Analysis of the influence of asset allocation policy, investment manager performance, and risk level on the performance of Sharia money market mutual funds in Indonesia [version 1; peer review: awaiting peer review]

Anisah Firli, Risris Rismayani, Dinna Miftahul Jannah

School of Economics and Business, Telkom University, Telekomunikasi No. 1, Bandung, 40257, Indonesia

Abstract
Background: Islamic money market mutual funds have become an alternative to conventional investment instruments. This research has novelty in determining the variables of mutual fund performance by combining risk and return factors, asset allocation policy variables, and investment manager performance, which have a high impact on the return and risk level in reducing the risk of loss on investment. In addition, this research was conducted on the performance of Islamic money market mutual funds that have not been studied before.

Methods: This research uses data on Islamic money market mutual funds registered with the Financial Services Authority in Indonesia. The performance of Islamic money market mutual funds was calculated using the Sharpe Method and tested using multiple regression analysis.

Results: The results showed that the asset allocation policy, investment manager performance, and the level of risk simultaneously have a significant effect on the performance of Islamic money market mutual funds in Indonesia; however, partially, there is no significant effect between (1) the asset allocation policy on the performance of Islamic money market mutual funds in Indonesia: (2) investment manager performance on the performance of Islamic money market mutual funds in Indonesia, and (3) the level of risk on the performance of Islamic money market mutual funds in Indonesia.

Conclusions: The results indicated that optimization of returns and risks was needed by considering the composition of asset allocation, choosing the right investment manager, and conducting a good risk level analysis to obtain optimal Islamic money market mutual fund performance.
Introduction
The Otoritas Jasa Keuangan (OJK/Financial Services Authority) stated that Islamic mutual funds in Indonesia had developed significantly from year to year. Initially, in 2013 there were only 50 products, and in 2018 there were 198 products. Numerous investors choose sharia mutual funds as an alternative to conventional mutual funds because the benefits are great, yet the risks received are not higher than conventional mutual funds. Amid negative sentiment hitting Indonesia’s stock and bond markets, money market mutual funds experienced positive performance in 2018, which grew 4.18%. Basic assets in deposits and increased interest rates increase the likelihood that returns on money market mutual funds will also rise. The performance of money market mutual funds will be stable at a positive level if the benchmark interest rate does not decline. Moreover, money market mutual funds have a smaller risk value than other mutual funds.

A mutual fund has good asset performance with a high asset allocation value. Researchers have examined the effect of asset allocation policy variables on mutual fund performance in Islamic equity mutual funds, tested the variables of mutual fund investment manager performance, and examined the level of risk as a variable that affects equity fund performance. This current research was conducted using more complete variables by combining the risk and return factors (asset allocation policy, investment manager performance, and risk level). It was carried out on a new object, namely Islamic money market mutual funds, which have not been the focus of previous research.

Research framework
Based on the phenomenon and literature review, to determine that the optimal performance of a mutual fund can be influenced by asset allocation policies, investment manager performance, and the level of risk, hypothesis testing was carried out on the performance of money market mutual funds. Figure 1 illustrate the relationship between the variables. The arguments that drive the relationships of studied research variables are as follows:

![Figure 1. Research framework.](image-url)
(1) Asset allocation policy

Asset allocations refer to various asset classes (e.g., money market securities, bank accounts, long-term bonds, stocks, tangible assets, and others) that are allocated in investment portfolios. Asset allocation is also defined as various asset classes invested according to their composition and proportion. Hence, performance depends on the allocation of the funds. The Asset Class Factor Model can measure the effectiveness of the asset allocation policy. To gain a greater return for investors, the appropriate allocation of funds is carried out to encourage the performance of Islamic equity funds. Moreover, findings from another empirical study explained that the asset allocation policy affects the performance of equity funds.

Hypothesis 1: Asset allocation policy has a significant effect on the performance of Islamic money market mutual funds that are registered with the OJK.

