

Carhart and Q-Factor Views of Mutual Fund Performance

(*Pandangan Carhart dan Faktor Q terhadap Prestasi Dana Amanah*)

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ABSTRACT

This study evaluates the performances of 321 Malaysian equity mutual funds for the period of June 1998 to May 2015. These mutual funds appear to generate an average monthly rate of 0.6878 percent (8.25% per annum), a performance close enough to that of the market (8.42% per annum). The Jensen's alphas show that only around 22 percent of these funds significantly outperform the market. While multifactor models are expected to produce better explanatory power, Carhart rather than q-factor model seems to fit the Malaysian funds data better. The results reveal that (i) funds' returns are closely linked to market performance, (ii) effect of fund managers' stock selection and market timing skills are both weak and insignificant on fund performance, (iii) of the five investment styles exhibited in these multifactor models, only value (HML) and profitability (RMW) have gained attention from fund managers, (iv) adoption of RMW tend to give an equal chance of deteriorating and improving funds' returns. The results of this study in general imply that investors might be better off investing in the equity market directly and passively through index-tracking and buy-and-hold strategies that are less costly.

Keywords: Mutual funds; Jensen's alpha; Carhart model; q-factor model; stock selection; market timing; investment styles; multifactor model

ABSTRAK

Kajian ini menilai prestasi 321 dana amanah ekuiti Malaysia bagi tempoh Jun 1998 hingga Mei 2015. Dana amanah ini didapati menjana kadar pulangan bulanan 0.6878 peratus (8.25% setahun), satu prestasi yang hampir sama dengan prestasi pasaran (8.42% setahun). Nilai alpha Jensen menunjukkan hanya sekitar 22 peratus daripada dana amanah tersebut mengatasi prestasi pasaran secara signifikan. Walaupun model-model multifaktor dijangka menghasilkan kuasa jelas yang lebih tinggi, model Carhart didapati lebih sesuai bagi data dana amanah Malaysia berbanding model faktor q. Dapatan kajian menunjukkan (i) pulangan dana amanah berkait rapat dengan prestasi pasaran, (ii) kesan pemilihan saham dan pemaasan pasaran terhadap prestasi dana adalah lemah dan tidak signifikan, (iii) daripada lima gaya pelaburan yang diuji dalam model-model multifaktor tersebut, hanya gaya nilai (HML) dan keuntungan (RMW) mendapat perhatian dari pengurus dana, dan (iv) penggunaan RMW bagaimanapun cenderung menunjukkan peluang yang sama untuk meningkat dan menyusutkan pulangan dana. Penemuan kajian ini umumnya menyarankan pelabur mempunyai peluang yang lebih baik dalam pasaran saham dengan melabur secara langsung dan secara pasif melalui penggunaan strategi mengikut indeks dan beli-dan-pegang yang kosnya sangat rendah.

Kata kunci: Dana amanah; alpha Jensen; model carhart; model faktor q; pemilihan saham; pemaasan pasaran; gaya pelaburan; model multifactor

INTRODUCTION

The mutual and unit funds industry in Malaysia has been undergoing tremendous growth in line with the development in the other parts of the world. Within 5-year period from 2009 to 2013, the Federation of Investment Managers Malaysia (FIMM) (2013) reports that the total net asset value (NAV) of the funds has increased by 75.01% (from RM191.75 billion to RM335.51 billion), consistent with the 70.3% growth in total market values of companies listed on Bursa Malaysia over the same

period. The industry has continued to grow steadily in 2014 at 5.7 percent with a NAV of RM354.7 billion as at the end July that year. This accounts for 19.9 percent of the market capitalization on Bursa Malaysia, again indicating an increase in its relative worth in 2013 (19.7% of market capitalization).

Of the various types of funds in the market, equity funds are preferred by most investors, with net sales of RM15.9 billion, followed by mixed asset funds at RM800 million for the first seven months of 2014. This remarkable growth may be attributed to several factors.

