
Indonesian mutual funds: performance determinants and interaction of macroeconomic factors

Mahartha Titi*

Faculty of Economics and Business,
Universitas Brawijaya,
Jl. MT Haryono 165, Gedung Pascasarjana FEB,
Program Doktor Ilmu Manajemen,
Bagian Ujian Lantai 5, Malang, 65145, Indonesia
Email: mahartha.titi@gmail.com
*Corresponding author

Ubud Salim, Sumiati and Risna Wijayanti

Management Department,
Faculty of Economics and Business,
Universitas Brawijaya, Indonesia
Email: ubud.salim123@gmail.com
Email: sumiati_atiek@yahoo.com
Email: risna@ub.ac.id

Abstract: We examine the determinants of fund returns of equity, fixed income, mixed, and money market mutual funds in Indonesia. Our empirical findings suggest that previous fund performances are significant determinants of current fund performances. On the other hand, fund age, management fee, and management period of the investment manager are not significant determinants of fund performances. Fund size is a significant determinant of fund performances only for equity funds. Furthermore, introducing the interest rate as a moderator variable weakens the effect of fund size on fund returns only for equity funds and it weakens the effect of the exchange rate on fund performances for equity and money market funds. For fixed income and mixed funds, the moderator variable does not change the effects of fund size and the exchange rate on fund performances. Overall, the robustness tests using three partitions of fund performances, namely bottom 20%, middle 60%, and top 20%, confirm our main findings. An interesting result is that returns of middle performers of fixed income funds are more sensitive to the changes of determinants than those of bottom and top performers.

Keywords: mutual funds; fund characteristics; fund performances; Indonesia.

Reference to this paper should be made as follows: Titi, M., Salim, U., Sumiati and Wijayanti, R. (2021) 'Indonesian mutual funds: performance determinants and interaction of macroeconomic factors', *Int. J. Revenue Management*, Vol. 12, Nos. 1/2, pp.83–103.

Biographical notes: Mahartha Titi is currently a PhD candidate in the Management Science program at Universitas Brawijaya. His research interests are in financial management, local government budgeting, and government accounting.

Ubud Salim is currently a Professor in the Management Science program at Universitas Brawijaya. He obtained his MA in Administrative Studies from Ohio University and his Doctor in Economics from Universitas Brawijaya. His research interests are in financial management, international business, international marketing, and entrepreneurship. His research has been published in various journals including *International Journal of Economics and Financial*, *Procedia-Social and Behavioral Sciences*, *European Research Studies Journal*, and *IOSR Journal of Business and Management*.

Sumiati is currently an Associate Professor at Faculty of Economics and Business, Universitas Brawijaya. She obtained her MSi in Management from Universitas Airlangga and her Doctor in Management Science from Universitas Brawijaya. Her research interests are in financial management, marketing, and entrepreneurship. Her research has been published in various journals including *International Journal of Economic Research*, *Journal of Asian Finance, Economics, and Business*, *European Research Studies Journal*, and *Management Science Letters*.

Risna Wijayanti is currently an Associate Professor at Faculty of Economics and Business, Universitas Brawijaya. She obtained her MM in Management from Universitas Brawijaya and her PhD in Corporate Finance from Universiti Sains Malaysia. Her research interests are in financial management, marketing, and corporate finance. Her research has been published in various journals including *International Jurnal Ekonomi Malaysia*, *International Journal of Public Leadership*, and *Russian Journal of Agricultural and Socio-Economic Sciences*.

1 Introduction

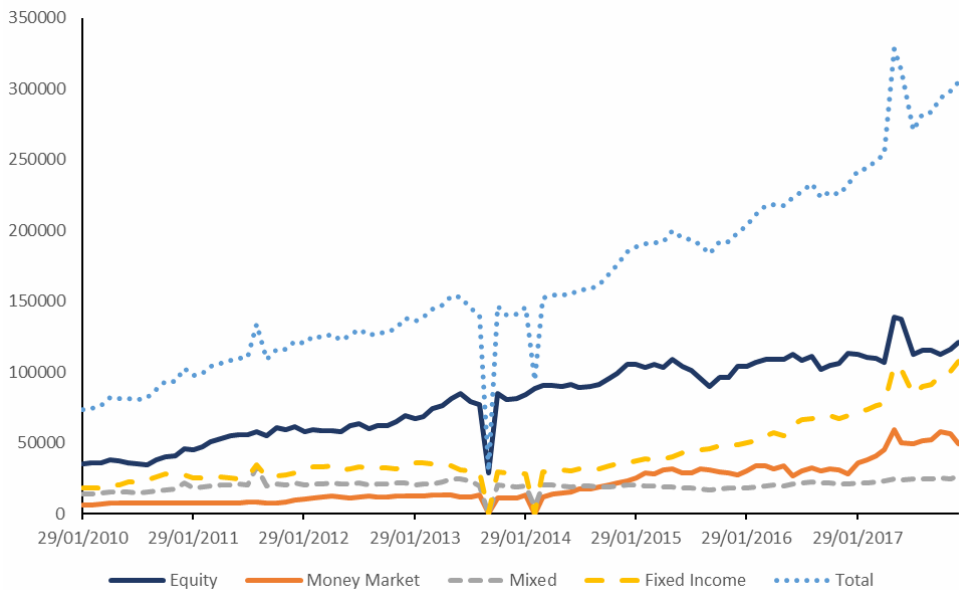
Mutual fund, as one of the investment alternatives other than stocks, was introduced in Indonesia in 1996 with total net asset values (NAV) of IDR 2.78 trillion (approximately USD 189.62 million using the exchange rate in October 2020). Even though the NAV of conventional mutual funds in 2017 only accounts for 4.32% of stock market capitalisation, the NAV has grown rapidly and reached IDR 457 trillion (approximately USD 31.17 billion) at the end of December 2017. In addition, from 2010 to 2017 the growth of stock market capitalisation was 117.19% while the growth of fund NAV was 197.27% suggesting that investors still have interests in mutual funds (OJK, 2017). From the total NAV in December 2017, conventional mutual funds account for IDR 305.16 trillion (approximately USD 20.79 billion) consisting of 39% equity funds, 35% fixed income funds, 16% money market funds, and 10% mixed funds. The total NAV of conventional mutual funds fluctuated during the 2010 to 2017 period as presented in Figure 1. For example, there were significant increases and decreases in 2011, 2013, 2014, and 2017. Those fluctuations show that there are some risks in mutual fund investments.

The growth or fluctuation of mutual fund NAV, variation in mutual fund products, and characteristic of investment managers result in different mutual fund performances, hence investors cannot easily select mutual funds that can produce optimal returns. Other factors that can affect mutual fund performances are fund characteristics such as fund size, fund age, fund fee, previous fund performance, and management period of

investment manager. Macroeconomic factors such as the interest rate and the exchange rate may also influence mutual fund performances. There are several studies of mutual fund performances, however there are some limitations in those studies, for example, those studies examine:

- 1 macroeconomic factor or fund characteristic impact on mutual fund performances separately
- 2 one type of mutual fund such as equity funds only
- 3 using relatively short research period such as three years.