(2) Investment manager performance

Prior research affirmed that the measurement of investment manager performance includes assessing the ability to manage investor funds, asset selection, investment timeliness, and diversification through portfolios. Investment manager performance can be measured through two abilities, namely the market timing ability (an investment manager’s ability to invest according to the market conditions) and Stock Selection Ability (an investment manager’s ability to determine asset choices and manage investor funds). Furthermore, empirical research also showed that the investment managers’ abilities include decomposing assets, estimating the predictability of asset performance, market timing, and the portfolio of asset selection.

To optimize mutual fund performance and returns, one of the supporting indicators is the performance of investment managers, which includes a composition of market timing abilities and stock selection abilities. In line with that, further research found that the performance of investment managers has a significant effect on the performance of equity funds.

Hypothesis 2: Investment managers’ ability significantly affects the performance of Islamic money market mutual funds registered with the OJK.

(3) Risk level

A risk is a form of uncertainty about things that will occur later in investment decisions and include interest rate, market risk, inflation risk, business risk, financial risk, liquidity risk, currency exchange risk, and country risk. Risk is also defined as a difference between the expected and actual returns; the greater the difference, the greater the risk. According to empirical research, every investment of funds in the form of a portfolio has a risk, which means that an investment has a risk that affects the performance of Islamic mutual funds. Further research also concluded that the level of risk influences the performance of equity funds.

Hypothesis 3: Risk level has a significant effect on the performance of Islamic money market mutual funds that are registered with the OJK.

Hypothesis 4: Asset allocation policy, investment manager performance, and risk level simultaneously affect the performance of Islamic money market mutual funds registered with the OJK.

Methods

Study design

This study used the quantitative method. The unit of analysis was the organization, and the study object was the shares of companies registered with the OJK. The time dimension used was time series, which involves data collected over several years (2015-2018) that provides an overview of the development of an activity or situation. This research took place in 2019 and was conducted on Islamic money market mutual funds registered with the OJK between 2015 and 2018, with a total sample of 36 Islamic money market mutual funds.

Sampling

This study used purposive sampling with the following criteria: Islamic money market mutual funds operating between January 2015 and December 2018 that their respective investment managers actively manage. The total sample obtained in this study was 36 Islamic money market mutual funds.
**Data collection**

There is one dependent variable in this research, namely the Islamic money market mutual funds’ performance, and three independent variables: asset allocation policy, investment manager performance, and risk level. Data from funds used in this study were obtained from the official website of the OJK [www.ojk.go.id](http://www.ojk.go.id) by searching the financial reports, annual reports, and prospectus’ of each mutual fund registered with OJK between 2015-2018.

Mutual fund performance data collected included:

1. Asset allocation, obtained from data on the proportion of assets, including sharia, Sukuk, and mudhabarah deposits, as well as return data from each asset
2. Investment manager performance, obtained from data on return of the portfolio, risk-free assets, and the stock market, as well as regression coefficient data of excess market return or slope when the market is down and regression coefficient that indicates the ability of market timing from the investment manager
3. The level of risk obtained from the return and expected return
4. Performance of Islamic money market mutual funds obtained from the average performance of a certain sub-period Mutual Fund and the average risk-free investment performance of a certain sub-period

We accessed the website [https://www.pasardana.id/fund/search](https://www.pasardana.id/fund/search) and then filtered the type of “sharia”, currency “IDR”, and date (each month of 2015, 2016, 2017, and 2018). The search list was narrowed again by typing the specific name of mutual funds, which were:

- BNI-AM Dana Lancar Syariah
- BNI-AM Dana Pasar Uang Syariah Amerta
- Bahana Likuid Syariah
- Mandiri Kapital Syariah
- Mega Dana Kas Syariah
- PNM Pasar Uang Syariah
- EMCO Barokah Syariah
- Insight Money Syariah
- Trimegah Pundi Kas Syariah

From this search, we obtained the “managed fund” and “participation unit” data for each month of 2015, 2016, 2017, and 2018 for every mutual fund that we listed.

