The Indonesian Capital Market Review

Volume 7
Number 2 *July*

Article 3

7-30-2015

Ambiguity towards Multiple Historical Performance Information Signals: Evidence from Indonesian Open-Ended Mutual Fund Investors

Haris Pratama Loeis
Faculty of Economics and Business, Universitas Indonesia, pratamaloeis@gmail.com

Ruslan Prijadi
Faculty of Economics and Business, Universitas Indonesia

Recommended Citation

Loeis, Haris Pratama and Prijadi, Ruslan (2015) "Ambiguity towards Multiple Historical Performance Information Signals: Evidence from Indonesian Open-Ended Mutual Fund Investors," *The Indonesian Capital Market Review*: Vol. 7 : No. 2 , Article 3.
DOI: 10.21002/icmr.v7i2.4846
Available at: https://scholarhub.ui.ac.id/icmr/vol7/iss2/3

INDONESIAN
CAPITAL MARKET REVIEW

Ambiguity towards Multiple Historical Performance Information Signals: Evidence from Indonesian Open-Ended Mutual Fund Investors

Haris Pratama Loeis* and Ruslan Prijadi
Department of Management, Faculty of Economics and Business, Universitas Indonesia

This study focuses on the behavior of open-ended mutual fund investors when encountered with multiple information signals of mutual fund's historical performance. The behavior of investors can be reflected on their decision to subscribe or redeem their funds from mutual funds. Moreover, we observe the presence of ambiguity within investors due to multiple information signals, and their reaction towards it. We apply a Fama-McBeth Regression technique for equity mutual funds, fixed income mutual funds, and balanced mutual funds that are effective during the period of February 2010 until February 2015. Our finding shows that open-ended mutual fund investors do not only have sensitivity towards past performance information signals, but also have additional sensitivity towards the ambiguity of multiple information signals. Because of the presence of ambiguity, investors consider more on negative information signals and the worst information signal in their investment decisions.

Keywords: *Open-ended mutual fund; multiple information signals; fund flows; information ambiguity*

Introduction

Recent advancements in information technology have driven both the efficiency in information seeking related costs and also an increase for individual access towards information. While increasing information accessibility were pursued and intended to fruit positive impacts, these advancements have also been followed by negative impacts. Modern investors are now exposed to expanding information quantities, without the existence of any party who can fully insure the reliability and relevance of the information made available to investors. Schinckus (2011) stated that these advancements lead modern investors to experience information overload.

Skepticism towards the reliability and relevance of information would stimulate investors to question the quality of information. This may become a problem since valuating the quality of information is not a widely held skill-set among investors. When faced with a series of information with unknown quality, that information series would be judged as ambiguous (Epstein & Schneider, 2008). Furthermore, information ambiguity would urge investors to make investment decisions based on historical performance as an indicator, which is a lag indicator (Bossaerts, Ghirardato, Guarnaschelli, & Zame, 2010).

A common practice for Indonesian Investment Managers is to publish a monthly fund fact sheet, composed of a number of facts regarding a mutual fund, including its historical performance. In most cases, historical performance is informed as a mutual fund's performance in the past 1 month, 3 months, 6 months,

*Corresponding email: pratamaloeis@gmail.com

Table 1. Example of Multiple Information Signals in Selected Indonesian Mutual Funds (as of January 2014)

Mutual Fund	Performance			
	1 Month	3 Months	6 Months	12 Months
Batavia Dana Saham Optimal	0.67%	-0.06%	-1.84%	0.53%
Grow-2-Prosper	6.29%	5.49%	2.49%	2.11%
Panin Dana Prima	0.22%	-1.11%	-2.75%	0.24%
Kresna Indeks 45	0.89%	-0.21%	-2.11%	-0.42%
RHB OSK Alpha Sector Rotation	0.84%	0.15%	-1.83%	0.51%
Danareksa Mawar Komoditas 10	-1.23%	2.22%	0.06%	-1.07%
Sam Indonesian Equity	0.09%	-1.42%	-2.53%	1.11%
First State Indo Equity High Conviction	5.56%	1.59%	-0.63%	1.13%
Simas Saham Unggulan	-1.54%	0.87%	-0.25%	0.15%

Notes: This table compiles historical performance information of a number of mutual funds as of January 2014, publicized in each fund's fact sheet. The data is retrieved from the ARIA Bapepepam-LK database.

