

MUTUAL FUND FAMILIES IN SAUDI ARABIA, MALAYSIA, INDONESIA AND PAKISTAN: HOW PERSIST THEIR PERFORMANCE ARE?

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Abstract

The paper investigates the fund family performance persistence in Saudi Arabia, Malaysia, Indonesia and Pakistan for one-, six-, and twelve-month period. The contingency table is used to identify the frequency with which fund families are defined as winners or losers and maintain that rating over succeeding time periods. The superior persistence is found in one-month period where investors can use past information for up to one month as a beneficial part of their investment decision-making process. There is some evidence for superior persistence up to six-month period (in Malaysia), and there is some evidence of an inferior persistence in one-month (only in Indonesia). This suggest that past performance is not predictive of future performance. This research presents new evidence of performance persistence at the fund family level in emerging markets. The results are useful for both the investors and managers where managers can position themselves relative to their competing peers and take the necessary decision or improvement to make themselves seen more competent. While for investors, they are able to allocate their capital more efficiently to funds that are better managed by the fund family. Investors are able to use this information when they want to apply top down approach in making their investment decision. This is the first study that investigates the performance persistence at fund family level to benefits investors that apply top down approach in their fund selection decision.

Keywords: *Fund Family, Performance Persistence, Contingency*

INTRODUCTION

Fund families act as financial intermediaries offering a variety of mutual funds under a common brand name and via common marketing and distribution channels. A fund family is a group of funds that is managed by an asset management company (AMC) (Iqbal, et al. 2019). This means, the asset management company is a fund family where

every mutual fund is a member of a fund family. The study of mutual funds at family level is important because of several reason (Nanda, Wang and Zheng, 2004). First, a fund family structure brings economies of scale to the distribution, servicing, and promotion of funds. Second, compared to stand-alone funds, a fund family has greater flexibility in reallocating its human resources and other resources in response to market opportunities. Third, a fund family's reputation can help to reassure investors about the selection and monitoring of investment managers.

The importance of fund families has been receiving attention from various third parties fund performance providers. For example, Morningstar and Barron's classifications have started to provide a classification of fund families to create the most effective investment data and research for investors. Referring to these reports, one page is dedicated to each fund family where they pair the qualitative and quantitative research with standard criteria for managers. The objectives of these reports are first, to make data on fund families easier to find. Second, to eliminate information asymmetry and verify the statistics provided by fund families. Third, to give credibility to fund families that act in investors' best interests. These reports are able to provide investors with valuable and more convincing information in their choice of fund family as an investment partner, and it can also help improve investors investment experience.

One of the importance strand of research in managed fund is to investigate the performance persistence which is known as the hot-hand phenomenon. The Efficient Market Hypothesis (EMH) states that future assets performance cannot be predicted with reference to the past performance of these assets. In a perfectly efficient market, managerial superiority is a result of chance and it does not reflect the managers' skill. However, there is evidence of performance persistence, which indicates managers sustainable superior performance. This evidence is against the EMH. Gruber, (1996) argued that investors who chase past performers are rational wealth maximizers and that they actually benefit from this action. In addition, the use of past performance by investors to allocate their capital can influence a funds future performance. Fund managers are motivated to improve their performance. It benefits both the investors and the fund managers if fund performance persists. With this phenomenon, fund managers can position themselves relative to their competing peers and take the necessary decision or improvement to make themselves more competent. While for investors, they are able to allocate their capital more efficiently to funds that are better managed.

Some evidence shows the existence of the hot-hand phenomenon (Hendricks et al. 1993; Brown & Goetzmann, 1995). Other evidence shows that performance persists over a longer period of five to ten years and that this superiority is due to the manager's stock selectivity ability and their possession of differential information (Grinblatt & Titman, 1992; Elton et al. 1996). Thus, future performance can be predicted from past performance. With the use of certain investment strategies,

investors are able to earn abnormal returns. Nevertheless, there is money that remained in funds that performed poorly in the previous period. Gruber (1996) explained this by classifying investors into two groups – the sophisticated and the disadvantaged clientele. The above mentioned holding is more likely due to the disadvantaged clientele who do not move their money out of the inferior fund because of the restriction in the pensioner's plan or for capital gain tax reasons. The evidence of funds with good past returns was rewarded with large cash flows into the funds; however, funds with bad past returns did not experience equal outflows.

Above studies focus on the performance persistence at the fund level. This study seeks to contribute in the performance persistence literature at the fund family level. It is argued that members of a fund family cannot be treated like standalone funds due to the most of funds work under the umbrella of the fund family. For example, all equity funds under the same family share the same resources such as research, marketing, administrative support and highly likely that these funds employ similar comprehensive investment strategies even though they have different objectives (Cheng et al., 1999). Accordingly, Brown and Goetzman (1995) argued that this common investment strategies might have an impact on the short-term performance persistence of mutual fund family. The performance persistence at the fund family level is also important due to most investors use a top-down approach in their fund selection. That means investors firstly choose fund family and they then choose the funds they will invest in. Thus, this study expects to contribute to literature by investigating the impact of common strategies on short-term performance persistence of fund family in the emerging countries which is under study.

Saudi Arabia, Malaysia, Indonesia and Pakistan are selected as sample in this study due to several reasons. First, these four countries are the top four Islamic countries that were reported as having the largest Islamic assets under management as well as the highest number of Islamic funds in the world at the first quarter of 2017 (MIFC, 2017). The growth of Islamic funds in these countries are in tandem with the growth of the investment houses or asset management companies. As at 2016, the top five largest asset management companies in Asian that managed Islamic assets are concentrated in Saudi Arabia and Malaysia¹. These are NCB Capital (Saudi Arabia, AUM USD7,445.9 million), Public Mutual (Malaysia, AUM USD7,232 million), Jadwa Asset Management (Saudi Arabia, AUM USD6,599.3 million), CIMB Islamic (Malaysia, AUM USD4,890 million) and Samba Capital (Saudi Arabia, AUM USD 3,137 million). The three largest asset management companies in Pakistan; Al Meezan Investment Management, NBP Fullerton Asset Management and Alfalah GHP Investment were ranked 21st, 31st and 35th with AUM amounting USD914.1 million, USD331.4 million and USD178.9 million, respectively. The top two asset management companies in Indonesia, Mandiri Investasi and Trimegah Asset Management

¹ <https://aiiman.com/2018/wp-content/uploads/2017/07/May31-17-The-50-biggest-managers-of-Islamic-funds-Asian-Investor.pdf>

managed to be in the 39th and 46th place from the top biggest asset management companies managing Islamic funds in the world with AUM worth USD123.5 million and USD64.7 million, respectively. Secondly, the heterogeneity of types of funds offered in the fund houses in these countries makes it interesting to see how the different investment strategies applied affect the performance persistence of the fund houses or fund family. Given the unique nature of Islamic funds, certain investment strategies such as short selling are prohibited. The remainder of this paper is organized as follows. Section 2 is literature review. Section 3 presents the methodology. Section 4 discusses the results. Section 5 conclusions.

LITERATURE REVIEW

Research on performance persistence examines if past performance information is useful for investors in investment decisions and test on market efficiency. The early studies investigate whether mutual funds can systematically pick securities over a certain period of time (Treyner, 1965; Sharpe, 1966; Jensen, 1968). They find either no existence of persistency or only some weak evidence of performance persistence which indicates that the track record of a fund manager contains no information about future performance. Most of these studies apply relatively long holding periods. Instead, Sharpe (1966) and Jensen (1969) indicate that the poor performance of funds persists over more than ten years.

In another study, Jensen (1968) examines fund performance persistence over the two ten-year periods from 1945 to 1964, consistently, he finds no existence of performance persistence but only a weak persistence in the poor funds. Morey & Matthew, (2005) investigate the performance persistence of 273 U.S. equity funds from 1987 until 2000 using different performance measures including Morningstar ratings, Sharpe Ratio and Jensen Alpha. They analyze for three-year returns and find no persistence among funds upgraded for the first time to Morningstar's five-star rating fund. Carlson (1970) examines 82 equity mutual funds over the period of 1948 to 1967. He finds no performance persistence using the ranking of Sharpe ratio for ten-year risk-adjusted performance, but some weak evidence in the five-year period. The evidence of persistence is weaker in the risk-adjusted returns than in the absolute returns. Grinblatt & Titman, (1989) examine 157 funds between the periods of 1974 to 1984, with five-year evaluation periods. They find that some mutual fund managers are able to earn abnormal returns consistently before fees and expenses. In addition, it shows that actively updated fund portfolios attains significant abnormal returns. The fund portfolios that were updated quarterly outperformed those that were updated annually.

