

The Treynor-Mazuy Conditional Model: Overview of Market Timing and Stock Selection on Equity Mutual Funds Performance

Musdalifah Azis^{*}, Rusdiah Iskandar^{*}, Lusiana Desy Ariswati^{*}, I Made Surya Negara Sudirman^{**}, Dio Caesar Darma^{***}

Abstract

This study explores market timing and stock selection by investment managers during the Covid-19 in Indonesia. By applying several sample criteria to the population of mutual funds registered at OJK, we found 55 stock mutual funds using the purposive sampling. We processed data using the STATA16 computer program. The Treynor-Mazuy conditional inflation and exchange rate model, according to the findings of this study, can show that market timing and stock selection for mutual fund managers have a positive and significant impact on improving the performance of equity fund portfolios during the pandemic in Indonesia. In Indonesia, there are 5 equities mutual funds having positive or market timing skills, accounting for 9.09 percent of all equity mutual funds, whereas the remaining 90.91 percent do not. The positive coefficient of the gamma variable shows that the investment manager's ability to market time expected to result in higher stock mutual fund returns. Positive or stock selectivity characteristics are available in 45 equity mutual funds, or 81.18 percent. The contribution of this study focuses on exchange rate and inflation. However, there needs to be a relevant follow-up comparison before the pandemic occurs. In addition, it is necessary to consider other elements in the macro-economy.

Keywords: Treynor Mazuy, inflation, exchange rate, market timing, stock selection

JEL Classification: C24; E31; E64; A11; C52

Introduction

The Covid-19 pandemic that ravaged Indonesia caused social constraints; there was a volatile health and economic crises, with a drop in people's purchasing power, while communal income remained unchanged, if not declining (e.g. Oyinlola et al., 2021). Of course, this has a negative influence on the country's economy, particularly the inflation rate and exchange rate, which are employed as indicators in the Treynor-Mazuy model's conditional model calculation.

The Treynor Mazuy conditional model is used to test market timing ability and stock selection skill using the same theoretical assumptions as the Treynor Mazuy unconditional model. Deb et al. (2007) discovered favorable but not significant selectivity results for stock mutual funds using the conditional method; this suggests that investment managers do poorly in stock selection when considering economic conditions in a country. Stock selection has a favorable and significant effect on stock mutual fund performance, according to research (Anita, 2013; Fakhrunnas, 2018), but market timing ability has a negative effect on stock mutual fund performance (Škrinjarić, 2013; Zouaoui, 2019).

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Inflation's relative increase might be a decent indicator for capital market investors. When examined using the conditional model, the results of [Anita's research-Chang and Lewellen \(20131994\)](#) reveal that inflation has a considerable negative effect on performing equities mutual funds. Mutual fund investors used inflation information on average to make investment decisions; if inflation is high, the rate of return on mutual funds will increase; if inflation is low, the rate of return on mutual funds will decrease.

When the rupiah decreases in value, stock prices decrease as foreign investors exit the Indonesian stock market by selling shares. The net asset value (NAV) of mutual funds dropped because of declining investment and decreasing stock prices. If the rupiah exchange rate strengthens, the stock price will rise. The rupiah exchange rate influences the performance of equities. In the stock market, mutual fund investors rely on information on changes in the rupiah exchange rate to make investment decisions; if the exchange rate changes are large, the mutual fund return rate will fall, and vice versa if the exchange rate changes are small.

We structure this article into five parts. Structure 1 highlights the background. It described the literature review in structure 2. Structured 3, data and empirical methods as instruments in data interpretation. We describe the results and discussion of structure 4 and the last is the conclusion which occupies structure 5.

1. Literature review

Treynor-Mazuy is a research method that has not been widely used in Indonesia (for example Paramita and Sembiring, 2018; Naveed et al., 2020). This model applies to the possibility of risks and the expected rate of return, which varies depending on the economic conditions in each country. Because the conditional model, which considers inflation and exchange rate conditions, to have better capabilities than the unconditional model, we expect it to outperform the unconditional model.