**Analysis**

These obtained data were then tabulated in Excel and then calculated using SPSS. The asset allocation policy variable was measured using Sharpe’s Asset Class Factor Model, the investment manager performance using the Treynor-Mazuy Model, the level of risk using the Standard Deviation Formula, and the performance of the Islamic money market mutual funds using the Sharpe Ratio (Table 1).

Data were tabulated for asset allocation policy variables by calculating the proportion of mutual fund allocation, the rate of return for each mutual fund, and error terms. Tabulated data for investment manager performance was obtained by calculating the return of the portfolio, return of risk-free assets, return for the stock market, and intercept that indicates stock selection from the investment manager. Tabulated risk level data was obtained by calculating return period-i, expected return, and the number of observations. Tabulated mutual fund performance data was obtained by calculating the Sharpe ratio value, the average performance of a certain sub-period Mutual Fund, the average risk-free investment performance of a certain sub-period, and the Mutual Fund standard deviation for a certain sub-period.
Data collection was carried out using the following stages: 1. Calculate the Asset Allocation Method with the following formula

\[ R_it = \left[ b_{i1}F_{1t} + b_{i2}F_{2t} + b_{i3}F_{3t} \right] + \varepsilon_{it} \]

- \( x_1 = b_{i1}F_{1t} \) = Asset Allocation for Syariah mutual funds
- \( x_2 = b_{i2}F_{2t} \) = Asset Allocation for Sukuk
- \( x_3 = b_{i3}F_{3t} \) = Asset Allocation for mudhabarah deposits

Class Factor Model (Sharpe, 1995) Asset allocation policies were analyzed

\[ R_a = \frac{\left[ b_{i1}F_{1t} + b_{i2}F_{2t} + b_{i3}F_{3t} \right]}{\sigma_i} + \varepsilon_{it} \]

\[ \sigma_i = \sqrt{\frac{\sum (R_i - E(R_i))^2}{n}} \]

Performance of Islamic Money Market Mutual Funds (Y)

\[ S_{RD} = \frac{\text{Performance} - \text{Performance}_R}{\sigma} \]

### Table 1. Variable operationalization.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data processing method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset allocation policy (X1)</td>
<td>Asset Class Factor Model ( R_a = \left[ b_{i1}F_{1t} + b_{i2}F_{2t} + b_{i3}F_{3t} \right] + \varepsilon_{it} )</td>
</tr>
<tr>
<td>Investment Manager Performance (X2)</td>
<td>( R_p - R_f = \alpha + \beta (R_m - R_f) + \gamma (R_m - R_f)^2 + \varepsilon_p )</td>
</tr>
<tr>
<td>Risk Level (X3)</td>
<td>( \sigma_i = \sqrt{\frac{\sum (R_i - E(R_i))^2}{n}} )</td>
</tr>
<tr>
<td>Performance of Islamic Money Market Mutual Funds (Y)</td>
<td>( S_{RD} = \frac{\text{Performance} - \text{Performance}_R}{\sigma} )</td>
</tr>
</tbody>
</table>

2. Calculate Investment Manager Performance using Treynor-Mazuy Model:

\[ R_p - R_f = \alpha + \beta (R_m - R_f) + \gamma (R_m - R_f)^2 + \varepsilon_p \]

- \( R_p \) = Return of portfolio
- \( R_f \) = Return of risk-free assets
- \( R_m \) = Return for stock market
- \( \alpha \) = Intercept that indicates stock selection from investment manager
- \( \beta \) = Regression coefficient of excess market return or slope when the market is down
- \( \gamma \) = Regression coefficient that indicates the ability of market timing from investment manager
ε_p = error term

3. Calculate Risk Level using standard deviation:

\[ \sigma_i = \sqrt{\frac{\sum_{i=1}^{n} (R_i - E(R_i))^2}{N}} \]

\( \sigma_i \) = Standard Deviation

\( R_i \) = Return period \( i \)

\( E(R_i) \) = Expected return

\( N \) = number of observations

4. Performance of Islamic money market mutual funds

Sharpe Ratio:

\[ S_{RD} = \frac{\text{Performance}_{RD} - \text{Performance}_{RF}}{\sigma} \]

