CHAPTER 5

RESEARCH FINDINGS

5.1 INTRODUCTION

The objective of this research is to examine the impact of unit trust family membership on investors risk and return. This is examined first through the analysis of the correlation and common stockholdings within and across fund families. Then the family performance persistence is examined to determine whether the superior performance of a family continues into the subsequent period. Finally, investors' behaviour is explored through the analysis of star phenomenon, the spillover effects and the relationship between the fund flows and the factors concerning fund families. This chapter reports and discusses the research findings of the study.

5.2 IMPACT OF UNIT TRUST FAMILY MEMBERSHIP ON INVESTORS RISK

5.2.1 Fund Return Correlations – Grouped by Conventional Objective

Elton *et al.* (2007) highlighted the risk of investing all one's capital in funds belonging to a single fund family. It is like putting all one's eggs in one basket. Park (2009) also documented a high correlation of funds managed in the same fund family. In view of this, the return correlations of similar objective funds within a fund family and across different families were compared. Using the monthly returns from January 2003 to June 2009, adjusted for dividend, the correlation of fund returns for each pair-wise combination of fund objectives was calculated. For each fund, the fund return correlations with all other funds within the fund family with a given objective were first computed. For example, the correlation between a combined pair of an aggressive growth (long term growth) fund with another aggressive growth (long term growth)

fund within the unit trust fund family or the correlation between a combined pair of an income (bond) fund with another balanced (money market) fund within the fund family are computed. The averages of the pair-wise objective correlation were then computed within a fund family and also inter-family. The two-sample t-test was performed to test whether there was any significant difference in the mean correlation between within family correlation and across family correlation.

Table 5.1 presents the pairwise correlation after grouping the funds into narrowly defined objectives, with the conventional funds and the Islamic funds combined. A total of 22 of the 28 objective pairs were found to have a statistically significant higher return correlation of funds within a unit trust fund family as compared to the return correlation of funds outside the fund family. Funds are grouped into objectives, such as aggressive growth – long term growth (AG–LG), aggressive growth – growth and income (AG-GY), growth and income – balanced (GY-BL), balanced – bond (BL-B), and bond – bond (B-B).

The second column of Table 5.1 shows the within family correlations and the third column shows the corresponding across-family correlations. In the within family correlation it was found that most correlations are positive as expected. The highest correlation is 0.8817 for AG-AG, indicating that the aggressive growth funds within a family are exceptionally highly correlated. It could be due to the portfolio manager tend to focus their investment on the securities that have the potential to grow very rapidly in value, such as the mid cap to small cap companies, which tend to generate major gains during the up market, but their prices plunge during the down market. Hence the returns of these funds are expected to be highly correlated. This very high positive relationship does not give benefits in terms of risk reduction.

The least correlated pair is between LG-MM with a coefficient of 0.0063. There are 3 pairs of funds showing negative correlations, all of which involve money market funds, correlation between GY-MM showing the greatest negative coefficient of -0.2251. From portfolio diversification standpoint, therefore, money market funds would be able to help reduce portfolio risk considerably. Money Market funds hold very short term money market instruments at the lowest risk; while equity funds have the potential for generating high returns over the long term and their volatility is high. Due to the difference in nature, these two funds are expected to be negatively correlated. This negative relationship reflects a good addition to the portfolio. For the between funds correlation, it was found that the highest correlation is 0.7864 for the LG-LG pair, while the lowest is 0.0519 for the MM-MM pair. In addition, there are six pairs showing negative correlation, all of which involved money market funds. As expected, the within family correlations are, in general, higher than the between family correlation with respective averages of 0.4708 and 0.4376. The last column of the table indicates the level of significance of the difference between the pair-wise comparisons of within and between family correlations. The results show that all but 6 of the 29 pairs show a significant difference with significant levels up to 10 per cent. The last row indicates that the within family correlation of 0.4708 is significantly greater than the across family correlation of 0.4376 for all the objectives pair. The high t-statistic of 3.4529 indicates that this difference is significant at the 1 per cent level. The results shown in this table clearly indicate that within family correlations are greater than between family correlations.

Table 5.1

Returns Correlation By Objectives Within And Across Unit Trust Management Companies, January 2003 - June 2009

Fund Objective pairs	Within Family Correlation		Between Family Correlation				
	Correlation	Number	Correlation	Number	t-statistic	p-value	
AG-AG	0.8817	60	0.7709	490	9.1731	0.0000	***
AG-LG	0.8623	118	0.7784	1712	9.3649	0.0000	***
AG-Y	0.7597	32	0.7154	357	1.5966	0.0556	*
AG-GY	0.8165	30	0.7691	500	2.9328	0.0029	***
AG-BL	0.7691	74	0.7380	1008	1.5173	0.0666	*
AG-B	0.2338	124	0.1554	1341	3.5979	0.0002	***
AG-MM	0.0144	54	-0.0864	446	3.2738	0.0009	***
LG-LG	0.7952	179	0.7864	1323	0.5758	0.2827	n.s.
LG-Y	0.7828	42	0.7175	588	3.4912	0.0005	***
LG-GY	0.8400	25	0.7760	847	3.6587	0.0005	***
LG-BL	0.8280	208	0.7412	1555	11.1003	0.0000	***
LG-B	0.1913	204	0.1585	2181	1.9329	0.0267	**
LG-MM	0.0063	81	-0.0689	761	3.1991	0.0009	***
Y-Y	0.7476	3	0.6773	58	0.7555	0.2265	n.s.
Y-GY	0.8363	4	0.7257	171	3.7463	0.0100	***
Y-BL	0.7698	24	0.6923	349	2.4823	0.0067	***
Y-B	0.2317	36	0.1980	466	0.8237	0.2053	n.s.
Y-MM	-0.1159	17	-0.0829	156	-0.7489	0.2275	n.s.
GY-GY	0.7946	20	0.7702	100	1.5372	0.0648	*
GY-BL	0.8326	25	0.7376	451	6.0783	0.0000	***
GY-B	0.1633	46	0.1570	651	0.1689	0.4330	n.s.
GY-MM	-0.2251	6	-0.0779	229	-1.8314	0.0342	**
BL-BL	0.8127	33	0.7125	465	5.2237	0.0000	***
BL-B	0.2137	120	0.1807	1240	1.4988	0.0671	*
BL-MM	0.0100	42	-0.0797	444	3.3740	0.0004	***
B-B	0.3279	96	0.2246	859	3.5310	0.0003	***
B-MM	0.0531	63	-0.0147	614	2.7594	0.0037	***
MM-MM	-0.0769	13	0.0519	103	-1.0745	0.1511	n.s.
ALL	0.4708	(N=1,773)	0.4376	(N=19,465)	3.4529	0.0003	***

Note: This table reports the return correlations by objectives within and between unit trust management companies for the whole sample. The number refers to the number of pair-wise combinations. The sample period covers from January 2003 to June 2009. The t-statistics test the difference between the within and across family correlations. The p-value is reported at significance levels of 1% (***), 5% (**) and 10% (*).

5.2.2 Fund Return Correlation – Grouped by Fund Type

When the same sample funds are grouped into fund types, namely, the Stock funds, the Balanced funds and the Bond funds, consistent results were found as the results in section 5.2.1, the pairwise return correlations of funds are statistically significantly

higher within a fund family than the return correlation of funds between fund families, as reported in Table 5.2. All the pairs are significant at the 1 per cent level. The average correlation between stock funds shows the highest value of 0.8210 for the within family combination and 0.7664 for the across family combination. Funds that invest the majority in stocks are categorised in the fund objective of aggressive growth funds, long term growth funds, growth and income funds and income funds. Balanced funds are invested in both stocks, for growth, and bonds, for income. The average correlation between two balanced funds also shows a high value of 0.8127 for the within family combination and 0.7125 for the across family combination. The pairwise combination of a stock fund and a balanced fund also shows a high average correlation of 0.8140 for the within family combination and 0.7347 for the across family combination. In addition, the average correlation between a stock fund and a bond fund shows a very low value of 0.1465 for the within family combination and 0.1006 for the across family combination. Similarly, the pairwise funds of balanced and bond have a return correlation value of 0.1609 for the within family combination and 0.1120 for the across family combination, which is slightly higher than the pairwise combination of a stock fund and a bond fund pair. For a combination of two bond funds, the within family combination return correlation is 0.1966 and 0.1201 for the across family pair. The results are as expected, this is because stock returns and bond returns are usually inversely related.

Table 5.2

Returns Correlation by Type of Funds (Equity, Balanced and Bond) Within and Across Fund Families, January 2003– June 2009

Fund Objective Pairs	Within Family		Between Family		t-stat	p-value	
	Correlation	number	Correlation	number			
Stock-Stock	0.8210	513	0.7664	6146	8.2051	0.0000	***
Stock-Balanced	0.8140	359	0.7347	3363	11.52	0.0000	***
Stock-Bond	0.1465	618	0.1006	6231	4.4501	0.0000	***
Balanced-Balanced	0.8127	33	0.7125	465	5.2237	0.0000	***
Balanced-Bond	0.1609	162	0.1120	1684	2.4476	0.0072	***
Bond-Bond	0.1966	172	0.1201	1576	3.2259	0.0007	***

Note: This table reports the return correlations by three fund types within and across fund families for the whole sample. The number refers to the number of pair-wise combinations. The sample period covers from January 2003 to June 2009. The t-statistics test the difference between the within and across family correlations. Significant levels are indicated by *** (1%), ** (5%) and * (10%). The p-value is reported at the significance level of 1% (***), 5% (**) and 10% (*).

5.2.3 Funds Return Correlation – with Sub-sample Periods

For a robustness check, the data were divided into three sub-periods based on the market trend as indicated by the Kuala Lumpur Composite Index from January 2003 through June 2009. The first sub-period corresponds to the stable market situation, from January 2003 to May 2006; the second sub-period refers to an uptrend market, from June 2006 to December 2007; and the third sub-period corresponds to the down-trend market, from January 2008 to June 2009. This division is in accordance with Ang and Chen (2002), Butler and Joaquin (2001), and Wang's (2007) study of portfolio diversification. In their studies, the samples were broken down into sub-periods according to the economic conditions. According to Ang and Chen (2002), correlations between U.S. stocks and the aggregate U.S. market are much greater during the downside moves than during the upside moves. Longin and Solnik (2001) argued that correlation is not related to market volatility, but to the market trend, and that correlation increases in the bear markets, but not in the bull markets.

Table 5.3(a), Table 5.3(b) and Table 5.3(c) report the within and across families average correlation of each objective pair for three sub-periods respectively.

Table 5.3(a) reports the within and across families average correlation for each objective pair for the stable period of January 2003 to May 2006. The second column of Table 5.3(a) presents the within family correlations and the third column shows the corresponding across-family correlations. Most of the within family correlation is found to be positively correlated. The highest correlation is 0.8855 for AG-AG, indicating that the aggressive growth funds within a family are highly correlated. The least correlated pair is between B-MM with a coefficient of 0.0481. Similar to the whole sample study, 3 pairs of funds show negative correlations, all of which involve money market funds. For the between funds correlation, it was found that the highest correlation is 0.7679 for LG-LG pair, while the lowest is 0.0651 for the GY-MM pair. There are also 6 pairs showing a negative correlation which doubles the number of pairs for the within family correlation. The last column of the table indicates the level of significance of the difference between the pair-wise comparisons of within and between family correlations. The results indicate that 18 of the 28 pairs show a significant difference with significant levels up to 10 per cent. Consistent with the whole sample analysis, the within family correlations are, in general, higher than the between family correlation with the respective averages of 0.4765 and 0.4344, as reported in the last row. This difference is significant at the 1 per cent level. The results shown in this table clearly indicate that within family correlations are greater than between family correlations.

Table 5.3(a)

Returns Correlation by Objectives Within and Across Unit Trust Families, for sub-period January 2003 - May 2006 (Stable)

	Within Family Correlation		Between Family Correlation				
	Corr.	number	Corr.	number	t-stat	p-value	Sig
AG-AG	0.8855	42	0.7227	418	9.0541	0.0000	***
AG-LG	0.8715	96	0.7404	1455	9.8817	0.0000	***
AG-Y	0.8278	18	0.6421	244	5.5677	0.0000	***
AG-GnY	0.7601	25	0.6591	399	3.9496	0.0002	***
AG-BL	0.7888	64	0.6947	818	3.6353	0.0001	***
AG-B	0.1662	79	0.0962	953	2.1907	0.0143	**
AG-MM	0.1388	20	-0.13	257	4.9196	0.0000	***
LG-LG	0.7819	145	0.7679	1137	0.7528	0.2264	n.s
LG-Y	0.7519	25	0.6698	407	2.2063	0.0139	**
LG-GnY	0.7254	18	0.6819	691	1.1662	0.1220	n.s
LG-BL	0.8046	185	0.7241	1285	7.3038	0.0000	***
LG-B	0.1118	139	0.0975	1577	0.7307	0.2330	n.s
LG-MM	0.0599	49	-0.104	428	6.0752	0.0000	***
Y-Y	0.7036	2	0.6586	34	0.2855	0.3885	n.s
Y-GY	0.7095	2	0.5555	108	0.7789	0.2189	n.s
Y-BL	0.7082	14	0.6471	236	1.1256	0.1307	n.s
Y-B	0.1779	19	0.185	263	-0.096	0.4619	n.s
Y-MM	-0.0563	4	-0.224	77	3.3592	0.0060	***
GY-GY	0.7194	18	0.5567	73	5.5856	0.0000	***
GY-BL	0.7449	20	0.6313	357	3.9423	0.0003	***
GY-B	-0.0218	40	0.0651	433	-1.5	0.0705	*
GY-MM	0.6213	2	-0.098	124	4.5138	0.0000	***
BL-BL	0.7924	30	0.7003	363	3.3701	0.0009	***
BL-B	0.1462	80	0.1391	864	0.2909	0.3858	n.s
BL-MM	-0.0166	26	-0.102	243	2.5656	0.0071	***
B-B	0.2951	44	0.2079	520	1.2865	0.1023	n.s.
B-MM	0.0481	31	-0.092	304	1.9917	0.0274	**
MM-MM	0.1429	3	0.0934	47	0.1913	0.4330	n.s
ALL	0.4765	1240	0.4344	14115	3.5376	0.0002	***

Note: This table reports the return correlations by fund objectives within and across unit trust fund families for the sub-period January 2003 to May 2006, the stable period. The number refers to the number of pair-wise combinations. The p-value is compared to the confidence level of 1%, 5% and 10%. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

Table 5.3(b) shows the results of the within and across families average correlation of each objective pair for the sub-period June 2006 to December 2007, which is an uptrend market. The second column of Table 5.3(b) reports the within family correlations and the third column exhibits the pairwise across-family correlations. The highest correlation is 0.8273 for AG-AG, consistently indicating that the aggressive growth funds within a family are highly correlated. The least correlated pair is between B-MM

with a coefficient of 0.1301. For the between funds correlation, it was found that the highest correlation is 0.7486 for GY-GY pair, while the lowest is 0.0877 for the B-MM pair. All pairs of funds, within and across, show positive correlations, even those involving the MM funds that are normally negatively correlated with other funds in the normal period. This is one feature that makes this sub-period different from the stable sub-period discussed above. The analysis shows that all pairwise return correlations for the within family combination are higher than the across family combination, except the pair of GY-MM, which is insignificant. The last column of the table indicates the level of significance of the difference between the pair-wise comparisons of within and between family correlations. The results indicate that 19 of the 28 pairs show a significant difference with significant levels up to 10 per cent. Consistently, the results shown in this table apparently specify that the average within family correlations of 0.5160 is greater than between family correlations of 0.4371. This difference is significant at the 1 per cent level.

Table 5.3 (b)

Returns Correlation by Objectives Within and Across Unit Trust Families, for Sub-period June 2006 to December 2007 (Bull)

	Within Family Correlation		Between Family Correlation			Significant	
	Corr.	number	Corr.	number	t-stat	p-value	Sig
AG-AG	0.8273	43	0.6619	445	7.2486	0.0000	***
AG-LG	0.8261	105	0.6828	1586	9.3745	0.0000	***
AG-Y	0.7456	28	0.5842	334	3.5803	0.0002	***
AG-GY	0.7899	26	0.6989	412	2.5760	0.0052	***
AG-BL	0.7676	66	0.6438	886	5.4529	0.0000	***
AG-B	0.3960	108	0.2305	1269	5.5005	0.0000	***
AG-MM	0.2869	46	0.1381	419	2.9730	0.0016	***
LG-LG	0.7430	162	0.7091	1285	1.9392	0.0270	**
LG-Y	0.7612	42	0.6138	577	4.7459	0.0000	***
LG-GY	0.8064	19	0.7371	732	3.1640	0.0024	***
LG-BL	0.8019	208	0.6632	1555	11.3723	0.0000	***
LG-B	0.2445	204	0.2240	2144	0.8842	0.1887	n.s
LG-MM	0.3051	78	0.1271	688	4.6508	0.0000	***
Y-Y	0.6545	3	0.5541	58	0.7911	0.2160	n.s
Y-GY	0.7165	4	0.6363	148	0.8762	0.1912	n.s
Y-BL	0.7459	22	0.5809	325	3.2195	0.0007	***
Y-B	0.3404	36	0.2703	463	1.3406	0.0903	*
Y-MM	0.1844	17	0.1149	143	0.8405	0.2009	n.s
GY-GY	0.7659	18	0.7486	73	0.9583	0.1718	n.s
GY-BL	0.8247	20	0.6907	370	5.2708	0.0000	***
GY-B	0.2596	44	0.2393	568	0.4527	0.3255	n.s
GY-MM	0.1312	4	0.1609	189	-0.8520	0.2071	n.s
BL-BL	0.7896	30	0.6215	396	6.0914	0.0000	***
BL-B	0.2647	118	0.2220	1150	1.3888	0.0836	*
BL-MM	0.3116	39	0.1223	377	3.5321	0.0002	***
B-B	0.2964	93	0.2494	859	1.3547	0.0879	*
B-MM	0.1301	63	0.0877	561	1.0657	0.1435	n.s
MM-MM	0.2243	13	0.1257	81	0.7231	0.2408	n.s
ALL	0.5160	1659	0.4371	18093	8.6261	0.0000	***

Note: This table reports the return correlations by fund objectives within and across unit trust fund families for the sub-period June 2006 to December 2007, the bull period. The number refers to the number of pair-wise combinations. The p-value is compared to the confidence level of 1%, 5% and 10%. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

Table 5.3(c) reports the results of the within and across families average correlation of each objective pair for the sub-period January 2008 - March 2009, which is the down trend market. The second column of Table 5.3(c) reports the within family correlations and the third column exhibits the pairwise across family correlations. The highest correlation is 0.8955 for Y-GY, revealing that the aggressive growth funds within a family are highly correlated. The least correlated pair is between B-MM with a coefficient of 0.0353. For the between funds correlation, it was found that the highest correlation is 0.8723 for AG-AG and AG-Y pairs, while the lowest is 0.0534 for the

MM-MM pair. The results indicate that 17 of the 28 pairs show a significant difference with significant levels up to 10 per cent. The results shown in this table indicate that the average correlation within family and the between family average correlation is not significantly different during the decreasing period although the within family correlation of 0.4735 is still greater than the between family correlation of 0.4603. Given the probability value of 0.1081, we deduce that it may be considered to be marginally significant at 10 per cent because it is right on the critical value.

Table 5.3 (c)

Returns correlation by objectives Within and Across Unit Trust Families, for sub-period January 2008 - March 2009 (Bear)

	Within Family Correlation		**Between Family Correlation**				
	Corr.	**number**	**Corr.**	**number**	**t-stat**	**p-value**	
AG-AG	0.8936	60	0.8723	458	1.4902	0.0703	*
AG-LG	0.8706	118	0.8522	1712	1.5294	0.0632	*
AG-Y	0.7744	31	0.8723	458	-3.7777	0.0003	***
AG-GY	0.8716	30	0.8371	486	2.4284	0.0100	***
AG-BL	0.796	72	0.8237	972	-1.1969	0.1176	n.s
AG-B	0.202	123	0.1761	1298	0.9572	0.1693	n.s
AG-MM	-0.087	53	-0.223	433	3.3108	0.0008	***
LG-LG	0.8186	178	0.8239	1262	-0.3277	0.3717	n.s
LG-Y	0.7727	42	0.7844	573	-0.5221	0.3009	n.s
LG-GY	0.8475	25	0.8062	833	1.2758	0.1012	n.s.
LG-BL	0.8442	208	0.7963	1515	5.4762	0.0000	***
LG-B	0.1841	210	0.1592	2130	1.0713	0.1426	n.s
LG-MM	-0.17	81	-0.202	745	1.3085	0.0968	*
Y-Y	0.7751	3	0.7705	58	0.0647	0.4743	n.s
Y-GY	0.8955	4	0.7849	171	4.0672	0.0076	***
Y-BL	0.8169	24	0.7697	349	1.7417	0.0412	**
Y-B	0.2104	36	0.1951	466	0.3131	0.3772	n.s
Y-MM	-0.221	17	-0.212	156	-0.1681	0.4334	n.s
GY-GY	0.8553	20	0.8139	100	1.9914	0.0268	**
GY-BL	0.8794	25	0.7895	451	7.1622	0.0000	***
GY-B	0.2646	46	0.1767	651	1.7434	0.0437	**
GY-MM	-0.498	6	-0.211	229	-6.3697	0.0004	***
BL-BL	0.8239	33	0.7793	465	1.8348	0.0336	**
BL-B	0.2344	120	0.214	1239	0.7423	0.2290	n.s
BL-MM	-0.195	42	-0.208	444	0.3811	0.3516	n.s
B-B	0.3955	96	0.3154	858	2.1486	0.0169	**
B-MM	0.0353	63	-0.033	614	2.0975	0.0198	**
MM-MM	-0.127	13	0.0534	103	-1.4902	0.0800	*
ALL	0.4735	1779	0.4603	19229	1.2366	0.1081	*

Note: This table reports the return correlations by fund objectives within and across unit trust fund families for the sub-period January 2003 to June 2009, the bear period. The number refers to the number of pair-wise combinations. The p-value is compared to the confidence level of 1%, 5% and 10%. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

The sample is broken into three sub-periods in accordance to the market trend – the stable, the uptrend and the down trend market, in the correlation analysis. The results show that the within family return correlation is significantly higher than the between family return correlation at 1 per cent during the stable and the uptrend market. But, the difference is only marginally significant at 10 per cent during the down trend market. It is concluded that the market trend is not an important factor in determining the correlation, hence no diversification impact to the investors. Table 5.4 summarises the results reported in Tables 5.1 and 5.3, which facilitates a comparison. For the whole sample a total of 22 pairs out of 28 have statistically significant higher return correlations of funds within a fund family than the return correlations of funds across fund families. There are 18, 19 and 18 pairs out of the 28 pairs of funds, which exhibit that the return correlations within a fund family is statistically significantly higher than the return correlations across fund families in the three sub-periods, respectively.