and 12 months. In other words, investors are exposed to multiple information signals in a single publication. Following the concept of heuristics in Shefrin (2002), the delivery of a fund's historical performance as a vocal point in a fund fact sheet may lead to investment decisions based on lagging indicators, reflected in their decisions to subscribe (or redeem) their investments to (or from) a mutual fund. This claim is empirically proven in Sirri and Tufano (1998), which documents performance chasing behavior among mutual fund investors, who tend to invest in winning funds and redeem from losing funds, in regard to the historical performance information of the mutual fund in question. Similar findings are also documented in Benson and Humphry (2008), Guercio and Tkac (2008), Huang, Wei, and Yan (2007), Jank and Wedow (2013), and Li, Tiwari, and Tong (2013).

The delivery of historical performance information regarding a mutual fund in the form of multiple information signals may not only lead investors to possess a performance chasing behavior, but may also lead to ambiguity among investors. Existence of the difference in monthly average raw returns between historical performance information is not only a possibility, but also commonly found in fund fact sheets. For example, Table 1 shows the historical performance of a number of mutual funds operating in Indonesia as of January 2014. The historical performance information is reported as the performance of each fund in four different time horizons, publicized in a single reporting period. Information in Table 1 shows that there is a significant difference between all four historical performance information, even if adjusted to simple monthly average returns. This practice promotes ambiguity among investors by expanding the quantity of information accessible to investors, without informing which information may be most relevant to them.

This paper intends to contribute to the existing literature on mutual fund investor behavior by documenting two key aspects. First, we attempt to document the presence of performance chasing behavior within investors in Indonesia. There is an emerging urgency to specifically document the behavior of Indonesian investors; since recent findings suggest that different clienteles show different flow-performance reactions and most existing empirical studies focus on US investors (Keswani & Stolin, 2012). For this objective, we employ a Fama-MacBeth Regression for the empirical model proposed by Sirri and Tuffano (1998) and enhanced in Benson and Humphry (2008), Guercio and Tkac (2008), Huang et al. (2007), Jank and Wedow (2013), and Li et al. (2013).

Second, we conduct additional testing to document the presence of ambiguity among investors as a result of the existence of multiple information signals. Developments for the empirical model are conducted by applying theoretical frameworks concerning loss aversion (Ahn, Choi, Gale, & Kariv, 2014; Barberis & Huang, 2001; Coval & Shumway, 2005; Shefrin & Statman, 1985) and ambiguity aversion (Epstein & Schneider, 2008; Ju & Miao, 2012;

Klibanoff, Marinacci, & Mukerji, 2005).

The following sections of this paper are organized as follows. Next section provides relevant literature reviews, followed by an explanation of the empirical methodology in Section 3. Findings of the tests we conduct are reported and discussed in Section 4. Finally, Section 5 is composed of concluding remarks.

Literature Review

There is an increasing urgency to understand the impact and pattern of information distribution, as information technology is rapidly advancing. The increasing access of investors towards information sources is judged as a major problem as people possess limitations in measuring information quality. Mauboussin (2007) stated that the increasing amount of information only brings small to no positive effects for investors, as investors have limitations in (i) weighting information, (ii) not depending on one source of information, and (iii) recognizing knowledge already possessed by the market. The limitations to measure the quality and relevance of information signals would urge information signals to be considered as ambiguous (Epstein & Schneider, 2008).

There is currently a limited line of literatures discussing the impact of mutual fund historical performance information towards mutual fund flows. One of the earliest studies was Sirri and Tufano (1998), which explored a number of determinants for fund flows of mutual funds. This paper coined the term 'performance chasing behavior', due to the behavior of mutual fund investors to give a disproportionately high consideration towards historical annual performance. Investors tend to place their investments to funds with superior annual performance, and conversely redeeming their investment from underperforming funds (Hazenberg, Irek, van der Scheer, & Stefanova, 2015; Huang et al., 2007; Sirri & Tufano, 1998). This pattern is considered as a behavioral bias as historical performance is reported as raw returns, not risk-adjusted returns.

Similar findings were documented in Huang et al. (2007) that additionally found the existence of mutual fund sensitivity towards historical monthly performance. Furthermore, Benson and Humphry (2008) and Jank and Wedow (2013) continued this literature line by using multiple information signals, by simultaneously testing for annual and monthly historical performances as dependent variables to understand investor behavior, eventually finding the same behavioral bias. Bailey, Kumar, and Ng (2011) argued that these performance-chasing behaviors by investor appear more suitably as behavioral biases, rather than a rational inference to valuate the investor manager's skill using past performances as an indicator. This behavior is not only possessed by mutual fund investors, but also hedge fund investors (Ramadorai, 2013).