First, since 1996, Employee Provident Fund Malaysia (EPF) has allowed its contributors to invest a certain portion of Account 1 in selected unit trust funds.¹ This is an opportunity for fund management companies to increase their assets and income. Second, in March 2005, the Bank Negara Malaysia (BNM) allowed unit trust funds to pursue greater geographical portfolio diversification to enhance investment returns. Investing in mixed asset classes in various markets translates into a better risk-return profile for funds, and thus higher yields to their unit holders (investors). Further in October 2007, Islamic fund managers were allowed to invest 100 percent of their assets abroad and given greater access to institutional funds including a RM2 billion start-up financing from the EPF (SC 2008). Foreign investment limit for conventional fund management is set at 70 percent including REITs (SC 2008). As of December 2014, the SC reports that a total of RM23.255 billion (or 6.8 percent) of the funds' NAV were invested in foreign markets.

Despite the growth in the industry, empirical studies on Malaysian mutual funds have not been particularly positive about the fund performance (Low & Ghazali 2005; Abdullah, Hassan & Mohamad 2007) and they generally attribute the poor performance to the weak stock selection and market timing abilities of the fund managers. The loss of RM600 million in mutual fund investment suffered by EPF contributors in August 2006 added another valid reason for questioning the viability of mutual fund investment as a professionally managed investment vehicle (Chong & Rupinder 2006; Lai & Lau 2010). In response, the government issued an immediate directive to the EPF to tighten the withdrawal policy.² This restrictive policy reduces available investable funds, while competition grows stiffer among fund managers, especially from fund supermarkets like Public Mutual Fund Bhd., CIMB-Principal Asset Management Bhd. and RHB Asset Management Bhd.

This study attempts to re-examine the performance of funds by focusing on stock selection and market timing abilities which conceptually are the competitive advantages of professionally managed financial instruments. Stock selection or micro forecasting is the ability to identify undervalued stocks during portfolio construction (Treyner & Mazuy 1966). Meanwhile, market timing or macro-forecasting is an ability to forecast and withstand a market movement (Jensen 1972). By incorporating Henriksson and Merton's (1981) approach in Carhart (1997) and *q*-factor (Hou, Xue & Zhang 2015) models, these two skills are tested while considering the contribution (if any) of five investment styles that are commonly attributed to fundamental factors namely size, value/growth, momentum, profitability and investment premiums. Assessing the impact of fund managers' stock selection and market timing skills on fund performance through Carhart and *q*-factor models is beneficial because these multifactor models take also into consideration the proportion of performance which are driven by fundamental factors which shape fund investment styles.

The remainder of this article is organized as follows. The next section reviews literature on fund performance and its components. This is followed by a section which describes the data and methodology employed to achieve the objectives of this study. The remaining two sections discuss the results and implications of the results.

LITERATURE REVIEW

Traditional portfolio evaluation methods like Treynor's (1965) reward-to-volatility, Sharpe's (1966) reward-to-variability, and Jensen's (1972) alpha assess fund performance in total. Later, Treynor and Mazuy (1966) and Henriksson and Merton (1981) develop models that allow the overall performance to be attributed to the stock selection and market timing abilities of the fund managers. Sahu, Kleiman and Wharton (1996) adopt Henriksson-Merton model to analyze common trust funds and employee benefit funds managed by bank trust in 2 sub-periods of 1975-1983 and 1984-1992. They report that departmental banks' trust fund managers lack the capabilities in positioning their portfolios in accordance to the market condition and consequently, fail to offer superior returns. Nonetheless, these fund managers still show good stock selection skills. Jiang (2003) also finds similar results as Sahu et al. (1996) in 1937 (1827 surviving and 110 un-surviving) US active domestic equity funds from 1980 to 1999. Employing similar Treynor and Mazuy (1966) and Henriksson and Merton (1981), Jiang, Yao and Yu (2007) analyze 2,294 US domestic equity funds of four investment objectives (i) aggressive growth, (ii) growth, (iii) growth and income, and (iv) balanced over the period from 1980 to 2002. Unlike Jiang (2003), they discover a significant positive market timing ability in this sample. They also discover that managers use private information to forecast market returns, while in selecting stocks managers tend to exercise industry concentration (large fund size, small cap stocks, and active industry rotation) in portfolio selection.

Result of Jiang et al. (2007) on market timing performance is consistent with that found by Busse (1999) who suggests that timing ability is the critical factor in determining superior mutual fund return. Analyzing daily data on 230 domestic equity funds for a period from 2 January 1985 to 29 December 1995, Busse (1999) finds that most of the best performance funds are funds that engaged in the market timing and sensitive to the market movement or volatility.