Market index movements and macroeconomic factors influenced the rate of return on a stock portfolio, such as inflation, interest rate changes, and economic growth. As a result, it must assess economic conditions, as well as their significance for the capital market (Elton et al., 2009), model Treynor-Mazuy conditional is:

$$Rp_t = \alpha_0 + \alpha_1.DP_{t-1} + \alpha_2.TB_{t-1} + \alpha_3.FX_{t-1} + \beta_0.Rm_t + \beta_1.Rm_t.DP_{t-1} + \beta_2.Rm_t.TB_{t-1} + \beta_3.FX_{t-1} + \gamma Rm_t^2 + \epsilon p \quad (1)$$

Where: Rp = return portofolio reksa dana; Rm = return market pada periode t ; DP = market dividen yield; TB = treasury bill interest rate; FX = yield on exchange rate fluctuation; and ϵp = random error.

Grinblatt and Titman (1995), Agarwal and Pradhan (2018), and Panda et al. (2015) derive the components in the Treynor Mazuy regression formula from the portfolio return minus the risk-free return for period t ; the value of the reduction is the same as the alpha component added the first beta, which is multiplied by market return after deducting the risk-free return, then the second beta multiplied by macroeconomic elements multiplied by the alpha component. If there is over one macroeconomic element, repeat the computation using market return minus risk-free return, then add gamma multiplied by market return minus the squared risk-free return.

The macroeconomic values put in the regression model will influence the value of the alpha, beta, and gamma coefficients got by the conditional formula (Issah and Antwi, 2017). Managers will evaluate the macroeconomic conditions of a country when deciding on investment management measures in the conditional model (Koju et al., 2020). If a manager is attentive in predicting the economic state of his

country and its expectations, his abilities will cause the positive value of an organization he manages (Carnevale and Hatak, 2020).

Inflation is one of the economic indicators marked by an increase in the price of needs in the market, hence this condition can describe a reduction in people's purchasing power because of rising prices in the conditional model. The rise in people's income does not keep pace with their needs. When inflation rises, Bank Indonesia will raise the SBI interest rate to keep inflation from bay and encourage investors to keep investing in the stock market. The exchange rate is the value of one currency in relation to other currencies. A status of a country's economy can be reflected in currency exchange rates. The stability of a growing exchange rate shows that the country in question is in reasonably excellent economic shape (Salvatore, 1997; Bresser-Pereira, 2013).

Changes in a country's exchange rate affect general economic conditions, primarily people's purchasing power, that are affected by changes in the consumer price index. According to Taylor (1995), the exchange rate's significance has grown significantly in recent years, mainly since the establishment of the Euro currency and the financial crisis. The movement of capital flows is better described by changes in exchange rates and stock prices. The major result of the portfolio method is a decrease in stock prices, which generates a decrease in the wealth of domestic investors, who are the drivers of money demand, and this can cause a decline in interest rates.

2. Data and empirical methods

There are 273 equity mutual funds in the population. Researchers chose this time period because Indonesia had an economic crisis precipitated by the Covid-19 outbreak in the 2020s, making it a good research reference point.

~~There were 58 mutual funds that met the sample requirements of having assets under management of over 500 billion rupiah, and there were three stock mutual funds whose data availability was incomplete throughout the research period, thus we gained 55 stock mutual fund samples. Because the enormous number of managed funds shows high public trust in mutual fund businesses, the examination is limited to mutual funds with AUM above 500 billion rupiah.~~