Later studies of mutual funds persistence in the 1990s challenge this conclusion over a one to the five-year holding period. Researchers that find evidence of performance persistence in the 1990s with the use of shorter periods include

Hendricks et al. (1993) [use even shorter periods of two-years, one-year, six-months, and three-months]; Goetzmann & Ibbotson (1994) [use sample at two-years and a one-month holding period]; Brown & Goetzmann (1995) [utilize a one-year holding period in their analysis]. In contrast, Droms & Walker, (2001) investigate 151 U.S. equity funds from 1971 until 1990 using raw returns and Jensen alpha find no evidence of long term performance persistence with the ten-year holding period but the results show short term persistence over a one-year to the three-year holding period. They argue that size has an effects on the time period dependency and they find that small-cap stock funds perform better than the S&P 500 index in the 1970s, but underperformed in the 1980s. Harlow & Brown, (2006) examine performance persistence of 5,614 U.S. equity funds from 1981 to 2003, for a one-year holding period, within the fund classes and at the cumulative level. They classify funds based on Fama and French's three-factor model. The results document strong evidence of short term performance persistence during the one-month and three-month holding periods. Sehgal & Jhanwar, (2008), using four-factor abnormal returns, show stronger short term performance persistence of 59 funds for period from 2000 until 2004 in daily data but they find no evidence in monthly data. They argue that the frequency of data influences the findings. Studies in developed countries show evidence of short term performance persistence in mutual fund performance but not in the long term performance.

In general studies in emerging countries on performance persistence results are fairly mixed. In Saudi Arabia, Marwa (2019) compared the market timing, the stock selection, and the performance persistence of Islamic and conventional HSBC Saudi mutual funds by using monthly returns for the period from 2011 to 2018. She grouped the sample into five portfolios based on geographical investment basis (locally, Arab, internationally) and Sharia compliance (Islamic and conventional). The results give a brief idea about the performance persistence of HSBC Saudi funds. The results confirmed the existence of the persistence performance when the funds do not apply Sharia law and when they are instead focused internationally. In Malaysia, Low & Ghazali, (2007), discovered in 1996–2000 a short-term relationship existed between Malaysian mutual funds and the stock market. It was because the mutual fund price is linked to the KLCI stock market index, which means that fund managers refer to past performance and stock market movement when deciding portfolio selection. Conversely, Taib & Isa, (2007) indicated that the return performance in Malaysia during the 1991–2001 decade was not persistent. Mansor et al., (2019) compared the return performance and persistence of ethical and conventional mutual funds during two extreme events, Asian and global financial crises under Sharia limitations. The study was composed of 129 Islamic mutual funds (IMFs) and 350 conventional mutual funds (CMFs). They employed the persistence performance measures through contingency tables on IMFs and CMFs. The results indicated that ethical funds are more persistent, especially during and the pre-crisis AFC and the GFC periods. Recently, Ahmad and Marzuki (2020) attempted to investigate the performance at the

fund family level in Malaysia, and also the two types of funds under the management of the family which are Islamic and conventional funds. However they did not investigate the persistency of these performance.

In Indonesia, Dwianggoro et al., (2012) used data from 2006 to 2011 and indicated that no mutual funds that performed persistently for five consecutive years but found persistence in the shorter term when using the indices Jensen and Sharpe, but never persistent when using the index Treynor. Meanwhile, for the period 2008-2012, Elviani & Linawati, (2013) noticed the persistence of the performance of the mutual funds. Arifin & Mulyati, (2017), measured the relative persistence in the short term and absolute short-term persistence. The results found that Sharia mutual fund samples from 2010 until 2016, equity mutual funds and mixed mutual funds have a fairly high relative-short-term persistence but then decline thereafter, while fixed income mutual funds have an up-and-down persistence. Meanwhile, Arifin, (2018), found ample evidence for the existence of output persistence in Indonesian Sharia mutual funds, but the persistence only surfaced during the initial study period, while it seemed to fade away in the latter stages. In Pakistan, Nafees et al., (2017) examined the strategic behavior; the selectivity and timing skills of mutual fund managers and the persistence of mutual fund performance, using data of 33 open-ended mutual funds for the period from 2008 to 2016. Strategic behavior was studied through the proposed methodology by Jensen Alpha, Treynor & Mazuy and Henriksson & Merton. Persistence in risk-adjusted performance was measured using tests from Sharpe, Treynor, and Sortino. Results showed that the persistence in the performance of mutual funds is not high enough, as the performance of fewer mutual funds exceeds stock market performance.

However, all above studies done at the individual fund level which fail to reveal information on the performance of the fund family which the individual fund belongs. This is important to investors who invest in funds within the same families for various reasons, including practical convenience. For them, the information on how a given mutual fund family as a whole may have performed relative to other mutual fund families is crucial (Premachandra et al., 2012). For investors, it is important to understand fund-family performance in order for them to make decision in selecting individual funds (Elton, Gruber, and Green, 2007; Brown and Wu, 2012; McCourt and Ramos, 2019). In addition, fund families provide convenience and lower cost for switching between funds in the family (Massa, 2003).

Among studies that investigate fund family persistence are Cheng, Pi and Wort (1999) and McCourt and Ramos (2019). The former study investigate the performance persistence of fund family in Hong Kong during the period 1992 to 1996, testing the impact of common management strategies and supervision to fund family performance persistence. They find a weak evidence that these fund families has short-term performance persistence. Only two fund families appear to have high return performance in the past periods. Overall, the findings contradict the previous

studies on short term persistence in the U.S funds. Further investigations find that these two fund houses own high number of superior performing funds support the hypothesis that common management strategies and supervision are potential reasons for these abnormal persistence. Previous studies have documented that decisions made at fund family level are contributed by a substantial portion of the management strategies employed by the fund families and the performance of the individual active fund managers in the family. The question then arises whether the average fund performance of some fund families is persistently superior or inferior to that of other fund families. Using gross returns, McCourt and Ramos (2019) find that top-decile family performance persistence is comparable to that of individual funds, indicating that families do not tend to create conditions for maintaining outperformance. After controlling for noise in the performance measure, they find that only 3% of fund families overall are genuinely skilled. Families with higher t-statistics of alpha are much more likely to be truly skilled. Multi-fund families are more likely to be truly unskilled compared to single-fund families. Using net returns however, they find very little evidence of skill.

For Islamic mutual funds' performance persistence, in some cases, persistence is not detected, though it may be caused by a fairly restrictive methodology. One such case is the investigation of the Dow Jones Islamic Index 100 Titans (DJI100) by El Khamlichi et al. (2014). Their analysis was limited by their focus on the recession and booming cycles of the stocks' companies. Meanwhile, Arifin (2018) find sufficient evidence for the presence of performance persistence in Indonesian Islamic mutual funds, but the persistence only surfaced in the initial period of study, while in the latter stages, it appeared to fade away. Most of previous studies focus on developed countries like US, UK, and they test persistence at fund level. So, there is a clear gap about the persistence at fund family level. This study seeks to bridge this gap by examining the performance persistence at the fund family level in the four emerging market with highest number of Islamic mutual funds.

METHODOLOGY

The sample in this study comprises 70 fund families in four emerging countries, where 25 fund families in Saudi Arabia, 20 fund families in Malaysia, 14 fund families in Indonesia, and 11 fund families in Pakistan. The total funds in these 70 fund families equals to 503 equity funds consisting both Islamic and conventional equity funds. The performance of fund family equal the weighted average of performance all funds in the family. The study uses Carhart Four-Factor model as a performance measure. Data include the rate of return, total asset, and market index prices collected from Bloomberg database from January 2007 to December 2018. Following previous studies (for examples, Malkiel, 1995; Droms & Walkers, 2006), this study uses the contingency table to test performance persistence at fund family level. The contingency table is used to analyze and identify the frequency with which funds are defined as winners or losers, and maintain that rating over succeeding time periods. The performance of

the fund family is examined on a rolling month-by-month basis. Then, the fund family performance equal the monthly average return of all equity funds in a fund family. This evaluation assumes that fund managers are competing with their peers and try to perform better than the others on a monthly basis. Only returns of equity funds are used in this study to avoid bias from mixing returns of equity with bond and cash returns. Subsequently, fund family returns are ranked and the median fund family return is computed as the benchmark. The performance of fund families is also examined on semi-annually and yearly basis. This is to explore the length of fund family performance persistence, both the winning and losing performance. This finding enables investors to know whether past returns can be used as a guide for fund selection.

The fund families are classified into four groups: (1) superior in one month and also superior in the following month (WW); (2) inferior in one month and also inferior in the following month (LL); (3) superior in one month and inferior in the following month (WL); and (4) inferior in one month and then superior in the following month (LW). Families with an average rate of return of funds above the median return of all fund families were labeled as ‘winners’. These funds achieved a rate of return equal to or higher than the median family return. The lower half families with the lowest returns were labeled as ‘losers’. These include the funds with a rate of return lower than the median family return. A two-by-two table of family returns is formed to identify whether the winner (W) or loser (L) funds in one period are the winners (W) or losers (L) in subsequent periods. ‘Hot-hand’ is defined as a fund that wins in one month and is followed by a win in the next month, whereas ‘cold-hand’ is a loser that loses in successive months. The earlier is the positive persistence and the latter is the negative persistence. The contingency table, in a matrix form, with two rows and two columns, is represented in the general format in Table I.