Fund performance evaluation goes through a reformation following the success of Fama and French (1993, 1996) three-factor model that puts CAPM and CAPM-based evaluation models on the "death row". Since then, various multifactor models have been introduced in capital asset pricing literature, but one that has proven to receive tremendous attention is the Carhart (1997) four-factor model. This model incorporates Jegadeesh and Titman's (1993) momentum factor into Fama-French three-factor

model. These multifactor models quickly gain attention in fund performance literature including studies by Bollen and Busse (2001, 2005), Chan, Chen and Lakonishok (2002) and Olbrys (2010) which incorporate timing measures of Treynor and Mazuy (TM) or Henriksson and Merton (HM). The adaption of these multifactor models allows assessment of market timing ability separately from effects of investment styles or fundamental factors on performance. In other words, the manager's market timing ability is assessed after taking into consideration various investment styles (or fundamental factors) that can easily be adopted by managers in forming their portfolio (i.e., size, growth and momentum). Therefore, the results on fund managers' stock selection and market timing abilities will be more reliable and justified.

Indeed, studies that apply these multifactor models, specifically Fama-French and Carhart models (Bollen & Busse 2001; Chan et al. 2002; Olbrys 2010) find that evaluating managers' market timing ability concurrently with several investment styles do improve their predictions. For instance, Bollen and Busse (2001) demonstrate that using Carhart with HM and TM improve the chances to detect significant timing ability. Meanwhile, Olbrys (2010) incorporates HM and TM market timing measurement into Fama-French model to evaluate manager's market timing ability in 15 Polish equity open-end mutual funds. His results show negative impacts of managers' selectivity and market timing abilities in most of the funds. On the other hand, he discovers significant SMB and HML effects, implying that both investment styles are important contributors to the portfolio performance. In a more robust study, Chan et al. (2002) compare managers' ability with respect to different investment style. By adopting the same procedure in TM market timing to manager's investment styles (SMB and HML) the study is able to evaluate the timing ability separately from each investment style. Another study by Lai and Lau (2010) on Malaysian unit trust performance also adds support to the effectiveness of multifactor factor models as they find beta for the factors demonstrate highest degree of coefficients and significance.

In the context of Malaysia, this market segment receives academic attention only recently consistent with the relatively late development of Malaysian unit trust industry. Some studies are also lagging in terms of evaluation methods in that traditional evaluation models (market adjusted return, Jensen's alpha, adjusted Jensen's alpha, Sharpe Index, adjusted Sharpe Index, and Treynor Index) are still adopted. For instance, Taib and Isa (2007) are still using these models when examining the performance of Malaysian unit trust from 1991 to 2001. Their finding indicates that most Malaysian unit trusts (around 75%) underperform not just the market, but even worse the risk-free security. Since the variance of the unit trusts is also less than that of the market, the poor performance could be the result of managers' tendency to prioritize diversification effect instead of return maximization. However, since bond funds also

show superior performance than the market and equity funds, the poor performance could also be attributed to the Asian 1997/98 financial crisis that has adversely affecting stock markets in the region including Bursa Malaysia.

More in line with the development in the literature on mutual funds, later studies (eg., Abdullah et al. 2007; Lai & Lau 2010; Low 2007, 2011; Low & Ghazali 2005; Mansor & Bhatti 2011) evaluate fund managers' performance by segregating it into its two components; stock selection and market timing ability. Two studies (Lee & Rahman 1990; Md Nassir, Shamsher & Mee Hua 1997) adopt Merton's (1980) simple regression model. Using monthly returns of 93 mutual funds for 87 months from January 1977 to March 1984, Lee and Rahman (1990) separate stock selection from timing ability and they find weak evidence of stock selection and market timing abilities among the fund managers. Specifically, only 10 out of 93 funds report significant stock selection and market timing abilities, 4 funds show significant stock selection ability, while 5 funds show significant market timing ability. Later, Md Nassir et al. (1997) conclude that prior to 1995, Malaysian unit trust managers do not possess market timing ability. However, they suggest that there is ample evidence to show that they have superior ability in selecting stocks and that ability alone is sufficient to outperform the market.