Figure 1 The NAV during the 2010 to 2017 period in billion IDR (see online version for colours)



This paper contributes to mutual fund literature in emerging market through several ways. Firstly, this paper utilises research object of all conventional mutual funds in Indonesia Capital Market, which are equity, fixed income, mixed, and money market funds during the 2010 to 2017 period. Secondly, this paper is an integrated research by combining fund characteristics and macroeconomic variables as determinants of fund performances. Thirdly, this paper examines the interest rate impact as the moderator variable on fund size and the exchange rate as determinants of fund performances. The moderator variable is necessary to determine whether the interest rate can strengthen or weaken fund characteristic influences on fund performances. The moderator variable examines and measures different impacts of independent variables on dependent variable. The interest rate is selected as the moderator variable because it potentially affects stock or bond prices as one of the underlying instruments in mutual fund portfolios. Therefore, this paper provides an insight into the interest rate role as the moderator variable that changes the impact level of determinants of fund returns. The explanatory variables in this paper are fund size, fund age, fund fee, previous fund performance, management period of investment manager as well as the exchange rate and the interest rate. This

paper fills the gap in the literature by providing empirical evidences on the effect of fund characteristics as well as macroeconomic factors on fund returns in Indonesia.

Our main findings suggest that previous fund returns are significant determinants of current fund returns showing that persistence in fund returns exists in Indonesia mutual funds or good previous returns are usually followed by good current returns. On the other hand, fund age, management fee, and management period of investment manager are not significant determinants of fund performances. Fund size is a significant determinant of fund performances only for equity funds. For equity and money market funds, a higher exchange rate of USD to IDR decreases fund returns. Introducing the interest rate as the moderator variable weakens the effect of fund size on fund returns only for equity funds and it weakens the effect of the exchange rate on fund performances for equity and money market funds. For fixed income and mixed funds, the moderator variable does not change the effects of fund size and the exchange rate on fund performances. Overall, the robustness tests using three regions of fund performances (bottom 20%, middle 60%, and top 20%) corroborate our main findings. An interesting result is that returns of middle performers of fixed income funds are more sensitive to the changes of determinants than those of bottom and top performers. The remainder of this paper is organised as follows, Section 2 reviews related literature review and hypothesis development and Section 3 describes research design. Section 4 presents empirical results and Section 5 concludes.

2 Literature review and hypothesis development

One of the motivations to invest is to gain returns that compensate expected inflation rate and cash flow uncertainty during the investment period (Reilly and Brown, 2010). Measuring returns or performances is not an easy job to do for investors due to information limitation, hence investors face some difficulties in comparing investment alternatives or products. The difficulties also exist when investors comparing mutual funds because risk profile of one mutual fund is different from others. One of the solutions to overcome the comparison problem between fund performances is using Risk Adjusted Performance theory (Modigliani and Modigliani, 1997). This theory introduces measurement for mutual fund performances considering their risks. Mutual fund returns or performances represent gains from investment in funds that can be measured by several methods including Sharpe ratio (Sharpe, 1994, 1964). Along with fund performances, there were several researches on fund characteristics that affects fund performances. This paper explores several studies on fund size, fund age, fund fee, previous fund performance, management period of investment manager as well as the exchange rate and the interest rate as potential determinants of fund performances.

The fund NAV representing assets under management or fund size may reflect investor trust toward certain mutual funds. Large funds can perform better as their investment managers have bigger investment opportunities and more flexibilities in forming investment portfolios using those big assets. Furthermore, large funds can gain more bargaining powers, economies of scale, and create better returns compared to their peers. Rao et al. (2017) analyse Chinese equity mutual funds and show that fund size is positively related to fund performances meaning that the bigger the funds, the better the performances. It is consistent with Belgacem and Hellara (2011) and Ferreira et al. (2013) findings on positive relationship between fund size and fund returns as well as Gil-Bazo and Ruiz-Verdú (2009) and Lee et al. (2008) who examine Taiwanese mutual

funds. Otten and Bams (2002) study European market using 506 mutual funds from five countries (France, Germany, Italy, Netherlands, and United Kingdom) and document that fund size has positive and significant relationship with fund returns. Investment managers of large funds have investment opportunities which small funds do not have. On the other hand, small funds may use their assets only on certain investment selections and result in good performances. Along the time, those funds become large funds because investors put their monies as responses to information of good performances. As the funds become bigger, the investment managers have to try to find other good investment opportunities and consequently managerial skills may deteriorate (diseconomies of scale), especially for mutual funds with aggressive growth objectives (Ciccotello and Grant, 1996). Small funds are more active while large funds tend to mimic the indexes. Besides, investment managers of large funds generally have to trade in large volume and suffer from large expenses which is called liquidity hypothesis (Cremers and Petajisto, 2009). Chen et al. (2004) examine US equity mutual funds from Center for Research in Security Prices database during the 1962 to 1999 period and find that fund returns, before or after fees, are smaller when fund sizes are bigger. Looking at mutual funds in Sweden, funds with small sizes and low fees have good returns in the current period (Dahlquist et al., 2000). In line with those findings, mutual funds in China from January 2000 until July 2013 show that smaller funds create better performances than others after considering their risks (Kiymaz, 2015). Other studies also document negative relationship between fund returns and fund size (Chou and Hardin, 2014; Hussain, 2017; Tang et al., 2012). Based on those mixed results from prior studies, economy of scale is a reasonable argument to relate fund size and fund returns. As such, this paper proposes the following hypothesis:

H1 All else being equal, funds with larger sizes have higher returns.

We can measure fund age from its effective date up to now. Fund age represents fund continuity. Influences of fund age on fund performances can be viewed from several angles. It can be assumed that younger funds are more active, however they usually suffer from higher expenses and lack of experiences during their beginning periods. Using the learning effect as an argument, older funds in Germany, UK, and US outperform younger funds suggesting that the older the funds, the higher the returns (Bauer et al., 2005). Furthermore, mutual fund returns in Tunisia, China, and Portugal also show positive relationship with fund age (Belgacem and Hellara, 2011; Kiymaz, 2015; Lobão and Gomes, 2015). Those findings are in line with Rao et al. (2017) who identify that fund age is positively related to fund performances in Chinese equity mutual funds. On the other hand, some papers report younger funds perform better than older funds (Ferreira et al., 2013; O'Neal and Page, 2000; Otten and Bams, 2002; See and Jusoh, 2012). Using the learning effect as an acceptable argument, the second hypothesis in this paper is:

H2 All else being equal, funds with older ages have higher returns.

Fund fee becomes one of fund characteristics that draws attentions in several studies showing that fund fees are significantly positive related to fund returns or higher fees result in higher returns (Ferreira et al., 2013; Kiymaz, 2015; Lobão and Gomes, 2015; O'Neal and Page, 2000; Rao et al., 2017). The findings are in line with a study on Malaysian funds presenting that funds with more research expenses have better returns than their counterparts or fund expenses are positively related to fund returns (See and Jusoh, 2012). In contrast, some studies document negative and significant relationship between fund fees and fund performances meaning that fund performances are higher

when fund fees are lower using sample of mutual funds in Taiwan (Wang et al., 2014), Thailand (Lamphun and Wongsurawat, 2012), Tunisia (Belgacem and Hellara, 2011), Europe (Otten and Bams, 2002), and Sweden (Dahlquist et al., 2000). Those findings are consistent with a study using US equity mutual funds from Center for Research in Security Prices database during the 1962 to 1999 period that documents fund returns are smaller when fund fees are bigger (Chen et al., 2004). Sharpe (1991) states that returns of active investors generally cannot outperform returns of passive investment strategy. Therefore, funds with high fees underperform funds with low fees (Elton et al., 1993). Furthermore, the mutual fund with the best performance is the one which has low expenses and slowly increases its expense ratios compared to the one that rapidly increases its expense ratios (Gruber, 1996). This paper utilises management fee as one of determinants of fund performances. Management fee is fixed fee during investor holding period and deducted from fund assets. Even though previous studies show mixed findings, this paper conjectures a feasible argument that value creations of active management in funds can be described by the relationship between fund returns and fund fees. Hence, this paper posits that:

H3 All else being equal, funds with higher fees have higher returns.