Table I. Contingency Table (Two-by-two)

		Period (t+1)		
		Winner	Loser	Total
Period (t)	Winner	WW	WL	WW+LW
	Loser	LW	LL	WL+LL
	Total	WW+LW	WL+LL	WW+WL+LW+LL

Repeat-winner is the ratio of fund families being winners in any two months repeatedly. Repeat-loser is the ratio of fund families being losers in any two months continually. A fund family is considered as a hot-hand if the chance of repeating the superior performance is significantly higher than 50 percent in the following period, that is, the repeat winner ratio, in percentage, is calculated as the count of winning in two months in a row (WW) divided by the sum of WW and WL. The analysis applies

the z-scores statistical significant test following Cheng et al. (1999). In this method, the repeat winner and the repeat loser are calculated. Then, the z-statistics for the repeat winner and the repeat loser are computed. The z-statistic is used to examine the significance of persistence of return. It is distributed normally with a zero mean and a standard deviation of 1.0. If the chance of a winner family continuing to win in the following period exceeds 0.50 it indicates the existence of performance persistence. If this chance has a value of less than 0.50 it indicates that the family performance reverses in the subsequent period; that is, performance persistence does not exist.

The persistence is significant if the calculated z-score is larger than the critical z-value of 1.645. The repeat losing percentage and z-score are calculated using the same principle as the winning funds. As this random variable z of the number of continuously winning funds follow a binomial distribution of b (n,p), the probability of persistent winning, that is, more than 0.5 can be determined. The number of winner-winners, represented by W_{t+1} , becomes larger. The random variable z will be distributed approximately normal with a mean equal to zero and standard deviation equal to one. When a high percentage of the winners in one period continue to be winners in the following period tested, a large positive z-statistic is observed. A large negative z-statistic is obtained when a high percentage of winners in one period become losers in the following period. The z-statistic would be zero if exactly the same proportion of winners continue to remain winners and the same losers remain losers in the next periods. When there is no clear pattern in the returns, small z-statistics are obtained. The z-statistic of repeat winning ratio is calculated as:

$$Z = \frac{W_{t+1} - W_{tp}}{\sqrt{W_{tp}(1-P)}} \quad (1)$$

Where, W_{t+1} is the count of winning in period t+1 of fund family, W_t is the total count of winning in period t of fund family, P is the probability of repeat winning of fund family. The z-statistic of repeat losing ratio is calculated as:

$$Z = \frac{L_{t+1} - L_{tp}}{\sqrt{L_{tp}(1-P)}} \quad (2)$$

Where, L_{t+1} is the count of losing in period t+1 of fund family, L_t is the total count of losing in period t of fund family, P is the probability of repeat losing of fund family.

RESULT

This section discusses the results of the performance persistence at the fund family level, that is, whether investing based on past information of superior fund family performance brings any good to investors. This section includes two parts. The first part (4.1) tests the whole sample that is the group of emerging countries as a whole, while the second part (4.2) test each country as individual sample.

The Whole Sample

This section reports the findings whether well-performing fund families in a group of emerging countries continue to perform well in the subsequent period, and then indicates that the hot-hand fund families exist, and poor-performing fund families continue to perform badly in the subsequent period and then shows the existence of cold-hand fund families. The periods include one month, six months and one year period.

One month

Table II shows the winning persistence of each fund family during the period from January 2007 to December 2018 using a month-by-month rolling period. The z-statistic, which is normally distributed with zero mean and a standard deviation of 1.0, is computed to examine the significance of fund family persistence. The repeat winner ratio for the family 1 of 78 percent of winners in month 1 are winners in month 2 is 80 (win-win) of 102 (win-win + win-lose). The repeat loser ratio for the family 1 of 49 percent, of losers in month 1 are losers in month 2, is calculated as 20 (lose-lose) of 41 (lose-lose + lose-win). The negative sign of the repeat winner z-statistic indicates that family 1 becomes a loser following the winning month. The positive sign of the repeat winner z-statistic exhibits that 17 of the 70 fund families are winners in the month immediately after a winning month, but of which only one family is statistically significant. Conversely, 52 of the 70 fund families are reported to experience a losing month immediately after the winning month as shown by a negative repeat winner ratio; but of which only one family is statistically significant. The positive sign of the repeat loser z-statistic exhibits that 52 of the 70 fund families are losers in the month immediately after a losing month, but of which only two families are statistically significant. Conversely, 17 of the 70 fund families are reported to experience a winning month immediately after the losing month as shown by a negative repeat winner ratio; but none of these are significant.

The repeat winner ratio of the average for all families shows that 71 percent of all winner families in month 1 are winners in month 2, that is, 3416 (win-win) of 4831 (win-win + win-lose). The repeat winner for two successive months is significant where the z-statistic equals 1.8873 more than the critical value "1.645". The negative sign of the repeat winner z-statistic indicates that the fund families become a loser following the winning month. The repeat loser ratio of the average for all families shows that a negative persistence, which that 74 percent of all winner families in month 1 are winners in month 2, that is, 3796 (lose-lose) of 5140 (lose-lose + lose-win). The repeat loser for two successive months is significant where the z-statistic equals 1.9367 more than the critical value "1.645". Therefore, the Cold-hand phenomenon in fund families is significant. It is concluded that poor-performing fund families continue to perform worse than others in the following month. The overall result of negative and positive performance persistence in fund families is significant.

Table II Family Performance Persistence (Monthly).

This table shows the winning persistency of each fund family during the twelve years period from January 2007 to December 2018 for the whole sample and separately countries. The winner is defined as fund families that are with the ranked ordered of one-month total returns above or equal to the median returns of all fund families in that period. The losers are defined as the families with the lower than median returns. Win-win represents the count of the fund family wins in any two months continuously. Lose-lose represents the count of the fund family loses in any two months continuously. Win-lose represents the count of the fund family wins in one month but loses in the subsequent month. Lose-win represents the count of the fund family loses in one month but wins in the subsequent month. Repeat Winner is the probability of winning continuously for two periods, given that it wins in the first period. Repeat Loser is the probability of losing continuously for two periods, given that it ranked on top in the first period. The significance of the persistence of returns is tested by calculation of a z-statistic, which is distributed normally with a zero mean and a standard deviation of 1.0. The z-statistic shows whether the probability of Repeat Winner (Repeat Loser) for the fund family is significantly different from zero.

Family	Previous Month	Following Month		Repeat Winner	Repeat Loser	Repeat Winner Z-stat	Repeat Loser Z-stat
		W	L				
Saudi Arabia							
Family 1	Winner	80	21	0.78	0.49	-0.2132	0.2182
	Loser	22	20				
Family 2	Winner	81	20	0.80	0.52	0.0000	0.0000
	Loser	20	22				
Family 3	Winner	138	2	0.99	0.50	1.0000	-0.7071
	Loser	1	2				
Family 4	Winner	137	3	0.99	0.40	2.0000	-1.1547
	Loser	1	2				
Family 5	Winner	56	30	0.64	0.45	-0.3536	0.3651
	Loser	32	25				
Family 6	Winner	130	5	0.98	0.50	1.1547	-0.8944
	Loser	3	5				
Family 7	Winner	115	6	0.94	0.50	-0.3780	0.4082
	Loser	7	6				
Family 8	Winner	115	7	0.95	0.46	0.4082	-0.3780
	Loser	6	6				
Family 9	Winner	100	10	0.93	0.58	1.1339	-0.9487
	Loser	7	14				