Table 1. Variable measurement

<u>Variabel</u>	<u>Operational Definition</u>	<u>Measuremet</u>
<u>Mutual fund performance</u>	<u>Indicators for assessing a mutual fund</u>	<u>Sharpe ratio</u>
<u>Market timing ability</u>	<u>Ability to read and forecast market situation</u>	<u>Treynor-Mazui model:</u> $Rp - Rf = \alpha + \beta_1 (Rm - Rf) + \beta_2 (\text{inflation}) (Rm - Rf) + \beta_3 (\text{exchange rate}) (Rm - Rf) + \gamma (Rm - Rf)^2 + \epsilon p$
<u>Stock selection skill</u>	<u>Ability to determine the selected stock</u>	<u>Treynor-Mazui model:</u> $Rp - Rf = \alpha + \beta_1 (Rm - Rf) + \beta_2 (\text{inflaton}) (Rm - Rf) + \beta_3 (\text{exchange rate}) (Rm - Rf) + \gamma (Rm - Rf)^2 + \epsilon p$
<u>Inflation</u>	<u>Inflation is measured by recording the inflation rate of the national consumer price index published by BI during the study period</u>	$\text{Inflation} = \frac{HK_n - HK_{n-1}}{HK_{n-1}} \times 100\%$

<u>Exchange rate</u>	<u>The exchange rate is measured using the middle rate of the US dollar against the rupiah during the study period</u>	$ER\ ratio = \frac{ERt - ERt-1}{ERt-1}$
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Source: Bank of Indonesia (2021).

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There were 58 mutual funds that met the sample requirements of having assets under management of over 500 billion rupiah, and there were three stock mutual funds whose data availability was incomplete throughout the research period, thus we gained 55 stock mutual fund samples. Because the enormous number of managed funds shows high public trust in mutual fund businesses, the examination is limited to mutual funds with AUM above 500 billion rupiah.

NAV data from each mutual fund sample during the observation period, BI rate information, JCI data, inflation data, and the rupiah exchange rate during the observation period are among the data collected. The STATA16 computer application is used to process the data that has been got (see Table 1).

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3. Results and discussion

Table 2 shows a minimum value of -6.934006 originating from Mandiri Dynamic Equity mutual funds with investment manager PT. Mandiri Manajemen Investasi, and a maximum value of 23.25468 originating from Pan Arcadia Dana Saham Growing with investment management PT. Pan Arcadia Capital. The mean value got is -2.256315, with a standard deviation of 5.574203, showing a data spread of 55.74 percent on the independent variable market timing ability conditional model. Compared to other companies, the market timing ability conditional model data fluctuation in each observed firm was substantially higher and showed the highest level of variability.

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Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
kinerja	55	.1220691	.0984873	-.1247642	.4709219
markettiming	55	-2.256315	5.574203	-6.934006	23.25468
stockselec~n	55	.005566	.0199809	-.0584528	.1068816

Source: calculated by STATA 16.

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The Pan Arcadia Mutual Fund, the Growing Stock Fund, with PT. Pan Arcadia Capital as investment manager, has a minimum value of -0.0584528, while the Sam Indonesian Equity Fund, with PT. Samuel Asset Management as investment manager, has a maximum value of 0.1068816.

Tabel 3. Normality test

Smaller group	D	P-value
Residual:	0.1038	0.306
Cumulative:	-0.1515	0.080
Combined K-S:	0.1515	0.160

Source: calculated by STATA 16.

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Table 4. Multicollinearity test

Variable	VIF	1/VIF
markettiming	1.11	0.900362
stockselec~n	1.11	0.900362
Mean VIF	1.11	

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Source: calculated by STATA 16.

The average result is 0.005566 . The standard deviation of 0.0199809 shows the level of distribution of the independent variable data from the stock selection skill conditional model of 1.20 percent. In the results of the Kolmogorov-Smirnov normality test show the residual probability level of $0.306 > 0.05$, these results show the data was normally distributed. From the *Table 4* and *Table 5* shows that the results of the multicollinearity test show the VIF value exceeds 10, meaning that it is free of multicollinearity.

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Table 5. Heteroscedasticity test

Source	SS	df	MS	Number of obs	=	54
Model	2.4289e-07	1	2.4289e-07	F(1, 52)	=	0.00
Residual	.008899747	52	.000171149	Prob > F	=	0.9701
Total	.008899989	53	.000167924	R-squared	=	0.0000
				Adj R-squared	=	-0.0192
				Root MSE	=	.01308

Residual2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Lag_Residual2	-.0052223	.1386263	-0.04	0.970	-.2833963 .2729517
_cons	.0055717	.0019362	2.88	0.006	.0016864 .0094571

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Source: calculated by STATA 16.