Persistence in fund performance exists when a fund that produces good return in the previous period tends to produce good return in the current period. It represents managerial skill or capability to produce good returns from their managed funds. Several papers study the performance persistence and result in various findings. Some papers show that funds with good performances in the previous period tend to have good performances in the current period (Belgacem and Hellara, 2011; Carhart, 1997; Dahlquist et al., 2000). Same findings, using UK and Portuguese data, report strong performance persistence in mutual funds (Lobão and Gomes, 2015; Otten and Bams, 2002). However, not all studies support the persistence in fund performances. Bollen and Busse (2004) state that superior fund returns are short term phenomena that can be observed only when mutual funds are evaluated several times in a year. Using funds in Czechoslovakia, persistence in fund returns is related to size and development stage of mutual industry (Filip, 2013), but the persistence is not strong in several sub periods. Mutual funds in China show that good (bad) fund returns from previous periods do not always become indicators for good (bad) fund returns in the subsequent periods (Rao et al., 2017). Based on an assumption that the learning effect is applicable so funds with good prior returns tend to maintain those good returns in the subsequent periods, hence the fourth hypothesis in this paper is:

H4 All else being equal, funds with good returns in the previous period have good returns in the current period.

A management period of investment manager is a period since a company establishment until today. As a result of managerial experiences, a company with longer management period potentially performs better than its counterparts. Consequently, investors tend to invest in mutual funds managed by the company with longer management period. In addition, longer management period can be related to lower fees paid by investors as the experienced company is more efficient in using its sources for investment and information analysis. Lee et al. (2008) investigate Taiwanese equity funds and suggest that a management period of more than two years produces better fund performances than their peers which is consistent with Ferreira et al. (2013) who show that a longer

management period tends to improve fund performances because it increases efficiency in analysing and processing information. In conjunction with previous findings and the learning effect argument, this paper proposes the following hypothesis:

H5 All else being equal, funds with longer management periods have higher returns.

Besides fund characteristics, this paper also considers macroeconomic variables as determinants of fund performances. An exchange rate is paid price for a currency of one country relative to foreign currency (Olweny and Omondi, 2011). The exchange rate is determined by supply and demand of certain currency. The foreign currency plays as an investment alternative other than mutual funds. The exchange rate can affect financial position of a company that utilises foreign currency in its operating activities. Securities of public companies in the capital market can become underlying assets of a mutual fund portfolio, hence the exchange rate may affect mutual fund performances when performances of the public companies are influenced by foreign currency movement. The exchange rate has positive and significant relationship with fund returns as stated in Sujoko (2009) study. However, Yadav et al. (2016) find that the exchange rate is negatively related to fund returns. Accordingly, due to the fact that foreign currency may act as an investment alternative or as an underlying asset of a fund portfolio, the sixth hypothesis in this paper is:

H6 All else being equal, the higher the USD to IDR exchange rates, the higher the fund returns.

The last macroeconomic variable in this paper is the interest rate. The interest rate is market interest rate that depends on money supply and demand (Keynes, 1936) and it motivates an individual to save cash, hence the interest rate is determined by an individual willingness to save cash versus to let go the cash within certain period. This is called liquidity preference which has three motives, namely transaction, precautionary, and speculative. Furthermore, the interest rate also plays significant role in determining securities prices and capital allocations of companies and investors. Consequently, as mutual funds consist of securities which can be equity or debt securities, changes of the interest rate may affect mutual fund performances. One study finds lower interest rate in US as a cause for individuals to invest in fixed income funds suggesting that the interest rate may affect fund size by changing investment from one type of fund to others (Delia-Elena and Alexandru, 2011). Using US monthly data from 1971 to 1998, Lipton and Buetow (2000) find the interest rate changes are related to fund performances. Some papers show negative impact of the interest rate on fund performances indicating that the higher the interest rate, the lower the fund returns (Hussain, 2017; Makau, 2016; Wibowo, 2011; Yadav et al., 2016). Theory states that if the interest rate on domestic currency increases, then the domestic currency will appreciate against foreign currency or it will affect the exchange rate. Basurto and Ghosh (2001) report that the interest rate affects the exchange rates movement or an increase in the interest rate is related to an appreciation of the exchange rate in Indonesia, Korea, and Thailand. Based on this relationship, the interest rate may affect fund performances through the exchange rate. This paper selects fund size and the exchange rate that are affected by the interest rate as the moderator variable because fund size and the exchange rate fluctuate every day. Based on the prior studies, this paper proposes the following hypotheses:

- H7 All else being equal, the interest rate as the moderator variable strengthens fund sizes and fund returns relationship.
- H8 All else being equal, the interest rate as the moderator variable strengthens the exchange rates and fund returns relationship.

3 Research design

This paper includes monthly data of conventional mutual funds in Indonesia (equity, fixed income, mixed, and money market funds) from 2010 to 2017. The data is obtained from Indonesia Financial Services Authority database. The final sample consists of 15,698 observations. Fund characteristics for this paper are fund returns, fund NAV, fund age, fund management fee, and management period of investment manager. The exchange rate as macroeconomic factor is extracted from Central Bank of Indonesia database. The data is adjusted for inflation where applicable. This paper employs pooled least square (PLS) regression based on Chow test and Breush Pagan LM test to analyse the effects of fund characteristics and macroeconomic factor on fund returns or performances.

$$R_{p,t} = \beta_0 + \beta_1 SIZE_{p,t-1} + \beta_2 AGE_{p,t-1} + \beta_3 FEE_{p,t-1} + \beta_4 PREVIOUS\ RETURNS_{p,t-1} + \beta_5 MI_{p,t-1} + \beta_6 EXCHANGE_{t-1} + \varepsilon_{p,t} \quad (1)$$

R_p is fund return at time t represented by fund Sharpe ratio (Bodie et al., 2004) while the explanatory variables are fund size ($SIZE$), fund age (AGE), management fee (FEE), previous returns ($PREVIOUS\ RETURNS$), management period of investment manager (MI), and the exchange rate ($EXCHANGE$).

To investigate the interest rate as the moderator variable that can affect the strength of fund size and fund returns relationship as well as the strength of the exchange rate and fund returns relationship, this paper employs the following equation.

$$R_{p,t} = \beta_0 + \beta_1 (SIZE * INTEREST)_{p,t-1} + \beta_2 AGE_{p,t-1} + \beta_3 FEE_{p,t-1} + \beta_4 PREVIOUS\ RETURNS_{p,t-1} + \beta_5 MI_{p,t-1} + \beta_6 (EXCHANGE * INTEREST)_{t-1} + \varepsilon_{p,t} \quad (2)$$

$SIZE * INTEREST$ and $EXCHANGE * INTEREST$ coefficients represent the effect of moderator variable on fund returns. The interest rate is nominal interest rate from Central Bank of Indonesia database. The Sharpe ratio as a proxy of fund return is calculated using the following formula:

$$S = \frac{R_p - R_f}{\sigma_p}$$

R_p and σ_p are fund return and fund standard deviation, respectively. R_f is return of risk-free instrument proxied by time deposit return from Central Bank of Indonesia database.