The percentage of significant pairs for the whole period of 78.57 per cent, being computed as 22 significant objective combinations, divided by 28, the total different objective combinations. The same applies to the sub-periods. The reported percentages of significant pairs are generally high, with the stable and bear period of 64.29 per cent and 67.86 per cent; and the bull period of 67.36 per cent. The overall results show that the stable sub-period and the bull sub-period show consistent results with the whole sample period, which indicates that the return correlations within a fund family are significantly greater than the return correlations across fund families. The bear sub-periods report an insignificant difference.

Table 5.4

Summary of Results Showing Significance of Return Correlations Within and Between Fund Families

	Whole		Stable		Bull		Bear	
	sig	n.s.	sig	n.s.	sig	n.s.	sig	n.s.
Equity-Equity	8	2	6	4	7	3	7	3
Equity -BL	4		3	1	4		3	1
Equity-B	5	3	5	3	4	4	4	4
BL-BL	1		1		1		1	
BL-B	2		1	1	2		0	2
B-B	2	1	2	1	1	2	3	
	22	6	18	10	19	9	18	10
% of sig pairs	78.57		64.29		67.86		64.29	
Overall	Sig at 1%		Sig at 1%		Sig at 1%		Sig at 10%	

Note: This table summarises all the results, which allows for a comparison. The number is the count of the number of significant pairwise correlations, using 90 per cent confidence level.

The evidence presented in this section rejects the $H_0 1$ in favour of $H_a 1$ hypothesis, which states that the correlation of the return of funds within a fund family is higher than across fund families. Hypothesis 1 is designed to examine the return correlation of similar objective funds within a fund family as compared to across different families, where the unit trust family risk is investigated through the fund return correlation. This research finding is in line with the evidence reported in the U.S. mutual funds study carried out by Elton *et al.* (2007), who examined the mutual funds in the CRSP database, for the period of January 1998 to December 2002. The authors found evidence that funds with the same objectives were more closely correlated within the fund family than across other fund families.

The above results signify that the fund return correlation within a fund family in Malaysia is consistently and significantly higher than the return correlation across fund families, even though this higher return correlation is insignificant at 5 per cent during the down market. Since the correlation of financial asset returns represents the major component in the portfolio risk of assets, the higher asset's return correlation of funds within a fund family has an impact on increasing the risk level for the unit trust

investors who invest their money in funds that are managed in one fund family. Therefore, it is concluded that investing in funds within a fund family in Malaysia would lead to higher portfolio risk than investing in funds across different fund families. Thus, keeping investments in a single fund family can increase risk and reduce diversification. This is possibly because although Malaysian fund families sell funds with different names, different growth potential and different objectives, their risk profiles are generally the same. These fund families attempt to capture market shares by offering a wide range of products. However, due to the limitation of sharing the research resources in a company, the funds that a fund family offers tend to have a very similar investment objective or market view, which leads to the high commonality of funds within a fund family.

The main implication in this part of the research is that limiting investment to one fund family brings about greater total portfolio risk than diversifying across different fund families. The higher risk is because funds within a family have a higher correlation than when funds are selected from two families.

5.2.4 Common Stockholdings

In the previous section, it was found that the correlation within the family is higher than across families. One possible reason for this result is that there is greater common holding of stocks among funds within a family as opposed to across families. In this section, the magnitude of common stock holdings of funds is examined. This analysis is done following the evidence established by Elton *et al.* (2007) who showed that the higher common holding within a fund family explains about two-thirds of the higher returns correlation of within family fund pairs as compared to the across families pairs.

Table 5.5 reports the common stock holdings for all the equity funds, as at 31 Dec 2007 to 31 May 2008, separating into within fund family group and across fund families group. Column 2 in Table 5.5 shows the within family common holding of stocks and column 3 reports the corresponding across family common holding of stocks. Column 4 presents the ratio of the amount of common holdings within family (column 2) to the amount of common holdings across families (column 3). It is the number of times the within family common holdings is greater than the across family common holdings. This ratio range from 1.5 times to 2.7 times for different pairwise objectives. The highest common holding is 32.14 per cent for Y-Y, indicating that the stocks held in income funds within a family are highly in common. The lowest percentage of stocks held in common is between AG-AG at 19.40 per cent. For the between funds common holding of stocks, it is found that the highest common holding is 16.06 per cent for the LG-LG pair, while the lowest is 11.05 per cent for the GY-GY pair. The GY-Y pair has the largest difference of 19.51 per cent; the within family common holding is 2.7 times greater than the across family common holding. The AG-Y pair reports the smallest difference of 8.75 per cent, which within the family common holding is 1.7 times greater than the across family common holding. As expected, the average portfolio in common within families is nearly two times (24.92 per cent) greater than the common holdings of the across families funds (14.79 per cent). The last column of the table indicates the level of significance of the difference between the pair-wise comparison of within and between family common stock holdings. The overall result in the last row shows that all the pairwise differences are highly significant at 1 per cent. As expected, the common portfolio holding of pairwise funds within families is consistently higher, by about twice, for all the categories than when the pair is made up of funds across fund families.

The evidence presented rejects the $H_0$2 in favour of the H_a2 hypothesis, which states that the common stock holdings in unit trusts within a fund family is higher than the holdings across fund families. This research finding is consistent with Elton *et al.* (2007) when examining the cause of the increased correlation in a fund family and documented an unexpectedly high level of common holdings when within family fund stock holdings were compared with the across family funds. They found that all the percentages of the pairwise combinations were more than twice in magnitude the percentage of the common holdings in the same category when a fund within family was compared to a fund across family. Our finding is closely related to the higher correlation found in funds within a fund family documented in the earlier testable hypothesis. This result implies that stocks in funds within a fund family in Malaysia are more common holdings than stock in funds across families. Again, this finding supports the argument concerning the commonality of funds within a fund family being higher than funds outside the fund family. This higher commonality could be caused by: (1) sharing of research resources by the portfolio managers in a fund family; (2) a specified investment style applies to all funds in a family; (3) the relation of the fund family with some investment firm leads to the common holding of new shares offered; (4) a similar view on the economy stance leads to a similar decision in portfolio exposure; and (5) a fund family has a company policy to achieve the total profits for the company as a whole, which leads to an increase in the number of funds offered to capture market shares. Massa (1998) and Khorona and Servaes (2003) provided evidence that a mutual fund company can increase market shares by differentiating their products or through a strategy to own a star fund by offering an increased number of funds to attract investment.

Table 5.5

Common Holding of Stocks for Funds Within and Across Funds Families

	Within Family		Across Family					
	Common Holding	number	Common Holding	number	Ratio of Within to Across	t-stat	p-value	
AG-AG	19.40	60	12.87	1057	1.5	3.804	0.0002	***
AG-LG	26.43	132	14.08	3444	1.9	9.520	0.0000	***
AG-GnY	24.43	16	12.25	662	2.0	3.771	0.0009	***
AG-Y	20.71	31	11.96	704	1.7	3.627	0.0005	***
LG-LG	27.67	140	16.06	2404	1.7	8.118	0.0000	***
LG-GnY	27.72	20	13.68	990	2.0	3.569	0.0010	**
LG-Y	21.85	54	13.46	1066	1.6	5.613	0.0000	***
GnY-GnY	21.80	4	11.05	82	2.0	1.143	0.1681	n.s.
GnY - Y	31.21	7	11.70	206	2.7	5.854	0.0000	***
Y-Y	32.14	3	12.34	106	2.6	2.899	0.0506	**
average	24.92	(N=467)	14.79	(N=10,721)	1.7	16.154	0.0000	***

Note: This table shows the average percentage of stockholding in common for funds within and across fund companies. The common percentage holdings for each pair of funds is calculated as $\sum_i \min(X_{iA}, X_{jA})$, where X_{iA} is the fraction of fund i's portfolio invested in stock A and X_{jA} is the fraction of fund j's portfolio invested in stock A. It is expressed as a percentage of Net Asset Value. The calculated common percentage holding is averaged within and across fund companies. The two-sample t-test will then be performed to test whether there are any significant differences in the mean of common holding within company and between companies in the same category.

5.2.5 Conventional Versus Islamic Funds

In this section, based on the rationale that the level of diversification is different between the conventional funds and Islamic funds, which arises from the Shariah restriction on investment, the analysis is carried out by dividing the sample into the conventional objective classification and the Islamic objective classification, even though studies showed that there was no significant different in performance in these two groups of funds (Hakim and Rashidian (2004); Hussien (2004)). However, Abdullah, Hassan and Mohamed (2007) showed that conventional funds have a marginally better diversification level than the Islamic funds, while Han and Rarick (2009) commented that several issues including diversification cause Islamic finance to remain as a niche in the financial services industry.

Table 5.6 reports the within and across families average correlation of each objective pair after categorising fund objectives into the Islamic and conventional objectives. The within family correlations and the corresponding between-family correlations are reported in column 2 and column 3 in Table 5.6. In the within family correlation, again, it is found that most (83 out of 97) correlations are positive as expected. The highest correlation is 0.9022 for AG-AG, indicating that the aggressive growth funds within a family are highly correlated. The aggressive growth and the Islamic aggressive growth funds within a family have a slightly lower correlation of 0.8722, indicating that the fund correlation decreases when Islamic funds are taken into account. The lowest correlated pair is between IAG-MM with a coefficient of 0.0036. There are 14 pairs of funds showing negative correlation, all of which involve money market funds, similar to the results reported in Table 5.1. For the between funds correlation, it is found that the highest correlation is 0.7941 for ILG-ILG pair, while the lowest is 0.0126 for the GY-IMM pair. There are also 21 pairs showing a negative correlation, which are the equity fund objectives pairing with money market funds. Quite similar pairs are seen for the within family correlation. As expected, the within family correlations are, in general, higher than the between family correlation with the respective averages of 0.3016 and 0.2701. The last column of the table indicates the level of significance of the difference between the pair-wise comparisons of within and between family correlations. The results indicate that 49 of the 97 pairs (not shown in the table) show a significant difference with significant levels at 5 per cent. Again, the return correlations of the within family group are generally greater than the across families pairs for the majority combinations when the Islamic objectives are differentiated. There are two pairwise combinations that gives the statistically opposite result which is significant at 1 per cent – the IAG-Y and LG-IMM. Some pairs of mean correlations do show an insignificant difference between the within and the across management companies.

Table 5.6

Return Correlations Difference By Objectives Within And Across Unit Trust Families, Differentiating The Shariah Objective And The Conventional Objective, January 2003 - June 2009

Fund Objective Pairs	Within Family Correlation		Between Family Correlation				
	Correlation	Number	Correlation	Number	t-stat	p-value	
AG-AG	0.9022	27	0.7703	345	7.9027	0.0000	***
AG-IAG	0.8722	27	0.7719	137	5.3699	0.0000	***
AG-LG	0.8752	67	0.7781	987	7.7298	0.0000	***
AG-ILG	0.8499	25	0.7739	445	3.8043	0.0003	***
AG-Y	0.7355	18	0.7070	248	0.7680	0.2216	n.s.
AG-IY	0.8816	6	0.7736	48	4.5708	0.0001	***
AG-GY	0.8231	18	0.7823	335	1.4619	0.0723	*
AG-IGY	0.7812	4	0.7094	77	1.1201	0.1330	n.s.
AG-BL	0.7946	38	0.7246	525	3.5901	0.0004	***
AG-IBL	0.7255	22	0.7563	310	-0.5422	0.2966	n.s.
AG-B	0.2707	47	0.1505	712	3.3232	0.0005	***
AG-IB	0.2079	39	0.1590	399	1.3574	0.0906	*
AG-MM	0.0038	29	-0.0583	270	2.4958	0.0083	***
AG-IMM	-0.0970	10	-0.1366	100	0.7057	0.2409	n.s.
IAG-IAG	0.8319	6	0.7905	9	0.8613	0.2023	n.s.
IAG-LG	0.8545	22	0.7852	207	4.5141	0.0000	***
IAG-ILG	0.7667	4	0.7827	101	-0.8415	0.2053	n.s.
IAG-Y	0.6133	4	0.6897	53	-2.7746	0.0055	***
IAG-IY	0.8318	4	0.7941	8	0.7520	0.2347	n.s.
IAG-GY	0.8188	7	0.7772	71	2.6411	0.0067	***
IAG-BL	0.7253	10	0.7349	107	-0.3058	0.3823	n.s.
IAG-IBL	0.8759	4	0.7632	66	1.8917	0.0314	**
IAG-B	0.2287	19	0.1670	152	1.0223	0.1541	n.s.
IAG-IB	0.2007	19	0.1574	78	0.7391	0.2308	n.s.
IAG-MM	0.0036	12	-0.1078	55	2.0140	0.02408	**
IAG-IMM	-0.1812	4	-0.1531	21	-0.3076	0.38057	n.s.
LG-LG	0.8537	84	0.7928	625	5.8875	1.9E-08	***
LG-ILG	0.8654	89	0.7779	575	9.0149	1.9E-16	***
LG-Y	0.7330	20	0.7024	336	1.1047	0.14036	n.s.
LG-IY	0.8529	11	0.7800	65	2.2587	0.01343	**
LG-GY	0.8333	21	0.7805	503	2.5624	0.00871	***
LG-BL	0.8009	101	0.7357	922	5.0059	3.3E-07	***
LG-IBL	0.7915	58	0.7592	513	1.7716	0.0405	**
LG-B	0.1664	123	0.1584	1027	0.3580	0.36021	n.s.
LG-IB	0.2008	74	0.1667	623	1.3024	0.09661	*
LG-MM	0.0697	47	-0.0534	402	4.3585	3E-05	***
LG-IMM	-0.2375	11	-0.0918	153	-3.2068	0.00317	***
ILG-ILG	0.0041	16	0.0126	136	5.3274	6.3E-06	***
ILG-Y	0.8203	14	0.7217	182	3.5865	0.00105	***
ILG-IY	0.8226	3	0.7870	35	0.4668	0.32173	n.s.
ILG-GY	0.8812	5	0.7831	221	4.1947	0.00427	***
ILG-BL	0.8259	40	0.7327	407	5.3409	1.1E-06	***
ILG-IBL	0.8433	29	0.7724	222	3.7536	0.00022	***

Table 5.6 (Continue…)

Fund Objective Pairs	Within Family Correlation		Between Family Correlation				
	Correlation	Number	Correlation	Number	t-stat	p-value	
ILG - B	0.1615	49	0.1473	453	0.4104	0.3415	n.s.
ILG - IB	0.2236	27	0.1590	275	1.4134	0.0793	*
ILG - MM	0.0472	20	-0.0440	183	2.0274	0.0220	**
ILG - IMM	-0.1510	5	-0.1363	67	-0.1734	0.4314	n.s.
Y-Y	0.8355		0.6832		7.2875	-	
Y-IY	0.7382	2	0.7335	20	0.0434	0.4829	n.s.
Y-GY	0.8556	9	0.7269	135	6.9495	0.0000	***
Y-IGY	0.8094	3	0.6773	30	4.4389	0.0006	***
Y-BL	0.7742	21	0.6797	256	2.8153	0.0026	***
Y-IBL	0.7438	12	0.6988	141	1.0902	0.1387	n.s.
Y-B	0.2229	32	0.1764	390	0.8697	0.1926	n.s.
Y-IB	0.1981	15	0.2065	174	-0.1608	0.4362	n.s.
Y-MM	-0.0768	10	-0.0645	111	-0.2111	0.4166	n.s.
Y-IMM	-0.1570	3	-0.1653	41	0.0803	0.4682	n.s.
IY-BL	0.7380	4	0.7500	46	-0.1785	0.4296	n.s.
IY-IBL	0.8357	3	0.7860	25	0.9186	0.1834	n.s.
IY-B	0.2656	5	0.2469	51	0.1473	0.4417	n.s.
IY-IB	0.2157	5	0.2515	29	-0.2714	0.3939	n.s.
IY-MM	-0.0320	4	-0.0541	18	0.2548	0.4007	n.s.
IY-IMM	-0.2043	2	-0.1019	6	-1.0628	0.1644	n.s.
GY-GY	0.7937	17	0.7984	61	-0.2682	0.3949	n.s.
GY-IGY	0.7994	3	0.7295	36	1.0476	0.1508	n.s.
GY-BL	0.8100	20	0.7394	306	2.7027	0.0036	**
GY-IBL	0.8704	9	0.7589	169	6.4425	0.0000	***
GY-B	0.2091	24	0.1609	337	0.8737	0.1914	n.s.
GY-IB	0.1230	17	0.1569	203	-0.5889	0.2783	n.s.
GY-MM	-0.2642	3	-0.0518	135	-1.2732	0.1655	n.s.
GY-IMM	-0.1430	2	-0.1662	50	0.1481	0.4414	n.s.
IGY-BL	0.7855	5	0.6787	70	1.8488	0.0343	**
IGY-B	0.1447	7	0.1481	76	-0.0270	0.4897	n.s.
IGY-IB	0.2245	4	0.1635	47	0.4019	0.3573	n.s.
BL-BL	0.8081	16	0.6947	284	4.4977	0.0001	***
BL-IBL	0.7770	26	0.7210	324	2.2434	0.0127	**
BL-B	0.2154	59	0.1723	641	1.3417	0.0901	***
BL-IB	0.2012	38	0.1969	389	0.1220	0.4515	n.s.
BL-MM	0.0231	22	-0.0510	252	1.5835	0.0635	**
BL-IMM	-0.1309	6	-0.1215	94	-0.1420	0.4437	n.s.
IBL-IBL	0.7946	4	0.7618	87	0.6629	0.2545	n.s.
IBL-B	0.1601	32	0.1747	360	-0.3180	0.3753	n.s.
IBL-IB	0.2134	20	0.1944	218	0.3758	0.3537	n.s.
IBL-MM	0.0331	15	-0.0657	140	2.1165	0.0180	**
IBL-IMM	-0.1314	5	-0.1402	51	0.2246	0.4140	n.s.
B-B	0.2782	32	0.1804	346	2.0273	0.0252	**
B-IB	0.3412	50	0.2331	426	2.6902	0.0047	***
B-MM	0.0875	27	-0.0137	291	2.5039	0.0092	***
B-IMM	-0.0538	5	-0.0295	107	-0.6423	0.2722	n.s.
IB-IB	0.3179	11	0.3183	125	-0.0041	0.4984	n.s.
IB-MM	0.0917	21	-0.0018	166	2.2816	0.0163	**
IB-IMM	0.0161	5	-0.0326	63	0.7004	0.2431	n.s.
MM-MM	-0.2379	8	0.0210	55	-1.5936	0.0775	*
MM-IMM	0.1807	5	0.0912	43	0.9265	0.1795	n.s.
Average /Total	0.3016	(N=1988)	0.2701	(N=21257)	-1.6484	0.0500	**

Note: This table reports the return correlations by Islamic and conventional funds objectives within and between unit trust fund families for the whole sample. The number refers to the number of pair-wise combinations. The sample period covers from January 2003 to June 2009. The p-value is compared to the confidence level of 1%, 5% and 10%. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

The first two columns in Table 5.7 reports the correlation of the pair-wise combinations of Islamic-Islamic, Conventional-conventional, and conventional-Islamic for the within and between families. Only the equity funds and balanced funds are included in the analysis. The last column of the table indicates the level of significance of the difference between the pair-wise comparisons of the combinations in the study.

The table shows that for the within fund family return correlations, the pairwise combination consisting of an Islamic fund and a conventional fund of 0.8207 is significantly lower than the average correlation of a pairwise combination consisting of two Islamic funds of 0.8492 at 1 per cent; which mean the return correlation of two Islamic funds is more closely correlated as compared to two mix funds of an Islamic and conventional fund. However, the pairwise combination that consists of an Islamic fund and a conventional fund of 0.8207 is insignificantly different from the average correlation of the two conventional funds pair of 0.8231. The mean return correlation of pairwise combination consisting of two Islamic funds of 0.8492 is significantly higher than the average correlation of a pairwise combination consisting of two conventional funds of 0.8231 at 1 per cent. Similarly for the between fund family return correlations, the average correlation of an Islamic fund paired with a conventional fund of 0.7526 is significantly lower than the average correlation of the two Islamic funds pair of 0.7753. However, the correlation of a pairwise combination that consists of an Islamic fund and a conventional fund of 0.7526 is higher than the average correlation of a pairwise combination that consists of two conventional funds of 0.7490. It is significant at 10 per cent. The mean return correlation of pairwise combination consisting of two Islamic funds of 0.7753 is significantly higher than the average correlation of a pairwise combination consisting of two conventional funds of 0.7490 at 1 per cent. Again, the

results indicate that the return correlation of two Islamic funds is more closely correlated as compared to the return correlation of two conventional funds.