Table 6. Autocorrelation test

Source	SS	df	MS	Number of obs	=	53
Model	.010243676	4	.002560919	F(4, 48)	=	0.43
Residual	.288367589	48	.006007658	Prob > F	=	0.7889
Total	.298611264	52	.005742524	R-squared	=	0.0343
				Adj R-squared	=	-0.0462
				Root MSE	=	.07751

Residual	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
markettiming	-.0002556	.0020045	-0.13	0.899	-.004286 .0037748
stockselection	-.0200955	.5572225	-0.04	0.971	-1.140466 1.100275
Lag_Residual_1	.0716579	.1437973	0.50	0.621	-.217466 .3607817
Lag_Residual_2	.1660969	.1437034	1.16	0.253	-.1228381 .4550319
_cons	.0012739	.0116078	0.11	0.913	-.0220652 .024613

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Source: calculated by STATA 16.

The ARCH test shows the probability value of Lag-residual of 0.970 , which is more than the coefficient value of 0.05 , then heteroscedasticity does not occur in the research data (see *Table 63*). The results of the autocorrelation test using the Lagrange Multiplier Test (LM test) show that the value of lag-residual is above the significance value of 0.05 , shows that the data is free of autocorrelation. From the *Table 7*, we can explain it:

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$$\text{Sharpe ratio} = 0.143 + 0.012 \text{ MTA conditional} + 1.117 \text{ SSS conditional} \quad (2)$$

Where: T-table (2.004879), and F-table (3.168246). The Sharpe ratio shows that the market timing ability conditional model variable has a considerable positive effect on performing stock mutual funds. These findings show that inflation and exchange rates have a major impact on market timing management by assessing an investment manager's ability to decide about when to sell and buy stocks in order to improve the performance of an equity mutual fund portfolio. In the Covid-19 situation that occurred in Indonesia, the market timing ability conditional model of the investment manager shows a positive direction, showing that the manager's ability to manage the portfolio considered in increasing the rate of return of his portfolio with the conditional model of inflation and exchange rates (see *Table 6*).

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Table 7. Multiple regression

Source	SS	df	MS	Number of obs	=	55
Model	.221416134	2	.110708067	F(2, 52)	=	19.04
Residual	.302370342	52	.005814814	Prob > F	=	0.0000
Total	.523786476	54	.00969975	R-squared	=	0.4227
				Adj R-squared	=	0.4005
				Root MSE	=	.07625

kinerja	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
markettiming	.0121049	.0019619	6.17	0.000	.008168	.0160418
stockselection	1.117081	.5473267	2.04	0.046	.0187899	2.215373
_cons	.1431639	.0112288	12.75	0.000	.1206316	.1656962

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This study's findings are consistent with Deb et al., (2007), Anita, (2013), Mustofa and Kusumawardhani, Azis et al. (2021), and Maulana and Ardiansari (2017), all of whom found conditional market timing to be favorable and significant in improving the performance of equity mutual fund portfolios. During the pandemic in Indonesia, fluctuations in the value of inflation and the rupiah exchange rate had a positive and significant impact on the selection of stock mutual funds, where investment managers were careful in choosing the stocks they managed, but economic conditions were unpredictable.

According to the Treynor-Mazuy Conditional model's recapitulation, which shown in *Table 4*, there are 5 equity mutual funds in Indonesia, or 9.09 percent, with positive or market timing capabilities, while the remaining 90.91 percent do not. The gamma variable's coefficient is positive, showing that the investment manager's ability to market time is predicted to lead to higher stock mutual fund returns. When making investment selections, investment managers should take inflation and the rupiah currency

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rate into account. If inflation rises, which is followed by an increase in firm costs and a decrease in profitability, mutual fund demand will decrease.