Low (2007) employs Henriksson and Merton model to assess fund managers' ability in selecting the stocks and in timing the market in a study that spans from January 1996 to December 2000. Using two market indexes (Kuala Lumpur Composite Index, KLCI) and the Exchange Main Board All-Share (EMAS) Index) as benchmarks, the study finds that her sample of 40 Malaysian fund managers fail to outperform both market benchmarks by exercising their stock selection and market timing skills. Earlier on the same set of funds, Low and Ghazali (2005) also report overall negative performance and based on results of Merton (1980) and Henriksson and Merton (1981) models, they attribute the poor performance to fund managers' lacking in both skills.

In comparing managers' ability in managing conventional and Islamic mutual funds in Malaysia, Abdullah et al. (2007) use a sample consists of 65 equity-based unit trust funds (51 Conventional and 14 Islamic funds). Monthly data for the 10-year period (January 1992 through December 2001) are regressed using Treynor and Mazuy (1966) performance evaluation model and the results show that both fund groups are significantly negative on both stock-picking and market timing abilities. Still, conventional fund managers seem to perform better than their Islamic fund manager counterparts. The poor market timing ability among managers of Islamic funds is probably due to their attempts to avoid engaging in speculative behavior (*maisyr*) in market volatilities which will put the investment at risks (*gharar*). Islamic investment instruments are prohibited from interest (*riba*), *maisyr*, and *gharar*. Using the Treynor and Mazuy (1966) method of portfolio evaluation, Mansor and Bhatti

(2011) find results that are contrary to Abdullah et al. (2007). Their results indicate positive selectivity and market timing skills for both conventional and Islamic mutual funds. The finding also shows that the Islamic fund outperform conventional in overall and selectivity performance but not in market timing, probably due to the same reason of avoiding speculation.

Empirical evidence on Malaysian funds so far generally suggests that this indirect investment product (mutual funds) has not delivered the kind of performance that would be expected from a professionally managed investment, particularly in recent years. This is a puzzle because empirical evidence in general indicates that Malaysian equity market is still inefficient in the weak-form level (eg., Ling & Abdul-Rahim 2016; Hamid et al. 2010; Fred, Azlinna & Lau 2012), which implies great potentials for market timing or technical trading strategies in producing abnormal returns. This study aims to shed some lights on the explanation for the weak market timing abilities by incorporating HM market timing factor into Carhart model and another newly founded multifactor model known as q -factor model of Hou, Xue and Zhang (2015). Both are four factor models and therefore more compatible in terms of number of factors while also sharing the same main common risk, namely market risk premium. An alternative model for recognizing q -fundamental factors (i.e., profitability and investment risks) would be Fama and French's (2015) five factor model. However, this model would complicate deduction of results because it ignores momentum effect despite the factor's importance as reflected in the widespread acceptance of Carhart model. Incorporating momentum factor would result in the development of a new six-factor model, but that seems to be inconsistent with the practice which favors parsimonious asset pricing model. Also, because this study is more interested in accounting for the effect stock selection and market timing abilities on performance, net of fundamental or common risk factors in assessing, it opts to employ the multifactor models in their original forms.

RESEARCH METHODOLOGY

This study employs data of monthly returns of 321 Malaysian equity funds for a study period that spans for nearly 18 years from June 1998 to May 2015. All fund data are sought from Bloomberg and following Cuthbertson et al. (2009), each of the 321 selected equity funds must have at least 36 monthly returns data. Thompson's Datastream is used to collect monthly stock prices and market price indexes data, as well as firms' end-of-year data on market capitalization, book-to-market of equity ratio, return on equity (ROE) and total assets. Monthly data on the 3-month Treasury bill rates are collected from the Bank Negara Malaysia website. The adoption of Carhart and q -factor models requires the construction of 6 investment indexes (SMB_C, HML, UMD, SMB_Q, INV and

PFT) by triple-sorting on the model's respective factors. The return premium of the indexes are then calculated using monthly data on prices of all stocks listed on Bursa Malaysia for the same time period from June 1998 to May 2015. The FTBM Kuala Lumpur Composite Index (KLCI) is used as the proxy for the market index.