Moreover, the existence of multiple information signals delivered to investors in a single publication may lead to ambiguity (Epstein & Schneider, 2008; Ju & Miao, 2012; Klibanoff et al., 2005; Li et al., 2013). The implication of multiple information signals is there is an existence of ambiguity aversion among investors, which urges investors to have additional sensitivity towards the worst-case scenario when evaluating a mutual fund. When investors are exposed to multiple information signals with unknown quality, the worst information signal would be weighted more in making investment decisions.

Besides ambiguity aversion, another behavioral bias that is possessed by investors due to the ambiguity of information is an existence of loss aversion. Evidence in Ahn et al. (2014), Barberis and Huang (2001), Coval and Shumway (2001), and Shefrin and Statman (1985) show that investors have a tendency to be loss averse. This can be shown by the tendency of investors to have a larger and quicker reaction in selling their assets, if that particular asset has a negative performance. While these literatures were not tested for mutual fund investors, but the existence of multiple information signals exposed to mutual fund investors in Indonesia drives the urgency for this framework to be tested in the Indonesian mutual fund market setting.

Research Methods

Data

Data of mutual fund performance and mutual fund flows are collected using the Eikon-ThomsonReuters services. Additionally we use the database provided by the Indonesian financial services authority (OJK) to identify the mutual funds that are listed and operating in Indonesia. We use all open-ended mutual funds that are classified as equity mutual funds, fixed income mutual funds, and balanced mutual funds, which are listed as effective during the period of February 2010 until February 2015 in the OJK database. Open-ended mutual funds are chosen as they give minimum restrictions for investor to subscribe or redeem investments, so investor behavior could be observed. Mutual funds classified as equity mutual funds, fixed income mutual funds, and balanced mutual funds are chosen because their similar characteristics besides their main investment type, so comparison between testing results could be conducted.

We use monthly data of the February 2010 until February 2015 period, resulting in 61 monthly sample periods. We decide to use monthly data since fund fact sheets of mutual funds in Indonesia are reported on a monthly basis. There are 183 observation periods, or 61 observation periods for each mutual fund class. In order to prevent extreme values of mutual fund flows, we only include data for a mutual fund after it is aged one year old. As an additional preventive measure, data of the last month before a mutual fund liquidation date is also excluded.

Methodology

Empirical models in this paper are used to estimate the sensitivity of mutual fund investors towards historical performance information signals. Since we relate monthly fund flows to historical performance measures, the cross-sectional estimation would potentially be highly autocorrelated. In order to prevent this problem, we apply a Fama-MacBeth Regression technique by conducting a cross-sectional regression for each observation period and reporting the time-series average value for each coefficient. In order to observe the behavior of equity mutual fund, fixed income mutual fund, and balanced mutual fund investors, we regress each mutual fund category separately, consistent with Huang et al. (2012). Additionally, we also report the significance level and t-statistic value. In each observation period, we exclude the top and bottom 1% data from the observation period. Additionally, we would like to note that the estimation process for each empirical model is conducted with the technique stated above.

Applying the model and framework proposed by Benson and Humphry (2008), Guercio and Tkac (2008), Huang et al. (2007), Jank and Wedow (2013), Li et al. (2013), and Sirri and Tuffano (1998), investors sensitivity towards historical performance information signals could be estimated using the following model:

$$Flow_{p,t} = \alpha + \beta_1 Perf1m_{p,t} + \beta_2 Perf3m_{p,t} + \beta_3 Perf6m_{p,t} + \beta_4 Perf12m_{p,t} + Controls + e_{p,t} \quad (1)$$

Where $Flow_{p,t}$ is the growth of the Net Asset Value (NAV) of mutual fund p during period t adjusted for internal growth; $Perf1m_{p,t}$, $Perf3m_{p,t}$, $Perf6m_{p,t}$, and $Perf12m_{p,t}$ is the historical performance information of a mutual fund for the past 1 month, 3 months, 6 months, and 12 months, respectively; and in *Controls* we incorporate other factor premiums of asset pricing as control variables, which are fund age, fund size, and fund volatility.