Family 10	Winner	11	23	0.28	0.79	-1.1142	1.2511																																																																																																																																																																																																																												
	Loser	29	89					Family 11	Winner	13	5	0.62	0.96	-1.0607	1.3416	Loser	8	115	Family 12	Winner	4	2	0.50	0.99	-1.0000	1.4142	Loser	4	133	Family 13	Winner	130	4	0.98	0.64	1.4142	-1.0000	Loser	2	7	Family 14	Winner	130	4	0.96	0.50	-0.4472	0.5000	Loser	5	4	Family 15	Winner	23	21	0.51	0.79	-0.2132	0.2182	Loser	22	77	Family 16	Winner	121	7	0.94	0.50	-0.3536	0.3780	Loser	8	7	Family 17	Winner	93	14	0.85	0.59	-0.5000	0.5345	Loser	16	20	Family 18	Winner	135	2	0.99	0.71	1.0000	-0.7071	Loser	1	5	Family 19	Winner	126	4	0.98	0.73	1.4142	-1.0000	Loser	2	11	Family 20	Winner	122	2	0.95	0.71	-1.8898	3.5355	Loser	7	5	Family 21	Winner	11	16	0.34	0.86	-1.0911	1.2500	Loser	21	95	Family 22	Winner	135	1	0.99	0.83	-0.7071	1.0000	Loser	2	5	Family 23	Winner	82	25	0.75	0.26	-0.3849	0.4000	Loser	27	9	Family 24	Winner	90	22	0.82	0.33	0.4472	-0.4264	Loser	20	11	Family 25	Winner	43	28	0.59	0.60	-0.3651	0.3780	Loser	30	42	All Family	Winner	2106	284	0.82	0.72	1.9160	-1.1134	Loser	303	737	Malaysia								Family 26	Winner	18	25	0.41	0.75	-0.1961	0.2000	Loser	26	74	Family 27	Winner	14	30	0.33	0.71	0.3780	-0.3651	Loser	28	74	Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164	Loser	17	106	Family 29	Winner	30
Family 11	Winner	13	5	0.62	0.96	-1.0607	1.3416																																																																																																																																																																																																																												
	Loser	8	115					Family 12	Winner	4	2	0.50	0.99	-1.0000	1.4142	Loser	4	133	Family 13	Winner	130	4	0.98	0.64	1.4142	-1.0000	Loser	2	7	Family 14	Winner	130	4	0.96	0.50	-0.4472	0.5000	Loser	5	4	Family 15	Winner	23	21	0.51	0.79	-0.2132	0.2182	Loser	22	77	Family 16	Winner	121	7	0.94	0.50	-0.3536	0.3780	Loser	8	7	Family 17	Winner	93	14	0.85	0.59	-0.5000	0.5345	Loser	16	20	Family 18	Winner	135	2	0.99	0.71	1.0000	-0.7071	Loser	1	5	Family 19	Winner	126	4	0.98	0.73	1.4142	-1.0000	Loser	2	11	Family 20	Winner	122	2	0.95	0.71	-1.8898	3.5355	Loser	7	5	Family 21	Winner	11	16	0.34	0.86	-1.0911	1.2500	Loser	21	95	Family 22	Winner	135	1	0.99	0.83	-0.7071	1.0000	Loser	2	5	Family 23	Winner	82	25	0.75	0.26	-0.3849	0.4000	Loser	27	9	Family 24	Winner	90	22	0.82	0.33	0.4472	-0.4264	Loser	20	11	Family 25	Winner	43	28	0.59	0.60	-0.3651	0.3780	Loser	30	42	All Family	Winner	2106	284	0.82	0.72	1.9160	-1.1134	Loser	303	737	Malaysia								Family 26	Winner	18	25	0.41	0.75	-0.1961	0.2000	Loser	26	74	Family 27	Winner	14	30	0.33	0.71	0.3780	-0.3651	Loser	28	74	Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164	Loser	17	106	Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780						
Family 12	Winner	4	2	0.50	0.99	-1.0000	1.4142																																																																																																																																																																																																																												
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	Loser	20	11					Family 25	Winner	43	28	0.59	0.60	-0.3651	0.3780	Loser	30	42	All Family	Winner	2106	284	0.82	0.72	1.9160	-1.1134	Loser	303	737	Malaysia								Family 26	Winner	18	25	0.41	0.75	-0.1961	0.2000	Loser	26	74	Family 27	Winner	14	30	0.33	0.71	0.3780	-0.3651	Loser	28	74	Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164	Loser	17	106	Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780																																																																																																																																																					
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	Loser	30	42					All Family	Winner	2106	284	0.82	0.72	1.9160	-1.1134	Loser	303	737	Malaysia								Family 26	Winner	18	25	0.41	0.75	-0.1961	0.2000	Loser	26	74	Family 27	Winner	14	30	0.33	0.71	0.3780	-0.3651	Loser	28	74	Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164	Loser	17	106	Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780																																																																																																																																																																
All Family	Winner	2106	284	0.82	0.72	1.9160	-1.1134																																																																																																																																																																																																																												
	Loser	303	737					Malaysia								Family 26	Winner	18	25	0.41	0.75	-0.1961	0.2000	Loser	26	74	Family 27	Winner	14	30	0.33	0.71	0.3780	-0.3651	Loser	28	74	Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164	Loser	17	106	Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780																																																																																																																																																																											
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Family 26	Winner	18	25	0.41	0.75	-0.1961	0.2000																																																																																																																																																																																																																												
	Loser	26	74					Family 27	Winner	14	30	0.33	0.71	0.3780	-0.3651	Loser	28	74	Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164	Loser	17	106	Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780																																																																																																																																																																																														
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	Loser	28	74					Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164	Loser	17	106	Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780																																																																																																																																																																																																									
Family 28	Winner	5	15	0.23	0.88	-0.4851	0.5164																																																																																																																																																																																																																												
	Loser	17	106					Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780																																																																																																																																																																																																																				
Family 29	Winner	30	28	0.50	0.66	-0.3651	0.3780																																																																																																																																																																																																																												

	Loser	30	55				
Family 30	Winner	5	14	0.24	0.89	-0.5000	0.5345
	Loser	16	108				
Family 31	Winner	21	30	0.40	0.67	-0.1796	0.1826
	Loser	31	61				
Family 32	Winner	14	29	0.32	0.71	-0.1826	0.1857
	Loser	30	70				
Family 33	Winner	13	24	0.33	0.77	-0.3922	0.4082
	Loser	26	80				
Family 34	Winner	2	2	0.33	0.99	-1.0000	1.4142
	Loser	4	135				
Family 35	Winner	21	27	0.45	0.72	0.1961	-0.1925
	Loser	26	69				
Family 36	Winner	29	26	0.52	0.70	-0.1925	0.1961
	Loser	27	61				
Family 37	Winner	15	27	0.34	0.72	-0.3714	0.3849
	Loser	29	71				
Family 38	Winner	15	26	0.36	0.74	-0.1925	0.1961
	Loser	27	75				
Family 39	Winner	17	25	0.40	0.75	-0.1961	0.2000
	Loser	26	75				
Family 40	Winner	35	29	0.54	0.63	-0.1826	0.1857
	Loser	30	49				
Family 41	Winner	12	24	0.32	0.77	-0.2000	0.2041
	Loser	25	82				
Family 42	Winner	9	24	0.26	0.78	-0.2000	0.2041
	Loser	25	85				
Family 43	Winner	18	33	0.35	0.64	-0.1715	0.1741
	Loser	34	58				
Family 44	Winner	15	20	0.39	0.81	-0.6255	0.6708
	Loser	23	85				
Family 45	Winner	13	24	0.33	0.77	-0.3922	0.4082
	Loser	26	80				
All Family	Winner	321	482	0.38	0.76	1.8756	-1.0796
	Loser	506	1553				
Indonesia							
Family 46	Winner	2	7	0.18	0.95	-0.6667	0.7559
	Loser	9	125				
Family 47	Winner	9	31	0.22	0.69	-0.1768	0.1796
	Loser	32	70				
Family 48	Winner	26	32	0.44	0.62	-0.1741	0.1768
	Loser	33	52				

Family 49	Winner	118	10	0.91	0.29	-0.3015	0.3162
	Loser	11	4				
Family 50	Winner	70	33	0.69	0.20	0.1768	-0.1741
	Loser	32	8				
Family 51	Winner	120	10	0.93	0.29	0.3333	-0.3162
	Loser	9	4				
Family 52	Winner	29	30	0.48	0.64	-0.1796	0.1826
	Loser	31	53				
Family 53	Winner	23	32	0.41	0.63	-0.1741	0.1768
	Loser	33	55				
Family 54	Winner	6	7	0.38	0.94	-0.9487	1.1339
	Loser	10	120				
Family 55	Winner	105	17	0.88	0.26	0.5164	-0.4851
	Loser	15	6				
Family 56	Winner	15	36	0.29	0.60	-0.1644	0.1667
	Loser	37	55				
Family 57	Winner	27	33	0.46	0.61	0.1768	-0.1741
	Loser	32	51				
Family 58	Winner	5	18	0.21	0.85	-0.2294	0.2357
	Loser	19	101				
Family 59	Winner	70	18	0.80	0.68	0.2425	-0.2357
	Loser	17	38				
All Family	Winner	625	314	0.66	0.70	1.7357	-0.3361
	Loser	320	742				
Pakistan							
Family 60	Winner	30	25	0.52	0.71	-0.5669	0.6000
	Loser	28	60				
Family 61	Winner	16	19	0.47	0.83	0.2357	-0.2294
	Loser	18	90				
Family 62	Winner	4	15	0.17	0.88	-0.9177	1.0328
	Loser	19	105				
Family 63	Winner	5	18	0.20	0.85	-0.4472	0.4714
	Loser	20	100				
Family 64	Winner	22	30	0.41	0.66	-0.3536	0.3651
	Loser	32	59				
Family 65	Winner	18	20	0.44	0.80	-0.6255	0.6708
	Loser	23	82				
Family 66	Winner	34	30	0.52	0.61	-0.3536	0.3651
	Loser	32	47				
Family 67	Winner	24	30	0.44	0.62	-0.1796	0.1826
	Loser	31	48				
Family 68	Winner	36	28	0.55	0.64	-0.3651	0.3780

	Loser	30	49				
Family 69	Winner	25	18	0.56	0.82	-0.4472	0.4714
	Loser	20	80				
Family 70	Winner	35	31	0.51	0.59	-0.3482	0.3592
	Loser	33	44				
All Family	Winner	249	264	0.57	0.74	-2.2517	1.9630
	Loser	186	764				
Whole Sample	Winner	3416	1344	0.71	0.74	-1.8875	1.9367
	Loser	1415	3796				

Six-Month

Next, performance persistence is assessed for a longer, return rolling period of six months. Table III reports the winning and losing persistence of each fund family for the period from 2007 to 2018 using a semi-annual rolling period. The repeat winner z-statistic shows that 5 families of 25 families have a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there are 8 families of 39 have a significant positive repeat loser z-statistic, implying the persistence of its inferior performance for six-months. The repeat winner ratio of the average for all families shows that 71 percent of all winner families in the first semiannual period are winners in the subsequent semi-annual period. It is insignificant where the z-statistics equals 1.3122 less than the critical value. The repeat loser ratio of the average for all families is reported as 75 percent of all loser families in the first semiannual period are losers in the subsequent semi-annual period. It is also insignificant, where the z-statistics equals 1.4455 less than the critical value.