Correspondingly for the combined result within and between fund family return correlations, the average correlation of an Islamic fund paired with a conventional fund of 0.7584 is significantly lower than the average correlation of the two Islamic funds pair of 0.7813. However, the correlation of a pairwise combination that consists of an Islamic fund and a conventional fund of 0.7584 is higher than the average correlation of a pairwise combination that consists of two conventional funds of 0.7545. It is significant at 10 per cent. The mean return correlation of the pairwise combination consisting of two Islamic funds of 0.7813 is significantly higher than the average correlation of a pairwise combination consisting of two conventional funds of 0.7545 at 1 per cent. This result signifies that there is room for risk reduction when investing in funds across conventional and Islamic objectives for both within family funds and across family fund combinations.

In addition, it is noticed that even if the cross investment in Islamic and conventional funds is taken into account, the within family correlations are still higher that the across families' combinations where two Islamic funds are paired (within family 0.8492 and across families 0.7753), two conventional funds are paired (within family 0.8231 and across families 0.7490) and when an Islamic fund is paired with a conventional fund (within family 0.8207 and across families 0.7526). This also supports our earlier findings that the correlation of return of funds within a fund family is higher than across fund families.

This evidence rejects $H_0$3(a) in favour of H_a3(a) - that the mean return correlation of only Islamic funds is greater than the correlation of a combination of Islamic and conventional funds. However, we cannot reject $H_0$3(b) of the mean return correlation of only conventional funds is the same as the correlation of a combination of Islamic and conventional funds. The evidence discussed above rejects $H_0$3(c) in favour of H_a3(c) – that mean return correlation of only the Islamic funds is greater than the mean return correlation of only the conventional funds, within family and across families. The findings is in line with Abdullah, Hassan and Mohamad (2007) who documented that conventional funds have a marginally better diversification level than the Islamic funds although both Islamic and conventional funds have diversification levels less than 50 per cent of the diversification level of the market portfolio.

On the other hand, the evidence rejects $H_0$3(d) in favour of H_a3(d) - that the mean return correlation of only the Islamic funds within family is greater than the mean return correlation of only the Islamic funds across families. $H_0$3(e) is also rejected in favour of H_a3(e) - that the mean return correlation of only the conventional funds within family is greater than the mean return correlation of only the conventional funds across families. Likewise, $H_0$3(f) is also rejected in favour of H_a3(f) - that the mean return correlation of a combination of Islamic and conventional funds within family is greater than the mean return correlation of a combination of Islamic and conventional funds across families. This research evidence is in line with the finding reported by Elton, Gruber and Green (2007) who found that funds are more closely correlated within the fund family than across other fund families. This also supports our earlier findings that the correlation of return of funds within a fund family is higher than across fund families.

It is concluded that diversifying investment across different fund families will lower the correlation of fund returns, especially if funds are again diversified across the Islamic and conventional funds, which yields the lowest pairwise return correlation in our sample. Restricting investment solely in a single fund family, especially solely in the Islamic funds will lower the diversification benefits. Shariah restrictions on stock investment do have an impact on fund return correlation and diversification, in line with the concluding remark made by Han and Rarick (2009).

Table 5.7

Equity Fund Returns Correlation by Objectives Within And Between Unit Trust Management Companies, January 2003 - June 2009

	Correlation		Correlation	t-stat	p-value	
Within Family						
Islamic-Islamic	0.8492	Islamic-Conventional	0.8207	2.4812	0.0072	***
	(N =72)		(N=411)			
Conventional-Conventional	0.8231	Islamic-Conventional	0.8207	0.3030	0.3810	n.s.
	(N =478)		(N=411)			
Islamic-Islamic	0.8492	Conventional-Conventional	0.8231	2.3673	0.0098	***
	(N = 72)		(N =478)			
Between Families						
Islamic-Islamic	0.7753	Islamic-Conventional	0.7526	4.7105	0.0000	***
	(N =808)		(N=4406)			
Conventional-Conventional	0.7490	Islamic-Conventional	0.7526	-1.4235	0.0773	*
	(N=5922)		(N=4406)			
Islamic-Islamic	0.7753	Conventional-Conventional	0.7490	5.5684	0.0000	***
	(N =808)		(N=5922)			
Combined Within and Between Families						
Islamic-Islamic	0.7813	Islamic-Conventional	0.7584	4.9420	0.0000	***
	(N =880)		(N=4817)			
Conventional-Conventional	0.7545	Islamic-Conventional	0.7584	-1.5886	0.0561	*
	(N=6400)		(N=4817)			
Islamic-Islamic	0.7813	Conventional-Conventional	0.7545	5.9738	0.0000	***
	(N =880)		(N=6400)			
Islamic-Islamic						
Within Family	0.8492	Between Families	0.7753	6.8805	0.0000	***
	(N =72)		(N = 808)			
Conventional-Conventional						
Within Family	0.8231	Between Families	0.7490	13.8208	0.0000	***
	(N =478)		(N = 5922)			
Islamic-Conventional						
Within Family	0.8207	Between Families	0.7526	10.5290	0.0000	***
	(N =411)		(N =4406)			

Note: This table shows the equity objectives classification separating into the Islamic and conventional objectives and the pair-wise returns correlation of the within and across families are calculated. The t-test is performed to test the mean difference. The number refers to the number of pairwise combinations. The sample period covers from January 2003 to June 2009. The p-value is compared to the confidence level of 1%, 5% and 10%. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

In Table 5.8, funds are grouped into 6 combinations and the average common stock holding of each combination is calculated. The first and the second column in Table 5.8 shows the within and across family common stockholdings results of the pairwise combination. Column 3 reports the t-statistic of the difference between the pair-wise combinations. Only the equity funds and balanced funds are included in the analysis. The last column of the table indicates the level of significance of the difference between the pair-wise comparisons of the combinations in the study.

For the funds within fund families, the common stock holding of an Islamic fund paired with a conventional fund of 22.94 per cent is statistically significantly lower than the average common stock holdings of pairs of two Islamic funds of 32.05 per cent at 1 per cent. Also, the average common stock holding of an Islamic fund paired with a conventional fund of 22.94 per cent is significantly lower than the average common stock holding of a pair of two conventional funds of 25.6 per cent. It is significant at 5 per cent. In addition, the common holding of the pairwise combination consisting of two conventional funds of 25.60 is significantly lower than the average common holding of a pairwise combination consisting of two Islamic funds of 32.05 at 5 per cent.

For the funds across fund families, the table reports that the common stock holding of an Islamic fund and a conventional fund of 13.88 per cent is significantly lower than the average common holdings of a pairwise combination that consists of two Islamic funds of 21.42 per cent. However, the common stock holding of an Islamic fund and a conventional fund of 13.88 per cent is significantly higher than the average correlation

of a pairwise combination that consists of two conventional funds of 13.19 per cent. The common holding of the pairwise combination consisting of two conventional funds of 13.19 is significantly lower than the average common holding of a pairwise combination consisting of two Islamic funds of 21.42 at 1 per cent.

Consistent with the results reported in Table 5.7, Table 5.8 reports that the common stock holding of a pairwise of two Islamic funds or two conventional funds are significantly higher than the pairwise funds of a conventional fund and an Islamic fund. The results indicate that the stock common holdings of two Islamic funds is higher than the stock common holdings of two conventional funds.

Although the cross investment in Islamic and conventional funds is taken into account, the within family common holding is still higher than the across families. This evidence is shown in the combination of purely the Islamic-Islamic (within family 32.05 and across families 21.42), the combination of purely the conventional funds (within family 25.60 and across families 13.19), and an Islamic fund pairing with a conventional fund (within family 22.94 and across families 13.88).

The evidence discussed above rejects $H_0$4(a) in favour of H_a4(a) - the mean common holding of only Islamic funds is greater than the mean common holding of Islamic and conventional funds. On the other hand, we cannot reject $H_0$4(b) of the mean common holding of only conventional funds is the same as the common holding of Islamic and conventional funds. The evidence rejects $H_0$4(c) in favour of H_a4(c) – the mean common holding of only the Islamic funds is greater than the mean common holding of only the conventional funds, within family and across families. The results are in line

with the argument made by Abdullah, Hassan and Mohamad (2007), and Han and Rarick (2009) that Shariah compliant assets suffer lower diversification.

On the other hand, the evidence rejects $H_0$4(d) in favour of H_a4(d) - that the mean common holding of only the Islamic funds within family is greater than the mean common holding of only the Islamic funds across families. $H_0$4(e) is also rejected in favour of H_a4(e) - that the mean common holding of only the conventional funds within family is greater than the mean common holding of only the conventional funds across families. Similarly, $H_0$4(f) is also rejected in favour of H_a4(f) - that the mean common holding of a combination of Islamic and conventional funds within family is greater than the mean common holding of a combination of Islamic and conventional funds across families.

In conclusion, the common stock holding is found to be higher by more than two-fold if investment is limited to the within families and investing solely in the Islamic funds, as compared to investing across families, across Islamic and conventional funds or across families across conventional funds.

The result implies that diversifying investment across different fund families will lower the correlation of fund returns, especially if funds are again diversified across Islamic and conventional funds, which yield the lowest pairwise return correlation in the sample. It is important to note that portfolio risks can be reduced by investing in funds managed by different fund families and a combination of funds consisting of a mixture of funds across conventional and Islamic objectives will further reduce the portfolio risk. It is also concluded that even though the Islamic objective is considered, the commonality of funds in the same fund family is higher than those across fund families.

The implication of this finding is that investors are advised to consider a mixture of conventional and Islamic funds managed by different fund families to enjoy a further risk reduction benefit.

Table 5.8

Common Holding of Stocks by Objectives Within And Between Unit Trust Management Companies, January 2003 - June 2009

Common Holdings		Common Holdings		t-stat	p-value	
Within Family						
Islamic-Islamic	32.05	Islamic-Conventional	22.94	2.7737	0.0041	***
	(N =37)		(N=213)			
Conventional-Conventional	25.60	Islamic-Conventional	22.94	1.9745	0.0245	**
	(N=234)		(N=213)			
Islamic-Islamic	32.05	Conventional-Conventional	25.60	1.9564	0.0285	**
	(N =37)		(N=234)			
Between Families						
Islamic-Islamic	21.42	Islamic-Conventional	13.88	15.0229	0.0000	***
	(N =596)		(N=4327)			
Conventional-Conventional	13.19	Islamic-Conventional	13.88	-3.5800	0.0002	***
	(N=1996)		(N=4327)			
Islamic-Islamic	21.42	Conventional-Conventional	13.19	16.5268	0.0000	***
	(N =596)		(N=1996)			
Combined Within and Between Families						
Islamic-Islamic	22.04	Islamic-Conventional	14.30	14.9063	0.0000	***
	(N =633)		(N=4540)			
Conventional-Conventional	13.38	Islamic-Conventional	14.30	-4.4069	0.0000	***
	(N=4996)		(N=4540)			
Islamic-Islamic	22.04	Conventional-Conventional	13.38	16.3269	0.0000	***
	(N =633)		(N=4996)			
Islamic-Islamic						
Within Family	32.05	Between Families	21.42	3.3360	0.0010	***
	(N =37)		(N = 596)			
Conventional-Conventional						
Within Family	25.60	Between Families	13.19	12.6209	0.0000	***
	(N =234)		(N = 6373)			
Islamic-Conventional						
Within Family	22.94	Between Families	13.88	9.6289	0.0000	***
	(N =213)		(N =4327)			

Note: Grouping funds into the Islamic and conventional objectives within and across unit trust families, the fund common holding of stocks is calculated. The t-test is performed to test the mean difference. The number refers to the number of pairwise combinations. The p-value is compared to the confidence level of 1%, 5% and 10%. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

5.3 PERFORMANCE PERSISTENCE

5.3.1 Family Performance Persistence

Performance persistence is examined at the fund family level, that is, whether investing based on past information of superior fund family performance brings any good to investors. The basis for this analysis is that investors tend to be influenced by the advertisement of superior performance. Fund families in Malaysia aggressively advertise their past superior performing funds in an effort to attract investors not only to the superior performing funds, but also to other funds managed by the same company. The aggressive promotional activities make the funds in these families more visible and investors tend to allocate their capital in these fund families. Investors tend to select a particular fund family rather than an individual fund (Cheng, Pi and Wort, 1999). We attempt to establish the relationship between the past family superior performance and its future superior performance, measured by the performance persistence. The methodology of a contingency table, following Brown and Goetzmann (1995), Malkiel (1995) and Cheng *et al.* (1999), is applied in the study of fund family performance persistence.

The Whole Sample

If hypothesis $H_0$5(a) is rejected in favour of H_a5(a), which states that the well-performing unit trust families continue to perform well in the subsequent period, it indicates that hot-hand fund family exists in the Malaysian fund market. If hypothesis $H_0$5(b) is rejected in favour of H_a5(b) that poor-performing unit trusts families continue to perform badly in the subsequent period, it shows the existence of icy-hand or cold-hand fund family. A fund family is considered to be hot hand or to have positive performance persistence when they have more than a 50 per cent chance of repeating the previous month's above median returns in the following month (Cheng *et al.*,1999).

Hot-hand is defined as any good performing fund of a company in the most recent years that continues to be a superior performer in the near term.

Table 5.9(a) reports the winning persistence of each fund family during the seven-year period from January 2003 to January 2010 using a month-by-month rolling period. The repeat winning ratio and the repeat losing ratio are reported in column 4 and column 7 of the table. 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 returns persistence. It is reported in column 5 and column 8 for the repeat winners and the repeat losers, respectively.

The repeat winner ratio for PMB of 65 per cent of winners in month 1 are winners in month 2 is 34 (win-win) of 52 (win-win + win-lose). The repeat winner for successive two months is significant at the 1 per cent level. The repeat loser ratio for PMB of 40 per cent, of losers in month 1 are losers in month 2, is calculated as 12 (lose-lose) of 30 (lose-lose + lose-win). The negative sign of the repeat loser z-statistic indicates that PMB becomes a winner following the losing month. However, it is insignificant.

The positive sign of the repeat winner z-statistic reported in column 5 exhibits that 11 of the 15 fund families are winners in the month immediately after a winning month; but of which only 3 families (PMB, MAA and TAI) are statistically significant. Conversely, 4 of the 15 fund families are reported to experience a losing month immediately after the winning month as shown by a negative repeat winner ratio; but none of these are significant.

For the repeat loser z-statistic reported in column 8, only 2 (RHB and AMI) of the 9 fund families with a positive repeat loser z-statistic are significant at 5 per cent. These fund families experience a losing month following the losing month. They are identified as icy-hand in our sample. Four (MAA, OSK, PRU and ING) of the five fund families with a negative repeat loser z-statistic are significant. These fund families become winners following the losing month.

The repeat winner ratio of the average for all families is reported in the last row in Table 5.9 (a). It shows that 55 per cent of all winner families in month 1 are winners in month 2, that is, 359 (win-win) of 649 (win-win + win-lose). The repeat winner for two successive months is significant at the 1 per cent probability level. The test evidence rejects hypothesis $H_0$5(a) in favour of H_a5(a) of which the well-performing unit trusts families continue to perform well in the subsequent month. It is concluded that the hot-hand effect exists in the Malaysian unit trust industry.

The repeat loser ratio of the average for all families is also reported. It reveals that 50 per cent of all loser families in month 1 remain losers in month 2, that is, 292 (lose-lose) of 581 (lose-lose + lose-win), as shown in the last row in Table 5.9(a). The repeat loser for two successive months is insignificant at the 10 per cent level. Therefore, the icy-hand phenomenon in unit trust families is not significant. It is concluded that poor-performing unit trust families do not continue to perform worse than others in the following month. The test results reported in Table 5.9(a) provide no evidence to reject $H_0$5(b) – that poor-performing unit trust families do not continue to perform badly in the subsequent period.

The individual family, PMB and MAA exhibit a strong positive repeat winning ratio, the measure of hot-hand. They are significant at the 1 per cent level and TAI is significant at 5 per cent. Only 3 out of the 15 fund families in Malaysia exhibit superior performance persistence with a significant repeat winning ratio on a rolling monthly basis. The overall result is highly significant at less than 1 per cent. For the inferior performance persistence at the family level, RHB and AMI exhibits a significant repeat loser ratio for two successive months at 5 per cent significant level, the measure of cold-hand. The overall result of negative performance persistence in Malaysia fund families is insignificant.

Table 5.9 (a)
Fund Families Performance Persistence- Contingency Table of Ranked Unit Trust Family Returns over the Consecutive Month, January 2003 - January 2010

Fund Families	Previous Month	Following month		Repeat Winner	Repeat winner z-stat	p-value		Repeat Loser	Repeat loser z-stat	p-value	
		Winner	Loser								
PMB	Winner	34	18	0.65	2.2188	0.0132	**	0.40	-1.0954	0.156	n.s.
	Loser	18	12								
HLG	Winner	21	18	0.54	0.4804	0.3156	n.s.	0.59	1.2060	0.113	n.s.
	Loser	18	26								
CPA	Winner	22	19	0.54	0.4685	0.3192	n.s.	0.52	0.3086	0.378	n.s.
	Loser	20	22								
RHB	Winner	13	18	0.42	-0.8980	0.1481	n.s.	0.63	1.9415	0.026	**
	Loser	19	33								
MAA	Winner	38	20	0.66	2.3635	0.0091	***	0.20	-3.0000	0.001	***
	Loser	20	5								
OSK	Winner	29	21	0.58	1.1314	0.1292	n.s.	0.34	-1.7678	0.038	**
	Loser	21	11								
AMI	Winner	19	17	0.53	0.3333	0.3707	n.s.	0.64	1.8962	0.029	**
	Loser	17	30								
PRU	Winner	23	25	0.48	-0.2887	0.3859	n.s.	0.35	-1.8084	0.036	**
	Loser	24	13								
PAC	Winner	19	23	0.45	-0.6172	0.2676	n.s.	0.46	-0.4685	0.319	n.s.
	Loser	22	19								
ING	Winner	21	19	0.53	0.3162	0.3745	n.s.	0.36	-1.5119	0.066	*
	Loser	18	10								
TAI	Winner	28	17	0.62	1.6398	0.0505	*	0.53	0.3244	0.375	n.s.
	Loser	18	20								
AVE	Winner	23	18	0.56	0.7809	0.2177	n.s.	0.55	0.6172	0.268	n.s.
	Loser	19	23								
HWD	Winner	19	21	0.48	-0.3162	0.3783	n.s.	0.51	0.1525	0.44	n.s.
	Loser	21	22								
ALL	Winner	26	19	0.58	1.0435	0.1515	n.s.	0.50	0.0000	0.5	n.s.
	Loser	19	19								
APX	Winner	24	17	0.59	1.0932	0.1379	n.s.	0.57	0.9258	0.176	n.s.
	Loser	18	24								
All Families	Winner	359	290	0.55	2.7085	0.0034	***	0.50	-0.1245	0.452	n.s.
	Loser	292	289								

Note: This table shows the winning persistency of each fund family during the seven years period from January 2003 to January 2010. 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 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 fund family is significantly different from zero. If the z-statistic falls in the rejection region, the null hypothesis of no fund family performance persistence is rejected. It could be positive persistence and or persistence. A large positive z-statistic is obtained when a high percentage of the "winners" in one period remain "winners" in the next period tested. When a high percentage of "winners" in one period become "losers" in the next period, a large negative z-statistic is found. Small z-statistics are determined when there is no clear pattern in the returns. If exactly the same winners remain winners and the same losers remain losers between two periods, the z-statistic would be zero. The significant of 1% is denoted by ***, 5% by ** and 10% by *.

Conventional versus Islamic Funds

Our previous analysis indicate that differences exist between conventional and Islamic funds in terms of returns correlation and common stock holdings. Following up on this analysis, in this section we split the sample into all conventional and all Islamic funds and analyse the persistency of their performance. Tables 5.9(b) and 5.9(c) present the results of our analysis for conventional and Islamic funds respectively.

Table 5.9(b) reports the winning and losing persistence of each fund family during the seven-year period from January 2003 to January 2010 using month-by-month rolling period. The analysis is similar to the previous table, but the sample is different. This table focus on only conventional funds. The fifth column of Table 5.9(b) shows that 13 fund families of the 15 have a positive repeat winner z-statistic, indicating that winners in the month follow by winning in the next month. 8 fund families (PMB, CPA, MAA, OSK, AMI, PRU, TAI and AVE) are statistically significant up to 10 per cent. These are the hot-hand fund families. Conversely, 2 fund families (RHB and PAC) are reported to suffer a losing month following the winning month, which are significant up to 10 per cent.

The eighth column in Table 5.9(b) shows that 4 (RHB, AMI, ING and TAI) of the 8 fund families with positive repeat loser Z-statistic are significant at 10 per cent. These fund families are identified as icy-hand, which undergo a losing month following the losing month. 3 (MAA, OSK and PRU) of the 7 fund families with negative repeat loser z-statistic are significant at 10 per cent. These fund families are winners following the losing month.