\( S_{RD} \) = Sharpe ratio value

\( \text{Performance}_{RD} \) = the average performance of a certain sub-period Mutual Fund

\( \text{Performance}_{RF} \) = the average risk-free investment performance of a certain sub-period

\( \sigma \) = Mutual Fund standard deviation for a certain sub-period

Hypothesis testing was carried out using Multiple Linear Regression Analysis (F test and t-test) to test the effect simultaneously and partially between variables. The data were tested using classical assumption tests (normality using the Kolmogorov-Smirnov test, multicollinearity using the VIF test, autocorrelation, and heteroscedasticity). The data were processed using SPSS software version 26.

Results and discussion

The asset allocation policy for Islamic money market mutual funds increased from 2015 to 2016 and from 2017 to 2018. During these years, five out of nine sharia money market mutual funds experienced a significant decrease in the average value of their asset allocation policies, while four out of nine Islamic money market mutual funds experienced an average increase of around one point. Meanwhile, from 2016 to 2017, there was a decline. The overall decline in that year is presented in Table 2 below.

The performance of Islamic money market investment managers increased on average in three years but decreased in the last year (2017-2018). In that period (2017-2018), the performance of almost all sharia money market mutual fund investment managers experienced a decline except for one company with an increase of 1 point. Thus, this resulted in an overall decline (see Table 3).

The level of risk in the Islamic money market increased in three years but decreased last year (2017-2018) (Table 4). This result is similar to the average value of investment managers. The decrease in the average value of investment managers for one year was also in line with the increased level of risk.

The performance of Islamic money market mutual funds was proxied using a shape ratio, the calculation result of the return, the Bank Indonesia Certificate, and standard deviation. The performance of Islamic money market mutual funds decreased from 2015 to 2018 (see Table 5).

The normality test was carried out using the Kolmogorov-Smirnov test with a result of 0.2, which is higher than 0.05. It can be concluded that the data is normally distributed. The multicollinearity test showed that all independent variables have VIF results of less than 10. It can be concluded that there is no multicollinearity. The autocorrelation test was carried
out by looking at the obtained Durbin-Waston value of 1.484, within the range of 1.654 and 2.346. Therefore, it can be concluded that there is no autocorrelation. The Heteroscedasticity test was performed using the Glejser test and showed a number greater than 0.05, namely 0.345 for asset allocation, 0.635 for operations manager performance, and 0.886 for the level of risk. Hence, heteroscedasticity did not occur.

The result of multiple linear analysis in this research is as follows:

\[ KR = -11.863 - 0.777 (AA) + 5.055 (KMI) + 3.383 (TR) + e \]

in which:

KR = Mutual Fund Performance
Table 6 shows the results of the F test (simultaneous), which gains the significance value of 0.031. It can be concluded that the asset allocation policy, investment manager performance, and risk level simultaneously affect the performance of Islamic mutual funds on the Islamic money market registered with the OJK.
Based on Table 7, the results of the t-test (partial) show that the significance value of the asset allocation policy is 0.9, the investment manager's performance is 0.156, and the risk level is 0.156. All variables have a significant value above 0.05; hence the asset allocation, investment manager performance, and risk level partially do not have a significant effect on the performance of sharia mutual funds registered with the OJK.

The asset allocation policy does not have a significant effect on the performance of Islamic money market mutual funds. This result aligns with prior research on stock market investment\(^7\) while contradicting another study that showed that the allocation asset policy and risk level have no significant partial effect on the performance of money market mutual funds in Indonesia.\(^8\)

The investment manager's performance does not have a significant effect on the performance of Islamic money market mutual funds. Changing market conditions can cause investment managers to have no consensus in predicting the future. Therefore, improving investment management performance may not necessarily improve the expected investment performance. This result aligns with prior research conducted in other markets.\(^{16,27}\) In contrast, another study regarding the influence between investment manager performance and allocation of assets on money market mutual funds performance in Indonesia conducted by Paramitha and Purnawati (2017) provided a different view, arguing that investment manager performance has a significant effect on the performance of money market mutual funds in Indonesia.\(^{10}\)