On an additional note, the operational definition we use for $Flow_{p,t}$ follows the same approach as a number of literatures about mutual fund flows (Benson & Humphry, 2008; Chevalier & Ellison, 1997; Huang et al., 2007; Li et al., 2013; Sirri & Tufano, 1998). The value of $Flow_{p,t}$ is calculated using the following approach:

$$Flow_{p,t} = NetSub_{p,t} + NAV_{p,t} \quad (2)$$

Where $NAV_{p,t}$ is the fee-adjusted NAV of mutual fund p on period t, and $NetSub_{p,t}$ is the value

of net subscriptions[1]. Following this approach allows us to find the growth of a mutual fund adjusted of internal growth, or the growth of a fund's NAV because of factors besides fund inflow and fund outflow (e.g. realized and unrealized gain (loss) of the portfolio). Spiegel and Zhang (2013) proposed an alternative approach by using market share[2] as the dependent variable. Although this approach is still questionable since there is still limited evidence that mutual fund investors exclusively only invest in mutual funds.

In order to apply the concept of loss aversion, documented in Ahn et al. (2014), Barberis and Huang (2001), Coval and Shumway (2001), and Shefrin and Statman (1985), we adjusted the base empirical model stated in Equation 1. Controlling variables $Perf1m_{p,t}$, $Perf3m_{p,t}$, $Perf6m_{p,t}$, and $Perf12m_{p,t}$, for negative values allows us to observe the additional sensitivity of investors when exposed to negative historical performance of mutual funds. The adjustment of the base model is stated in the following equation:

$$\begin{aligned} Flow_{p,t} = {} & \alpha+\beta_1 Perf1m_{p,t}+\beta_2 Perf3m_{p,t} \\ & +\beta_3 Perf6m_{p,t}+\beta_4 Perf12m_{p,t} \\ & +\gamma_1 Perf1m_{p,t}xD_1+\gamma_2 Perf3m_{p,t}xD_2 \\ & +\gamma_3 Perf6m_{p,t}xD_3+\gamma_4 Perf12m_{p,t}xD_4 \\ & +Controls+e_{p,t} \end{aligned} \quad (3)$$

Where the dummy variables equal to 1 if the historical performance information is negative, and equal to 0 if otherwise.

Furthermore, we also adjust the base empirical model to observe the additional sensitivity of investors towards the worst-case scenario, applying the framework of Epstein and Schneider (2008), Ju and Miao (2012), and Klibanoff et al. (2005). This adjustment is done by adding $MinRank_{p,t}$ to the model. The adjustment of the base model is stated in the following equation:

$$\begin{aligned} Flow_{p,t} = {} & \alpha+\beta_1 Perf1m_{p,t}+\beta_2 Perf3m_{p,t} \\ & +\beta_3 Perf6m_{p,t}+\beta_4 Perf12m_{p,t} \\ & +\theta MinRank_{p,t}+Controls+e_{p,t} \end{aligned} \quad (4)$$

Where $MinRank_{p,t}$ is the value of the worst historical performance information signal between all four historical performance information. Operationally, we calculate $MinRank_{p,t}$ following the notation in Equation 5.

$$\begin{aligned} MinRank_{p,t} = Min\,(& Perf1m_{p,t}, Perf3m_{p,t}, \\ & Perf6m_{p,t}, Perf12m_{p,t}) \end{aligned} \quad (5)$$

Results and Discussions

Sensitivity of Investors towards Multiple Historical Performance Information Signals

The initial step for this research is to test the sensitivity of investors when exposed to multiple information signals. We estimate investor sensitivity using the model stated in Equation 1. Our findings show that both equity mutual fund and balanced mutual fund investors have sensitivity to 1 month and 12 months historical performance information (Table 2).

The findings shown in Table 2 are in line with the findings documented in Benson and Humphry (2008), which found that both monthly and annual historical performance information is a determinant for mutual fund flows. On the other hand, historical performance for the past 3 months and 6 months do not significantly affect mutual fund investor's decisions. The appearance of investors sensitivity towards past performance information signals are considered a behavioral bias, as these information signals are not reported as risk-adjusted returns, but given disproportionately high consideration for investment decisions (Bailey et al., 2011; Huang et al., 2007; Sirri & Tufano, 1998). In addition, the high aggresivity of Indonesian mutual fund investors in reacting to historical performance information, indicated by significance at a 1% level for a number of performance variables, is argued to be a result of the low development level of Indonesia's financial market, financial literacy, and mutual fund industry (Ferreira, Keswani, Miguel, & Ramos, 2012).