The repeat winner ratio of the average for all families reported in the last row of the table shows that 57 per cent of all winner families in month 1 are winners in month 2. This is calculated as 359 (win-win) of 650 (win-win + win-lose), which is significant at the 1 per cent probability level. Consistently, the evidence rejects hypothesis $H_0$5(a) in favour of H_a5(a) of which the well-performing unit trusts families continue to perform well in the subsequent month.

In contrast, the repeat loser ratio of the average for all families is also reported. It presents that 52 per cent of all loser families in month 1 remain losers in month 2, being 300 (lose-lose) of 580 (lose-lose + lose-win) and it is insignificant at the 10 per cent level. Hence, the icy-hand phenomenon in unit trust families is insignificant for the conventional funds. It is concluded that loser families do not continue to perform poorer than others in the following month. Thus, hypothesis $H_0$5(b) of poor-performing unit trust families do not continue to perform badly in the subsequent period cannot be rejected.

Table 5.9(c) reports the winning and losing persistence of each fund family during the seven-year period from January 2003 to January 2010 using month-by-month rolling period; with only the Islamic funds included. Column 5 of Table 5.9(c) shows that the exact same 5 families as the conventional funds sample (PMB, MAA, ING, TAI and APX) of the 11 families, which have a positive repeat winner z-statistic are significant up to 5 per cent, indicating that winners in the month follow by winning in the next month. These are the hot-hand fund families. Conversely, only 1 fund family, of the 4 suffer a losing month following the winning month; it is significant at 10 per cent.

The repeat loser z-statistic in column 8 of Table 5.9(c) shows that 4 fund families (HLG, RHB, AVE and AMI) of the 9 fund families with a positive repeat loser z-statistic are significant at 10 per cent. These fund families are persistent loser and they are identified as icy-hand. MAA is the only family of the 6 fund families with a negative repeat loser z-statistic that is significant at 5 per cent, which turns into a winner following the losing month.

The repeat winner ratio of the average for all families shows that 60 per cent of all winner families in month 1 are winners in month 2. This is calculated as 368 (win-win) of 617 (win-win + win-lose) and is significant at 1 per cent. Consistent with the evidence presented for the whole sample and the conventional funds, the evidence rejects hypothesis $H_0$5(a) in favour of H_a5(a) of which the well-performing unit trust families continue to perform well in the subsequent month.

The repeat loser ratio of the average for all families is reported as 53 per cent of all loser families in month 1 remain losers in month 2, being 262 (lose-lose) of 560 (lose-lose + lose-win) and it is significant at 10 per cent. Hence, the icy-hand phenomenon in unit trust families is also significant for the Islamic funds. It is concluded that loser families did continue to perform poorer than others in the following month. Different from the conventional funds, hypothesis $H_0$5(b) is rejected in favour of H_a5(b) – that poor-performing unit trusts families continue to perform badly in the consecutive month in the Islamic funds. However, this evidence is only significant at 10 per cent.

In general, the persistence result presented is quite similar for the whole sample and the sample when data is separated into the conventional funds and the Islamic funds as shown in Table 5.9(b) and Table 5.9(c). 8 out of 15 fund families in Malaysia exhibit

superior performance persistence when only the conventional funds are considered. When only Islamic funds are considered, 5 out of 15 fund families exhibit superior performance persistence; and only 3 out of 15 in the whole sample. The all family result shows that the superior performance persistence is significant at less than 1 per cent for all three samples. On the other hand, there are 3 of 15 families in Malaysia exhibit inferior performance persistence in the conventional sample, 4 of 15 show inferior persistence in the Islamic sample; while only 2 of 15 show significant inferior performance persistence in the whole sample. The all family results of inferior performance persistence in Malaysia for the Islamic sample is significant at 10 per cent; while it is insignificant for the whole sample and the conventional funds.

Table 5.9(b)

Fund Families Performance Persistence - Contingency Table of Ranked Unit Trust Family Returns over the Consecutive Month, January 2003 - January 2010 (Only the Conventional Funds)

Fund Families	Previous Month	Following month		Repeat Winner	Repeat winner z-stat	p-value		Repeat Loser	Repeat loser z-stat	p-value	
		Winner	Loser								
PMB	Winner	34	17	0.67	2.3805	0.0087	***	0.47	-0.3536	0.3632	n.s.
	Loser	17	15								
HLG	Winner	22	18	0.55	0.6325	0.2643	n.s.	0.56	0.7625	0.2236	n.s.
	Loser	19	24								
CPA	Winner	29	18	0.62	1.6045	0.0548	*	0.47	-0.3333	0.3707	n.s.
	Loser	19	17								
RHB	Winner	7	20	0.26	-2.5019	0.0062	***	0.63	1.8708	0.0307	**
	Loser	21	35								
MAA	Winner	41	18	0.69	2.9943	0.0014	***	0.29	-2.0412	0.0207	**
	Loser	17	7								
OSK	Winner	31	21	0.60	1.3868	0.0823	*	0.35	-1.6164	0.0526	*
	Loser	20	11								
AMI	Winner	23	15	0.61	1.2978	0.0968	*	0.67	2.2361	0.0125	**
	Loser	15	30								
PRU	Winner	30	21	0.59	1.2603	0.1038	*	0.34	-1.7678	0.0384	**
	Loser	21	11								
PAC	Winner	14	22	0.39	-1.3333	0.0869	*	0.55	0.7293	0.2327	n.s.
	Loser	21	26								
ING	Winner	19	14	0.58	0.8704	0.1922	n.s.	0.63	1.5213	0.0643	*
	Loser	13	22								
TAI	Winner	24	16	0.60	1.2649	0.1038	*	0.60	1.3725	0.0853	*
	Loser	17	26								
AVE	Winner	29	20	0.59	1.2857	0.0985	*	0.44	-0.6860	0.2451	n.s.
	Loser	19	15								
HWD	Winner	20	20	0.50	0.0000	0.5000	n.s.	0.51	0.1525	0.4408	n.s.
	Loser	21	22								
ALL	Winner	25	20	0.56	0.7454	0.2266	n.s.	0.47	-0.3244	0.3745	n.s.
	Loser	20	18								
APX	Winner	23	19	0.55	0.6172	0.2676	n.s.	0.51	0.1562	0.4364	n.s.
	Loser	20	21								
All Families	Winner	371	279	0.57	3.6085	0.0002	***	0.52	0.8305	0.2033	n.s.
	Loser	280	300								

Note: This table shows the winning persistency of each fund family during the seven years period from January 2003 to January 2010. Only the Conventional equity and balanced funds of fund families are included, the Islamic funds are excluded.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 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 fund family is significantly different from zero. If the z-statistic falls in the rejection region, the null hypothesis of no fund family performance persistence is rejected. It could be positive persistence and or persistence. A large positive z-statistic is obtained when a high percentage of the "winners" in one period remain "winners" in the next period tested. When a high percentage of "winners" in one period become "losers" in the next period, a large negative z-statistic is found. Small z-statistics are determined when there is no clear pattern in the returns. If exactly the same winners remain winners and the same losers remain losers between two periods, the z-statistic would be zero. The significant of 1% is denoted by ***, 5% by ** and 10% by *.

Table 5.9(c)
Fund Families Performance Persistence - Contingency Table of Ranked Unit Trust Family Returns over the Consecutive Month, January 2003 - January 2010 (Only the Islamic Funds)

Fund Families	Previous Month	Following month		Repeat Winner	Repeat winner z-stat	p-value		Repeat Loser	Repeat loser z-stat	p-value	
		r	Loser								
PMB	Winner	44	15	0.75	3.7755	0.0001	***	0.46	-0.4082	0.3409	n.s.
	Loser	13	11								
HLG	Winner	19	16	0.54	0.5071	0.3085	n.s.	0.65	2.0207	0.0217	**
	Loser	17	31								
CPA	Winner	18	20	0.47	-0.3244	0.3745	n.s.	0.58	1.0435	0.1492	n.s.
	Loser	19	26								
RHB	Winner	18	19	0.49	-0.1644	0.4364	n.s.	0.61	1.4744	0.0708	*
	Loser	18	28								
MAA	Winner	41	14	0.75	3.6407	0.0001	***	0.32	-1.7056	0.0446	**
	Loser	15	7								
OSK	Winner	15	21	0.42	-1.0000	0.1587	n.s.	0.53	0.4376	0.3336	n.s.
	Loser	22	25								
AMI	Winner	20	17	0.54	0.4932	0.3121	n.s.	0.63	1.7693	0.0392	**
	Loser	17	29								
PRU	Winner	27	20	0.57	1.0211	0.1539	n.s.	0.44	-0.6667	0.2546	n.s.
	Loser	20	16								
PAC	Winner	14	23	0.38	-1.4796	0.0694	*	0.52	0.2949	0.3859	n.s.
	Loser	22	24								
ING	Winner	28	1	0.97	5.0138	0.0000	***	0.44	-0.6000	0.2743	n.s.
	Loser	14	11								
TAI	Winner	31	19	0.62	1.6971	0.0446	**	0.39	-1.2185	0.1112	n.s.
	Loser	20	13								
AVE	Winner	23	16	0.59	1.1209	0.1314	n.s.	0.64	1.8091	0.0351	**
	Loser	16	28								
HWD	Winner	26	19	0.58	1.0435	0.1492	n.s.	0.50	0.0000	0.5	n.s.
	Loser	19	19								
ALL	Winner	21	17	0.55	0.6489	0.2578	n.s.	0.45	-0.5388	0.2946	n.s.
	Loser	17	14								
APX	Winner	23	12	0.66	1.8593	0.0314	**	0.55	0.5571	0.2877	n.s.
	Loser	13	16								
All Families	Winner	368	249	0.60	4.7908	0.0000	***	0.53	1.5213	0.0643	*
	Loser	262	298								

Note: This table shows the winning persistency of each fund family during the seven years period from January 2003 to January 2010. Only the Islamic equity and balanced funds of fund families are included, the Conventional funds are excluded.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 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 fund family is significantly different from zero. If the z-statistic falls in the rejection region, the null hypothesis of no fund family performance persistence is rejected. It could be positive persistence and or persistence. A large positive z-statistic is obtained when a high percentage of the "winners" in one period remain "winners" in the next period tested. When a high percentage of "winners" in one period become "losers" in the next period, a large negative z-statistic is found. Small z-statistics are determined when there is no clear pattern in the returns. If exactly the same winners remain winners and the same losers remain losers between two periods, the z-statistic would be zero. The significant of 1% is denoted by ***, 5% by ** and 10% by *.

Longer Interval Rolling Period

Next, the performance persistence is assessed for a longer return rolling period of one quarter, six months and one year, as reported in Table 5.9(d), Table 5.9(e) and Table 5.9(f) respectively. Table 5.9(d) exhibits evidence of performance persistence for both the winners and the losers when the quarterly interval of returns is examined. Table 5.9(d) reports the winning and losing persistence of each fund family during the seven-year period from January 2003 to January 2010 using a quarterly rolling period. Column 5 of Table 5.9(d) shows that 4 families (PMB, MAA, OSK and ING) of the 13 families which have a positive repeat winner z-statistic are significant at 10 per cent, indicating the existence of hot-hand fund families. Conversely, only 1 fund family of the 2 suffer losing month following the winning month and is significant at 10 per cent. The repeat loser z-statistic in Table 5.9(d) shows that 4 fund families (RHB, ING, AVE and APX) of the 8 fund families, which exhibit a positive repeat loser z-statistic, are significant at up to 10 per cent. PRU is one of the 2 fund families with a negative repeat loser z-statistic that is significant at 10 per cent.

The repeat winner ratio of the average for all families shows that 59 per cent of all winner families in quarter 1 are winners in quarter 2. This is calculated as 125 (win-win) of 211 (win-win + win-lose) and is significant at 1 per cent. The result is consistent with the evidence presented for the whole sample and the conventional funds. It is concluded that hypothesis $H_0$5(a) is rejected in favour of H_a5(a) of which the well-performing unit trusts families continue to perform well in the subsequent quarter.

The repeat loser ratio of the average for all families is reported as 55 per cent of all loser families in quarter 1 remain losers in quarter 2, being 103 (lose-lose) of 187 (lose-lose + lose-win) and it is significant at 10 per cent. Thereby, the icy-hand phenomenon in the

unit trust family is also significant for the one quarter rolling period. It is concluded that loser families tend to continue to perform poorer than others in the following quarter. Similarly, hypothesis $H_0$5(b) is rejected in favour of H_a5(b) that poor-performing unit trust families continue to perform badly in the consecutive quarter. However, this evidence is weak as it is only significant at 10 per cent.

The evidence is in line with Ginblatt and Titmann (1992), Goetzmann and Ibbotson (1994), and Hendrick *et al.* (1993) who found fund persistence in both the winning and losing funds. The result implies that investors can use past information of fund returns up to one quarter as a guide in the superior or inferior fund selection process.

Table 5.9(e) reports the winning and losing persistence of each fund family for the period from January 2003 to January 2010 using a semi-annual rolling period. The reported repeat winner z-statistic shows that PRU is the only family that has a significant positive repeat winner z-statistic at 10 per cent, indicating the persistence of its superior performance. On the other hand, RHB is reported as the only fund that has a significant positive repeat loser z-statistic at 1 per cent, implying the persistence of its inferior performance for six-months.

Although the result indicates significant superior performance persistence in PRU at 10 per cent, this evidence disappears in the Fisher's non-parametric test, which uses the exact probability distribution of the observed frequencies. Thus, we conclude that there is no significance evidence of persistence in the semi-annually performance at 5 per cent significance level. The conclusion is consistent with the Z-statistic noted. The total months and total quarters have the reasonable frequencies, there is no required Fisher adjustment.

The repeat winner ratio of the average for all families shows that 54 per cent of all winner families in the first semi-annual period are winners in the subsequent semi-annual period. It is insignificant at 5 per cent. Thus, hypothesis $H_0$5(a) cannot be rejected. The repeat loser ratio of the average for all families is reported as 49 per cent of all loser families in the first semi-annual period are losers in the subsequent semi-annual period. It is insignificant. Hence, hypothesis $H_0$5(b) cannot be rejected.

Table 5.9(f) reports the winning and losing persistence of each fund family for the period from January 2003 to January 2010 using yearly rolling period. The reported repeat winner z-statistic shows that PRU and PAC have a weak significant positive repeat winner z-statistic at 10 per cent, while RHB and AMI are reported with a significant positive repeat loser z-statistic at 10 per cent. This implies no evidence of superior or inferior performance persistence for one-year rolling period at 5 per cent significance level. Similar results were obtained in the Fisher's exact probability and the chi-squared statistic. We therefore conclude that none of the fund family's annual performance persistence is significant at 5 per cent significant level.

The repeat winner ratio of the average for all families shows that 51 per cent of all winner families in the first year are winners in the following year. As in the six-month period, it is insignificant at 5 per cent. Thus, hypothesis $H_0$5(a) cannot be rejected. The repeat loser ratio of the average for all families is reported as 47 per cent of all loser families in the first year are losers in the next year. It is also insignificant. Hence, hypothesis $H_0$5(b) cannot be rejected.

The evidence of performance persistence, both the superior and inferior returns, disappears beyond the three-month rolling returns, as reported in Table 5.9(e) and Table 5.9(f). Thereby, hypothesis $H_0$5(a) cannot be rejected. The results show that past six-month and past one-year interval provide no guide for future investment decisions. Our result contradicts Malkiel (1995), Gruber (1996) and Carhart (1997) who found evidence of icy-hand in their analysis. We also conclude that hypotheses $H_0$5(a) and $H_0$5(a) are sensitive to the length of period being studied.

It is concluded that the superior performance of fund families persists for up to one quarter. The hot-hands effect is found to exist. We also found some weak evidence of icy-hand families up to one quarter period. In other words, short-term past superior performance of fund families provides useful information for future fund family performance. The track record of superior fund families can be used by the investors for investment decision making for up to one quarter. The evidence is in line with the studies conducted in the U.S. on mutual funds performance persistence by Hendrick, *et al.* (1993), Goetzmann and Ibbotson (1994), Elton *et al.* (1996) who found evidence of short-term funds performance persistence of one-quarter to three-years. However, in Hong Kong, Cheng *et al.* (1999) found no evidence of performance persistence in fund houses. Similarly, our study found no evidence of long term fund performance persistence in six-months or longer in both the superior or inferior fund families in our sample.

Much of the theoretical debate on mutual fund performance persistence has been conducted with reference to the efficient market hypothesis. It is noted that the efficient market hypothesis implies that it is not possible to make superior returns consistently. The theoretical implication of the results of persistent superior performance found in

one-month and three-month data of Malaysia unit trust families is that the efficient market hypothesis in this market may be in its weak form and that the Malaysian market is informationally less efficient. As the performance persistence evidence is found up to one quarter, this evidence does not invalidate the efficient market hypothesis. Most investors in Malaysia 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 mutual fund performance persists to the following month and this effect continues up to one quarter. In addition, this superior persistence phenomenon could also be because the majority of investors in Malaysia are unsophisticated investors. Sirri and Tufano (1997) and James and Karceski (2001) explained that unsophisticated investors in the market could lead to evidence of performance persistence. Market momentum could be another possible explanation for this superior performance persistence evidence. Momentum is the empirically perceived tendency for the rising asset prices to increase further. Then, after the period of over performance, the asset is more likely to underperform, and sometimes severely underperform. Jegadeesh and Titman (1993, 1999) documented that stocks with superior historical performance continue to outperform stocks with inferior historical performance in the following period with an average excess return of about 1 per cent per month. The behavioural economists attributed the emergence of momentum to the cognitive biases and heuristics, which arise from the behaviour of irrational investors according to Daniel, Hirschleifer and Subrahmanyam (1998), and Barberis, Shleifer and Vishny (1998), where they under-react to new information by not integrating news in their asset prices.

Based on this analysis, the study concludes that investors in Malaysia can use past information up to three months as a beneficial part of their investment decision making

process. It is concluded that the hot-hand phenomenon exists in Malaysia since the performance persists over a very short time period into the future. It has a short memory. Nevertheless, the inferior performance of fund family does not persist. Consequently, the efficient market hypothesis is not invalid. Whereas, the argument of the existence of common management strategies in mutual fund families and the high correlation across managers, by Brown and Goetzmann (1995), perhaps explains some of the short-term persistence found in this study.

Table 5.9(d)

Fund Families Performance Persistence - Contingency Table of Ranked Unit Trust Family Returns over the Consecutive Quarter, January 2003 - January 2010

Fund Families	Previous Month	Following month		Repeat Winner	Repeat winner z-stat	p-value		Repeat Loser	Repeat loser z-stat	p-value	
		Winner	Loser								
PMB	Winner	13	6	0.68	1.606	0.054	*	0.25	-1.414	0.079	*
	Loser	6	2								
HLG	Winner	11	7	0.61	0.943	0.174	n.s.	0.33	-1.000	0.159	n.s.
	Loser	6	3								
CIMB	Winner	8	5	0.62	0.832	0.203	n.s.	0.57	0.535	0.298	n.s.
	Loser	6	8								
RHB	Winner	1	4	0.20	-1.342	0.090	*	0.77	2.558	0.005	***
	Loser	5	17								
MAA	Winner	13	5	0.72	1.886	0.029	**	0.33	-1.000	0.159	n.s.
	Loser	6	3								
OSK	Winner	12	6	0.67	1.414	0.079	*	0.44	-0.333	0.371	n.s.
	Loser	5	4								
AMI	Winner	5	7	0.42	-0.577	0.281	n.s.	0.47	-0.258	0.397	n.s.
	Loser	8	7								
PRU	Winner	11	7	0.61	0.943	0.174	n.s.	0.25	-1.414	0.079	*
	Loser	6	2								
PAC	Winner	7	6	0.54	0.277	0.390	n.s.	0.57	0.535	0.298	n.s.
	Loser	6	8								
ING	Winner	8	2	0.80	1.897	0.029	**	0.82	2.111	0.017	**
	Loser	2	9								
TAI	Winner	8	7	0.53	0.258	0.397	n.s.	0.50	0.000	0.500	n.s.
	Loser	6	6								
AVE	Winner	4	4	0.50	0.000	0.500	n.s.	0.79	2.524	0.006	***
	Loser	4	15								
HWD	Winner	8	7	0.53	0.258	0.397	n.s.	0.50	0.000	0.500	n.s.
	Loser	6	6								
ALL	Winner	10	7	0.59	0.728	0.233	n.s.	0.30	-1.265	0.102	n.s.
	Loser	7	3								
APX	Winner	6	6	0.50	0.000	0.500	n.s.	0.67	1.291	0.099	*
	Loser	5	10								
All Families	Winner	125	86	0.59	2.685	0.004	***	0.55	1.389	0.082	*
	Loser	84	103								

Note: This table shows the winning persistency of each fund family during the seven years period from January 2003 to January 2010. Only the Islamic equity and balanced funds of fund families are included, the Conventional funds are excluded.Winner is defined as fund families that are with the ranked ordered of one-quarter 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 quarters continuously. *Lose-lose* represents the count of the fund family loses in any two quarters continuously. *Win-lose* represents the count of the fund family wins in one quarter but loses in the subsequent quarter. *Lose-win* represents the count of the fund family loses in one quarter but wins in the subsequent quarter. *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 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 fund family is significantly different from zero. If the z-statistic falls in the rejection region, the null hypothesis of no fund family performance persistence is rejected. It could be positive persistence and or persistence. A large positive z-statistic is obtained when a high percentage of the "winners" in one period remain "winners" in the next period tested. When a high percentage of "winners" in one period become "losers" in the next period, a large negative z-statistic is found. Small z-statistics are determined when there is no clear pattern in the returns. If exactly the same winners remain winners and the same losers remain losers between two periods, the z-statistic would be zero. The significant of 1% is denoted by ***, 5% by ** and 10% by *.