4 Empirical results

Table 1 shows summary statistics of the variables used in our empirical analysis. On average, during the 2010 to 2017 period, size of conventional mutual funds (equity, fixed income, mixed, and money market funds) in Indonesia was IDR 534.83 billion (approximately USD 36.48 million), fund age was 97 months or 8 years, and fund management fee was 2.02%. Fund returns calculated using Sharpe ratio was -5.85% on average while management period of those funds was approximately 184 months or 15 years. The exchange rate and the interest rates as macroeconomic factors were approximately IDR 11,106 and 6.36%, respectively.

Table 1 Descriptive statistics of variables

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
<i>SIZE</i> (IDR)	15,698	534,835,603,336	0.678	19,653,956	17,654,414,903,068
<i>AGE</i> (Month)	15,698	97	0.224	1	263
<i>FEE</i> (%)	15,698	2.02	0.009	0.18	5
<i>RETURNS</i> – Sharpe ratio (%)	15,698	-5.85	0.942	-7.35	8.70
<i>MI</i> (Month)	15,698	184	0.147	36	312
<i>EXCHANGE</i> (IDR)	15,698	11,106	0.076	8,508	14,656
<i>INTEREST</i> (%)	15,698	6.36	0.010	4.25	7.75

Table 2 reports determinants of fund returns during the sample period. The table presents the results for all conventional fund types ('all funds') and for each conventional fund type ('equity funds', 'fixed income funds', 'mixed funds', and 'money market funds'). For 'all funds', the coefficient of *FEE* is significantly positive at 5% level indicating the higher the fund management fees, the higher the fund returns. This is in line with an argument that funds use more expenses (one of them is management fee) or research expenses to produce more returns than their peers as fees are paid by investors to gain benefits or better performances from their investments (Ferreira et al., 2013; Kiyamaz, 2015; Lobão and Gomes, 2015; O'Neal and Page, 2000; Rao et al., 2017; See and Jusoh, 2012). The coefficient of *PREVIOUS RETURNS* is significantly positive at 1% level suggesting that good previous returns are followed by good current returns or there is persistence in fund returns which is supported by previous findings of Belgacem and Hellara (2011), Carhart (1997), Dahlquist et al. (2000), Lobão and Gomes (2015) as well as Otten and Bams (2002). An argument for persistence in fund returns is that fund managers who produce good returns in the previous period attempt to produce good returns in the current period. It confirms manager capabilities or experiences in managing funds for producing good returns and also confirms investors as timers in selecting funds that perform well. It supports a notion that historical performances are indications of future performances. Based on those results, hypotheses H3 and H4 are supported.

Table 2 Regression analysis of determinants of fund performances without moderator (dependent variable: Sharpe ratio)

	All funds		Equity funds		Fixed income funds		Mixed funds		Money market funds	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Intercept	-1.662**	0.019	5.949***	0.000	-1.031	0.372	-0.553	0.730	-4.735***	0.000
SIZE	-0.008	0.604	0.055**	0.016	0.037	0.311	0.058	0.175	0.005	0.881
AGE	0.008	0.898	0.054	0.538	0.015	0.897	-0.093	0.527	0.138	0.333
FEE	2.721**	0.021	-1.346	0.401	1.028	0.605	1.338	0.633	-1.748	0.770
PREVIOUS RETURNS	0.985***	0.000	0.014	0.404	0.985***	0.000	0.958***	0.000	0.991***	0.000
MI	0.009	0.913	0.161	0.291	0.122	0.359	0.042	0.818	0.222	0.346
EXCHANGE	-0.400**	0.038	-1.703***	0.000	0.262	0.405	0.289	0.493	-0.973**	0.032
R ²	0.978		0.014		0.978		0.925		0.980	
N	15,698		3,948		6,110		3,760		1,880	

Notes: The table reports the results of PLS regressions estimating determinants of fund performances. The dependent variable is fund performance represented by Sharpe ratio of each fund at time t . SIZE is logarithm of fund NAV. AGE is logarithm of fund existing period in months. FEE is percentage of fund management fee. PREVIOUS RETURNS is fund returns at time $t-1$. MI is logarithm of management period of investment manager. EXCHANGE is logarithm of exchange rate of USD to IDR. *, **, *** statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

The coefficient of *EXCHANGE* is significantly negative at 5% level implying that the higher the USD to IDR exchange rates, the lower the fund returns, as such hypothesis H6 is rejected. This finding is consistent with a notion that foreign currency is an investment alternative other than mutual funds. The exchange rate affects financial positions of public companies who utilise foreign currency for their main business activities because when securities issued by the public companies are part of fund portfolios, the exchange rate potentially affects the fund performances (Sujoko, 2009; Yadav et al., 2016). One reasonable explanation for this finding is that securities of public companies which part of fund portfolios, use USD for their liabilities or for import transactions. Consequently, an increase in the exchange rate of USD to IDR or a depreciation of IDR will decrease fund returns because an adverse effect of the exchange rate on the liabilities or import transactions of those public companies.

The coefficients of *SIZE*, *AGE*, and *MI* are insignificant, as such hypotheses H1, H2, and H5 are rejected suggesting that fund size, fund age, and management period are not determinants of fund returns, hence even though funds are getting bigger or older, or fund company is getting older does not mean that fund performances or returns are getting better. It is consistent with O'Neal and Page (2000) who argue that fund size is not significant determinant of fund returns as economies of scale are not present, Low (2010) who finds that period of fund existence has nothing to do with fund returns, and Chevalier and Ellison (1999) who state that no relationship between fund performances and management period as fund performances depend on stock-picking ability of fund managers. The finding of insignificant *AGE* contradicts a practical assumption that older funds have more experiences to produce better returns than their peers while insignificant *MI* disagrees with a view that investment managers with longer management periods are more capable and efficient in analysing and processing information for achieving better performances than their counterparts.

For 'equity funds', the coefficient of *SIZE* is significantly positive at 5% level indicating that funds with larger sizes have higher returns and supporting hypothesis H1. It is in line with an argument that fund managers of large funds have bigger opportunities and flexibilities to execute their investment strategies, form fund portfolios as well as create economies of scales and therefore their chances to produce better fund returns are also bigger than their counterparts (Belgacem and Hellara, 2011; Ferreira et al., 2013; Lee et al., 2008; Otten and Bams, 2002; Rao et al., 2017). Consistent with the previous finding of 'all funds', the coefficient of *EXCHANGE* for 'equity funds' is still significantly negative as determinant of fund performances implying the argument that foreign currency as an investment alternative other than mutual funds still holds. On the other hand, the coefficient of *PREVIOUS RETURNS* is no longer significant meaning that for investment in equity mutual funds, previous returns are not good indicators of current returns. *FEE* turns into an insignificant determinant of fund returns as suggested by Ippolito (1989) that fund performances are not related to management fees because mutual funds invest efficiently. *AGE* and *MI* remain insignificant as determinants of fund returns.