The coefficient of $Perf12M$ for equity mutual funds equals to 0.0659. This value implies

[1] Calculated as $Subscriptions_{p,t}$ - $Redemptions_{p,t}$
[2] Calculated as $NAV_{p,t}$ / NAV_t

Table 2. Estimation Results for the Sensitivity of Investors towards Multiple Information Signals

	Equity Mutual Funds	Fixed Income Mutual Funds	Balanced Mutual Funds
Perf1M	0.0329 **	0.0058	0.0087*
	(3.0474)	(0.9179)	(1.9869)
Perf3M	0.0024	0.0004	0.0171
	(0.2533)	(0.0274)	(0.1152)
Perf6M	0.0052	0.0192	0.0048
	(1.2123)	(0.9687)	(0.3539)
Perf12M	0.0659 **	0.0507*	0.0425**
	(5.0591)	(2.4895)	(2.8648)
Age	-0.0548 *	-0.0082	-0.0391*
	(-2.4911)	(-1.3461)	(-2.3720)
Size	-0.0658 **	-0.0434**	-0.0256**
	(-8.8192)	(-6.2989)	(-3.5306)
Vol	-0.0209 **	0.0001	-0.0096**
	(-5.8444)	(0.3205)	(-3.5674)
Intercept	0.4993 **	0.0035	0.2666**
	(5.6308)	(0.3327)	(4.0029)
Cross-Sections	122	124	118
Periods	61	61	61
R-Squared	0.1005	0.0490	0.0586
Durbin-Watson Stat	1.6854	1.8096	1.7756

Notes: This table reports the *coefficient* value, along with *t-statistics* (in parenthesis), R^2, and *Durbin-Watson Stat*. The * and ** symbol denotes significance at the 5% and 1 % level, respectively.

that for equity mutual funds, a 1% increase in 12 months performance of a mutual fund would be followed by an increase of fund flows amounting to 0.07% of the mutual fund's NAV by assuming that other factors are constant. The same interpretation method could be applied to the coefficients of other variables that have a significant value.

Different results are found for fixed income mutual fund investors, where investors are found to have sensitivity only towards 12 months historical performance information. This indicates that fixed income mutual fund investors only weigh long term performance information in making investment decisions. From a practical stand point, one explanation for this finding is the investor target market for this mutual fund category, as fixed income mutual funds in Indonesia are mainly targeted for investors with long term investment preferences. Result differences between fund types are understandable, since each mutual fund type has different objectives and are offered to different types of investors. Investors are also heterogeneous and unequally distributed among mutual fund types (Cashman, Nardari, Deli, & Villupuram, 2014). Different results between mutual fund types are also found in the subsequent steps of this paper.

Additional Sensitivity towards Negative Historical Performance Information Signals

In this step, we control for negative historical performance information signals, by applying the model stated in Equation 3. The results in Table 3 show that equity mutual fund and balanced mutual investors possess an additional sensitivity towards all four historical performance information signals, if the information is valued negative. For example, a 1% increase in a balanced mutual fund 6 month historical performance with a positive value would yield in an increase of fund flows amounting to 0.0341% of the mutual fund's NAV, but if the 6 month historical performance is valued negative, a 1% increase would yield an decrease of fund flows amounting to 0.0099% [(0.0341-0.0440) x 1%] of the mutual fund's NAV by assuming that other factors are constant. In this case, investors respond to negative information signals by punishing the mutual fund with redeeming their investments (Jank & Wedow, 2013).

The results in Table 3 also show a difference in the behavior of fixed income mutual fund investors, where these investors are only sensitive to negative values of 12 months performance signals. Consistent with the findings in Table 2,

Table 3. Estimation Results for the Additional Sensitivity of Investors towards Negative Information Signals