The selection of equity funds are appropriate for the issue on stock selection and marketing timing abilities raised in this study since the funds comprise common stocks which prices are most volatile compared to the prices of other financial assets. Equity fund managers can more actively adjust the asset allocation as more equities are offered in this market compared to bond and other types of securities. Equity funds are also more sensitive to micro and macro-economic shocks (Francis 1991; Farrell 1997; Reilly & Norton 2003) such that they need to be managed more actively to deliver performance which is expected by the investors. These characteristics make stock selection and market timing more appropriately tested in the equity funds rather than bond, money market or other fund types. The choice of equity funds allows comparison among all available sets of evidence established in previous studies. The scope of equity funds is further restricted to those invested in stocks listed on Bursa Malaysia so that the use of KLCI correctly represents the market condition toward which these funds' sensitivity to market and market timing ability are subjected to.

The monthly funds' return is calculated as $R_{p,t} = \frac{NAV_{p,t}}{NAV_{p,t-1}} - 1$ where $R_{p,t}$ is the monthly return for the p^{th} fund at time t , $NAV_{p,t}$ is the net asset value of fund p at time t , and $NAV_{p,t-1}$ is the net asset value of fund p at time $t-1$. This study then uses Jensen's alpha as the benchmark performance measure because of its function as the basis for the other asset pricing models. Jensen's alpha gauges the performances of an asset or a portfolio against a benchmark as follows:

$$E(R_{p,t}) - R_{f,t} = \alpha_p + \beta_p [E(R_{m,t} - R_{f,t})] + \varepsilon_{p,t} \quad (1)$$

where $E(R_{p,t})$ is the expected portfolio return at time t , $R_{f,t}$ is the risk-free rate of return at time t and β_p is the portfolio's systematic risk for portfolio p , $E(R_{m,t})$ is the expected return for market portfolio at time t , and $\varepsilon_{p,t}$ is the random component of portfolio return. Since alpha is $\alpha_p = [E(R_{p,t}) - R_{f,t}] - [\beta_p (E(R_{m,t} - R_{f,t}))] + \varepsilon_{p,t}$, it represents the performance of the portfolio or fund p relative to the benchmark. In this measurement, the performance is measured with an assumption that the portfolio is fully diversified and risk level is constant throughout time of observation.

In assessing the stock-picking and market timing abilities, this study modifies the Carhart and q -factor models by incorporating the HM market timing variable. The standard Carhart four-factor model can be represented as follows:

$$E(R_{p,t} - R_{f,t}) = \alpha_p + \beta_1 E(R_{m,t} - R_{f,t}) + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \beta_{UMD} UMD_t + \varepsilon_p \quad (2)$$

where:

- $E(R_{pt} - R_{ft})$ = excess return of the p^{th} fund at time t ,
- $E(R_{mt} - R_{ft})$ = market risk premium at time t ,
- SMB = return difference of triple-sorted small versus big firm portfolios (size factor),
- HML = return difference of triple-sorted high versus low book-to-market portfolios (value vs growth factor), and
- UMD = return difference of triple-sorted past winners versus lower stocks portfolios (momentum factors).

Beta coefficients in the forms of β_{SMB} , β_{HML} and β_{UMD} are the sensitivity of the portfolio's return to the size, value and momentum factors, respectively while ε_p is the random component of portfolio return. Note that the base portfolios to estimate the SMB, HML and UMD factors in Carhart model are constructed on triple-sorting based on market capitalization, book-to-market and return momentum variables.³

Next, this study incorporates the HM's market timing factor into Carhart model to yield;

$$E(R_{pt} - R_{ft}) = \alpha_p + \beta_1 E(R_{mt} - R_{ft}) + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \beta_{UMD} UMD_t + \beta_{MT} \text{Max}[0 - E(R_{mt} - R_{ft})] + \varepsilon_p \quad (3)$$

where the market timing performance β_{MT} represents the risk changes from portfolio rebalancing activity (restructure the portfolio composition) in response to market changes. The descriptions of r_p , β_{mkt} , EMR_p , β_{SME} , SMB_p , β_{HML} , HML_p , β_{UMD} , UMD_p , MV_t and ε_p are as in Eq. (2). Market timing factor takes the maximum term of positive market risk premium ($R_{mt} - R_{ft}$) or otherwise zero, indicating managers' reaction to downward market movement. In short β_{MT} indicates changes in the fund's risk level during portfolio re-adjustment activity in anticipation of the market movement. A positive value of β_{MT} indicates managers' market timing ability in adjusting portfolio risk to cater for both market conditions during portfolio restructuring.