Table 3 Regression analysis of determinants of fund performances with moderator (dependent variable: Sharpe ratio)

Variable	All funds		Equity funds		Fixed income funds		Mixed funds		Money market funds	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Intercept	-0.406**	0.023	5.949***	0.000	-1.031	0.372	-0.553	0.730	-4.735***	0.002
SIZE*INTEREST	0.004	0.147	0.016**	0.016	0.009	0.311	-0.019	0.175	0.001	0.881
AGE	0.034	0.555	0.054	0.538	0.015	0.897	-0.093	0.527	0.138	0.333
FEE	0.513	0.677	-1.346	0.401	1.028	0.605	1.338	0.633	-1.748	0.770
PREVIOUS RETURNS	0.981***	0.000	0.014	0.404	0.985***	0.000	0.958***	0.000	0.991***	0.000
MI	0.119	0.172	0.161	0.291	0.122	0.359	0.042	0.818	0.222	0.346
EXCHANGE*INTEREST	-0.008	0.339	-0.496***	0.000	-1.063	0.405	0.096	0.439	-0.107**	0.032
R ²	0.978		0.014		0.978		0.925		0.980	
N	15.698		3.948		6.110		3.760		1.880	

Notes: The table reports the results of PLS regressions estimating determinants of fund performances. The dependent variable is fund performance represented by Sharpe ratio of each fund at time t . SIZE*INTEREST is interaction variable of INTEREST rate and SIZE. AGE is logarithm of fund existing period in months. FEE is percentage of fund management fee. PREVIOUS RETURNS is fund returns at time $t-1$. MI is logarithm of management period of investment manager. EXCHANGE*INTEREST is interaction variable of INTEREST rate and EXCHANGE. *, **, *** - statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Interestingly, for 'fixed income funds' and 'mixed funds', *PREVIOUS RETURNS* is the only significant determinant of fund returns with its coefficient significantly positive at 10% level, hence hypothesis H4 is supported. Other explanatory variables (*SIZE*, *AGE*, *FEE*, *MI*, and *EXCHANGE*) are not significant determinants of fund returns and therefore hypotheses H1, H2, H3, H5, and H6 are rejected. For 'money market funds', the coefficient of *PREVIOUS RETURNS* and *EXCHANGE* are significantly positive at 10% level and negative at 5% level, respectively. *SIZE*, *AGE*, *FEE*, and *MI* are not significant determinants of fund returns implying that fund size, number of years the funds have been in existence, management fee, and management period of investment manager have nothing to do with returns of money market funds. In this case, hypotheses H1, H2, H3, and H5 are not supported.

Table 3 presents determinants of fund returns during the sample period incorporating the interest rate as the moderator variable to investigate its strengthening or weakening effect on the relationship between fund sizes and fund returns, and between the exchange rates and fund returns. For 'all funds', the coefficient of *FEE* is no longer significant which rejects hypothesis H3. It means that management fee is not significant determinant of fund performances as suggested by Ippolito (1989) that fund performances are not related to management fees because mutual funds invest efficiently to form fund portfolios and produce fund returns. Introducing the interest rate as the moderator variable does not change the effect of fund size on fund performances. The coefficient of interaction variable *SIZE*INTEREST* is insignificant, as such hypothesis H7 is not supported. Based on the results on Table 2, fund size is not a determinant of fund returns and when we introduce the moderator variable to examine the strength of fund size influence on fund returns, the results are the same and therefore the moderator variable does not have any effect on the relationship between fund sizes and fund performances. The finding is applied for 'fixed income funds', 'mixed funds', and 'money market funds' as well.

In contrast, introducing the interest rate as the moderator variable weakens the relationship between the exchange rate and fund performances. For 'all funds', the coefficient of interaction variable *EXCHANGE*INTEREST* is insignificant which rejects hypothesis H8. Table 2 shows the coefficient of *EXCHANGE* is significantly negative at 5% level. However, when the moderator variable is introduced, the coefficient of *EXCHANGE*INTEREST* becomes insignificant, hence the moderator variable weakens the relationship between the exchange rates and fund performances. A reasonable explanation for this finding is that due to their natural interactions as macroeconomic factors, one factor can undermine the influence of other factor on fund performances.

For 'equity funds', the coefficient of *SIZE*INTEREST* is 0.016 and significant at 5% level while the coefficient of *SIZE* without the moderator variable is 0.055 and significant at 5% level. It suggests that the moderator variable weakens the relationship between fund sizes and fund returns which rejects hypothesis H7. When the interest rate is introduced as the moderator variable, the effects of funds sizes as determinants of fund returns become smaller. One possible explanation is that changes of the interest rate cause investors to shift their investments from one type of fund to others or to a different investment alternative such as stock or bond (Delia-Elena and Alexandru, 2011), hence it changes the fund sizes and fund performances relationship. The coefficients of *EXCHANGE*INTEREST* and *EXCHANGE* without the moderator variable are -0.496 and -1.703, respectively and they are significant at 1% level. It indicates that the moderator variable weakens the relationship between the exchange rates and fund

performances which rejects hypothesis H8. A similar result related to the moderator variable is found for ‘money market funds’ where the coefficients of *EXCHANGE*INTEREST* and *EXCHANGE* without the moderator are -0.107 and -0.973 , respectively and they are significant at 5% level. It suggests that the moderator variable weakens the relationship between the exchange rates and fund performances which rejects hypothesis H8. A reasonable explanation is that changes of the interest rate cause the exchange rate movements because of their natural relations (Basurto and Ghosh, 2001) and eventually affect the exchange rates and fund performances relationship. For ‘fixed income funds’ and ‘mixed funds’, the moderator variable does not change the relationship between fund sizes and fund returns, and between the exchange rates and fund returns as the coefficients of *SIZE*, *EXCHANGE*, *SIZE*INTEREST*, and *EXCHANGE*INTEREST* are insignificant.

This paper performs a robustness test by classifying fund performances into three partitions namely bottom 20%, middle 60%, and top 20% (Sirri and Tufano, 1998). The detailed results are reported in Appendix A and Appendix B. In general, the results using three partitions of fund performances confirm our main findings. Previous performances are significant determinants of current performances or the persistence in fund performances holds in those three classifications of fund performances. Fund age, management fee, and management period of investment manager remain insignificant as determinants of fund returns. For ‘equity funds’, fund size and the exchange rate are significant determinants of fund performances as in our main results. An interesting result is for middle performers of ‘fixed income funds’ where all explanatory variables are significant determinants of fund returns. It suggests that returns of middle performers of fixed income funds are more sensitive to the changes of determinants than those of bottom and top performers. Lastly, similar to our main findings, the interest rate as the moderator variable weakens the relationship between fund sizes and fund performances, and between the exchange rates and fund performances.

5 Conclusions

This paper investigates the determinants of fund performances of conventional mutual funds in Indonesia. The empirical findings suggest that persistence in fund returns exists for those funds. Good previous fund returns usually is followed by good current fund returns. Our findings also suggest that lower exchange rate of USD to IDR may increase fund returns, especially for equity and money market funds. Fund size is important as determinant of fund returns only in equity funds. The influence of management fee on fund returns only prevails when it is analysed using all types of mutual funds altogether. However, the fee influence does not prevail when we analyse each type of mutual fund separately. Furthermore, the effect of fund age and management period of investment manager on fund returns do not prevail in the Indonesian conventional mutual funds.