	Equity Mutual Funds	Fixed Income Mutual Funds	Balanced Mutual Funds
Perf1M	0.0336**	0.0048	0.0165*
	(3.4654)	(0.4577)	(1.9610)
Perf3M	0.0207*	0.0229	0.0211*
	(2.0642)	(1.0149)	(2.0204)
Perf6M	0.0165*	0.0293	0.0341*
	(2.1933)	(0.9838)	(2.2727)
Perf12M	0.0808**	0.0613*	0.0545**
	(3.9722)	(2.0421)	(3.4221)
DPerf1M	-0.0651**	-0.0014	-0.0148*
	(-4.2703)	(-0.1008)	(-2.0045)
DPerf3M	-0.0161*	-0.0371	-0.0440*
	(-2.6378)	(-1.2141)	(-2.1856)
DPerf6M	-0.0573*	-0.0194	-0.0899*
	(-2.2617)	(-0.4211)	(-2.5558)
DPerf12M	-0.0844**	-0.0290*	-0.0768**
	(-4.3444)	(-2.5439)	(-4.3942)
Age	-0.0635**	0.0079	-0.0209*
	(-3.2702)	(1.2934)	(-2.2423)
Size	-0.0524**	-0.0424**	-0.0213**
	(-7.9349)	(-6.1268)	(-2.9511)
Vol	-0.0187**	0.0001	-0.0089**
	(-5.9172)	(0.2914)	(-3.3314)
Intercept	0.4267**	0.0070	0.2132**
	(5.4449)	(0.6653)	(3.2055)
Cross-Sections	122	124	118
Periods	61	61	61
R-Squared	0.2708	0.0599	0.1583
Durbin-Watson Stat	1.8195	1.8102	1.7827

Notes: This table reports the *coefficient* value, along with *t-statistics* (in parenthesis), R^2, and *Durbin-Watson Stat*. The * and ** symbol denotes significance at the 5% and 1 % level, respectively.

fixed income mutual fund investors still do not possess sensitivity to short-term historical performance information signals, although those signals are valued negative.

Results found in this step show that there is ambiguity among investors when reacting to multiple historical performance information signals. Investor ambiguity is reflected by the presence of the additional sensitivity that investors possess towards negative information signals. Investors are not well prepared in facing short-term fluctuations of assets that they perceive to be highly potential (Shefrin & Statman, 1985). Another explanation is that investors tend to quickly withdraw their investments before other investors do, as they fear the damaging effect when other investors redeem their investments and push the fund to sell its assets at discount (Chen, Goldstein, & Jiang, 2010). As a result, when exposed to negative information signals, investors give a greater amount of consideration to these information signals compared to positive information signals when making an investment decision (Barberis & Huang, 2001; Coval & Shumway, 2005; Jank & Wedow, 2013). Hence, indicating a behavioral bias of loss aversion that mutual fund investors possess.

Additional Sensitivity towards the Worst Historical Performance Information Signal

Furthermore, we also control for the worst historical performance between all four information signals, by applying the model stated in Equation 4. We found similar behaviors for mutual investors in all three categories (Table 4), where investors possess additional sensitivity towards the worst information signal. This result indicates that there is a presence of ambiguity among investors in reacting towards multiple information signals, by giving additional

Table 4. Estimation Results for the Additional Sensitivity of Investors towards the Worst Information Signal

	Equity Mutual Funds	Fixed Income Mutual Funds	Balanced Mutual Funds
Perf1M	0.0424**	0.0063	0.0372**
	(3.7436)	(0.7586)	(4.9051)
Perf3M	0.0198*	0.0001	0.0207*
	(2.0265)	(0.0086)	(2.0629)
Perf6M	0.0210*	0.0196	0.0270*
	(2.3074)	(0.9653)	(2.3556)
Perf12M	0.0716**	0.0512*	0.0597**
	(5.4276)	(2.4401)	(3.9303)
MinRank	0.0366**	0.0311*	0.0670**
	(2.7202)	(2.0949)	(4.9004)
Age	-0.0738**	0.0082	-0.0297*
	(-3.2018)	(1.3452)	(-1.9746)
Size	-0.0653**	-0.0434**	-0.0256**
	(-8.7638)	(-6.2879)	(-3.5457)
Vol	-0.0211**	0.0001	-0.0093**
	(-5.9051)	(0.3221)	(-3.4433)
Intercept	0.4804**	0.0036	0.2303**
	(5.4055)	(0.3423)	(3.4451)
Cross-Sections	122	124	118
Periods	61	61	61
R-Squared	0.1526	0.0591	0.0833
Durbin-Watson Stat	1.6872	1.8099	1.7837

Notes: This table reports the *coefficient* value, along with *t-statistics* (in parenthesis), R^2, and *Durbin-Watson Stat*. The * and ** symbol denotes significance at the 5% and 1 % level, respectively.

weight towards the worst information signal in making investment decisions (Epstein & Schneider, 2008; Ju & Miao, 2012; Klibanoff et al., 2005; Li et al., 2014).