Stock selection skill is a conditional model variable that has a positive and large impact on stock mutual fund performance. It described the capacity of stock selection conditional models of investment managers to increase mutual fund performance in this paper, which describes the activities of investment managers in their ability to choose stocks. The mutual fund's performance improves as the investment manager's stock selection competence improves. In the presence of macroeconomic variables as control variables in the Treynor-Mansuy, which allows investment managers to improve the performance of stock mutual fund portfolios through stock picking abilities.

According to the Treynor-Mazuy conditional model's recapitulation had shown in *Table 8*, 45 equity mutual funds (*81.18 percent*) have positive or have stock selectivity capabilities. Another *18.82 percent* cannot choose their own stocks. The findings of this study are comparable to those of Paramita et al., (2017), who found that mutual fund investment managers' stock selection skills and market timing abilities are stronger in times of crisis than in periods of stability. This is because, during a crisis, investment managers are more cautious in their decisions.

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Table 8. Recapitulation of Treynor Mazuy calculation

NO	Mutual Funds	Y	X3 Condi	X4 Condi	Sharpe Ratio	MTA conditio nal.	SS conditio nal.
		Perform RD	γ	α			
1	Schroder Dana Prestasi Plus	0.0714	-1.3050	-0.0007	√	-	-
2	Batavia Dana Saham	0.0815	-3.4152	0.0036	√	-	√
3	Ashmore Dana Ekuitas Nusantara	0.1292	-1.2085	0.0043	√	-	√
4	Schroder Dana Prestasi	0.1017	-2.1668	0.0038	√	-	√
5	Mandiri Saham Atraktif	0.0945	-4.8569	0.0058	√	-	√
6	Manulife Dana Saham Utama	0.2267	-2.7103	0.0161	√	-	√
7	Ashmore Dana Progresif Nusantara	0.1635	-4.4545	0.0203	√	-	√
8	Ashmore Saham Sejahtera Nusantara	0.1461	-2.2270	0.0073	√	-	√
9	Eastspring Investments Value Discovery Kelas B	0.1978	-2.1460	0.0199	√	-	√
10	Manulife Dana Saham Kelas A	0.1303	-3.5563	0.0113	√	-	√
11	Batavia Saham Cemerlang	0.0716	-5.1965	0.0062	√	-	√
12	Sam Dana Cerdas	0.0554	-4.4604	0.0070	√	-	√
13	Batavia Saham Sejahtera	0.0715	-5.2020	0.0062	√	-	√
14	Sucorinvest Equity Fund	0.2223	-3.6102	0.0080	√	-	√
15	Sequis Equity Maxima	0.0508	-5.2451	0.0006	√	-	√
16	Trimegah Saham Nusantara	0.0894	-5.3398	0.0061	√	-	√
17	Danareksa Mawar Ekuitas Plus	0.0625	-5.1348	-0.0007	√	-	-
18	Heam Smart Beta Ekuitas	0.1463	-4.3535	0.0134	√	-	√
19	Svailendra Dana Ekuitas Sejahtera	0.0322	-3.7326	-0.0041	√	-	-
20	Manulife Dana Saham Andalan	0.2729	-0.2330	0.0188	√	-	√
21	Simas Saham Unggulan	-0.1248	-1.2657	-0.0097	-	-	-
22	Schroder 90 Plus Equity Fund	0.0871	-2.3561	0.0004	√	-	√
23	Bahana Primavera 99 Kelas S	0.0340	-5.1296	0.0013	√	-	√
24	BNP Paribas Pesona	0.0759	-3.9909	0.0070	√	-	√
25	BNP Paribas Ekuitas	0.0758	-3.9382	0.0055	√	-	√
26	BNI-AM Inspiring Equity Fund	0.0326	-6.1426	0.0075	√	-	√
27	BNP Paribas Maxi Saham	0.0417	-6.1284	0.0032	√	-	√
28	Panin Dana Maksima	0.0796	-3.1282	0.0017	√	-	√
29	Schroder Dana Prestasi Prima	0.0749	-3.5878	0.0007	√	-	√
30	Schroder Dana Istimewa	0.1875	-2.4895	0.0177	√	-	√
31	BNP Paribas Infrastruktur Plus	0.0674	-5.4752	0.0098	√	-	√
32	Capital Equity Fund	0.0130	12.8300	-0.0138	√	√	-
33	Bahana Stellar Equity Fund	0.0317	-3.4107	-0.0037	√	-	-
34	Mandiri Investa Atraktif	0.0901	-4.7161	0.0010	√	-	√
35	Sam Indonesian Equity Fund	0.2963	10.8225	0.1069	√	√	√
36	Fwd Asset Dividend Yield Equity Fund	0.0864	-3.1045	-0.0031	√	-	-
37	Danareksa Mawar Ekuitas Utama	0.0651	-5.1867	0.0008	√	-	√
38	BNP Paribas Solaris	0.2447	-2.3359	0.0165	√	-	√
39	Manulife Dana Ekuitas Utama	0.1419	-5.6932	0.0112	√	-	√
40	Mandiri Investa Cerdas Bangsa	0.0652	-3.9212	0.0015	√	-	√
41	Schroder Dana Ekuitas Utama	0.1308	-2.3703	0.0061	√	-	√
42	Panin Dana Berkembang	0.1052	-4.7119	0.0049	√	-	√
43	Ashmore Saham Sejahtera Nusantara II	0.1032	-3.7680	0.0058	√	-	√
44	Panin Dana Teladan	0.1590	-0.6648	0.0147	√	-	√
45	Trimegah Bhakti Bangsa	0.1455	-4.5553	0.0137	√	-	√
46	Tram Consumption Plus	0.1058	-6.0054	0.0103	√	-	√
47	Pan Arcadia Dana Saham Bertumbuh	0.4709	23.2547	-0.0585	√	√	-
48	Ashmore Saham Dinamis Nusantara	0.2299	-2.5171	0.0169	√	-	√
49	Pinnacle Dana Prima	0.3409	8.4968	-0.0283	√	√	-
50	Svailendra Equity Garuda Fund	0.0939	-3.0738	0.0053	√	-	√
51	Mandiri Dynamic Equity	0.2516	-6.9340	0.0363	√	-	√
52	Panin Dana Berdedikasi	0.0443	-6.3179	0.0052	√	-	√
53	Bahana Dana Ekuitas Andalan	0.0357	-5.2229	0.0024	√	-	√
54	Mandiri Investa Equity Movement	0.0756	-4.7041	0.0001	√	-	√
55	Pool Advista Kapital Optimal	0.3381	13.8990	-0.0444	√	√	-
Average & Good Performance Percentage		0.1221	-2.2563	0.0056	54	5	45
					98.18%	9.09%	81.82%