Table III. Family Performance Persistence (Six-Month).

This table shows the winning persistency of each fund family during the twelve years period from January 2007 to December 2018 for the whole sample and separately countries. The winner is defined as fund families that are with the ranked ordered of six-month total returns above or equal to the median returns of all fund families in that period. The losers are defined as the families with the lower than median returns. Win-win represents the count of the fund family wins in any six-month period continuously. Lose-lose represents the count of the fund family loses in any six-month period continuously. Win-lose represents the count of the fund family wins in six-month but loses in the subsequent six-month. Lose-win represents the count of the fund family loses in six-month but wins in the subsequent six-month. Repeat Winner is the probability of winning continuously for two periods, given that it wins in the first period. Repeat Loser is the probability of losing continuously for two periods, given that it ranked on top in the first period. The significance of the persistence of returns is tested by calculation of a z-statistic, which is distributed normally with a zero mean and a standard deviation of 1.0. The z-statistic shows whether the

probability of Repeat Winner (Repeat Loser) for the fund family is significantly different from zero.

Family	Previous Month	Following Month		Repeat Winner	Repeat Loser	Repeat Winner Z-stat	Repeat Loser Z-stat
		W	L				
Saudi Arabia							
Family 1	Winner	9	5	0.60	0.38	-0.4082	0.4472
	Loser	6	3				
Family 2	Winner	10	6	0.67	0.25	0.4472	-0.4082
	Loser	5	2				
Family 3	Winner	19	2	0.95	0.33	1.0000	-0.7071
	Loser	1	1				
Family 4	Winner	18	3	0.95	0.25	2.0000	-1.1547
	Loser	1	1				
Family 5	Winner	13	4	0.72	0.20	-0.4472	0.5000
	Loser	5	1				
Family 6	Winner	16	3	0.94	0.40	2.0000	-1.1547
	Loser	1	2				
Family 7	Winner	20	0	0.87	-----	-1.7321	-----
	Loser	3	0				
Family 8	Winner	17	2	0.94	0.60	1.0000	-0.7071
	Loser	1	3				
Family 9	Winner	13	2	0.72	0.60	-1.3416	2.1213
	Loser	5	3				
Family 10	Winner	4	4	0.44	0.71	-0.4472	0.5000
	Loser	5	10				
Family 11	Winner	4	2	0.67	0.88	0.0000	0.0000
	Loser	2	15				
Family 12	Winner	3	1	0.43	0.94	-1.5000	3.0000
	Loser	4	15				
Family 13	Winner	15	3	0.79	0.25	-0.5000	0.5774
	Loser	4	1				
Family 14	Winner	17	3	0.94	0.40	2.0000	-1.1547
	Loser	1	2				
Family 15	Winner	4	2	0.57	0.88	-0.5774	0.7071
	Loser	3	14				
Family 16	Winner	21	1	0.95	0.00	0.0000	0.0000
	Loser	1	0				
Family 17	Winner	19	2	0.95	0.33	1.0000	-0.7071
	Loser	1	1				
Family 18	Winner	18	2	0.95	0.50	1.0000	-0.7071
	Loser	1	2				

Family 19	Winner	16	3	0.89	0.40	0.7071	-0.5774																																																																																																																																																																																																																												
	Loser	2	2					Family 20	Winner	21	1	0.95	0.00	0.0000	0.0000	Loser	1	0	Family 21	Winner	14	4	0.82	0.33	0.5774	-0.5000	Loser	3	2	Family 22	Winner	15	3	0.94	0.57	2.0000	-1.1547	Loser	1	4	Family 23	Winner	17	3	0.89	0.25	0.7071	-0.5774	Loser	2	1	Family 24	Winner	19	2	0.95	0.33	1.0000	-0.7071	Loser	1	1	Family 25	Winner	7	5	0.54	0.50	-0.4082	0.4472	Loser	6	5	All Family	Winner	343	68	0.83	0.57	-0.2392	0.2434	Loser	66	91	Malaysia								Family 26	Winner	3	2	0.43	0.88	-1.0000	1.4142	Loser	4	14	Family 27	Winner	1	6	0.13	0.60	-0.3780	0.4082	Loser	7	9	Family 28	Winner	3	1	0.60	0.94	-0.7071	1.0000	Loser	2	17	Family 29	Winner	1	4	0.17	0.76	-0.4472	0.5000	Loser	5	13	Family 30	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 31	Winner	1	5	0.14	0.69	-0.4082	0.4472	Loser	6	11	Family 32	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 33	Winner	2	2	0.67	0.90	1.0000	-0.7071	Loser	1	18	Family 34	Winner	12	6	0.75	0.14	1.0000	-0.8165	Loser	4	1	Family 35	Winner	3	3	0.38	0.80	-0.8944	1.1547	Loser	5	12	Family 36	Winner	2	5	0.25	0.67	-0.4082	0.4472	Loser	6	10	Family 37	Winner	2	3	0.33	0.82	-0.5000	0.5774	Loser	4	14	Family 38	Winner	1
Family 20	Winner	21	1	0.95	0.00	0.0000	0.0000																																																																																																																																																																																																																												
	Loser	1	0					Family 21	Winner	14	4	0.82	0.33	0.5774	-0.5000	Loser	3	2	Family 22	Winner	15	3	0.94	0.57	2.0000	-1.1547	Loser	1	4	Family 23	Winner	17	3	0.89	0.25	0.7071	-0.5774	Loser	2	1	Family 24	Winner	19	2	0.95	0.33	1.0000	-0.7071	Loser	1	1	Family 25	Winner	7	5	0.54	0.50	-0.4082	0.4472	Loser	6	5	All Family	Winner	343	68	0.83	0.57	-0.2392	0.2434	Loser	66	91	Malaysia								Family 26	Winner	3	2	0.43	0.88	-1.0000	1.4142	Loser	4	14	Family 27	Winner	1	6	0.13	0.60	-0.3780	0.4082	Loser	7	9	Family 28	Winner	3	1	0.60	0.94	-0.7071	1.0000	Loser	2	17	Family 29	Winner	1	4	0.17	0.76	-0.4472	0.5000	Loser	5	13	Family 30	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 31	Winner	1	5	0.14	0.69	-0.4082	0.4472	Loser	6	11	Family 32	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 33	Winner	2	2	0.67	0.90	1.0000	-0.7071	Loser	1	18	Family 34	Winner	12	6	0.75	0.14	1.0000	-0.8165	Loser	4	1	Family 35	Winner	3	3	0.38	0.80	-0.8944	1.1547	Loser	5	12	Family 36	Winner	2	5	0.25	0.67	-0.4082	0.4472	Loser	6	10	Family 37	Winner	2	3	0.33	0.82	-0.5000	0.5774	Loser	4	14	Family 38	Winner	1	1	0.33	0.95	-0.7071	1.0000						
Family 21	Winner	14	4	0.82	0.33	0.5774	-0.5000																																																																																																																																																																																																																												
	Loser	3	2					Family 22	Winner	15	3	0.94	0.57	2.0000	-1.1547	Loser	1	4	Family 23	Winner	17	3	0.89	0.25	0.7071	-0.5774	Loser	2	1	Family 24	Winner	19	2	0.95	0.33	1.0000	-0.7071	Loser	1	1	Family 25	Winner	7	5	0.54	0.50	-0.4082	0.4472	Loser	6	5	All Family	Winner	343	68	0.83	0.57	-0.2392	0.2434	Loser	66	91	Malaysia								Family 26	Winner	3	2	0.43	0.88	-1.0000	1.4142	Loser	4	14	Family 27	Winner	1	6	0.13	0.60	-0.3780	0.4082	Loser	7	9	Family 28	Winner	3	1	0.60	0.94	-0.7071	1.0000	Loser	2	17	Family 29	Winner	1	4	0.17	0.76	-0.4472	0.5000	Loser	5	13	Family 30	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 31	Winner	1	5	0.14	0.69	-0.4082	0.4472	Loser	6	11	Family 32	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 33	Winner	2	2	0.67	0.90	1.0000	-0.7071	Loser	1	18	Family 34	Winner	12	6	0.75	0.14	1.0000	-0.8165	Loser	4	1	Family 35	Winner	3	3	0.38	0.80	-0.8944	1.1547	Loser	5	12	Family 36	Winner	2	5	0.25	0.67	-0.4082	0.4472	Loser	6	10	Family 37	Winner	2	3	0.33	0.82	-0.5000	0.5774	Loser	4	14	Family 38	Winner	1	1	0.33	0.95	-0.7071	1.0000																	
Family 22	Winner	15	3	0.94	0.57	2.0000	-1.1547																																																																																																																																																																																																																												
	Loser	1	4					Family 23	Winner	17	3	0.89	0.25	0.7071	-0.5774	Loser	2	1	Family 24	Winner	19	2	0.95	0.33	1.0000	-0.7071	Loser	1	1	Family 25	Winner	7	5	0.54	0.50	-0.4082	0.4472	Loser	6	5	All Family	Winner	343	68	0.83	0.57	-0.2392	0.2434	Loser	66	91	Malaysia								Family 26	Winner	3	2	0.43	0.88	-1.0000	1.4142	Loser	4	14	Family 27	Winner	1	6	0.13	0.60	-0.3780	0.4082	Loser	7	9	Family 28	Winner	3	1	0.60	0.94	-0.7071	1.0000	Loser	2	17	Family 29	Winner	1	4	0.17	0.76	-0.4472	0.5000	Loser	5	13	Family 30	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 31	Winner	1	5	0.14	0.69	-0.4082	0.4472	Loser	6	11	Family 32	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 33	Winner	2	2	0.67	0.90	1.0000	-0.7071	Loser	1	18	Family 34	Winner	12	6	0.75	0.14	1.0000	-0.8165	Loser	4	1	Family 35	Winner	3	3	0.38	0.80	-0.8944	1.1547	Loser	5	12	Family 36	Winner	2	5	0.25	0.67	-0.4082	0.4472	Loser	6	10	Family 37	Winner	2	3	0.33	0.82	-0.5000	0.5774	Loser	4	14	Family 38	Winner	1	1	0.33	0.95	-0.7071	1.0000																												
Family 23	Winner	17	3	0.89	0.25	0.7071	-0.5774																																																																																																																																																																																																																												
	Loser	2	1					Family 24	Winner	19	2	0.95	0.33	1.0000	-0.7071	Loser	1	1	Family 25	Winner	7	5	0.54	0.50	-0.4082	0.4472	Loser	6	5	All Family	Winner	343	68	0.83	0.57	-0.2392	0.2434	Loser	66	91	Malaysia								Family 26	Winner	3	2	0.43	0.88	-1.0000	1.4142	Loser	4	14	Family 27	Winner	1	6	0.13	0.60	-0.3780	0.4082	Loser	7	9	Family 28	Winner	3	1	0.60	0.94	-0.7071	1.0000	Loser	2	17	Family 29	Winner	1	4	0.17	0.76	-0.4472	0.5000	Loser	5	13	Family 30	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 31	Winner	1	5	0.14	0.69	-0.4082	0.4472	Loser	6	11	Family 32	Winner	1	1	0.33	0.95	-0.7071	1.0000	Loser	2	19	Family 33	Winner	2	2	0.67	0.90	1.0000	-0.7071	Loser	1	18	Family 34	Winner	12	6	0.75	0.14	1.0000	-0.8165	Loser	4	1	Family 35	Winner	3	3	0.38	0.80	-0.8944	1.1547	Loser	5	12	Family 36	Winner	2	5	0.25	0.67	-0.4082	0.4472	Loser	6	10	Family 37	Winner	2	3	0.33	0.82	-0.5000	0.5774	Loser	4	14	Family 38	Winner	1	1	0.33	0.95	-0.7071	1.0000																																							
Family 24	Winner	19	2	0.95	0.33	1.0000	-0.7071																																																																																																																																																																																																																												
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	Loser	6	10					Family 37	Winner	2	3	0.33	0.82	-0.5000	0.5774	Loser	4	14	Family 38	Winner	1	1	0.33	0.95	-0.7071	1.0000																																																																																																																																																																																																									
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Family 38	Winner	1	1	0.33	0.95	-0.7071	1.0000																																																																																																																																																																																																																												

