efficiency difference between sharia equity mutual funds in Indonesia in 2012-2015 is between mutual funds of CIMB Principal Islamic Equity Growth Syariah with mutual funds BNP Paribas Pesona Syariah, Danareksa Indeks Syariah and Manulife Syariah Sektoral Amanah.

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