Through the same process, the q -factor is modified with the HM's market timing variable to yield the following equation;

$$E(R_{pt} - R_{ft}) = \alpha_p + \beta_1 E(R_{mt} - R_{ft}) + \beta_{SMB} SMB_t + \beta_{INV} CMA_t + \beta_{PRT} RMV_t + \beta_{MT} \text{Max}[0 - E(R_{mt} - R_{ft})] + \varepsilon_p \quad (4)$$

where all variables and parameters remain as described in Eq. (2) except CWA which is the return spread of triple-sorted portfolios of conservative versus aggressive investment at time t and RMW is the return spread of triple-sorted portfolios of robust versus weak profitability at time t . Similar to the constructions of the base portfolios in Carhart model, for the q -factor model, the SMB , CMA and RMW factors are estimated by triple-sorting all listed stocks on market capitalization, investment (growth in total assets, I/A) and profitability (return on equity, ROE).

RESULTS AND DISCUSSION

To set the stage, Table 2 presents the descriptive statistics of the 321 funds and market returns as well as the investment fundamental factors in the Carhart and q -factor models. Over the study period from June 1998 to May 2015, the average monthly return of 0.6878 percent on the 321-fund portfolio (equivalent to 8.25% per annum), which is much higher than 0.2567 percent monthly (3.08% per annum) returns on the risk free security. However, the fund performance is very close to the market return (0.7017%, equivalent to 8.42% per annum), which is not at all a good indication of an effective fund management because it suggests that the fund which is supposedly actively managed is inferior to a passive investment (indexing). A quick look at the Sharpe ratio (R/σ) of the two investment strategies would only show a slight advantage of investment in funds over the index (0.1550 vs 0.1116).

TABLE 2. Descriptive statistics of returns and factor premiums; 1998:M6-2015:M5

	Mean	Std Dev	Minimum	Maximum	Kurtosis	Skewness
R_p	0.6878	4.4373	-13.9585	18.1004	4.4598	0.1734
R_M	0.7017	6.2892	-17.7517	28.2443	6.1236	0.5370
R_F	0.2567	0.0796	0.1510	0.8651	25.1319	3.9839
SMB_C	-2.8148	1.6219	-5.6484	0.7614	2.2473	-0.0530
HML	-2.1156	0.8038	-4.9668	-1.0898	3.1586	-0.8779
UMD	0.0209	0.8362	-2.1221	1.5753	2.6520	-0.4621
SMB_Q	-3.8820	1.7163	-5.9868	0.7916	4.6380	1.5482
CMA	0.2022	0.9384	-1.8644	3.6461	5.6447	0.8782
RMW	1.8259	1.3167	-2.9018	4.4852	5.6491	-1.4242

Note: N = 204 monthly returns from June 1998 to May 2015. RP represents the average monthly returns of all 321 sample funds. All monthly returns are stated in percentage.

A closer look at the *individual* funds level reveals that the funds produce average monthly returns that range from -1.36 percent (-16.32% per annum) to 16.88 percent (202.56% per annum) during the nearly 18-year study period (1998: M6-2015: M5). With a median of 0.43 percent (5.21% per annum), the majority of the funds are performing below average. As graphically illustrated through the distribution of funds' returns in Figure 1, it

appears that a large bulk of the funds report returns to the right side of the market line (R_M). Specifically, 263 of 321 funds (81.93%) record average returns that are lower than the market ($R_M=8.42\%$ per annum). However, unlike the results in Taib and Isa (2007) earlier for the period of 1991-2007, majority (243 or 75.70%) of the funds in this study perform better than the risk-free security ($R_F=3.08\%$).