Results show that for a fixed income mutual fund, a 1% increase of the 12 month historical performance information would be reacted by investors with an increase of fund flows amounting to 0.0512% of the mutual fund's NAV. Additionally, if that information was also the worst information signal between all four information signals, a 1% increase of the 12 month historical performance information would be reacted by investors with an increase of fund flows amounting to 0.0823% [(0.0512+0.0311) x 1%] of the mutual fund's NAV by assuming that other factors are constant..

Moreover, this result also indicates that investors take account information signals that are normally insignificant to them, when that particular information was also the worst information signal. For a fixed income mutual fund investor, test results indicate that the 1 month historical performance information would not be considered in making investment decisions, except when the 1 month historical performance information was also the worst information signal. This is a form of response by investors towards the ambiguity of multiple information signals. Given the uncertainty in regard of the quality of multiple information signals (as shown in Table 1), investors do not update their decision making process in a standard Bayesian fashion (Ju & Miao, 2012). Investors fail to consider that each information signal is not independent to one another and has a high level of auto-correlation (Epstein & Schneider, 2008), promoting the ambiguity level of these information signals. Since the level of amibuity and fund flows are negatively correlated (Antoniou, Harris, & Zhang, 2015), investors tend to redeem their investments from ambiguous funds. As a result, ambiguity averse investors tend to prefer mutual funds that show consistent information signals and place a greater weight on the worst information signal (Li et al., 2014).

Conclusion

This study attempts to investigate the behavior of mutual fund investors in Indonesia, particularly when exposed to multiple historical information signals. Applying the framework proposed by Sirri and Tuffano (1998), we found evidence that mutual fund investors in Indonesia possess a performance chasing behavior. Investors are found to be sensitive towards historical performance information signals, reflected in their decision to subscribe (redeem) their investments to (from) mutual funds. As historical performance information signals are delivered as multiple information signals, we also found that not all information signals are significant for investors in making investment decisions. Equity mutual fund and balanced mutual fund investors are sensitive towards 1 month and 12 months historical performance information signals, while fixed income mutual fund investors are only sensitive towards the 12 months historical performance information signal.

Additionally, we found that exposing investors to multiple information signals also promotes ambiguity for investors in reacting towards multiple information signals. We used two approaches in investigating ambiguity among investors. In the first approach, we applied the loss aversion concept, proposed in Ahn et al. (2014), Barberis and Huang (2001), Coval and Shumway (2001), and Shefrin and Statman (1985). The application of this approach found that investors have additional sensitivity when exposed to negative information signals. Meanwhile, in the second approach, we applied the concept proposed in Epstein and Schneider (2008), Ju and Miao (2012), and Klibanoff et al. (2005), regarding ambiguity aversion of investors. This approach resulted in additional evidence that there is ambiguity among mutual fund investors when exposed to multiple information signals, where investors have additional sensitivity towards the worst information signal.

Findings of this research have three main managerial implications. First, it should be taken to account that fund subscription and redemption decisions by investors can directly influence the cash flow of a mutual fund. By understanding the impact on historical performance on mutual fund flows, Investment Managers can conduct better cash and portfolio management. Second, as the government regulations in Indonesia about which historical performance information that should be publicized is currently non-existent, Investment Managers have the ability to constantly adjust which information would be exposed to investors in their upcoming fund fact sheet. Understanding how investors would react towards information and adjusting information displayed in the fund fact sheet based on this understanding could increase (decrease) potential fund subscriptions (redemptions). Third, estimating future mutual fund flows can be beneficial for Investment Managers and other investors, as mutual fund flows create temporary price pressure in the capital market (Ben-Raphael, Kandel, & Wohl, 2011).

References

Ahn, D., Choi, S., Gale, D., & Karivl, S. (2011). Estimating ambiguity aversion in a portfolio choice experiment. *Quantitative Economics*, 5(2), 195-223.

Antoniou, C., Harris, R. D., & Zhang, R. (2015). Ambiguity aversion and stock market participation: an empirical analysis. *Journal of Banking and Finance*, 58, 57-70.

Bailey, W., Kumar, A., & Ng, D. (2011). Behavioral biases of mutual fund investors. *Journal of Financial Economics*, 102(1), 1-27.

Barberis, N., & Huang, M. (2001). Mental Accounting, Loss Aversion, and Individual Stock Returns. *The Journal of Finance*, 56(4), 1247-1292.

Bapepam-LK. *Beranda*. Web site: http://aria.bapepam.go.id/

Ben-Rephael, A., Kandel, S., & Wohl, A. (2011). The price pressure of aggregate mutual fund flows. *Journal of Financial and Quantitative*

Analysis, *46*(02), 585-603.