When the moderator variable (the interest rate) is introduced, performance persistence is still there, but management fee does not play as significant determinant of fund returns. Fund age and management period of investment manager are consistently not significant in influencing fund returns. Interestingly for equity funds, the moderator variable weakens the effect of fund size and the exchange rate on fund returns suggesting that introducing the interest rate alters the influence level of those two determinants of fund returns. This paper fills the gap in the literature by providing empirical evidences on the

effect of fund characteristics as well as macroeconomic factors on fund returns in Indonesia. Moreover, this paper provides an insight into the interest rate role as the moderator variable that changes the impact level of determinants of fund returns.

Our main findings suggest that previous fund performances are significant determinants of current fund performances showing that persistence in fund returns exists in Indonesia mutual funds or good previous returns are usually followed by good current returns. In contrast, fund age, management fee, and management period of investment manager are not significant determinants of fund performances. Fund size is a significant determinant of fund performances only for equity funds. For equity and money market funds, a higher exchange rate of USD to IDR decreases fund returns. The interest rate as the moderator variable weakens the effect of fund size on fund returns only for equity funds and it weakens the effect of the exchange rate on fund performances for equity and money market funds. For fixed income and mixed funds, the moderator variable does not change the effects of fund size and the exchange rate on fund performances. Overall, the robustness tests using three regions of fund performances (bottom 20%, middle 60%, and top 20%) confirm our main findings. An interesting result is that returns of middle performers of fixed income funds are more sensitive to the changes of determinants than those of bottom and top performers.

In summary, the results indicate that investors should select funds based on their previous returns in Indonesia. Especially for equity mutual funds, investors should focus on fund sizes, the exchange rate, and the interest rate. For investing in money market funds, investors should consider the exchange rate. Fund age, management fee, and management period of investment manager do not influence fund performances. Lastly, investment managers should understand the determinants of fund performances to develop appropriate strategies for increasing fund performances of each type of conventional mutual fund.

References

- Basurto, G. and Ghosh, A. (2001) 'The interest rate-exchange rate nexus in currency crises', *IMF Staff Papers*, Vol. 47, pp.99–20.
- Bauer, R., Koedijk, K. and Otten, R. (2005) 'International evidence on ethical mutual fund performance and investment style', *Journal of Banking and Finance*, Vol. 29, No. 7, pp.1751–1767.
- Belgacem, S.B. and Hellara, S. (2011) 'Predicting Tunisian mutual fund performance using dynamic panel data model', *The Journal of Risk Finance*, Vol. 12, No. 3, pp.208–225.
- Bodie, Z., Kane, A. and Marcus, A.J. (2004) *Essentials of Investments*, 5th ed., McGraw-Hill Higher Education, USA.
- Bollen, N.P.B. and Busse, J.A. (2004) 'Short-term persistence in mutual fund performance', *The Review of Financial Studies*, Vol. 18, No. 2, pp.569–597.
- Carhart, M.M. (1997) 'On persistence in mutual fund performance', *The Journal of Finance*, Vol. LII, No. 1, pp.57–82.
- Chen, J., Hong, H., Huang, M. and Kubik, J. J. (2004) 'Does fund size erode mutual fund performance? The role of liquidity and organization', *The American Economic Review*, Vol. 9, No. 5, pp.1276–1302.
- Chevalier, J. and Ellison, G. (1999) 'Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance', *The Journal of Finance*, Vol. LIV, No. 3, pp.875–899.

- Chou, W. and Hardin, W. (2014) 'Performance chasing, fund flows and fund size in real estate mutual funds', *Journal of Real Estate Financial Economic*, Vol. 49, No. 3, pp.379–412.
- Ciccotello, C.S. and Grant, C.T. (1996) 'Equity fund size and growth: implications for performance and selection', *Financial Services Review*, Vol. 5, No. 1, pp.1–12.
- Cremers, M. and Petajisto, A. (2009) 'How active is your fund manager? A new measure that predicts performance', *Review of Financial Studies*, Vol. 22, No. 9, pp.3329–3365.
- Dahlquist, M., Engström, S. and Söderlind, P. (2000) 'Performance and characteristics of Swedish mutual funds', *Journal of Financial and Quantitative Analysis*, Vol. 35, No. 3, pp.409–423.
- Delia-Elena, D. and Alexandru, A. (2011) *The Relationship between Mutual Funds-Inflation Rate and Benchmark Interest Rate: USA Versus Romania*, Alexandra Ioan Cuza University, Romania.
- Elton, E.J., Gruber, M.J., Das, S. and Hlavka, M. (1993) 'Efficiency with costly information: a reinterpretation of evidence from managed portfolios', *The Review of Financial Studies*, Vol. 6, No. 1, pp.1–22.
- Ferreira, M.A., Keswani, A., Miguel, A.F. and Ramos, S. (2013) 'The determinants of mutual fund performance: a cross-country study', *Review of Finance*, Vol. 17, No. 2, pp.483–525.
- Filip, D. (2013) 'Returns and persistence of investment fund performance in the Czech Republic', *Prague Economic Papers*, Vol. 22, No. 3, pp.324–342.
- Gil-Bazo, J. and Ruiz-Verdú, P. (2009) 'The relation between price and performance in the mutual fund industry', *The Journal of Finance*, Vol. 64, No. 5, pp.2153–2183.
- Gruber, M.J. (1996) 'Another puzzle: the growth in actively managed mutual funds', *The Journal of Finance*, Vol. LI, No. 3, pp.783–810.
- Hussain, N. (2017) 'Mutual fund performance; funds and country specific characteristics: a comparative study of Pakistan and India equity funds', *Journal of Poverty, Investment and Development*, Vol. 37, No. 3, pp.18–24.
- Ippolito, R.A. (1989) 'Efficiency with costly information: a study of mutual fund performance, 1965-1984', *The Quarterly Journal of Economics*, Vol. 104, No. 1, pp.1–23.
- Keynes, J.M. (1936) *The General Theory of Employment, Interest, and Money*, Palgrave Macmillan, UK.
- Kiyamaz, H. (2015) 'A performance evaluation of Chinese mutual funds', *International Journal of Emerging Markets*, Vol. 10, No. 4, pp.820–836.
- Lamphun, P.N. and Wongsurawat, W. (2012) 'A survey of mutual fund fees and expenses in Thailand', *International Journal of Emerging Markets*, Vol. 7, No. 4, pp.411–429.
- Lee, J., Yen, P. and Chen, Y. (2008) 'Longer tenure, greater seniority, or both? Evidence from open-end equity mutual fund managers in Taiwan', *Asian Academy of Management Journal of Accounting and Finance*, Vol. 4, No. 2, pp.1–20.
- Lipton, A.F. and Buetow, G.W. (2000) 'Interest rate sensitivity of equity mutual funds', *Journal of Private Portfolio Management*, Vol. 2, No. 4, pp.61–71.
- Lobão, J. and Gomes, S. C. (2015) 'Performance and characteristics of mutual funds: evidence from the Portuguese market', *Revista de Gestão, Finanças e Contabilidade*, Vol. 5, No. 4, pp.125–148.
- Low, S. (2010) 'Relationship between fund performance and characteristics of the Malaysian unit trust fund', *Singapore Management Review*, Vol. 2, No. 1, pp.29–43.
- Makau, M.M. (2016) 'Effect of macroeconomic variables on financial performance of unit trusts in Kenya', *Research Journal of Finance and Accounting*, Vol. 7, No. 14, pp.146–162.
- Modigliani, F. and Modigliani, L. (1997) 'Risk-adjusted performance how to measure it and why', *The Journal of Portfolio Management*, Vol. 23, No. 2, pp.45–54.
- O'Neal, E.S. and Page, D.E. (2000) 'Real estate mutual funds: abnormal performance and fund characteristics', *Journal of Real Estate Portfolio Management*, Vol. 6, No. 3, pp.239–247.