The risk level does not have a significant effect on the performance of Islamic money market mutual funds. Previous research conducted by Hariyono & Tamsil (2015) that showed the risk level has a significant impact on money market mutual funds performance supported this result,\(^7\) while Handayani et al. (2015) found there is a significant impact between risk level and Islamic money market mutual funds.\(^{16}\)

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### Table 6. F test results.

| Model          | Sum of squares | df | Mean square | F     | Sig. 
|----------------|----------------|----|-------------|-------|------
| Regression     | 50.868         | 3  | 16.956      | 3.349 | .031 
| Residual       | 162.032        | 32 | 5.063       |       |      
| Total          | 212.900        | 35 |             |       |      

*Dependent Variable: Mutual Fund Performance.

### Table 7. t-Test results.

| Model           | Unstandardized B | Coefficients Std. error | Standardized coefficients beta | t     | Sig. 
|-----------------|------------------|-------------------------|-------------------------------|-------|------
| (Constant)      | -11.863          | 9.649                   | -1.229                        | .228  |      
| Asset allocation| -.777            | .445                    | -.281                         | -1.748| .090 
| Investment manager performance | 5.055          | .445                    | .224                          | 1.454 | .156 
| Risk level      | 3.383            | 2.128                   | .256                          | 1.590 | .122 

*Dependent Variable: Mutual Fund Performance.

### Table 8. Coefficient of determination.

| Model summary | R     | R square | Adjusted R square | Std. error of the estimate | Durbin-Watson 
|---------------|-------|----------|-------------------|--------------------------|----------------
| 1             | .489  | .239     | .168              | 2.2502190               | 1.484          

*Predictors: (Constant), Risk Level, Investment Manager Performance, Asset Allocation.

*Dependent Variable: Mutual Fund Performance.
Table 8 shows that the R Square value is 0.239. Viewed in a percentage, the asset allocation variable, the investment manager performance, and the risk level have a 23.9% contribution or effect on the performance of mutual funds. The remaining 76.1% is influenced by other factors not examined in this research.

Conclusions
Asset allocation policy, investment manager performance, and risk level simultaneously have a significant effect on the performance of Islamic money market mutual funds in Indonesia, but partially there is no significant effect. These results imply that the produce a high performance of the Islamic money market is affected by the combination of optimized asset allocation policies, the right investment manager, and a suitable risk level analysis. If one of these variables (asset allocation policies, the right investment manager, and a suitable risk level analysis) is not applied, the desired Islamic money market mutual performance will not be achieved effectively. The actual influence of the dependent variable on the independent variable is 23.9%. Further research is expected to add other variables such as mutual fund size, mutual fund age, portfolio turnover, stock price index, mutual fund operating costs, and total mutual fund assets on the Islamic money market to enrich the research results.

A strength of this study is its use of a different object from previous works of literature. This study uses Islamic money market mutual funds, focusing on Indonesia. Using a complete combination of variables compared to previous research can contribute to the existing literature, namely that asset allocation policy, investment manager performance, and the level of risk simultaneously have a significant effect on the performance of Islamic money market mutual funds in Indonesia. Investors, companies, and governments are expected to focus on asset allocation policies, investment manager performance, and the level of risk in order to improve the performance of Islamic money market mutual funds in Indonesia. A limitation of this study is the low number of samples because Islamic mutual funds only started in 2015. To analyze data using the regression method, we need to reach a minimum of 30 samples. The Financial Services Authority of Indonesia stated that Islamic mutual funds in Indonesia had only a variety of 50 products in 2013 and increased to 198 products in 2018. Based on our data collection, we only have a total sample of 36 Islamic money market mutual funds conducted during 2019. However, the study results can be generalized for Islamic mutual funds' performance in Indonesia.

Data availability
Underlying data

This project contains the following underlying data:

- Dataset - F1000-109708.xlsx

(Data of Indonesian Sharia Mutual fund asset allocation, risk level, mutual fund performance, and investment manager performance for the last four years).

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

Author contributions

References


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