Benson, K. L., & Humphrey, J. E. (2008). Socially Responsible Investment Funds: Investor Reaction to Current and Past Returns. *Journal of Banking & Finance*, *32*(9), 1850-1859.

Bossaerts, P., Ghirardato, P., Guarnaschelli, S., & Zame, W. (2010). Ambiguity in Asset Markets: Theory and Experiment. *Review of Financial Studies,* (23), 1325-1359.

Cashman, G. D., Nardari, F., Deli, D. N., & Villupuram, S. V. (2014). Investor behavior in the mutual fund industry: evidence from gross flows. *Journal of Economics and Finance*, 38(4), 541-567.

Chen, Q., Goldstein, I., & Jiang, W. (2010). Payoff complementarities and financial fragility: Evidence from mutual fund outflows. *Journal of Financial Economics*, *97*(2), 239-262.

Chevalier, J., & Ellison, G. (1997). Risk Taking by Mutual Funds as a Response to Incentives. *Journal of Political Economy*, 105(6), 1167-1200.

Coval, J. D., & Shumway, T. (2005). Do Behavioral Biases Affect Prices?. *The Journal of Finance*, 60(1), 1-34.

Eipstein, L. G., & Schneider, M. (2008). Ambiguity, Information Quality, and Asset Pricing. *The Journal of Finance*, 63(1), 197-228.

Ferreira, M. A., Keswani, A., Miguel, A. F., & Ramos, S. B. (2012). The flow-performance relationship around the world. *Journal of Banking & Finance*, 36(6), 1759-1780.

Guercio, D. D., & Tkac, P. A. (2008). Star Power: The Effect of Morningstar Ratings on Mutual Fund Flow. *Journal of Financial and Quantitative Analysis*,*43*(04), 907-936.

Huang, J., Wei, K. D., & Yan, H. (2007). Participation Costs and the Sensitivity of Fund Flows to Past Performance. *The Journal of Finance*, *62*(3), 1273-1311.

Huang, J., Wei, K. D., & Yan, H. (2012). Investor learning and mutual fund flows. In *AFA 2012 Chicago Meetings Paper*.

Hazenberg, J. J., Irek, F., van der Scheer, W., & Stefanova, M. (2015). The Lure of the Brand: Evidence from the European Mutual Fund Industry. *European Financial Management, 21(5), 867-904. doi: 10.1111/eufm.12046*

Jank, S., & Wedow, M. (2013). Purchase and Redemption Decisions of Mutual Fund Investors and the Role of Fund Families. *The European Journal of Finance,* 19(2), 127-144.

Ju, N., & Miao, J. (2012). Ambiguity, Learning, and Asset Returns. *Econometrica*, *80*(2), 559-591.

Keswani, A., & Stolin, D. (2012). Investor reaction to mutual fund performance: Evidence from UK distribution channels. *Journal of Financial Research*, 35(3), 425-450.

Klibanoff, P., Marinacci, M., & Mukerji, S. (2005). A Smooth Model of Decision Making Under Ambiguity. *Econometrica*, *73*(6), 1849-1892.

Li, C. W., Tiwari, A., & Tong, L. (2013). Investment Decisions Under Ambiguity: Evidence from Mutual Fund Investor Behavior. In *AFA 2014 Philadelphia Meetings Paper*.

Mauboussin, M. (2007). *More Than You Know: Finding Financial Wisdom in Unconventional Places.* New York: Colombia University Press.

Ramadorai, T. (2013). Capacity constraints, investor information, and hedge fund returns. *Journal of Financial Economics*, 107(2), 401-416.

Schinckus, C. (2011). Archeology of Behavioral finance. *The IUP Journal of Behavioral Finance*, *8*(2), 7-22.

Shefrin, H. (2002). *Beyond Greed and Fear: Understanding Behavioural Finance and Psychology of Investing*. Oxford University Press.

Shefrin, H., & Statman, M. (1985). The Disposition to Sell Winners too Early and Ride Losers too Long: Theory and Evidence. *The Journal of Finance*, 777-790.

Sirri, E. R, & Tufano, P. (1998). Costly Search and Mutual Fund Flows. *The Journal of Finance,* 53(5), 1589-1622.

Spiegel, M., & Zhang, H. (2013). Mutual fund risk and market share-adjusted fund flows. *Journal of Financial Economics*, 108(2), 506-528.