Table 5.9(e)

Fund Families Performance Persistence - Contingency Table of Ranked Unit Trust Family Returns over the Consecutive Six-Month, January 2003 - January 2010

		t+1											
Fund Families	**t**	**W**	**L**	**Repeat Winner**	**Repeat Winner Z-stat**		**Repeat Loser**	**Repeat Loser Z-stat**		**Fisher's Exact p-value**		**Chi-square**	
PMB	W	4	5	0.44	-0.333	n.s.	0.000	-2.000	**	0.105	n.s.	3.611	*
	L	4	0		(0.371)			(0.023)				(0.057)	
HLG	W	2	3	0.40	-0.447	n.s.	0.625	0.707	n.s.	1	n.s.	0.008	n.s.
	L	3	5		(0.330)			(0.239)				(0.928)	
CPA	W	3	3	0.50	0.000	n.s.	0.429	-0.378	n.s.	1	n.s.	0.066	n.s.
	L	4	3		(0.309)			(0.352)				(0.797)	
RHB	W	0	0	0.00	-	-	0.923	3.051	***	1	n.s.	NA	n.s.
	L	1	12		-			(0.001)				NA	
MAA	W	6	3	0.67	1.000	n.s.	0.000	-2.000	**	0.497	n.s.	1.733	n.s.
	L	4	0		(0.159)			(0.023)				(0.188)	
OSK	W	7	3	0.70	1.265	n.s.	0.333	-0.577	n.s.	1	n.s.	0.012	n.s.
	L	2	1		(0.104)			(0.281)				(0.913)	
AMI	W	1	4	0.20	-1.342	*	0.375	-0.707	n.s.	0.266	n.s.	2.236	n.s.
	L	5	3		(0.090)			(0.239)				(0.135)	
PRU	W	6	2	0.75	1.414	*	0.600	0.447	n.s.	0.293	n.s.	1.593	n.s.
	L	2	3		(0.079)			(0.330)				(0.207)	
PAC	W	4	2	0.67	0.816	n.s.	0.571	0.378	n.s.	0.592	n.s.	0.737	n.s.
	L	3	4		(0.209)			(0.352)				(0.391)	
ING	W	3	2	0.60	0.447	n.s.	0.600	0.447	n.s.	1	n.s.	0.400	n.s.
	L	2	3		(0.330)			(0.326)				(0.527)	
TAI	W	4	5	0.44	-0.333	n.s.	0.000	-2.000	**	0.105	n.s.	3.611	*
	L	4	0		(0.371)			(0.022)				(0.057)	
AVE	W	4	3	0.57	0.378	n.s.	0.667	0.816	n.s.	0.592	n.s.	0.737	n.s.
	L	2	4		(0.352)			(0.206)				(0.391)	
HWD	W	4	4	0.50	0.000	n.s.	0.400	-0.447	n.s.	1	n.s.	0.124	n.s.
	L	3	2		(0.500)			(0.326)				(0.725)	
ALL	W	4	4	0.50	0.000	n.s.	0.200	-1.342	n.s.	0.565	n.s.	1.170	n.s.
	L	4	1		(0.500)			(0.090)				(0.279)	
APX	W	3	4	0.43	-0.378	n.s.	0.500	0.000	n.s.	1	n.s.	0.066	n.s.
	L	3	3		(0.352)			(0.500)				(0.797)	
All Families	W	55	47	0.54	0.792	n.s.	0.489	-0.211	n.s.	0.772	n.s.	0.151	n.s.
	L	46	44		(0.215)			(0.417)				(0.697)	
		106	89										

Note: This table shows the winning persistency of each fund family during the seven years period from January 2003 to January 2010. Only the Islamic equity and balanced funds of fund families are included, the Conventional funds are excluded.Winner is defined as fund families that are with the ranked ordered of one-quarter 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 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 fund family is significantly different from zero. If the z-statistic falls in the rejection region, the null hypothesis of no fund family performance persistence is rejected. It could be positive persistence and or persistence. A large positive z-statistic is obtained when a high percentage of the "winners" in one period remain "winners" in the next period tested. When a high percentage of "winners" in one period become "losers" in the next period, a large negative z-statistic is found. Small z-statistics are determined when there is no clear pattern in the returns. If exactly the same winners remain winners and the same losers remain losers between two periods, the z-statistic would be zero. The value of chi-square is calculated as $\sum_{all\ cells} \frac{(Actual\ obs\ freq - Expected\ cell\ freq)^2}{Expected\ cell\ freq}$. The null hypothesis of no association between the variables will be rejected if the calculated value of the test statistic exceeds the critical value of 3.841 at the significance level of 0.05. The Fisher's exact probability as $\frac{\text{number of ways getting p successes x number of ways getting n−p failures}}{\text{number of ways of selecting objects from a set of F}}$. The exact probability is compared to the level of significance of 5 per cent. If it is smaller than 5 per cent, the null hypothesis of no association of the variables is rejected in favour of the hypothesis of independence. The significant of 1% is denoted by ***, 5% by ** and 10% by *.

Table 5.9(f)

Fund Families Performance Persistence - Contingency Table of Ranked Unit Trust Family Returns over the Consecutive Years, January 2003 - January 2010

		t+1											
Fund Families	t	W	L	Repeat Winner	Repeat Winner Z-stat		Repeat Loser	Repeat Loser Z-stats		Fisher's Exact p-value		Chi-square	
PMB	W	2	2	0.50	0.000	n.s.	0.00	-1.414	*	0.467	n.s.	1.500	n.s.
	L	2	0		(0.5)			(0.0793)				(0.221)	
HLG	W	0	2	0.00	-1.414	*	0.50	0.000	n.s.	0.467	n.s.	1.500	n.s.
	L	2	2		(0.0793)			(0.5)				(0.221)	
CPA	W	3	1	0.75	1.000	n.s.	0.00	-1.414	*	1.000	n.s.	0.600	n.s.
	L	2	0		(0.1587)			(0.0793)				(0.439)	
RHB	W	0	0	-	-	-	0.83	1.633	*	1.000	n.s.	NA	n.s.
	L	1	5					(0.0516)					
MAA	W	3	1	0.75	1.000	n.s.	0.00	-1.414	*	1.000	n.s.	0.600	n.s.
	L	2	0		(0.1587)			(0.0793)				(0.439)	
OSK	W	3	2	0.60	0.447	n.s.	0.00	-1.000	n.s.	1.000	n.s.	0.600	n.s.
	L	1	0		(0.3264)			(0.1587)				(0.439)	
AMI	W	0	1	0.00	-1.000	n.s.	0.80	1.342	*	1.000	n.s.	0.240	n.s.
	L	1	4		(0.1587)			(0.0901)				(0.624)	
PRU	W	4	1	0.80	1.342	*	0.00	-1.000	n.s.	1.000	n.s.	0.240	n.s.
	L	1	0		(0.0901)			(0.1587)				(0.624)	
PAC	W	4	1	0.80	1.342	*	0.00	-1.000	n.s.	1.000	n.s.	0.240	n.s.
	L	1	0		(0.0901)			(0.1587)				(0.624)	
ING	W	0	2	0.00	-1.414	*	0.50	0.000	n.s.	1.000	n.s.	1.333	n.s.
	L	1	1		(0.0793)			(0.5)				(0.248)	
TAI	W	2	2	0.50	0.000	n.s.	0.00	-1.414	*	0.467	n.s.	1.500	n.s.
	L	2	0		(0.5)			(0.0793)				(0.221)	
AVE	W	1	2	0.33	-0.577	n.s.	0.33	-0.577	n.s.	1.000	n.s.	0.667	n.s.
	L	2	1		(0.281)			(0.281)				(0.414)	
HWD	W	1	2	0.33	-0.577	n.s.	0.67	0.577	n.s.	1.000	n.s.	0.000	n.s.
	L	1	2		(0.281)			(0.281)				(1.000)	
ALL	W	1	2	0.33	-0.577	n.s.	0.33	-0.577	n.s.	1.000	n.s.	0.667	n.s.
	L	2	1		(0.281)			(0.281)				(0.414)	
APX	W	0	2	0.00	-1.414	n.s.	0.75	1.000	n.s.	1.000	n.s.	0.600	n.s.
	L	1	3		(0.0793)			(0.1587)				(0.439)	
All Families	W	24	23	0.51	0.146	n.s.	0.46	-0.469	n.s.	0.834	n.s.	0.059	n.s.
	L	22	19		(0.4404)			(0.3192)				(0.808)	

Note: This table shows the winning persistency of each fund family during the seven years period from January 2003 to January 2010. Only the Islamic equity and balanced funds of fund families are included, the Conventional funds are excluded.Winner is defined as fund families that are with the ranked ordered of one-quarter 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 year continuously. *Lose-lose* represents the count of the fund family loses in any year continuously. *Win-lose* represents the count of the fund family wins in a year but loses in the subsequent year. *Lose-win* represents the count of the fund family loses in year but wins in the subsequent year. *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 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 fund family is significantly different from zero. If the z-statistic falls in the rejection region, the null hypothesis of no fund family performance persistence is rejected. It could be positive persistence and or persistence. A large positive z-statistic is obtained when a high percentage of the "winners" in one period remain "winners" in the next period tested. When a high percentage of "winners" in one period become "losers" in the next period, a large negative z-statistic is found. Small z-statistics are determined when there is no clear pattern in the returns. If exactly the same winners remain winners and the same losers remain losers between two periods, the z-statistic would be zero. The value of chi-square is calculated as $\sum_{all\ cells} \frac{(Actual\ obs\ freq - Expected\ cell\ freq)^2}{Expected\ cell\ freq}$. The null hypothesis of no association between the variables will be rejected if the calculated value of the test statistic exceeds the critical value of 3.841 at the significance level of 0.05. The Fisher's exact probability as $\frac{\text{number of ways getting p successes x number of ways getting n−p failures}}{\text{number of ways of selecting objects from a set of F}}$. The exact probability is compared to the level of significance of 5 per cent. If it is smaller than 5 per cent, the null hypothesis of no association of the variables is rejected in favour of the hypothesis of independence. The significant of 1% is denoted by ***, 5% by ** and 10% by *.

In order to justify that the winning families are genuine winners, the following analysis is conducted. The average return of the top-half fund families is compared with the bottom-half. The average returns of the top-half fund families, which are categorised as winners, is compared with the bottom-half average return of fund families, which are identified as losers, for each month. In the case of an uneven data set for the top and bottom performer, the median data point is excluded in the t-test.

The t-statistic is computed to test whether the average returns for winners is equal to the average returns for the losers in each month. The t-test is computed on the sample, which are separated into three sub-periods; the stable period from January 2003 to May 2006; the bull period from June 2006 to December 2007; the bear period from January 2008 to January 2010, and the whole sample period. Table 5.10 presents the results of our analysis. The table shows that the respective t-statistics of the three sub-periods are -4.031, -6.010, -4.947, -7.916. All the returns are significant at the probability of 1 per cent level, which means the average return for winners is not equal to the average return for the losers in each month. The result of this analysis shows that the difference in the two groups is significant. Thus, a fund family, which is classified as a winner in any period does mean it has a higher return than the average funds in any future period. This reinforces the conclusion summarized in Tables 5.9. Fund families that are classified as winners with high return funds do make a difference with those families that are classified as losers. Moreover, if these fund families are genuine superior performers, the above average returns of fund families should be sustained into the next period.

Table 5.10

Comparing the Average Returns of the Top-half Fund Families with the Bottom-half

	Stable		Bull		Bear			
	Jan03 - May06		Jun06 - Dec 07		Jan08 - Jan10		Jan03 - Jan10	
Mean Fund Family Returns	0.002	0.013	0.015	0.025	-0.015	0.003	0.000	0.013
Std Dev of Fund Family Return	0.027	0.030	0.029	0.031	0.038	0.037	0.033	0.033
Number of observations	280	280	133	133	175	175	588	588
t Statistic	-4.031		-6.010		-4.947		-7.916	
P(T<=t) one-tail	0.000	***	0.000	***	0.000	***	0.000	***

Note: The significance of 1% is denoted by ***.

5.3.2 The Significance of Performance Persistence to Investors

In the previous section, it was identified that the historical superior performance of fund families in Malaysia tends to continue into the next period. In this section, we examine whether these hot-hand families can be used as a guide to differentiate superior and inferior performance of fund families and to what extent the performance persistence is relevant to investors. The overall performance and the excess returns of the performance persistent fund families for the whole period are calculated. Assuming that fund families are competing with their peers in the industry, this analysis examines the performance persistence with regards to the relative fund family's overall performance in the whole period.

The repeat winning ratio, the conditional probability; and the win-win ratio, the unconditional probability of winning repeated in the following month are calculated. The repeat winning ratio ($\frac{WW}{WW+WL}$) is calculated as the count of the fund family wins in any two months continuously, divided by the summation of the count of the fund family wins in any two months continuously and the count of the fund family wins in one month but losses in the subsequent month. This is to determine whether a fund family is

hot-hand or whether the performance of a fund family is persistent. The win-win ratio ($\frac{WW}{WW+WL+LL+LW}$), which is calculated as the count of the fund family wins in any two months continuously divided by the total number of observations. The win-win ratio and the lose-lose ratio of any fund family should not be different from 25 per cent. A win-win ratio exceeding 25 per cent represents a superior performing family while a lose-lose ratio exceeding 25 per cent represents an inferior performing family.

Table 5.11 reports the results of fund family performance persistence and the overall superior performer. The repeat winning ratio, win-win ratio and lose-lose ratio and the excess returns earned by each fund family are presented for comparison. Fund families are arranged in the order of the repeat winning ratio with the fund family with the highest repeat winning ratio on top. The second column of the table reports the repeat winning ratio of each fund family. The third column presents its rank order. The fourth and fifth column present the win-win ratio of each fund family, followed by the rank of the win-win ratio. The lose-lose ratio and its rank is reported in the sixth and seventh column. The win-win excess returns earned by each fund family and the lose-lose excess returns of each fund family are presented with the respective t-statistics in the subsequent columns.

Table 5.11 reports that fund families with a high repeat winning ratio also exhibit a high win-win ratio. This analysis shows that the positive performance persistence fund family, known as the hot-hand fund family, is also the overall good performing company in that industry as a whole. The result indicates that positive performance persistence fund families are relatively more likely to be the superior performer in the following month. The fund family that is able to repeat its past above average returns tends to have a high overall win-win ratio, a measure that is not dependent on its prior

period returns. A hot-hand family generally performs better than other funndustry. Further, these hot hand fund families with a high repeat winning ratio also tend to have a low lose-lose ratio. This indicates that hot-hand fund families stand a low chance of performing badly in the following month. This analysis provides some direction to investors that past superior performance of a fund family can be used as a guide to differentiate superior and inferior performance of fund families in the future period to identify the overall good fund family.

The mean of win-win excess returns as a percentage in Table 5.11, column 8, shows the average monthly excess returns (and lose) in the month of win-win (and lose-lose) for each fund family. All the reported t-statistics of win-win excess returns are statistically significant. This shows that the win-win excess returns are significantly higher than the median family's excess returns. However, not all the reported t-statistics of the lose-lose excess returns are statistically significantly lower than the median family returns.

The test evidence reject hypothesis $H_0$6 in favour of H_a6 which states that the hot-hand unit trust families are the overall superior performers in general. The finding indicates that the hot-hand fund families are performing well in general while the negative performance persist fund families are not necessarily overall ill-performers. This is in line with the study done by Cheng *et al.* (1999) who reported that all the mean excess returns of the win-win month are statistically above the median returns for each fund house in Hong Kong within the ten-year period. The implication of the findings to fund investors is that investors may make investment decisions based on a fund family's track record of past returns to select a fund as the performance persistence fund families are generally the superior performers.

Table 5.11

The Fund Family Performance Persistence and the Overall Superior Performer – Comparison of the Repeat Winning Ratio, Win-win Ratio and Lose-lose Ratio and the Excess Returns Earned by Each Fund Family

Fund Family (1)	Repeat Winning Ratio (2)	Rank (3)	Win-Win Ratio (4)	Rank (5)	Lose-Lose Ratio (6)	Rank (7)	Win-Win Excess Return Ratio (Mean) (8)	t-stat (9)	sig (10)	Lose-Lose Excess Return Ratio (Mean) (11)	t-stat (12)	sig (13)
PMB	0.667	1	0.434	1	0.133	12	0.008	5.249	***	-0.007	-3.672	***
MAA	0.643	2	0.434	1	0.072	15	0.005	5.900	***	-0.008	-3.630	***
TAI	0.628	3	0.325	4	0.277	5	0.011	5.115	***	-0.012	-1.430	*
APX	0.610	4	0.301	7	0.301	4	0.011	3.450	***	-0.017	-0.021	n.s.
OSK	0.604	5	0.386	3	0.120	13	0.013	2.065	***	-0.019	-0.430	n.s.
AVE	0.581	6	0.301	7	0.277	5	0.010	6.424	***	-0.012	-1.014	n.s.
ALL	0.565	7	0.313	5	0.205	10	0.007	6.564	***	-0.007	-3.073	***
HLG	0.526	8	0.241	10	0.325	3	0.005	8.965	***	-0.005	-2.813	***
ING	0.525	9	0.309	6	0.147	11	0.003	6.219	***	-0.007	-3.888	***
AMI	0.514	10	0.217	13	0.373	2	0.007	7.812	***	-0.009	-1.340	*
PRU	0.490	11	0.289	9	0.120	13	0.006	6.031	***	-0.006	-3.548	***
CPA	0.487	12	0.229	11	0.277	5	0.007	9.579	***	-0.008	-1.987	**
HWD	0.475	13	0.229	11	0.265	8	0.016	2.863	***	-0.011	-1.245	n.s.
RHB	0.438	14	0.169	15	0.386	1	0.004	10.392	***	-0.009	-1	n.s.
PAC	0.385	15	0.181	14	0.253	9	0.009	7.153	***	-0.005	-3.011	***

Note: This table compares the Repeat Winning ratio with the Win-win and Lose-lose ratio of each Fund Family. Win-Win Ratio rank (Lose-Lose Ratio rank) represents the ranking of fund families in terms of their Win-Win and lose-lose Ratio. WW Excess Return % (Mean) reports the monthly economic gain (and lose) in the month of Win-Win (and Lose-Lose) for each fund family. It is calculated to determine whether the mean excess returns of the WW months are significantly above the winning median family. The mean excess return is calculated as the monthly average of the difference between a particular month's return and the median fund family's return for each family over the 7 years. The Win-Win Ratio is calculated as the count of the fund family wins in any two months continuously over the total number of periods in the study. The Lose-Lose Ratio represents the count of the fund family losses in any two months continuously over the total number of periods in the study. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

To find out whether investors benefit from investing in performance persistent families, the fund family's annualized excess returns are examined in relation to the persistence measure. A higher return associated with family performance persistence would justifies the investment in these persistent families. In the study by Cheng *et al.* (1999), it is assumed that the higher the annualised excess return of a fund family, the higher the economic gain for investors. The mean excess return is calculated as monthly average of the difference between the particular month's return and the median fund family's return for each family over the 7 years.

Table 5.12 reports the annualised excess returns of a fund family, repeat winner z-statistic and win-win z-statistic and all the respective rankings. Columns 4 to 6 in Table 5.12 report the repeat winner z-statistic and its ranking; while columns 7 to 9 in Table 5.12 show the win-win z-statistic and its ranking. It is clear that the ranking of the z-statistic of the two ratios are of a similar order. The annualised excess returns of fund families are reported in column 2 and the rank in column 3. Five (PMB, MAA, ALL, PRU, HWD and PAC) of the 15 fund families exhibit positive annualised excess returns over the sample period, while the other 10 show negative excess returns.

PMB ranks the first in the annualised excess returns, the repeat winner z-statistic and win-win z-statistic. HWD ranks the second in the annualised excess returns, but it ranks the thirteenth and twelfth of the total fifteen families in the repeat winner z-statistic and win-win z-statistic. PAC is ranked third in the annualised excess returns, but is ranked last and the second last in the repeat winner z-statistic and win-win z-statistic. PRU ranks fourth in the annualised excess returns, but it ranks eleventh and ninth in the repeat winner z-statistic and win-win z-statistic. MAA ranks fifth in the annualised excess returns and ranks second in both the repeat winner z-statistic and win-win z-statistic. It is apparent that the rankings of annualised excess returns and the repeat winning ratio are quite random. Two of the three hot-hand fund families (PMB, MAA and TAI) reported in Table 5.9(a) show positive annualised excess returns and TAI reports negative returns.

There is no clear relationship shown between the superior performance persistence and the excess returns. Thus, the evidence exhibits that investing in hot-hand fund families might not guarantee actual monetary gain to the investors, although it may be so in just a few fund families.

It is concluded that only weak evidence is found to reject hypotheses $H_0 7$ in favour of $H_a 7$, which states that investors make higher excess returns from investing in performance persistent families. Prior studies found no relationship between the statistical significance of being hot-hand and the implied economic significance of investing in a hot hand fund family (Cheng *et al.* 1999). The two possible explanations for the weak relationship between performance persistence and the annualized excess returns are: (1) the classification of a fund family as a winner or loser applies the non-parametric methodology; where fund families are classified as winner (loser) if the average return is greater than the median family's returns, however, it does not take into account the magnitude of the excess returns. (2) it is possible to have a hot-hand family with a very low total win-win frequency for the whole sample period, as the persistence is a timing issue. In this case the hot-hand family is likely to have low annualized excess returns.