	Loser	2	18				
Family 39	Winner	3	1	0.60	0.94	-0.7071	1.0000
	Loser	2	17				
Family 40	Winner	2	3	0.33	0.82	-0.5000	0.5774
	Loser	4	14				
Family 41	Winner	2	1	0.50	0.95	-0.7071	1.0000
	Loser	2	18				
Family 42	Winner	2	2	0.50	0.89	0.0000	0.0000
	Loser	2	17				
Family 43	Winner	5	2	0.63	0.86	-0.5774	0.7071
	Loser	3	12				
Family 44	Winner	1	2	0.25	0.89	-0.5774	0.7071
	Loser	3	17				
Family 45	Winner	1	3	0.20	0.83	-0.5000	0.5774
	Loser	4	15				
All Family	Winner	49	48	0.41	0.85	1.9081	-1.0148
	Loser	70	285				
Indonesia							
Family 46	Winner	1	2	0.25	0.89	-0.5774	0.7071
	Loser	3	16				
Family 47	Winner	0	1	0.00	0.95	-1.1547	2.0000
	Loser	3	18				
Family 48	Winner	2	2	0.22	0.78	-1.8898	3.5355
	Loser	7	7				
Family 49	Winner	17	4	0.94	0.20	3.0000	-1.5000
	Loser	1	1				
Family 50	Winner	17	1	0.89	0.50	-0.7071	1.0000
	Loser	2	1				
Family 51	Winner	18	2	0.95	0.33	1.0000	-0.7071
	Loser	1	1				
Family 52	Winner	1	2	0.14	0.85	-1.6330	2.8284
	Loser	6	11				
Family 53	Winner	3	3	0.30	0.70	-1.5119	2.3094
	Loser	7	7				
Family 54	Winner	17	2	0.94	0.33	1.0000	-0.7071
	Loser	1	1				
Family 55	Winner	16	2	0.94	0.50	1.0000	-0.7071
	Loser	1	2				
Family 56	Winner	3	3	0.33	0.70	-1.2247	1.7321
	Loser	6	7				
Family 57	Winner	5	3	0.45	0.67	-1.2247	1.7321
	Loser	6	6				

Family 58	Winner	2	2	0.67	0.89	1.0000	-0.7071
	Loser	1	17				
Family 59	Winner	14	4	0.88	0.50	1.4142	-1.0000
	Loser	2	4				
All Family	Winner	116	33	0.71	0.75	1.1297	-1.3173
	Loser	47	99				
Pakistan							
Family 60	Winner	5	5	0.45	0.58	-0.4082	0.4472
	Loser	6	7				
Family 61	Winner	3	4	0.60	0.78	1.4142	-1.0000
	Loser	2	14				
Family 62	Winner	1	2	0.25	0.89	-0.5774	0.7071
	Loser	3	17				
Family 63	Winner	1	3	0.33	0.85	0.7071	-0.5774
	Loser	2	17				
Family 64	Winner	4	4	0.57	0.75	0.5774	-0.5000
	Loser	3	12				
Family 65	Winner	2	5	0.25	0.67	-0.4082	0.4472
	Loser	6	10				
Family 66	Winner	8	4	0.62	0.60	-0.4472	0.5000
	Loser	5	6				
Family 67	Winner	5	5	0.45	0.58	-0.4082	0.4472
	Loser	6	7				
Family 68	Winner	7	5	0.64	0.58	0.5000	-0.4472
	Loser	4	7				
Family 69	Winner	4	2	0.50	0.87	-1.0000	1.4142
	Loser	4	13				
Family 70	Winner	7	7	0.54	0.30	0.4082	-0.3780
	Loser	6	3				
All Family	Winner	47	46	0.50	0.71	0.1466	-0.1468
	Loser	47	113				
Whole Sample	Winner	561	201	0.71	0.75	1.3122	1.4455
	Loser	230	588				

One year

Table IV reports the winning and losing persistence of each fund family for the period from 2007 to 2019 using a yearly rolling period. The repeat winner z-statistic shows that only two of 32 fund families have a significant positive repeat winner z-statistic, while 7 families of 34 families are a significant positive repeat loser z-statistic. The repeat winner z-statistic shows only one family of 34 fund families has a significant negative repeat winner z-statistic, while none of the families have a significant

negative repeat loser z-statistic. This implies no evidence of superior or inferior performance persistence for a one-year rolling period. The repeat winner ratio of the average for all families shows that 57 percent of all winner families in the first year are winners in the following year, but it is insignificant. The repeat loser ratio of the average for all families is reported as 66 percent of all loser families in the first year are losers in the next year. It is also insignificant. The results show that the past six-month and past one-year intervals provide no guide for future investment decisions. This result contradicts Malkiel (1995), Gruber (1996) and Carhart (1997) who found evidence of Cold-hand in their analysis.

Table IV. Family Performance Persistence (Yearly).

This table shows the winning persistency of each fund family during the twelve years period from January 2007 to December 2018 for the whole sample and separately countries. The winner is defined as fund families that are with the ranked ordered of six-month total returns above or equal to the median returns of all fund families in that period. The losers are defined as the families with the lower than median returns. Win-win represents the count of the fund family wins in any six-month period continuously.