- Olweny, T. and Omondi, K. (2011) 'The effect of macro-economic factors on stock returns volatility in the Nairobi stock exchange, Kenya', *Economics and Finance Review*, Vol. 1, No. 10, pp.34–48.
- Otoritas Jasa Keuangan (OJK) (2017) [online] <http://reksadana.ojk.go.id/> (accessed 3 July 2017).
- Otten, R. and Bams, D. (2002) 'European mutual fund performance', *European Financial Management*, Vol. 8, No. 1, pp.75–101.
- Rao, Z., Tauni, M.Z., Iqbal, A. and Umar, M. (2017) 'Emerging market mutual fund performance: evidence for China', *Journal of Asia Business Studies*, Vol. 11, No. 2, pp.167–187.
- Reilly, F.K. and Brown, K.C. (2010) *Investment Analysis & Portfolio Management*, 10th ed., South-Western Cengage Learning, USA.
- See, Y.P. and Jusoh, R. (2012) 'Fund characteristics and fund performance: evidence of Malaysian mutual funds', *International Journal of Economics and Management Sciences*, Vol. 1, No. 9, pp.31–43.
- Sharpe, W.F. (1964) 'Capital asset prices: a theory of market equilibrium under conditions of risk', *The Journal of Finance*, Vol. XIX, No. 3, pp.425–442.
- Sharpe, W.F. (1991) 'The arithmetic of active management', *Financial Analysts Journal*, Vol. 47, No. 1, pp.7–9.
- Sharpe, W.F. (1994) 'The Sharpe ratio', *Journal of Portfolio Management*, Vol. 1, No. 1, pp.49–58.
- Sirri, E.R. and Tufano, P. (1998) 'Costly search and mutual fund flows', *Journal of Finance*, Vol. 53, No. 5, pp.1589–1622.
- Sujoko (2009) 'Analisis Pengaruh Suku Bunga, Inflasi, Kurs Mata Uang, IHSG, dan Dana Kelolaan Terhadap Imbal Hasil Reksa Dana Saham', *Jurnal Ilmu Ekonomi dan Manajemen*, Vol. 5, No. 2, pp.133–166.
- Tang, K., Wang, W. and Xu, R. (2012) 'Size and performance of Chinese mutual funds: the role of economy of scale and liquidity', *Pacific-Basin Finance Journal*, Vol. 20, No. 2, pp.228–246.
- Wang, J., Fok, C., Gao, M. and Liu, Y. (2014) 'Out of sight, not out of mind: the evidence from Taiwan mutual funds', *International Review of Economics and Finance*, Vol. 37, No. 11, pp.138–156.
- Wibowo, A. (2011) 'Pengaruh Variabel Makro Ekonomi Terhadap Kinerja Reksa Dana Pendapatan Tetap di Indonesia', *Jurnal Akuntansi, Manajemen Bisnis, dan Sektor Publik*, Vol. 7, No. 2, pp.163–182.
- Yadav, C.S., Sudhakar, A. and Kumar, S. (2016) 'The impact of macroeconomic factors on the performance: a study of selected equity oriented mutual funds in India', *Journal of Economic Policy and Research*, Vol. 11, No. 2, pp.49–55.

Appendix A

Table A1 Robustness test (without moderator)

<i>Regression analysis of determinants of fund performances without moderator (dependent variable: Sharpe ratio)</i>						
<i>Variable</i>	<i>Bottom</i>		<i>Middle</i>		<i>Top</i>	
	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
<i>All funds</i>						
Intercept	-4.699***	0.000	-6.889***	0.000	6.533***	0.000
SIZE	0.022	0.523	0.112***	0.000	0.024	0.253
AGE	0.020	0.886	0.090	0.176	0.024	0.626
FEE	5.571	0.368	0.883***	0.000	0.454	0.616
PREVIOUS RETURNS	0.983***	0.000	0.503***	0.000	0.050***	0.000
MI	0.330	0.122	-0.038	0.648	0.140*	0.070
EXCHANGE	-0.833**	0.023	-0.970***	0.000	-1.567***	0.000
R ²	0.988		0.429		0.063	
N	3,140		9,418		3,140	
<i>Equity funds</i>						
Intercept	-7.406***	0.000	1.066**	0.034	5.589***	0.000
SIZE	0.027**	0.034	-0.007	0.530	0.024***	0.003
AGE	0.011	0.904	0.028	0.533	0.050	0.421
FEE	-0.902	0.638	0.498	0.513	-1.381	0.352
PREVIOUS RETURNS	0.119***	0.000	0.014*	0.081	0.064***	0.000
MI	-0.080	0.662	0.099	0.186	-0.050	0.685
EXCHANGE	-1.302***	0.000	-0.567***	0.000	-1.309***	0.000
R ²	0.052		0.010		0.052	
N	790		2,368		790	
<i>Fixed income funds</i>						
Intercept	-4.516*	0.091	1.278	0.209	-2.975**	0.045
SIZE	0.108	0.291	0.126***	0.000	0.114**	0.035
AGE	-0.371	0.277	0.401***	0.001	0.413**	0.032
FEE	-3.428	0.801	0.830***	0.000	-1.735	0.355
PREVIOUS RETURNS	0.985***	0.000	0.445***	0.000	0.046***	0.009
MI	0.379	0.436	0.387***	0.001	-0.254	0.125
EXCHANGE	0.694	0.295	-0.608***	0.000	-1.131***	0.006
R ²	0.990		0.387		0.033	
N	1,222		3,666		1,222	

Notes: The table reports the results of a robustness test on PLS regressions estimating determinants of fund performances by classifying the fund performances into three partitions: bottom 20%, middle 60%, and top 20%. The dependent variable is fund performance represented by Sharpe ratio of each fund at time t . *SIZE* is logarithm of fund NAV. *AGE* is logarithm of fund existing period in months. *FEE* is percentage of fund management fee. *PREVIOUS RETURNS* is fund returns at time $t-1$. *MI* is logarithm of management period of investment manager. *EXCHANGE* is logarithm of exchange rate of USD to IDR. *, **, *** statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Table A1 Robustness test (without moderator) (continued)