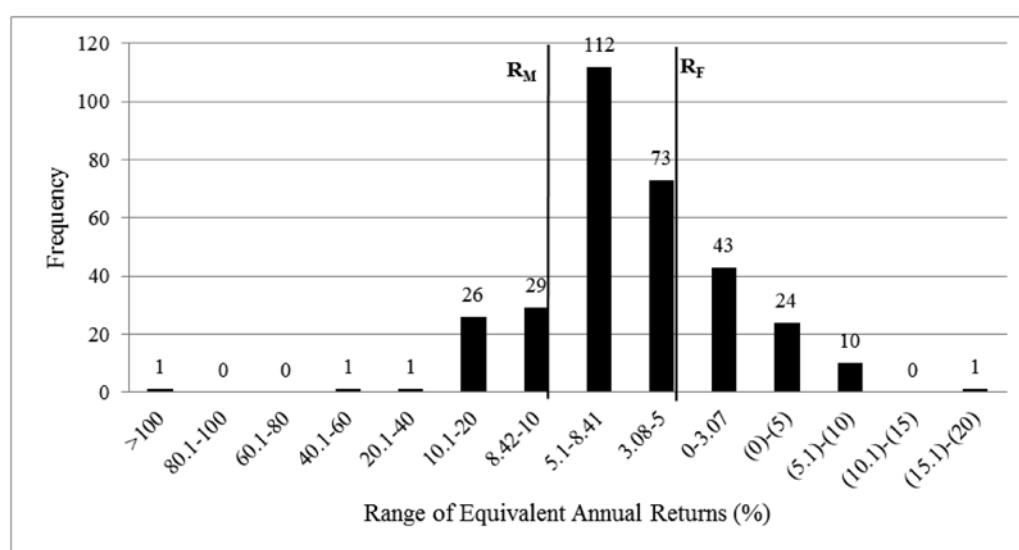


FIGURE 1. Distribution of fund returns, in an equivalent annual basis

Next, on the fundamental asset pricing factors that gauge attempts by fund managers to follow certain investment styles, Table 2 shows that only momentum (*UMD*), profitability (*RMW*) and investment (*CMA*) factors report positive values. Despite the prevalent evidence on size effect, both size (SMB_c and SMB_o) portfolios report huge monthly negative returns of -2.81 percent and -3.88 percent. This finding is a sharp contrast with that of Abdul-Rahim and Mohd Nor. (2006) who find a significant size premium (1.2 percent per month) in this market during the period from January 1987 to December 2004. Value premium (*HML*) which is reported negative by Abdul-Rahim and Mohd Nor (2006) remains negative in this study (-2.12%). The negative returns on *SMB* and *HML* suggest that these investment styles may not work in a similar manner as they would have in other markets such as the US (Fama & French 1993, 1996). Based on the results in Table 2, funds that select stocks to mimic *UMD* and *CMA* investment styles would be able to enjoy some benefits (0.21% and 0.20%, respectively). However, funds that use the profit-based selection (*RMW*) style seem to benefit the most. This asset pricing factor reports an outstanding average monthly return of 1.83 percent (equivalent to 21.91% per annum).

Before moving on to the regression analyses, look at the trends of the return series exhibited in Figure 2 which seem to corroborate with the average values in Table 2. With a correlation of 0.3931, the fund and market returns

are moving in the same directions, but at relatively small magnitude. This probably because, the fund returns are more often than not leading the movement of the market portfolio (KLCI). The co-movement and lead-lag movement are consistent throughout the study period including in times of market downturn like during the 2008 Global Financial Crisis. Yet, fund managers cannot simply blame their poor performance on market downturn. With sales charges or load that can go as high as 5 percent, these fund managers should have done a better job than a strategy that is passively tracking the index or adopting buy and hold investment strategies.