Family	Previous Month	Following Month		Repeat Winner	Repeat Loser	Repeat Winner Z-stat	Repeat Loser Z-stat
		W	L				
Saudi Arabia							
Family 1	Winner	4	3	0.67	0.40	0.7071	-0.5774
	Loser	2	2				
Family 2	Winner	7	1	0.78	0.50	-0.7071	1.0000
	Loser	2	1				
Family 3	Winner	7	2	0.88	0.33	1.0000	-0.7071
	Loser	1	1				
Family 4	Winner	6	2	0.86	0.33	1.0000	-0.7071
	Loser	1	1				
Family 5	Winner	6	2	0.86	0.50	1.0000	-0.7071
	Loser	1	2				
Family 6	Winner	5	3	0.71	0.25	0.7071	-0.5774
	Loser	2	1				
Family 7	Winner	7	2	0.88	0.33	1.0000	-0.7071
	Loser	1	1				
Family 8	Winner	7	2	0.88	0.33	1.0000	-0.7071
	Loser	1	1				
Family 9	Winner	4	2	0.80	0.67	1.0000	-0.7071
	Loser	1	4				

Family 10	Winner	1	3	0.20	0.50	-0.5000	0.5774																																																																																																																																																																																																																												
	Loser	4	3					Family 11	Winner	1	1	0.50	0.89	0.0000	0.0000	Loser	1	8	Family 12	Winner	0	1	0.00	0.90	0.0000	0.0000	Loser	1	9	Family 13	Winner	3	1	0.38	0.67	-1.7889	4.0000	Loser	5	2	Family 14	Winner	4	2	0.57	0.50	-0.5774	0.7071	Loser	3	2	Family 15	Winner	1	2	0.33	0.75	0.0000	0.0000	Loser	2	6	Family 16	Winner	5	1	0.71	0.75	-0.7071	1.0000	Loser	2	3	Family 17	Winner	2	2	0.29	0.50	-1.3416	2.1213	Loser	5	2	Family 18	Winner	3	2	0.50	0.60	-0.5774	0.7071	Loser	3	3	Family 19	Winner	3	2	0.43	0.50	-1.0000	1.4142	Loser	4	2	Family 20	Winner	7	2	0.88	0.33	1.0000	-0.7071	Loser	1	1	Family 21	Winner	4	3	0.80	0.25	2.0000	-1.1547	Loser	1	1	Family 22	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 23	Winner	7	2	0.88	0.33	1.0000	-0.7071	Loser	1	1	Family 24	Winner	6	2	0.86	0.50	1.0000	-0.7071	Loser	1	2	Family 25	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	All Family	Winner	110	50	0.69	0.55	-0.1419	0.1414	Loser	49	62	Malaysia								Family 26	Winner	1	3	0.33	0.67	0.7071	-0.5774	Loser	2	6	Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774	Loser	4	3	Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1
Family 11	Winner	1	1	0.50	0.89	0.0000	0.0000																																																																																																																																																																																																																												
	Loser	1	8					Family 12	Winner	0	1	0.00	0.90	0.0000	0.0000	Loser	1	9	Family 13	Winner	3	1	0.38	0.67	-1.7889	4.0000	Loser	5	2	Family 14	Winner	4	2	0.57	0.50	-0.5774	0.7071	Loser	3	2	Family 15	Winner	1	2	0.33	0.75	0.0000	0.0000	Loser	2	6	Family 16	Winner	5	1	0.71	0.75	-0.7071	1.0000	Loser	2	3	Family 17	Winner	2	2	0.29	0.50	-1.3416	2.1213	Loser	5	2	Family 18	Winner	3	2	0.50	0.60	-0.5774	0.7071	Loser	3	3	Family 19	Winner	3	2	0.43	0.50	-1.0000	1.4142	Loser	4	2	Family 20	Winner	7	2	0.88	0.33	1.0000	-0.7071	Loser	1	1	Family 21	Winner	4	3	0.80	0.25	2.0000	-1.1547	Loser	1	1	Family 22	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 23	Winner	7	2	0.88	0.33	1.0000	-0.7071	Loser	1	1	Family 24	Winner	6	2	0.86	0.50	1.0000	-0.7071	Loser	1	2	Family 25	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	All Family	Winner	110	50	0.69	0.55	-0.1419	0.1414	Loser	49	62	Malaysia								Family 26	Winner	1	3	0.33	0.67	0.7071	-0.5774	Loser	2	6	Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774	Loser	4	3	Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071						
Family 12	Winner	0	1	0.00	0.90	0.0000	0.0000																																																																																																																																																																																																																												
	Loser	1	9					Family 13	Winner	3	1	0.38	0.67	-1.7889	4.0000	Loser	5	2	Family 14	Winner	4	2	0.57	0.50	-0.5774	0.7071	Loser	3	2	Family 15	Winner	1	2	0.33	0.75	0.0000	0.0000	Loser	2	6	Family 16	Winner	5	1	0.71	0.75	-0.7071	1.0000	Loser	2	3	Family 17	Winner	2	2	0.29	0.50	-1.3416	2.1213	Loser	5	2	Family 18	Winner	3	2	0.50	0.60	-0.5774	0.7071	Loser	3	3	Family 19	Winner	3	2	0.43	0.50	-1.0000	1.4142	Loser	4	2	Family 20	Winner	7	2	0.88	0.33	1.0000	-0.7071	Loser	1	1	Family 21	Winner	4	3	0.80	0.25	2.0000	-1.1547	Loser	1	1	Family 22	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 23	Winner	7	2	0.88	0.33	1.0000	-0.7071	Loser	1	1	Family 24	Winner	6	2	0.86	0.50	1.0000	-0.7071	Loser	1	2	Family 25	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	All Family	Winner	110	50	0.69	0.55	-0.1419	0.1414	Loser	49	62	Malaysia								Family 26	Winner	1	3	0.33	0.67	0.7071	-0.5774	Loser	2	6	Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774	Loser	4	3	Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																	
Family 13	Winner	3	1	0.38	0.67	-1.7889	4.0000																																																																																																																																																																																																																												
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Family 24	Winner	6	2	0.86	0.50	1.0000	-0.7071																																																																																																																																																																																																																												
	Loser	1	2					Family 25	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	All Family	Winner	110	50	0.69	0.55	-0.1419	0.1414	Loser	49	62	Malaysia								Family 26	Winner	1	3	0.33	0.67	0.7071	-0.5774	Loser	2	6	Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774	Loser	4	3	Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																																																																																																																																																					
Family 25	Winner	5	3	0.71	0.25	0.7071	-0.5774																																																																																																																																																																																																																												
	Loser	2	1					All Family	Winner	110	50	0.69	0.55	-0.1419	0.1414	Loser	49	62	Malaysia								Family 26	Winner	1	3	0.33	0.67	0.7071	-0.5774	Loser	2	6	Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774	Loser	4	3	Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																																																																																																																																																																
All Family	Winner	110	50	0.69	0.55	-0.1419	0.1414																																																																																																																																																																																																																												
	Loser	49	62					Malaysia								Family 26	Winner	1	3	0.33	0.67	0.7071	-0.5774	Loser	2	6	Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774	Loser	4	3	Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																																																																																																																																																																											
Malaysia																																																																																																																																																																																																																																			
Family 26	Winner	1	3	0.33	0.67	0.7071	-0.5774																																																																																																																																																																																																																												
	Loser	2	6					Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774	Loser	4	3	Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																																																																																																																																																																																														
Family 27	Winner	1	3	0.20	0.50	-0.5000	0.5774																																																																																																																																																																																																																												
	Loser	4	3					Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071	Loser	3	4	Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																																																																																																																																																																																																									
Family 28	Winner	2	2	0.40	0.67	-0.5774	0.7071																																																																																																																																																																																																																												
	Loser	3	4					Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																																																																																																																																																																																																																				
Family 29	Winner	1	2	0.25	0.71	-0.5774	0.7071																																																																																																																																																																																																																												

	Loser	3	5				
Family 30	Winner	1	2	0.25	0.71	-0.5774	0.7071
	Loser	3	5				
Family 31	Winner	2	3	0.67	0.63	2.0000	-1.1547
	Loser	1	5				
Family 32	Winner	4	2	0.80	0.67	1.0000	-0.7071
	Loser	1	4				
Family 33	Winner	3	2	0.75	0.71	1.0000	-0.7071
	Loser	1	5				
Family 34	Winner	7	2	0.88	0.33	1.0000	-0.7071
	Loser	1	1				
Family 35	Winner	0	1	0.00	0.89	-0.7071	1.0000
	Loser	2	8				
Family 36	Winner	1	2	0.25	0.71	-0.5774	0.7071
	Loser	3	5				
Family 37	Winner	1	1	0.33	0.88	-0.7071	1.0000
	Loser	2	7				
Family 38	Winner	1	2	0.50	0.78	1.0000	-0.7071
	Loser	1	7				
Family 39	Winner	1	2	0.25	0.71	-0.5774	0.7071
	Loser	3	5				
Family 40	Winner	2	1	0.50	0.86	-0.7071	1.0000
	Loser	2	6				
Family 41	Winner	1	2	0.50	0.78	1.0000	-0.7071
	Loser	1	7				
Family 42	Winner	1	1	0.33	0.88	-0.7071	1.0000
	Loser	2	7				
Family 43	Winner	2	1	0.50	0.86	-0.7071	1.0000
	Loser	2	6				
Family 44	Winner	1	1	0.25	0.86	-1.1547	2.0000
	Loser	3	6				
Family 45	Winner	1	1	0.33	0.88	-0.7071	1.0000
	Loser	2	7				
All Family	Winner	34	36	0.44	0.75	0.9583	-0.9765
	Loser	42	109				
Indonesia							
Family 46	Winner	3	2	0.75	0.71	1.0000	-0.7071
	Loser	1	5				
Family 47	Winner	2	2	0.67	0.75	1.0000	-0.7071
	Loser	1	6				
Family 48	Winner	1	3	0.33	0.63	0.7071	-0.5774
	Loser	2	5				