<i>Regression analysis of determinants of fund performances without moderator (dependent variable: Sharpe ratio)</i>						
<i>Variable</i>	<i>Bottom</i>		<i>Middle</i>		<i>Top</i>	
	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
<i>Mixed funds</i>						
Intercept	2.922	0.283	2.786	0.179	2.101	0.937
<i>SIZE</i>	-0.156	0.223	-0.046	0.410	-0.041	0.545
<i>AGE</i>	-0.308	0.228	-0.139	0.509	-0.084	0.771
<i>FEE</i>	3.412	0.656	1.008	0.784	1.766	0.655
<i>PREVIOUS RETURNS</i>	0.929***	0.000	0.968***	0.000	0.939***	0.000
<i>MI</i>	0.010	0.980	0.004	0.984	-0.062	0.840
<i>EXCHANGE</i>	-6.915	0.311	-0.516	0.335	-0.334	0.959
<i>R</i> ²	0.869		0.939		0.939	
<i>N</i>	752		2,256		752	
<i>Money market funds</i>						
Intercept	0.206	0.948	-9.176***	0.000	-6.548	0.229
<i>SIZE</i>	-0.045	0.621	0.044	0.344	0.335**	0.021
<i>AGE</i>	0.088	0.837	0.396**	0.017	0.360	0.583
<i>FEE</i>	-9.453	0.382	-0.578	0.942	2.045	0.427
<i>PREVIOUS RETURNS</i>	0.862***	0.000	0.939***	0.000	0.837***	0.000
<i>MI</i>	-0.130	0.881	0.446	0.141	0.587	0.571
<i>EXCHANGE</i>	-0.961	0.301	-1.391**	0.015	1.499	0.490
<i>R</i> ²	0.843		0.932		0.785	
<i>N</i>	376		1,128		376	

Notes: The table reports the results of a robustness test on PLS regressions estimating determinants of fund performances by classifying the fund performances into three partitions: bottom 20%, middle 60%, and top 20%. The dependent variable is fund performance represented by Sharpe ratio of each fund at time *t*. *SIZE* is logarithm of fund NAV. *AGE* is logarithm of fund existing period in months. *FEE* is percentage of fund management fee. *PREVIOUS RETURNS* is fund returns at time *t-1*. *MI* is logarithm of management period of investment manager. *EXCHANGE* is logarithm of exchange rate of USD to IDR. *, **, *** statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Appendix B

Table A2 Robustness test (with moderator)

<i>Regression analysis of determinants of fund performances with moderator (dependent variable: Sharpe ratio)</i>						
<i>Variable</i>	<i>Bottom</i>		<i>Middle</i>		<i>Top</i>	
	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
<i>All funds</i>						
Intercept	-1.441***	0.000	-2.502***	0.000	0.731***	0.000
SIZE*INTEREST	0.001	0.883	0.025***	0.000	0.017***	0.005
AGE	0.244*	0.062	0.214***	0.000	0.196***	0.000
FEE	3.171	0.623	0.581***	0.000	0.339	0.703
PREVIOUS RETURNS	0.983***	0.000	0.478***	0.000	0.048***	0.000
MI	0.123	0.575	0.219***	0.007	0.365	0.000
EXCHANGE*INTEREST	-0.011**	0.329	-0.079***	0.000	-0.043**	0.015
R ²	0.988		0.434		0.042	
N	3,140		9,418		3,140	
<i>Equity funds</i>						
Intercept	-7.406***	0.000	1.066**	0.034	5.589***	0.000
SIZE*INTEREST	-0.008	0.348	-0.002	0.530	-0.007	0.327
AGE	0.011	0.904	0.028	0.533	0.050	0.421
FEE	-0.902	0.638	0.498	0.513	-1.381	0.352
PREVIOUS RETURNS	0.119***	0.000	0.014*	0.081	0.064***	0.000
MI	-0.080	0.662	0.099	0.186	-0.050	0.685
EXCHANGE*INTEREST	-0.379***	0.000	-0.165***	0.000	-0.380***	0.000
R ²	0.052		0.010		0.052	
N	790		2,368		790	
<i>Fixed income funds</i>						
Intercept	-4.516*	0.091	1.278	0.209	-2.975**	0.045
SIZE*INTEREST	-0.026	0.291	0.030***	0.000	0.027**	0.035
AGE	-0.371	0.277	0.401***	0.001	0.413**	0.032
FEE	-3.428	0.801	0.830***	0.000	-1.735	0.355
PREVIOUS RETURNS	0.985***	0.000	0.445***	0.000	0.046***	0.009
MI	0.379	0.436	0.387***	0.001	-0.254	0.125
EXCHANGE*INTEREST	-0.167	0.295	0.387***	0.000	-0.272***	0.006
R ²	0.990		0.387		0.033	
N	1,222		3,666		1,222	

Notes: The table reports the results of a robustness test on PLS regressions estimating determinants of fund performances by classifying the fund performances into three partitions: bottom 20%, middle 60%, and top 20%. The dependent variable is fund performance represented by Sharpe ratio of each fund at time t . SIZE*INTEREST is interaction variable of INTEREST rate and SIZE. AGE is logarithm of fund existing period in months. FEE is percentage of fund management fee. PREVIOUS RETURNS is fund returns at time $t-1$. MI is logarithm of management period of investment manager. EXCHANGE*INTEREST is interaction variable of INTEREST rate and EXCHANGE. *, **, *** statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.

Table A2 Robustness test (with moderator) (continued)

<i>Regression analysis of determinants of fund performances with moderator (dependent variable: Sharpe ratio)</i>						
<i>Variable</i>	<i>Bottom</i>		<i>Middle</i>		<i>Top</i>	
	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
<i>Mixed funds</i>						
Intercept	2.922	0.283	2.786	0.179	2.101	0.937
<i>SIZE*INTEREST</i>	-0.051	0.223	-0.015	0.410	-0.013	0.545
<i>AGE</i>	-0.308	0.228	-0.139	0.509	-0.084	0.771
<i>FEE</i>	3.412	0.656	1.008	0.784	1.766	0.655
<i>PREVIOUS RETURNS</i>	0.929***	0.000	0.968***	0.000	0.939***	0.000
<i>MI</i>	0.010	0.980	0.004	0.984	-0.062	0.840
<i>EXCHANGE*INTEREST</i>	-2.291	0.311	-0.171	0.335	-0.111	0.959
<i>R</i> ²	0.869		0.939		0.939	
<i>N</i>	752		2,256		752	
<i>Money market funds</i>						
Intercept	0.206	0.948	-9.176***	0.000	-6.548	0.229
<i>SIZE*INTEREST</i>	0.005	0.621	-0.004	0.344	0.037**	0.021
<i>AGE</i>	0.088	0.837	0.396**	0.017	0.360	0.583
<i>FEE</i>	-9.453	0.382	-0.578	0.942	2.045	0.427
<i>PREVIOUS RETURNS</i>	0.862***	0.000	0.939***	0.000	0.837***	0.000
<i>MI</i>	-0.130	0.881	0.446	0.141	0.587	0.571
<i>EXCHANGE*INTEREST</i>	0.106	0.301	-1.153**	0.015	-0.165	0.490
<i>R</i> ²	0.843		0.932		0.785	
<i>N</i>	376		1,128		376	

Notes: The table reports the results of a robustness test on PLS regressions estimating determinants of fund performances by classifying the fund performances into three partitions: bottom 20%, middle 60%, and top 20%. The dependent variable is fund performance represented by Sharpe ratio of each fund at time *t*. *SIZE*INTEREST* is interaction variable of *INTEREST* rate and *SIZE*. *AGE* is logarithm of fund existing period in months. *FEE* is percentage of fund management fee. *PREVIOUS RETURNS* is fund returns at time *t-1*. *MI* is logarithm of management period of investment manager. *EXCHANGE*INTEREST* is interaction variable of *INTEREST* rate and *EXCHANGE*. *, **, *** statistical significance at the 0.1, 0.05, and 0.01 levels, respectively.