Table 5.12

Excess Returns of Performance Persistence Fund Family

Fund Family (1)	Annualised Excess Returns % (2)	Rank (3)	Repeat Winner Z-stat (4)	sig (5)	Rank (6)	Win-Win Z-stat (7)	sig (8)	Rank (9)	Repeat Loser Z-stat (10)	sig (11)	Lose-Lose Z-stat (12)	sig (13)
PMB	20.91	1	2.449	***	1	3.866	***	1	-1.300	n.s.	-2.472	***
MAA	7.27	5	2.138	**	2	3.866	***	2	-2.887	***	-3.739	***
TAI	-0.35	7	1.677	**	3	1.584	*	4	0.949	n.s.	0.570	n.s.
APX	-29.71	15	1.406	*	4	1.077	n.s.	7	1.234	n.s.	1.077	n.s.
OSK	-4.99	9	1.511	*	5	2.852	***	3	-1.826	**	-2.725	***
AVE	-8.65	12	1.067	n.s.	6	1.077	n.s.	8	0.949	n.s.	0.570	n.s.
ALL	7.19	6	0.885	n.s.	7	1.331	*	5	-0.493	n.s.	-0.951	n.s.
HLG	-3.61	8	0.324	n.s.	8	-0.19	n.s.	10	1.342	*	1.584	*
ING	-7.66	11	0.316	n.s.	9	1.12	n.s.	6	-1.512	*	-1.960	**
AMI	-16.97	13	0.169	n.s.	10	-0.697	n.s.	13	2.021	**	2.598	***
PRU	9.33	4	-0.143	n.s.	11	0.824	n.s.	9	-2.401	***	-2.725	***
CPA	-7.06	10	-0.160	n.s.	12	-0.444	n.s.	11	0.302	n.s.	0.570	n.s.
HWD	20.40	2	-0.316	n.s.	13	-0.444	n.s.	12	0.152	n.s.	0.317	n.s.
RHB	-26.61	14	-0.707	n.s.	14	-1.711	**	15	1.820	**	2.852	***
PAC	13.35	3	-1.441	*	15	-1.458	n.s.	14	-0.302	n.s.	0.063	n.s.

Note: This table relates performance persistence with excess returns earned by fund families. The annualised mean excess return is calculated as the annualised difference between the average monthly return of an individual fund family and the median fund family's return for all family over the 7 years. The significance of 1% is denoted by ***, 5% by ** and 10% by *.

Table 5.13 presents comprehensive Pearson correlation coefficients, which are computed for annualised excess returns, repeat winner z-statistic, repeat loser z-statistic, win-win z-statistic, lose-lose z-statistic for the fund families persistence variables examined above for an overview of the relationship between these variables. Correlation measures the degree of association between two or more variables over a period. The correlation coefficient describes the relationships between the overall performing company as a whole, the realised gain to the investors and the fund family performance persistence. The high value of correlation of 0.981 between annualised excess returns and the repeat winner z-statistic indicates a strong positive relationship between the realised gain to the investors and the fund family performance persistence. Similarly, the correlation between annualised excess returns and repeat win-win z-statistic is reported high at 0.907, suggesting that there is a high relationship between the realised gain of investing in that company to the investors and the superior performance of the fund family as a whole.

Additionally, the measures of repeat winner z-statistic and win-win z-statistic exhibit a strong positive correlation of 0.916, indicating that hot-hand fund families are closely associated with overall well-performance. The two negative performance persistence measures of repeat loser z-statistic and lose-lose z-statistic exhibit a strong positive correlation of 0.979, which indicates that icy-hand families are closely associated with overall under-performance. Then, as expected, the correlation between the annualised excess returns and repeat loser z-statistic and the correlation between the annualised excess returns and lose-lose z-statistic is negative and weak at 0.328 and 0.493, respectively.

Base on the correlation between the variables reported in Table 5.13, it is concluded that there is a high correlation between the performance persistence fund family and the realised gain for fund investors and the superior performance of a fund family as a whole. Thus, we conjecture that a hot-hand fund family is more likely to be a superior performing company and it stands a high chance of earning positive excess returns.

Table 5.13

Correlation between Excess Returns and Performance Persistence

	Annualised Excess Returns %	Repeat Winner z-stat	Repeat Loser z-stat	Win-Win z-stat	Lose-Lose z-stat
Annualised Excess Returns	1				
Repeat Winner Z-stat	0.981***	1			
	(0.000)				
Repeat Loser Z-stat	-0.328	-0.305	1		
	(0.233)	(.268)			
WW z-stat	0.907***	0.916***	-0.655***	1	
	(0.000)	(.000)	(.008)		
LL z-stat	-0.493	-0.473	0.979***	-0.783***	1
	(0.062)	(.075)	(.000)	(.001)	

Note: The Pearson Correlation Coefficients of Annualised Excess Returns, Repeat Winner Z-statistic, Repeat Loser Z-statistic, Win-Win Z-statistic, Lose-Lose Z-statistic of fund families in our sample are reported in this table. The p-value of 2-tails significance test is reported in parenthesis. *** represents the significance level at the 0.05 probability level.

5.4 FUND FLOWS, SPILLOVER EFFECT AND STAR PHENOMENON

5.4.1 Spillover Effect in Fund Family

The spillover effect is a phenomenon where a fund family signals its superior performance, by having some star funds (Nanda *et al*, 2004) or by terminating a star fund (Zhao, 2004) etc., to attract investors' attention and investment to other funds in the family. This effect can be tested by examining whether the new money growth of the non-star funds managed by a star family is higher than the other non-star funds in the non-star family. To test this effect, we run five (5) multiple regression analyses.

Regression model (5) in which all variables are included is stated below. In this equation, the spillover effect is captured in the S*tar Family Dummy*, O*ne-year Lipper Star Family Dummy* and *Three-year Lipper Star Family Dummy* in the fixed-effect panel regression model.

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i.\,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Star}_{(i,\,t-1)} + \beta_8 * \text{StarFam}_{(i,\,t-1)} + \beta_9 * \text{Dog}_{(i,\,t-1)} + \beta_{10} * \text{DogFam}_{(i,\,t-1)} + \beta_{11} * \text{Lstar1D}_{(i,\,t-1)} + \beta_{12} * \text{LipFam1D}_{(i,\,t-1)} + \beta_{13} * \text{Lstar3D}_{(i,\,t-1)} \beta_{14} * \text{LipFam3D}_{(i,\,t-1)} + \mu_{(f,,t)}$$

In this regression, *Flow growth*$_{i,}$ is the fund i's growth of new money flow at time t.

It is computed as:

$$\text{Flow growth}_{i,t} = \frac{\text{TNA}_{i,t} - \text{TNA}_{i,t-1} * (1 + \text{R}_{i,t})}{\text{TNA}_{i,t-1}}$$

Index *i* represents the fund index and *t* is the index for year and αi captures the fund's fixed effects. *RET* is the fund-level average annual return over the past 12 months at time t. *StdDev* is the standard deviation of returns across all funds. *Size* represents fund size. It is computed as the logarithm TNA of the fund, the log lag TNA. *MER* represents the Management Expense Ratio, it is the ratio of total investment that investors paid for the fund's operating expenses, calculated as the total fees of the unit trust fund to the average value of the unit trust fund, which includes management fees, administrative expenses and trustee fees. It is fees/average value of funds. *PTR* represents the Portfolio Turnover ratio, it is the percentage of a mutual fund or other investment tool's holdings that have been turned over or replaced with other holdings in a given period.

Star represents Star fund dummy, it has a value of 1 if the fund itself is a star fund and has a value of 0 if the fund is not a star. *Star family* is a dummy variable that has a value of 1 if the fund is not a star but belongs to a star family that has at least one star and a value of 0 if it is a non-star fund belonging to a non-star family. *Dog* represents Dog

fund dummy, it has a value of 1 if the fund itself is a dog. It is 0 if otherwise. *Dog family* dummy has a value of 1 if the fund is not a dog but belongs to a dog family that has at least one dog. This dummy has a value of 0 if it is a non-dog fund and belongs to a non-dog family. *Star fund* and *star family* are identified by ranking the average annual returns over the past 12 months. *Lstar1D* and *Lstar3D* represent the one-year Lipper Star fund Dummy and three-year Lipper Star fund Dummy, respectively. They are dummies indicating whether the fund is a Lipper star. *LipFam1D* and *LipFam3D* represent the one-year Lipper Star family Dummy and three-year Lipper Star family Dummy, respectively. It has a value of 1 if the fund is not a Lipper star but belongs to a Lipper star family that has at least one Lipper star and a value of 0 if it is a non-star fund belonging to a non-star family one year and three years, respectively.

To check if the problem of multicollinearity exists, the correlations of the independent variables are analysed. Table 5.14 reports the correlation between fund flow growth and the five fund attributes: fund returns, standard deviation of returns, size, age, management expense ratio and portfolio turnover ratio. None of the variables or independent variables are highly correlated. The highest reported figure is 33.12 per cent, the correlation between fund returns and fund age. Hence, the estimation is less likely to suffer the multicollinearity problem.

Table 5.14

Correlation Matrix of Dependent and Independent Variable by Fund

Probability	RET1	STDDEV1	SIZE1	AGE1	MER1	PTR1
RET1	1					
STDDEV1	-0.2223	1				
SIZE1	0.0997	-0.0552	1			
AGE1	-0.0971	0.3312	0.2099	1		
MER1	-0.0109	0.0541	-0.3060	-0.0281	1	
PTR1	0.0314	0.1062	-0.1375	-0.0964	0.1153	1

Note: The table presents a correlation matrix of fund flow growth's five fund attributes. (RET1) is the fund-level average return over the past 12 months at time t. (STDDEV1) is the volatility of the family's fund return over last 12 months. It is the average standard deviation of monthly return of funds in the family the year prior to each time t. (SIZE1) represents the past 1 year fund size. It is computed as the logarithm TNA of the fund, the log lag TNA. (MER1) and (PTR1) represent the past 1 year Management Expense Ratio and Portfolio Turnover ratio. (MER) is the fund's expense ratio, the ratio of total investment that investors paid for the fund's operating expenses f at time t-1. (PTR) is calculated as [(total acquisition for time t + total disposal for time t)/2]/ average value of fund for time t. It is the percentage of a mutual fund or other investment tool's holdings that have been turned over or replaced with other holdings in a given period.

Panel Data regression analysis is used in our study of new money growth, which measures the investors' response, to the funds' attributes. Beforehand, the model selection is carried out. Table 5.15 presents the results of the estimation of the pooled regression and fixed effect (group) regression for model (1), (2), (3), (4) and (5) using the individual funds data. The R-squared, adjusted R-squared, standard error of regression, F-statistic and Durbin Watson statistic are reported for comparison. The Redundant fixed effect-likelihood test is carried out in the five models to determine whether the fixed effect model (group) is better than the pooled model. The hypothesis is stated as: H_0: Fixed effect model (group) is not a better model than the pooled regression model. H_1: Fixed effect model (group) is a better model than the pooled regression model. The results of the redundant fixed effect test are reported in the last two rows of Table 5.15. The p-values of the F-test of all five models indicate significance at 1 per cent. Hence, H_0 is rejected in favour of H_1. Our findings show that the fixed effect (group) model is better than the pooled model in this study. Moreover, in all five regressions, the adjusted R-squared of the fixed effect model reports a much higher adjusted r-squared (0.4417, 0.4448, 0.4420, 0.4437 and 0.4496) than that of the

pooled model (0.0519, 0.0553, 0.0722, 0.0786 and 0.0971), which indicates that the fixed effect model is a better model. From these findings, it is concluded that the fixed effect model is selected for the spillover effects study.

Table 5.15

Pooled Regression and Fixed Effect (group) Regression Model using Fund's Attributes

	Regression Model 1		**Regression Model 2**		**Regression Model 3**		**Regression Model 4**		**Regression Model 5**	
	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)
No. of Observations	562	562	562	562	562	562	562	562	562	562
R-squared	0.0519	0.4417	0.0553	0.4448	0.0722	0.442	0.0786	0.4437	0.0971	0.4496
Adjusted R-squared	0.0416	0.2189	0.0381	0.2155	0.0588	0.2155	0.0653	0.2179	0.074	0.2143
S.e. of Regression	0.8869	0.8007	0.8885	0.8024	0.8789	0.8024	0.8759	0.8012	0.8718	0.803
F-statistic	5.0625	1.9826	3.2249	1.9395	5.3825	1.9511	5.8988	1.9646	4.2001	1.9107
Prob.of F-stat	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Durbin-Watson stat	1.7241	2.1452	1.7302	2.1257	1.7585	2.1477	1.7375	2.1405	1.7443	2.1203
Redundant FE Test	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
Cross-Section F	1.8178	0.0000	1.8087	0.0000	1.717	0.0000	1.7005	0.0000	1.6344	0.0001

Note: This table presents the Redundant Fixed Effect test results for the five regression models, as follows for model selection.

Regression Model (1):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \mu_{(f,t)}$$

Regression Model (2):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Star}_{(i,t-1)} + \beta_8 * \text{StarFam}_{(i,t-1)} + \beta_9 * \text{Dog}_{(i,t-1)} + \beta_{10} * \text{DogFam}_{(i,t-1)} + \mu_{(f,t)}$$

Regression Model (3):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Lstar1D}_{(i,t-1)} + \beta_8 * \text{LipFam1D}_{(i,t-1)} + \mu_{(f,t)}$$

Regression Model (4):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Lstar3D}_{(i,t-1)} + \beta_8 * \text{LipFam3D}_{(i,t-1)} + \mu_{(f,t)}$$

Regression Model (5):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Star}_{(i,t-1)} + \beta_8 * \text{StarFam}_{(i,t-1)} + \beta_9 * \text{Dog}_{(i,t-1)} + \beta_{10} * \text{DogFam}_{(i,t-1)} + \beta_{11} * \text{Lstar1D}_{(i,t-1)} + \beta_{12} * \text{LipFam1D}_{(i,t-1)} + \beta_{13} * \text{Lstar3D}_{(i,t-1)} \beta_{14} * \text{LipFam3D}_{(i,t-1)} + \mu_{(f,t)}$$

The regressions are estimated allowing for heteroscedasticity and autocorrelation. The groupwise differences cause the heteroscedasticity problem in the panel data study. The heteroscedasticity problem can be removed by taking the mean of the groups. The cross-section weight in Eviews using the GLS (Generalised Least Square) estimates corrected for heteroscedasticity.

Table 5.16 reports the summary results for the 5 regression models and the coefficients of the independent variables in the flows-performance model. The fund's new money growth (FG), being the dependent variable, is regressed on the independent variables shown in column 1 of Table 5.16. Column 2 to column 6 report the coefficients of each variable for model (1) to model (5). In model (1), FG is regressed on all the independent variables of returns, standard deviation, MER, PTR, size and age. The dummy variables are excluded in this equation. In model (2), FG is regressed on all the independent variables plus the dummy variables of the star fund, star fund family, dog fund and dog fund family. In model (3), FG is regressed on all the independent variables plus the dummy variables of the one-year Lipper star fund and one-year Lipper star fund family. In model (4), FG is regressed on all the independent variables plus the dummy variables of the three-year Lipper star fund and three-year Lipper star fund family. In the last model, FG is regressed on all the independent variables plus all the dummy variables in the study.

The F-statistics of all five models are highly statistically significant at 1 per cent. Model (1) has the highest adjusted R-squared. The adjusted R-squared for the five models range from 0.2143 to 0.2189. All the Durbin Watson statistics that close to 2.0 implies that the models are less likely to suffer the autocorrelation problem.

Most of the past return coefficients in the flows model reported in Table 5.16 are positive, however, they are not significant in all equations. Thus, the evidence suggests that the fund flow growth is not sensitive to fund lag performance. This finding is inconsistent with past research in the U.S., where the majority documented a significant positive relationship between the fund flows and fund performance (Chevalier and

Ellison, 1997; Sirri and Tufano, 1998; DelGuercio and Tkac, 2002; Berk and Green, 2004). However, the finding of the fund flows and performance relationship of this study is similar to that in Thailand, an emerging market, by Teerapan (2010).

The control variables of the regression model include the past returns, standard deviation, MER, PTR, size and age. The coefficient of the control variable of the standard deviation of fund returns in all models are positive, but insignificant at 10 per cent level, which is similar to the finding of Sirri and Tufano (1998) who documented no significant relationship between the standard deviation and fund flows.

The coefficients of the control variable of fund asset size are negative and statistically significant in all equations at less than the 1 per cent level. This is consistent with the past literatures that report a negative significant relationship in the control variable of funds asset size and fund flows that smaller assets grow more quickly – the Law of Diminishing return (Chevalier and Ellison, 1997; Sawicki, 2001; and DelGuercio and Tkac, 2002).

The coefficients of fund age are negative but insignificant in all equation at 10 per cent level. However, a negative significant relationship between fund age and fund flow was reported in Sawicki (2001), Deaves (2004), Nanda *et al.* (2004) and Kempf and Ruenzi (2008).

Next, the coefficients of MER, another control variable, are not significantly related to the fund flow growth in regression (1), (2), (4) and (5), similar to Deaves (2004), but contradictory to Chevalier and Ellison (1997), Sirri and Tufano (1998) and Goetzmann and Pale (1997). The latter documented an asymmetric impact of flow to fees. The

coefficient of control variables of PTR is insignificantly related to the fund flow growth, as per Ippolito (1992).

The evidence shows that the coefficients of the star family dummy and one-year Lipper star family dummy are negative and significant at 5 per cent in model (5), but not in model (2), suggesting the non-existence of a spillover effect in the Malaysian unit trust industry. The non-star fund flow did not increase by having a star fund in a family. Instead, having a star fund in a family leads to a capital outflow in the non-star fund. However, the Lipper star rating, which represents the star marketing effect, exhibits inconsistent results. The coefficient of the three-year Lipper star family dummy, on the other hand, is positive and significant at 1 per cent, indicating the existence of a spillover effect in the three-year Lipper star family. This implies having a three-year Lipper star in family lead to greater money inflows to the non-star funds in star family as compare to other non-star funds in non-star family. The coefficient of the star family dummy captures the mean difference in new money growth between star and non-star families, after controlling for other variables that have an impact on new money growth.

In general, it is concluded that the Lipper star status could not contribute in increasing the inflows of money into other non-Lipper star funds managed by the same family. Though, the evidence is opposite for the three-year Lipper star.

The evidence cannot reject hypothesis $H_0$8(a) that new fund flows to non-star funds in the one-year star family is the same as the other non-star funds in the one-year non-star family, that is, no evidence of spillover effect within one-year star families. In fact, some evidences of new money flowing out of the non-star funds in star family are found. This evidence fails to agree with the U.S. findings, reported by Massa (1998),

Khorana and Servaes (1999, 2004), Zhao (2003), Nanda *et al.* (2004) and Huij and Verbeek (2007), where spillover effects are documented in fund families that have highly ranked funds, in terms of experiencing higher flows to other funds in the same family.

Additionally, the evidence presented rejects hypothesis $H_0$8(b) in favour of H_a8(b) which states that new fund flows to non-star funds in the three-year star family is greater than the other non-star funds in the three-year non-star family. As such, the spillover effect exists within three-year Lipper star families.

Table 5.16 shows that the coefficients of the star dummy and one-year Lipper star dummy in model (2), (3) and (5) are negative and significant at 5 per cent. There is no evidence that star funds attract more capital inflows than non-star funds. We cannot reject hypothesis $H_0$9(a) that one-year star funds do not generate greater money inflows than non-star funds. In fact, the finding shows the opposite. However, the three-year Lipper star dummy in model (4) and (5) is positive and significant at 5 per cent. Thus, hypothesis $H_0$9(b) is rejected in favour of Ha9(b) that three-year star funds generate greater money inflows than non-star funds. On the other hand, all the reported coefficients of the dog dummy in models (2) and (5) equations are insignificant and, therefore, the sign is meaningless. There is no evidence dog funds lead to more money outflows than non-dog funds. The evidence cannot reject hypothesis $H_0$9(c) that dog funds do not generate less money inflows than non-dog funds. This finding is in tandem with Sinha and Jog (2005), a Canadian study and the study on the China Unit trust industry by Ouyang (2008). However, Nanda *et al.* (2004), and Kempf and Ruenzi (2008) reported significant positive star effects in the U.S. mutual fund study.

It is concluded that star funds do not generate greater money inflows than non-star funds. Instead, the evidence shows that star funds generate lesser new money inflows than non-star funds. This finding is different from the past studies on the star phenomenon carried out in the U.S. On the other hand, we find that dog funds do not generate smaller money inflows than non-dog funds.

This finding shows that the Malaysian unit trust investors behave very distinct from those in the developed markets such as the U.S. It is concluded that having a star fund in a family would not help attract new capital into the star fund itself and into other funds in the family in Malaysia. The plausible reasons for this finding are: (1) investors perceive that star or dog performance will not continue into future periods of one year's time; and (2) the disposition effect exists in Malaysia. The disposition effect is a phenomenon where investors hurry to sell the winning securities while keeping the losers.

The insignificant relationship between the fund flow growth and the star or dog performance of funds is due to that the investors in Malaysia perceiving that star or dog performance are non persistent in a year's time. Therefore, they are not rushing into the star or out of the dog. Having a star fund does not result in greater cash inflows to the funds itself or to the family, which own at least one star fund. In fact, the evidence of investors rushing out of star fund is documented in this study. On the other hand, having a dog fund does not lead to greater cash outflows from the funds or from the family that owns a dog fund. The Malaysian investors seem to be rational. They invest or divest based on the appearance of star funds in the previous period. This explains our findings in the earlier sub-section, where evidence is documented that funds performance is not persistent in 6-months or longer while the inferior performance does not persist even in

the following month. Investors in Malaysia perceive that star or dog performance will not continue into future periods of one year's time.