Family 49	Winner	6	1	0.75	0.67	-0.7071	1.0000																																																																																																																																																																																																																												
	Loser	2	2					Family 50	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 51	Winner	2	1	0.29	0.75	-1.7889	4.0000	Loser	5	3	Family 52	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 53	Winner	2	1	0.40	0.83	-1.1547	2.0000	Loser	3	5	Family 54	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	Family 55	Winner	4	1	0.57	0.75	-1.1547	2.0000	Loser	3	3	Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774	Loser	4	4	Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1
Family 50	Winner	3	4	0.50	0.20	0.5774	-0.5000																																																																																																																																																																																																																												
	Loser	3	1					Family 51	Winner	2	1	0.29	0.75	-1.7889	4.0000	Loser	5	3	Family 52	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 53	Winner	2	1	0.40	0.83	-1.1547	2.0000	Loser	3	5	Family 54	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	Family 55	Winner	4	1	0.57	0.75	-1.1547	2.0000	Loser	3	3	Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774	Loser	4	4	Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000						
Family 51	Winner	2	1	0.29	0.75	-1.7889	4.0000																																																																																																																																																																																																																												
	Loser	5	3					Family 52	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 53	Winner	2	1	0.40	0.83	-1.1547	2.0000	Loser	3	5	Family 54	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	Family 55	Winner	4	1	0.57	0.75	-1.1547	2.0000	Loser	3	3	Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774	Loser	4	4	Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000																	
Family 52	Winner	1	1	0.33	0.88	-0.7071	1.0000																																																																																																																																																																																																																												
	Loser	2	7					Family 53	Winner	2	1	0.40	0.83	-1.1547	2.0000	Loser	3	5	Family 54	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	Family 55	Winner	4	1	0.57	0.75	-1.1547	2.0000	Loser	3	3	Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774	Loser	4	4	Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000																												
Family 53	Winner	2	1	0.40	0.83	-1.1547	2.0000																																																																																																																																																																																																																												
	Loser	3	5					Family 54	Winner	5	3	0.71	0.25	0.7071	-0.5774	Loser	2	1	Family 55	Winner	4	1	0.57	0.75	-1.1547	2.0000	Loser	3	3	Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774	Loser	4	4	Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000																																							
Family 54	Winner	5	3	0.71	0.25	0.7071	-0.5774																																																																																																																																																																																																																												
	Loser	2	1					Family 55	Winner	4	1	0.57	0.75	-1.1547	2.0000	Loser	3	3	Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774	Loser	4	4	Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000																																																		
Family 55	Winner	4	1	0.57	0.75	-1.1547	2.0000																																																																																																																																																																																																																												
	Loser	3	3					Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774	Loser	4	4	Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000																																																													
Family 56	Winner	0	3	0.00	0.57	-0.5000	0.5774																																																																																																																																																																																																																												
	Loser	4	4					Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774	Loser	4	2	Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000																																																																								
Family 57	Winner	2	3	0.33	0.40	-0.5000	0.5774																																																																																																																																																																																																																												
	Loser	4	2					Family 58	Winner	1	2	0.50	0.78	1.0000	-0.7071	Loser	1	7	Family 59	Winner	5	2	0.63	0.33	-0.5774	0.7071	Loser	3	1	All Family	Winner	37	29	0.48	0.64	1.1948	-1.2436	Loser	36	52	Pakistan								Family 60	Winner	3	4	0.50	0.20	0.5774	-0.5000	Loser	3	1	Family 61	Winner	1	1	0.25	0.86	-1.1547	2.0000	Loser	3	6	Family 62	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 63	Winner	1	3	0.33	0.63	0.7071	-0.5774	Loser	2	5	Family 64	Winner	1	2	0.25	0.71	-0.5774	0.7071	Loser	3	5	Family 65	Winner	1	1	0.33	0.88	-0.7071	1.0000	Loser	2	7	Family 66	Winner	5	2	0.83	0.60	1.0000	-0.7071	Loser	1	3	Family 67	Winner	1	4	0.25	0.43	0.5774	-0.5000	Loser	3	3	Family 68	Winner	1	4	0.25	0.43	0.5774	-0.5000																																																																																			
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	Loser	3	3				
Family 69	Winner	2	2	0.67	0.75	1.0000	-0.7071
	Loser	1	6				
Family 70	Winner	4	3	0.50	0.00	-0.5000	0.5774
	Loser	4	0				
All Family	Winner	22	26	0.44	0.63	0.3898	-0.1924
	Loser	27	46				
Whole Sample	Winner	202	142	0.57	0.66	-0.9670	1.0070
	Loser	154	270				

Individual Country Analysis

The previous 3 tables show that the four countries have significantly superior persistence at the one month period, according to Z-statistic test. The best performer in performance persistence is Saudi Arabia (1.9160) and then Malaysia (1.8756) with a small difference between them. However Indonesia shows a significant inferior persistence (1.9630). For six-month period, unlike the results in the whole sample analysis section, it shows Malaysia has a significant winning persistence at six-month period (1.9081). For a year period the results similar to the results of the whole sample analysis section, no significant persistence for all countries. In Table II, for Saudi Arabia, the repeat winner z-statistic shows that 2 families of 23 families have a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there is one family of 18 has a significant positive repeat loser z-statistic, implying the persistence of its inferior performance for one-months. Second, for Malaysia, the repeat winner z-statistic shows that one family of 3 families has a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there is one family of 20 has a significant positive repeat loser z-statistic, implying the persistence of its inferior performance for one-months. Third, for Indonesia, the repeat winner z-statistic shows that one family of 5 families has a significant positive repeat winner z-statistic, indicating the persistence of its superior performance, and the same results for repeat loser z-statistic. Finally, for Pakistan, the same results of Indonesia.

In Table III. First, for Saudi Arabia, the repeat winner z-statistic shows that 5 families of 23 families have a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there is two family of 9 have a significant positive repeat loser z-statistic, implying the persistence of its inferior performance for one-months. Second, for Malaysia and Pakistan, the z-statistic show that no family has a significant positive repeat winner and loser z-statistic, indicating no persistence of its superior performance. Third, for Indonesia, the repeat winner z-statistic shows that two families of 7 families have a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there is 6 families of 11 have a significant positive repeat loser z-statistic, implying the

persistence of its inferior performance for one-months. In Table IV. First, for Saudi Arabia, the repeat winner z-statistic shows that two families of 19 families have a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there is two family of 15 have a significant positive repeat loser z-statistic, implying the persistence of its inferior performance for one-months. Second, for Malaysia, the repeat winner z-statistic shows that two families of 8 families have a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there is one family of 19 has a significant positive repeat loser z-statistic, implying the persistence of its inferior performance for one-months. Third, for Indonesia, the repeat winner z-statistic shows that one family of 8 families has a significant positive repeat winner z-statistic, indicating the persistence of its superior performance. While, there is 3 families of 10 have a significant positive repeat loser z-statistic, implying the persistence of its inferior performance for one-months. Finally, for Pakistan, just one family of 7 has a significant positive repeat loser z-statistic.

CONCLUSIONS

For the whole sample, the results concluded that the superior performance of fund families persists for up to one month. That means investors in fund families can use past information for up to one month as a beneficial part of their investment decision-making process. It is concluded that the hot-hand phenomenon exists in fund families. Whereas, the argument of the existence of common management strategies in mutual fund families and the high correlation across managers, by Brown & Goetzmann (1995), perhaps explains some of the short-term persistence. The results also found evidence of Cold-hand families up to one month period. The results found no evidence of long term performance persistence in six-months or longer in both the superior or inferior fund families in our sample.

The theoretical implication of the results of persistent superior performance found in one-month data of fund families is that the efficient market hypothesis in this market may be in its weak form and that the market is informationally less efficient. Most investors are not well-informed, therefore, there is comparatively weaker competition among the informed investors who attempt to compete away the surplus generated by genuinely skilled fund managers. Consequently, the superior fund family performance persists to the following month. In addition, this superior persistence phenomenon could also be because the majority of investors are unsophisticated investors. For individual country analysis, the four countries have superior persistence at one-month period. In addition, Malaysia has superior persistence at six-month. However, Indonesia has an inferior persistence at one-month period.

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