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The alpha variable's coefficient is positive, showing that the investment manager's stock selection ability contributes to a decrease in stock mutual fund returns. When the rupiah weakens, stock prices fall as foreign investors sell their shares and exit the Indonesian capital market, resulting in a decline in stock prices, which leads mutual fund NAVs to decrease, and vice versa.

Conclusion

This study has the ambition to investigate market timing and stock selection by investment managers during the Covid-19 moment in Indonesia based on the exchange rate and inflation. Interestingly, the conditional model of investment managers requires inflation and exchange rates into consideration while making management decisions, resulting in positive and significant results. The results show an exorbitant amount of positive numbers, as well as 5 equity funds is 9.09 percent having market timing ability. In the conditional model shows that stock selection skills have a positive and significant coefficient value on stock mutual fund performance. The number of investment managers with the ability to choose stocks was determined to be 81.18 percent in the conditional model during the epidemic that sparked the crisis.

Only one stock mutual fund, the Sam Indonesia Equity Fund mutual fund from the investment manager of PT. Samuel Asset Management, was found to have both market timing and positive stock selection capabilities when the conditional model was calculated. According to Sharpe's estimate, the Sam Indonesia Equity Fund mutual fund has a good timing capability of 10,8225 and a stock selection capability of 0.1069, resulting in outstanding performance. The public's faith in this investment manager is similarly high, with assets under management (AUM) exceeding 1 trillion rupiah throughout the research period. Based on the conditional model, 1.82 percent of funds are invested.

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