Subsequently, we also believed that the disposition effect exists in the Malaysian unit trust market. The disposition effect is explained by Shefrin and Statmen (1985), as investors are more likely to sell the well-performers while keeping the bad-performers. As documented by Grinblatt and Keloharju (2000), unsophisticated investors are more eager to realize the winning stocks. It is reasonable to think that investors in emerging markets such as Malaysia are less sophisticated than those in the U.S. We deduced that due to a lack of an information dissemination channel in the market, Malaysia consists of a larger proportion of unsophisticated investors as compared to the U.S. market. As such, while the unsophisticated investors tend to sell the winning funds, the sophisticated investors purchase. When the selling and buying neutralizes the impact of the star identity on the fund flows, the spillover effects and the star phenomenon disappear. In our study, we documented significant negative star dummy. This could be due to that there are more investors tend to sell the winning funds than those who purchase the winning funds. This finding is in line with the Disposition effect stemmed from the Behavioural theory where investors rushing out of the winning funds while riding on the losers.

On the other hand, the significant three-year Lipper star and three-year Lipper star family dummy shows that the Malaysian investors are rational. They are investing in the star performing funds using longer period information of three year. Investors do belief that funds which perform well in the past longer run periods will do well in future.

Table 5.16

Spillover Effects and Star Fund Phenomenon in Mutual Funds Families in Malaysia

Estimation of Panel Data Regression by FUNDs					
Dependent Variable : FG	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
c	3.8921***	4.0808***	3.8889***	3.7797	3.9602***
Return (-1)	0.0049	0.0497	0.009	-0.0118	0.0299
Std dev (-1)	-0.5581	-0.0218	-0.5856	-0.6092	0.2071
MER (-1)	15.8891	14.2768	16.5857*	16.1712	15.7052
PTR (-1)	0.021	0.0105	0.0274	0.0238	0.03314
size (-1)	-2.1102***	-2.1331***	-2.1146***	-2.1031***	-2.1126***
Age (-1)	-0.3134	-0.3377	-0.3	-0.304	-0.3061
Star fund (-1)(Dummy)		-0.2053**			-0.2655***
Star family (-1)(Dummy)		-0.1092			-0.1731*
Dog fund (-1) (Dummy)		-0.0288			-0.0991
Dog Family (-1) (Dummy)		-0.0519			-0.1303
1 yr Lipper Star (-1) (Dummy)			-0.0489		-0.0809**
1 yr Lipper Star Family (-1) (Dummy)			-0.0509		-0.1211**
3 yr Lipper Star (-1) (Dummy)				0.0858*	0.1486***
3 yr Lipper Star Family (-1) (Dummy)				0.1269**	0.1813***
No.of Observations	562	562	562	562	562
R-squared	0.4417	0.4448	0.4420	0.4437	0.4496
Adjusted R-squared	0.2189	0.2155	0.2155	0.2179	0.2143
S.e. of Regression	0.8007	0.8024	0.8024	0.8012	0.8030
F-statistic	1.9826	1.9395	1.9511	1.9646	1.9107
Prob.of F-statistic	0.0000	0.0000	0.0000	0.0000	0.0000
Durbin-Watson statistic	2.1452	2.1257	2.1477	2.1405	2.1203

Note: The table examines the star-fund effect on the fund's new money growth and star fund effect on other funds in the family. The following fixed-effect panel regressions are estimated:

Regression Model (1):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \mu_{(f,,t)}$$

Regression Model (2):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Star}_{(i,t-1)} + \beta_8 * \text{StarFam}_{(i,t-1)} + \beta_9 * \text{Dog}_{(i,t-1)} + \beta_{10} * \text{DogFam}_{(i,t-1)} + \mu_{(f,,t)}$$

Regression Model (3):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Lstar1D}_{(i,t-1)} + \beta_8 * \text{LipFam1D}_{(i,t-1)} + \mu_{(f,,t)}$$

Regression Model (4):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Lstar3D}_{(i,t-1)} + \beta_8 * \text{LipFam3D}_{(i,t-1)} + \mu_{(f,,t)}$$

Regression Model (5):

$$\text{Flow Growth}_{(i,t)} = \alpha_f + \beta_1 * \text{RET}_{(i,t-1)} + \beta_2 * \text{Stddev}_{(i,t-1)} + \beta_3 * \text{Size}_{(i,t-1)} + + \beta_4 * \text{Age}_{(i,t-1)} + \beta_5 * \text{MER}_{(i,t-1)} + \beta_6 * \text{PTR}_{(i,t-1)} + \beta_7 * \text{Star}_{(i,t-1)} + \beta_8 * \text{StarFam}_{(i,t-1)} + \beta_9 * \text{Dog}_{(i,t-1)} + \beta_{10} * \text{DogFam}_{(i,t-1)} + \beta_{11} * \text{Lstar1D}_{(i,t-1)} + \beta_{12} * \text{LipFam1D}_{(i,t-1)} + \beta_{13} * \text{Lstar3D}_{(i,t-1)} \beta_{14} * \text{LipFam3D}_{(i,t-1)} + \mu_{(f,,t)}$$

*significant at 10%; **significant at 5%; **significant at 1%.

5.4.2 Star phenomenon in Fund Family

The main reason for investing in unit trusts, other than diversification, is profit seeking. It is believed that families try to generate star funds because star funds attract investment and increase total money flow into the family (Ippolito, 1992; Sirri and Tufano, 1998; and Nanda *et al.,* 2004). This research examines the behaviour of unit trust investors in Malaysia in respect of the star identity of fund families. In this section of the study, the regressions are run using fund family's data. We examine whether having at least one star in the fund family attracts investment capital into the family as a whole. In the previous section, the regressions were run using the fund's information. We examine whether investment is attracted into the star fund itself and whether money flows into the non-star fund, which belongs to a star fund family (the so-called spillover effect).

To test the star impact on fund families, we run 5 multiple regression models. Regression model (5) with all the variables included as stated below. In this equation, the star family identity is captured in the *Star Family Dummy*, the O*ne-year Lipper Star Family Dummy*, and the *Three-year Lipper Star Family Dummy*.

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\,t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{DSF}_{(f.\,t-12,t-1)} + \beta_9 * \text{DDF}_{(f.\,t-12,t-1)} + \beta_{10} * \text{L1D}_{(f.\,t-12,t-1)} + \beta_{11} * \text{L3D}_{(f.\,t-12,t-1)} + \mu_{(f,,t)}$$

The index *f* and *t* denote family and period, respectively. *FlowGrowth* is the new money flow into the family normalized by the previous year-end family TNA. *RET* is the annual family returns, measured by the average family-level return over the previous 12 months. *Stddev* is defined as the standard deviation of returns across all funds in the family. High standard deviation is the proxy for family star-creating strategy and low standard deviation is the proxy for focused strategy. *NoFunds* is the logarithm of the

total number of member funds managed by the family. *Size* is measured by the logarithm of sum of TNA of fund of the fund family. Log transformation is performed in the TNA and No. of funds variables to standardise the variables and to facilitate comparison. *Age* is measured by the number of months from the family date of inception to year t, taking the age of the oldest fund. *PTR* is the Portfolio Turnover Ratio, it is the average PTR of all member funds in the family. *MER* is the Management Expense Ratio, it is the average of MER for all member funds in the family. *DSF* represents the Star Family Dummy, and *DDF* represents the Dog Family Dummy. They are dummies indicating whether the family has at least one star or dog fund under management. *L1D* represents the one-year Lipper Star Family Dummy and *L3D* represents the three-year Lipper Star Family Dummy. They are dummies indicating whether the family has at least one Lipper star fund under management.

To ensure that our estimation is free of the multicollinearity problem, the correlations of the independent variables are analysed. Table 5.17 presents the correlation between the family flow growth's seven fund family attributes: fund family returns (*RET*), standard deviation of family's returns (*STDDEV*), family's size (*SIZE*), family's age (*AGE*), number of funds (No.of funds) family's management expense ratio (*MER*) and family's portfolio turnover ratio (*PTR*). None of the variables are highly correlated. The highest reported correlation is between the number of funds in fund family and family's size being 72 per cent. Using the cut-off rate of 75 per cent, it is still acceptable to have both the number of funds in fund family and family's size in the same model.

Table 5.17

Correlation Matrix of Dependent and Independent Variable by Fund Family

Probability	RET	STDDEV	SIZE	AGE	No.of fund	MER	PTR
RET1	1.0000						
STD_DEV1	-0.6794	1.0000					
SIZE1	0.1841	0.0630	1.0000				
AGE1	-0.1121	0.2750	0.5656	1.0000			
NOOFFUNDS	0.0012	0.3617	0.7247	0.6130	1.0000		
MER1	0.0138	0.0131	-0.2490	-0.1287	-0.2241	1.0000	
PTR1	0.0103	0.0890	-0.2425	-0.0799	-0.0980	0.3481	1.0000

Note: The table represents the correlation matrix of FG and fund families's attributes in the sample period. (RET) is measured by the average family-level return over the previous 12 months. (Stddev) is defined as the standard deviation of returns across all funds in the family. High standard deviation is the proxy for family star-creating strategy and low standard deviation is the proxy for focused strategy. (Size) is measured by the logarithm of sum of TNA of funds of the fund family. (Age) is measured by the number of months from the family date of inception to year t, taking the age of the oldest fund. (NoFunds1) is the logarithm of the total number of member funds managed by the family. (PTR) is the PortfolioTurnover Ratio, it is the average PTR of all member funds in the family. (MER) is the Management Expense Ratio, it is the average of MER of all member funds in the family.

Table 5.18 presents the relevant statistics on the estimation of pooled regression and fixed effect (group) regression for five models using the fund family data. The R-squared, adjusted r-squared, standard error of regression, F-statistic and Durbin Watson statistic are reported for comparison. The Redundant fixed effect-likelihood test is carried out in the five models to determine whether the fixed effect model (group) is better than the pooled model. The hypothesis is: H_0: The pooled regression model is a better model than the fixed effect model (group). H_1: The pooled regression model is not a better model than the fixed effect model (group). The p-value of the f-test and chi-square of all five models indicate significance at 1 per cent. Hence, H_0 is rejected in favour of H_1. It is concluded that the fixed effect (group) model is better than the pooled model in this study. In addition, the adjusted r-squared of the fixed effect model (0.6846, 0.7012, 0.6703, 0.7116 and 0.7171) is very much higher than the adjusted R-squared of the pooled model (0.1593, 0.2184, 0.2171, 0.1819 and 0.3014) in all five regression models, which indicates that the fixed effect model is a better model. From these findings, we conclude that the fixed effect model is selected for study in the family's star impact.

Table 5.18

Pooled Regression and Fixed Effect (group) Regression Model using Fund Family Attributes

	Regression Model 6		**Regression Model 7**		**Regression Model 8**		**Regression Model 9**		**Regression Model 10**	
	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)	Pooled Regression	Fixed Effects (group)
No. of Observations	45	45	45	45	45	45	45	45	45	45
R-squared	0.2930	0.8351	0.3783	0.8574	0.3594	0.8352	0.3306	0.8558	0.4760	0.8779
Adjusted R-squared	0.1593	0.6846	0.2184	0.7012	0.2171	0.6703	0.1819	0.7116	0.3014	0.7171
S.e. of Regression	0.3313	0.2029	0.3194	0.1975	0.3197	0.2075	0.3268	0.1940	0.3020	0.1922
F-statistic	2.1908	5.5469	2.3664	5.4896	2.5249	5.0664	2.2226	5.9353	2.7256	5.4623
Prob.of F-stat	0.0577	0.0001	0.0330	0.0001	0.0272	0.0002	0.0487	0.0000	0.0127	0.0002
Durbin-Watson stat	1.8120	2.6011	2.0823	2.4312	2.0426	2.5878	2.0359	2.8205	2.2006	2.5066
Redundant FE Test	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
Cross-Section F	5.4009	0.0002	5.0395	0.0005	4.5352	0.0008	5.7236	0.0002	4.4647	0.0015

Note: This table presents the Redundant Fixed Effect test results for the five regression models as follows for model selection.

Regression Model (6):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\ t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \mu_{(f,,t)}$$

Regression Model (7):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\ t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{DSF}_{(f.\ t-12,t-1)} + \beta_9 * \text{DDF}_{(f.\ t-12,t-1)} + \mu_{(f,,t)}$$

Regression Model (8):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\ t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{L1D}_{(f.\ t-12,t-1)} + \mu_{(f,,t)}$$

Regression Model (9):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\ t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{L3D}_{(f.\ t-12,t-1)} + \mu_{(f,,t)}$$

Regression Model (10):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\ t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{DSF}_{(f.\ t-12,t-1)} + \beta_9 * \text{DDF}_{(f.\ t-12,t-1)} + \beta_{10} * \text{L1D}_{(f.\ t-12,t-1)} + \beta_{11} * \text{L3D}_{(f.\ t-12,t-1)} + \mu_{(f,,t)}$$

The estimated regressions have allowed for heteroskedasticity and autocorrelation. Table 5.19 reports the summary results for the five regression models and the coefficients of the independent variables in the flows-performance model. Fund family's flow growth (FG) being the dependent variable is regressed on the independent variables shown in column 1 of Table 5.19. Column 2 to column 6 report the coefficients of each variable of model (6) to model (10). In model (6), FG is regressed on all the independent variables of family returns, return's standard deviation, MER, PTR, family size and family age. The dummy variables are excluded in this equation. In

model (7), FG is regressed on all the independent variables plus the dummy variables of the star fund family and the dog fund family. In model (8), FG is regressed on all the independent variables plus the dummy variables of the one-year Lipper star fund family. In model (9), FG is regressed on all the independent variables plus the dummy variables of the three-year Lipper star fund family. In the last equation, FG is regressed on all the independent variables plus all the dummy variables in the study.

The F-statistics in all the five models are statistically significant at 1 per cent. Model (10) shows the highest adjusted r-squared of 71.71 per cent; while the adjusted r-squared for model (7) is the lowest at 67.03 per cent. None of the Durbin Watson statistics exhibit autocorrelation problems.

There is a highly significant positive relationship between current fund family's flow growth and lag one-year fund family's return in all the five models, (6), (7), (8), (9) and (10) at 1 per cent. Consistent with the previous studies, most of the past researchers found a significant positive relationship between the flows and the performance variable (Chevalier and Ellison, 1997; Sirri and Tufano, 1998; DelGuercio and Tkac, 2002; Berk and Green, 2004; Nanda *et al.*, 2004).

The coefficient of the control variable of standard deviation of family fund returns is positive and significantly related to the fund flow growth in models (6), (7) and (8); but, it is insignificant in models (9) and (10). The positive relationship is in line with Deaves (2004), and Sinha and Jog (2005). As the fund flow growth is positively related to the star creating strategy arises from the high standard deviation, we infer that the investment in fund family, measured in fund flow growth, believes that high risk investment will in return reward the investment with high returns.

The family's asset size is negative and highly significantly related to fund flow growth in all the five models, (6), (7), (8), (9) and (10) at 1 per cent, similar to Nanda, Wang, and Zheng (2004), Chevalier and Ellison (1997), Sirri and Tufano (1998), Sawicki (2001) and Deaves (2004), who argued that smaller funds grow more quickly as a result of the law of diminishing return. Another explanation for this finding is that the investors perceived diseconomies of scale of large companies. When the organization grows larger, the operating and management expenses are perceived to increase.

The coefficient of another variable – the number of funds in a family – has a highly significant positive relationship with the fund flow growth in all the five models, (6), (7), (8), (9) and (10) at 5 per cent. This finding is interesting as it contradicts Nanda *et al.* (2004). The evidence shows that investment capital is attracted to fund families that offer a large number of funds. This implies that a fund family's strategy of offering more funds helps to attract investment in Malaysia. This argument is in line with Massa (1998), and Khorana and Servaes (2005) who pointed out that fund families effectively capture market share by product proliferation.

The coefficient of family's age is significantly positive related to the new money flow growth in family in models (8), (9) and (10). This indicates that older funds attract more capital in all the models at 1 per cent. This finding is explained as the older fund families are more likely to have gained recognition among other fund family and thus attract more money inflows into funds in the family. This positive sign contradicts the sign between the family's age and the money fund flow documented in Chevalier and Ellison (1997), DelGuercio and Tkac (2002) and Bergstresser and Poterba (2002).

However, Deaves (2004) and Sinha and Jog (2005) found the family's age factor to be insignificant in their flow model.

As expected, all the coefficients of MER show a negative relationship with the new money flow growth in the family, in all the models at 10 per cent. This evidence is in line with Hendricks *et al.* (1994), Sirri and Tufano (1998), Bergstresser and Poterba (2002), and Nanda *et al.* (2004) and Barber *et al.* (2005). The negative relationship is explained by fund fees and expenses reducing the returns. As such, investment is kept away from high fee fund families.

The coefficient of PTR is significantly positively related to the new money flow growth in the family in model (6), (7), (9) and (10) at 10 per cent, which is in line with Bergstresser and Poterba (2002) who also documented a positive relationship for this variable. The variable of portfolio turnover examines whether investors prefer actively managed funds. Woerheide (1982) found no significant relationship between trading activity, measured by PTR on fund flows.

Next, the coefficient of the *Star Family Dummy* in models (7) and (10) is insignificant. However, the Lipper star rating, which represents the star marketing effect, exhibits inconsistent results. The O*ne-year Lipper Star Family Dummy* in models (7) and (10) is insignificant. The coefficient of the *Three-year Lipper Star Family Dummy* in models (9) and (10) is positive and significant at 5 per cent. The coefficient of the *Three-year Lipper Star Family Dummy* captures the mean difference in new money growth between star and non-star families, after controlling for other variables that have an impact on new money growth. Although there is no tendency among unit trust investors to allocate funds to a winning family, the evidence shows that having a three-year Lipper star fund

in the family attracts higher new money flows to the fund family by 0.14 per cent. This implies that a Lipper three-year star fund in family attracts, on average, more money than a non-three-year Lipper star family. The evidence shows that the past one year fund family's star identity has no impact on investor's capital flows. This could be due to the impact of the disposition effect which neutralises the money inflows into fund family. However, the Lipper star does have a long term marketing effect in attracting money into a fund family.

Our finding cannot reject $H_0$10(a) - that having a one-year star fund does not increase family level new money flows. However, the evidence discussed above reject hypothesis $H_0$10(b) in favour of H_a10(b) – that having a three-year star fund increases family level new money flows. Our evidence seems not in line with the star phenomenon found in a U.S. study carried out by Nanda *et al.* (2004). On the other study, Ouyang (2008) documented that the star phenomenon did not exist in the China mutual fund industry. The Malaysian investors behave differently from those in the U.S. and even the China.

The coefficient of the *Dog dummy* shows an insignificant relationship in models (8) and (10). There is no evidence that unit trust investors are withdrawing funds out of losing families. This evidence cannot reject the hypothesis of $H_0$10(c) – that having a dog fund does not decrease family level new money flows. Thus, having a dog fund would not lead to money flowing out of fund family.

This study found that having a superior performer in the past one year would not increase the total money flows into the fund family as a whole, unless the family own a three-year Lipper star rated fund. In a star phenomenon study in the U.S., Nanda et al.

(2004) documented that: (1) family-level new money growth increases as a result of the existence of a Lipper star fund in a family; (2) the money flows into the non-star funds in a star family are significantly higher than other non-star funds in a non-star family; (3) higher money flows into the star fund compared to the non-star fund. In contrast, our study concluded that: (1) the money flow into the non-star funds in a one-year star family is not higher than other non-star funds in the non-star family, no spillover effects; (2) no higher money flows into the one-year star fund compared to non-star funds, but there is higher money flows into the three-year star fund compared to non-star funds ; and (3) family-level new money growth does not increase as a consequence of the existence of a past one-year star fund in a family, however, it does if the family own a three-year Lipper star rated fund. This study may imply that cross-fund subsidization (Massa, 1998, 2003) or star-creating strategy (Nanda *et al*., 2004) within a fund family does not exist in Malaysia. One plausible reason could be that the fund families are not in the position to take on either the star-creating strategy or the cross-subsidisation strategy because according to Guedj and Papastaikoudi (2005), the number of funds in the mutual fund family is required to be large enough in order to promote their funds selectively.

The possible explanation for the insignificant past one-year Lipper star identity and significant positive past three-year star identity in the flows model is that the insignificant one-year Lipper Malaysian investors may be influenced by the disposition effect. The unsophisticated investors dispose of the funds that make a profit and sit on the losing funds (Shefrin and Statman, 1985; Grinblatt and Kelohar, 2001; Weber and Camerer, 1998; Ocean, 1998). In this case, the star funds may be the target for the investors to sell in order to realise gain. As stated by Grinblatt and Keloharju (2000), unsophisticated investors are in a hurry to realize their winning stocks. It is believed that

a large amount of the retail investors are less sophisticated in Malaysia, an emerging market. Thus, it could be the unsophisticated investors in the market who are contributing to this effect. On the other hand, sophisticated investors invest in these one-year Lipper star funds. The inflow of money is as large as the outflows of money which lead to the insignificant result. In contrast, investors are more sophisticated in developed countries such as the U.S. and are attracted to the winning funds. Therefore, the star identity of funds and fund families were documented as having a positive and significant impact on fund flows (Nanda et al. (2004)). Kempf and Ruenzi (2006) provided evidence of large inflows followed by top ranking of funds relative to other funds within its family, especially in large fund families. Conversely, the result of the significant positive three-year Lipper star in the Malaysian fund family attracts investment. This shows that Malaysian investors are rational and the long run past star identity and the Lipper rating information are used in fund family investment decision.

In addition, based on the evidence discussed above, it is also concluded that the previous year's fund family return has an impact on investors capital flows in this study, thus, we reject hypothesis $H_0$11 in favour of H_a11 that there is a positive relationship between fund flows and past performance. Thus, unit trust investors are responsive to past performance. This finding is in line with Hendricks *et al.* (1990), Ippolito (1992), Gruber (1996), Chevalier and Ellison (1997) and Sirri and Tufano (1998), DelGuercio and Tkac (2002). It is deduced that the majority of investors in Malaysia are unsophisticated investors since this group of investors allocate their money based on past performance given that their search costs and information costs are high (Sirri and Tufano (1997); James and Karceski (2001); Phalippou (2010)). Therefore, Malaysian investors make fund selection and investment decisions based on the historical fund

performance as a result of the inefficient information dissemination. This is consistent with the rational investment behaviour.

An additional conclusion can be drawn from the insignificant relationship between fund flows and fund's past performance and the significant relationship between family flows and family's past performance. Since the investment flows in Malaysia are highly related to past family performance rather than past individual fund performance, we conclude that investment decision are made based on the performance of fund family as a whole rather than on the individual fund performance. Thus, the Malaysian investors select investment on fund family basis instead of on the individual fund basis.

In an earlier section, we presented evidence of fund family performance persistence up to one quarter while there is no evidence of persistence in the inferior performance. This implies that the information of past superior returns is only useful up to three months, and that using the past inferior fund returns as a guide for future funds selection does no good. It is worth highlighting that while past literature documented a positive relationship between the growth of fund money flow and performance, such a connection has been found in all the five regressions of (6), (7), (8), (9) and (10) of this study. This finding shows that the historical fund returns of a company have a positive significant impact on fund flows, consistent with the previous studies (Ippolito (1992); Chevalier and Ellison (1997); Sirri and Tufano (1998); DelGuercio and Tkac (2002); Nanda *et al.* (2004)). However, the individual fund return is positive but not significant. This result implies that investors in Malaysia invest their capital based more on past performance of a fund company than on individual fund returns.

The impact of variables such as the past performance of a fund company, company size, fund fees, portfolio turnover is slightly different from past studies that were carried out in the U.S. Family age is positive and highly significantly related to fund flow, which indicates that older fund families, with better reputation, grow more quickly than younger funds. This finding is in line with previous studies Yates (2007) who documented that flows is significantly related to family reputation measured by family age.

Interestingly, the number of funds in a fund company is found to be positive and highly significantly related to the fund flows while Nanda *et al.* (2004) documented a significant negative relationship. Therefore, the evidence reject hypothesis $H_0$12 in favour of H_a12, which states that there is a positive relationship between fund flows and the number of funds in a fund family. Therefore, unit trust investors are responsive to the number of funds in a fund family. This indicates that investors in Malaysia are attracted to fund companies with a larger number of funds on offer. This is consistent with the findings of Massa (1998), and Khorana and Servaes (2005), who argued that fund families effectively boost market share by introducing more funds than their competitors.

It is concluded that investors in Malaysia tend to invest in fund families that offer a wide range of funds, perhaps for economic reasons, convenience or simplicity. The evidence shows that fund families in Malaysia are successful in attracting investment by offering a wide range of funds. This leads to a large number of funds being offered and managed by unit trust families that are highly correlated within a family. The evidence shows that investors in Malaysia are attracted to fund family which offers a large number of funds, perhaps for the ease of management of the portfolio. They should be

aware of the risk of investing all capital in one fund family as documented in this study. Hereby, the findings in this study highlight to investors the risk of investing all their money in a single family. They have to be aware of the trade off between the convenience and simplicity they enjoy from investing in a fund family and the greater risk they might suffer from the high commonality between funds in a family.

Table 5.19

The Star-fund Effect on Family-level New Money Growth

Dependent Variable : FG	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
c	-0.4087	-0.3789	-0.383	-0.3842	-0.3035
Return (-1)	0.7109***	0.8723**	0.7069***	0.7259***	0.8836***
Std dev (-1)	1.2903***	1.7929**	1.2683**	0.7627	1.2337
size (-1)	-2.9420***	-3.0851***	-2.9357***	-2.9992***	-3.1335***
No.of funds (-1)	1.9187***	1.8521***	1.9157***	1.7158**	1.6521***
Age (-1)	1.7172***	2.0509***	1.6998***	1.9091***	2.2047***
MER (-1)	-0.2398**	-0.3390***	-0.2367*	-0.1982**	-0.2949***
PTR (-1)	23.1661*	11.7771**	22.9413	27.0575*	15.120**
Star family (Dummy)(-1)		-0.0235			-0.0186
Dog Family (Dummy) (-1)		0.1331			0.1386
1 yr Lipper Star Family (Dummy) (-1)			0.007		0.01631
3 yr Lipper Star Family (Dummy) (-1)				0.1499**	0.1447***
No.of Observations	45	45	45	45	45
R-squared	0.8351	0.8574	0.8352	0.8558	0.8779
Adjusted R-squared	0.6846	0.7012	0.6703	0.7116	0.7171
S.e. of Regression	0.2029	0.1975	0.2075	0.1940	0.1922
F-statistic	5.5469	5.4896	5.0664	5.9353	5.4623
Prob.of F-statistic	0.0001	0.0001	0.0002	0.0000	0.0002
Durbin-Watson statistic	2.6011	2.4312	2.5878	2.8205	2.5066

Note: The table examines the star-fund effect on the family-level new money growth. We estimate the following fixed-effect panel regressions:

Regression Model (6):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\,t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \mu_{(f,,t)}$$

Regression Model (7):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\,t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{DSF}_{(f.\,t-12,t-1)} + \beta_9 * \text{DDF}_{(f.\,t-12,t-1)} + \mu_{(f,,t)}$$

Regression Model (8):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\,t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{L1D}_{(f.\,t-12,t-1)} + \mu_{(f,,t)}$$

Regression Model (9):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\,t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{L3D}_{(f.\,t-12,t-1)} + \mu_{(f,,t)}$$

Regression Model (10):

$$\text{Flow Growth}_{(f,t)} = \alpha_f + \beta_1 * \text{RET}_{(f.\,t-12,t-1)} + \beta_2 * \text{Stddev}_{(f,t-1)} + \beta_3 * \text{Size}_{(f,t-1)} + \beta_4 * \text{NoFunds}_{(f,t-1)} + \beta_5 * \text{Age}_{(f,t-1)} + \beta_6 * \text{MER}_{(f,t-1)} + \beta_7 * \text{PTR}_{(f,t-1)} + \beta_8 * \text{DSF}_{(f.\,t-12,t-1)} + \beta_9 * \text{DDF}_{(f.\,t-12,t-1)} + \beta_{10} * \text{L1D}_{(f.\,t-12,t-1)} + \beta_{11} * \text{L3D}_{(f.\,t-12,t-1)} + \mu_{(f,,t)}$$

Column (1) of the table, reports the coefficient estimates when all the control variables are included. Column (2) reports the coefficient estimates when both star measures (Star Family Dummy) and (Dog Family Dummy) are included in the regression. Column (3) reports the coefficient estimates when all star measures (Star Family Dummy), (Dog Family Dummy) one-year Lipper Star Family Dummy and three-year Lipper Star Family Dummy. Column (4) reports the coefficient estimates when only one-year Lipper Star Family Dummy is included. Column (5) reports the coefficient estimates when only the three-year Lipper Star Family Dummy is included. *significant at 10%; **significant at 5%; **significant at 1%.

5.5 SUMMARY

In the study of the fund commonality within a fund family, unit trust family membership has a significant impact on investor risk. Funds within a fund family are highly correlated compared to funds across fund families. The funds common stockholdings are found to be high within a fund family as compared to funds across fund families. The findings in this study highlight that risk reduction can be achieved through diversifying investment across fund families and across Islamic and conventional funds. In addition, money market funds stand out as good diversification due to their negative correlation with other funds.

In the fund family performance persistence analysis, we found evidence of the hot-hand phenomenon. However, this effect is short and is only up to one quarter. No icy-hand is documented in this study. The hot-hand family is positively related to the overall fund family's superior performance and investors economic gain. Investing in a hot-hand family does benefit the investors.

The study of investor response to star ranking funds provides evidence of no obvious star identity or spillover effect in the Malaysian unit trust market. Some possible explanations for the findings are as follows. First, investors do not perceive that the historical superior performance would promise future excess return. Second, the disposition effect exists in the mutual fund market in Malaysia. Funds that make money are disposed of and funds that do not are being retained. Third, investors in Malaysia are more unsophisticated compared to the developed markets and they are in a hurry to sell the wining stocks, as documented by Grinblatt and Keloharju (2000). The unsophisticated investors are expected to behave differently from the sophisticated investors.

Additionally, this study also found that investors make investment decisions based on the past fund family's return perhaps because of inefficient information. This finding is in line with Representative Heuristic Theory where investors tend to be overly optimistic on the performance of past winners and overly pessimistic on the performance of past losers. In addition, the number of funds in a fund company is found to be positive and highly significant related to the fund flows, thus, fund families effectively capture market share by product proliferation in line with Massa (1998), and Khorana and Servaes (2005).

Table 5.20 presents the summary result of flow growth study at fund level (table 5.16) and at family level (table 5.19) to facilitate comparison. Our results show that all fund attributes except fund size, are not significantly related to the individual fund flows; while the findings at family level show that all the included fund family's attributes are significantly related to the family flow growth. These results imply that fund family's attributes, rather than individual fund attributes, carry significant weight in the investment decision in Malaysia. Disposition effect seems to occur only in the star fund. This effect does not appear in the star family. This means that investors sell the good performing funds, but they do not exit the good performing fund family. Perhaps the effect of the flows of money into the star fund families has been set off by the money flowing out of the star fund families. Additionally, monies are attracted into funds and fund families which relates to the existence of three-year Lipper star status. In view of this finding, we conclude that long term information is used for investment selection decision.

Table 5.20

Summary result of flow growth at fund-level and at family-level

Fund Level (Table 5.16)	**Family Level** (Table 5.19)	**Reasons**
Ret + (n.s.)	Ret + (***)	- Investors are rational, but unsophisticated. Money flows follow past family return since search cost in developing market is high.
s.d. – (n.s.)	S.d.+ (n.s.)	- Capital flows into family with high standard deviation strategy perceiving that high risk yield high return.
MER + (n.s.)	MER - (***)	- Fees and expense reduce return.
PTR + (n.s.)	PTR + (**)	- Investors prefer actively managed family.
Age – (n.s.)	Age + (***)	- Older funds gained reputation and attract investment.
Size – (***)	Size – (***)	- Investors perceived that when organisation grows larger, management and operating fees will increase accordingly and so not investing in large family.
	No.of Funds + (***)	- Family successfully capture market share through product proliferation (K&S, 2005).
Star – (***)		Negative star phenomenon arises from the disposition effect shown in the star fund. But, no evidence of star phenomenon in star family.
1YrLipStar – (**)		
	Star Fam – (n.s.)	
	1YrLipStarFam +(n.s.)	
Dog – (n.s.)		No evidence of dog phenomenon.
Non-dog in dog fam – (n.s.)		
	Dog Fam + (n.s.)	
	3YrLipStarFam + (***)	Having 3yrLip star attract investment into the family.
Non-star in Star fam – (*)		Negative spillover effect arises from the disposition effect. The existence of star fund lead to money outflows from the non-star funds in star family.
1YrLipStarFam – (**)		
3YrLipStar + (***)		Having 3-year Lipper star attracts investment into the star fund. The Lipper rated star performing funds attract investment.
3YrLipStarFam + (***)		Having 3-year Lipper star attracts investment into the non-star fund in star family - spillover effect exists.

Table 5.21

Summary of All Findings

Panel A: The Impact of Unit Trust Company Membership on Investor's Risk			
Hypotheses			
Fund Return Correlations (H1)	Within Family Correlation	Between Family Correlation	t-stat
(a) Fund Return Correlations - Whole Period	0.4708	0.4376	3.4529***
	(N=1,773)	(N=19,465)	
(b) Fund Returns Correlation for sub-period January 2003 - May 2006 (Stable)	0.4765 N=1240)	0.4344 (N=14115)	3.5376***
(c) Funds Return Correlation – for Sub-period June 2006 to December 2007 (Rising)	0.5160 (N=1659)	0.4371 (N=18093)	8.6261***
(d) Fund Returns correlation for sub-period January 2008 - March 2009 (decreasing)	0.4735 (N=1779)	0.4603 (N=19229)	1.2366*
Reject $H_0$1 in favour of Ha1 that the correlation of return of funds within funds family is higher than across funds families.			
Common Stockholdings (H2)	Within Family Common Holding	Between Family Common Holding	t-stat
	24.92	14.79	16.154***
	(N=467)	(N=10,721)	
Reject $H_0$2 in favour of Ha2 that common stocks holding in unit trusts within funds family is higher than across funds families.			
Conventional Versus Islamic Funds in Returns Correlation (H3)			
	Only Islamic funds	Islamic and Conventional funds	t-stat
	0.7813	0.7584	4.9420***
	(N =880)	(N=4817)	
Reject $H_0$3(a) in favour of Ha3(a) that the mean return correlation made up of only Islamic funds is greater than the correlation of a combination of Islamic and conventional funds.			
	Only Conventional funds	Islamic and Conventional funds	t-stat
	0.7545	0.7584	-1.5886*
	(N=6400)	(N=4817)	
Cannot reject $H_0$3(b)of the mean return correlation made up of only conventional funds is the same as the correlation of a combination of Islamic and conventional funds. The reserve is found.			
	Only Islamic funds	Only Conventional funds	t-stat
	0.7813	0.7545	5.9738***
	(N =880)	(N=6400)	
Reject $H_0$3(c) in favour of Ha3(c) that the mean return correlation of only the Islamic funds is greater than the mean return correlation of only the conventional funds, within family and across families.			
	Within Family	Across Families	t-stat
Islamic-Islamic	0.8492	0.7753	6.8805***
	(N =478)	(N = 808)	
Reject $H_0$3(d) in favour of Ha3(d) that the mean return correlation of only the Islamic funds within family is greater than the mean return correlation of only the Islamic funds across families.			

Table 5.21 (continue)

Panel A (cont'...) The Impact of Unit Trust Company Membership on Investor's Risk				
Hypotheses				
Conventional Versus Islamic Funds in Returns Correlation (H3)				
		Within Family	Across Families	t-stat
conventional-conventional		0.8231	0.7490	13.8208***
		(N =478)	(N = 5922)	
Reject H0 3(e) in favour of Ha3(e) that the mean return correlation of only the conventional funds within family is greater than the mean return correlation of only the conventional funds across families.				
		Within Family	Across Families	t-stat
Islamic-conventional		0.8207	0.7526	10.529***
		(N =411)	(N =4406)	
Reject H0 3(f) in favour of Ha3(f) that the mean return correlation of a combination of Islamic and conventional funds within family is greater than the mean return correlation of a combination of Islamic and				
Conventional Versus Islamic Funds in Common Holdings (H4)				
		Only Islamic funds	Islamic and Conventional funds	t-stat
		22.04	14.30	14.9063***
		(N =633)	(N=4540)	
Reject H0 4(a) in favour of Ha4(a) that the mean common holding of only Islamic funds is greater than the common holding of Islamic and conventional funds.				
		Only Conventional funds	Islamic and Conventional funds	t-stat
		13.38	14.30	-4.4069***
		(N=4996)	(N=4540)	
Cannot reject H0 4(b) of the mean common holding of only conventional funds is the same as the common holding of Islamic and conventional funds. The reverse is found.				
		Only Islamic funds	Only Conventional funds	t-stat
		22.04	13.38	16.3269***
		(N =633)	(N=4996)	
Reject H0 4(c) in favour of Ha4(c) that the mean common holding of only the Islamic funds is greater than the mean common holding of only the conventional funds, within family and across families.				
		Within Family	Across Families	t-stat
Islamic-Islamic		32.05	21.42	3.3360***
		(N =37)	(N=596)	
Reject H0 4(d) in favour of Ha4(d) that the mean common holding of only the Islamic funds within family is greater than the mean common holding of only the Islamic funds across families.				
		Within Family	Across Families	t-stat
conventional-conventional		25.60	13.19	12.6209***
		(N =234)	(N=6373)	
Reject H0 4(e) in favour of Ha4(e) that the mean common holding of only the conventional funds within family is greater than the mean common holding of only the conventional funds across families.				
		Within Family	Across Families	t-stat
Islamic-conventional		22.94	13.88	9.6289***
		(N =213)	(N=4327)	
Reject H0 4(f) in favour of Ha4(f) that the mean common holding of a combination of Islamic and conventional funds within family is greater than the mean common holding of a combination of Islamic and conventional funds across families.				

Table 5.21 (continue)

Panel B: Performance Persistence of Fund Family and Its Significance						
Hypotheses						
Family Performance Persistence (H5)	Repeat Winner	Repeat Winner z-stat	Repeat Loser	Repeat Loser z-stat		
Over the Consecutive Month	0.55	2.708***	0.5	-1.1245		
Only the Conventional Funds	0.57	3.6085***	0.52	0.8305		
Only the Islamic Funds	0.6	4.7908***	0.53	1.5213*		
Over the Consecutive Quarter	0.59	2.685***	0.55	1.389*		
Over the Consecutive Six-Month	0.54	0.792	0.49	-0.211		
Over the Consecutive Years	0.51	0.146	0.46	-0.469		
Reject $H_0$5(a) in favour of Ha5(a) that the well-performing unit trusts families continue to perform well in the subsequent period.						
Cannot Reject $H_0$5(b) that poor-performing unit trusts families do not continue to perform badly in the subsequent period						
Performance Persistence and the Overall Superior Performance (H6)						
Fund Family	**Repeat Winning Ratio**	**Rank**	**Win-Win Ratio**	**Rank**		
PMB	0.667	1	0.434	1		
MAA	0.643	2	0.434	1		
TAI	0.628	3	0.325	4		
Note: The three hot-hand fund family are also ranking on top in the overall superior performance measure (WW ratio).						
Reject $H_0$6 in favour of Ha6 that unit trusts families that positive performance persists are the overall superior performer.						
Excess Returns of Performance Persistence Fund Family (H7)						
Fund Family	**Annualised Excess Returns %**	**Rank**	**Repeat Winner Z-stat**	**Rank**	**Win-Win Z-stat**	**Rank**
PMB	20.91	1	2.449***	1	3.866	1
MAA	7.27	5	2.138**	2	3.866	2
TAI	-0.35	7	1.677**	3	1.584	4
Note: The annualised excessed returns three hot-hand fund family seems to rank above the med of fund families.						
Cannot reject $H_0$7 that investors do not make significant higher excess return from investing in performance persistence family.						

Table 5.21 (continue)

Panel C: The New Flow Growth					
Hypotheses					
Using Fund information	**Regression (1)**	**Regression (2)**	**Regression (3)**	**Regression (4)**	**Regression (5)**
Spillover Effects (H8a & H8b)					
Star family		-0.1092			-0.1731*
1 yr Lipper Star Family			-0.0509		-0.1211**
3 yr Lipper Star Family				0.1269**	0.1813***
Cannot reject $H_0$8(a) that new fund flows to non-star funds in 1-year star family is the same as the other non-star funds in the non-star family (No evidence of spillover effects within 1-year star families).					
Reject H08(b) in favour of Ha8(b) that new fund flows to non-star funds in 3-year star family is greater than the other non-star funds in the non-star family (Evidence of spillover effects within 3-year star families).					
Star Fund generate inflows to the fund itself (H9a & H9b)					
Star fund		-0.2053**			-0.2655***
1 yr Lipper Star			-0.0489		-0.0809**
3 yr Lipper Star				0.0858*	0.1486***
Cannot reject $H_0$9(a) that 1-year star funds do not generate greater money inflows than non-star funds.					
Reject $H_0$9(b) in favour that Ha9(b) that 3-year star funds generate greater money inflows than non-star funds.					
Dog Fund causes cash outflows from the fund itself (H9c)					
Dog fund		-0.0288			-0.0991
Cannot reject $H_0$9(c) that dog funds do not generate smaller money inflows than non-dog funds.					
Using Fund Family Information	**Regression (6)**	**Regression (7)**	**Regression (8)**	**Regression (9)**	**Regression (10)**
Star Fund Identity Increase Family Cash Inflows (H10a & H10b)					
Star family		-0.0235			-0.0186
1 yr Lipper Star Family			0.007		0.01631
3 yr Lipper Star Family				0.1499**	0.1447***
Cannot reject $H_0$10(a) that having a one-year star fund does not increase family level new money flows.					
Reject $H_0$10(b) in favour of Ha10 (b) that having a three-year star fund increases family level new money flows.					
Dog Fund Identity Increase Family Cash Outflows (H10c)					
Dog Family		0.1331			0.1386
Cannot reject H010(c) that having a dog fund do not decrease family level new money flows.					
Investors Response on Past Returns (H11)					
Return	0.7109***	0.8723**	0.7069***	0.7259***	0.8836***
Reject $H_0$11 in favour of Ha11 that there is positive relationship between fund flows and past performance.					
Investors Response on Number of Funds Offered in Family (H12)					
No.of funds (-1)	1.9187***	1.8521***	1.9157***	1.7158**	1.6521***
Reject $H_0$12 in favour of Ha12 that there is positive relationship between fund flows and number of funds in fund family.					