Before applying the multifactor models, this study estimates Jensen's alpha for measuring CAPM-based risk-adjusted fund returns. This exercise is a statistical test to validate the relative performance of these funds against the market. First, although the resulting adj- R^2 values of the models are on average relatively low, 60 percent are significant (shown at the bottom of Figure 3). This result indicates the significant role of market risk premium in predicting the funds' returns which simultaneously verify the close co-movement of fund to market condition. Consistent with the results reported earlier, Figure 3 plots the t-statistics of the individual fund's alpha from the Jensen model. Majority (281 or 87.54%) of the funds report positive alpha values but only 72 (22.03%) of these funds report alphas that are significantly higher than the standard errors ($p\text{-value} \leq 5\%$). Finding of this study is

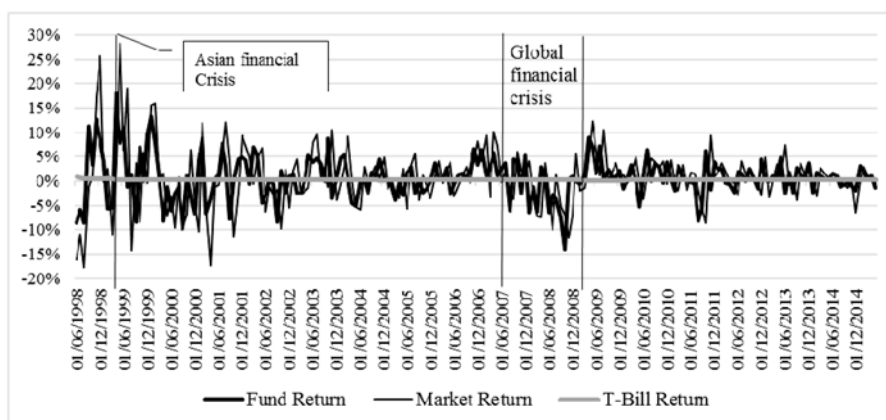
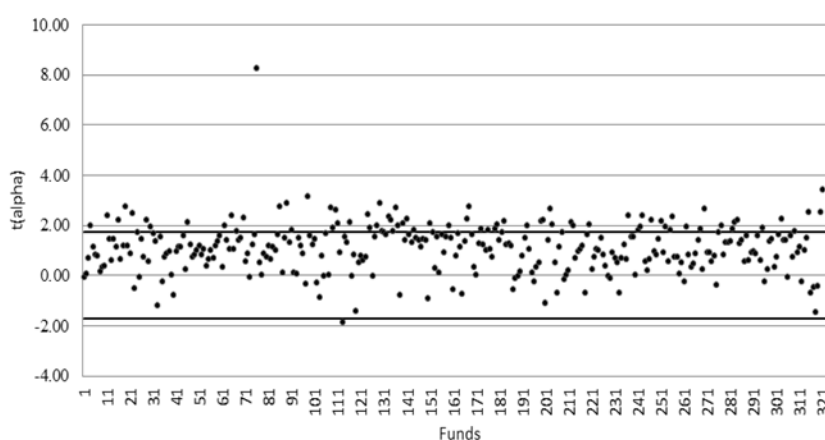


FIGURE 2. Trends of returns on funds, KLCI and T-Bill



Alpha	$p < 0.05$	$R_M - R_F$	$p < 0.05$	Adj R^2	$p < 0.05$	D-Watson
0.0048	72 funds	0.1452	195 funds	0.0394	195 funds	2.0459
(1.0890)	22.03%	(2.0304)	60.75%	(8.1026)	60.75%	

Note: Area between the two lines in the figure represents insignificant t-values at the 10% significant levels. Value in the bracket in the table is the t-stats. All values are average except in columns “ $p < 0.05$ ”.

FIGURE 3. T-statistics of Jensen’s alpha of 321 funds

consistent with that in Mansor and Bhatti (2011), but in contrast with results in Taib and Isa (2007) and Low and Ghazali (2005) that show negative overall performance for Malaysian unit trusts.

Finally, this study runs the main empirical models of Carhart and q -factor to segregate the overall performance into (i) stock selection versus market timing abilities, and (ii) investment style strategies. Between the two multifactor models, Carhart model fits data from our sample better by reporting a slightly higher adjusted R-squared value (4.45%), of which for 124 (38.63%) funds the adjusted R-squared values are significant. On the contrary, q -factor model reports a lower adjusted R-squared value (2.56%) with about 30 percent (98 funds) of the times the model fits the data. This finding adds support and justification for the persistent use of Carhart model in academic works. The Durbin-Watson values are around 2.071 for both models, indicating no threat of autocorrelations.

TABLE 3. Summary of statistics from Carhart and q -factor models

Carhart Model			Q-Factor Model		
Adj R^2	$p < 0.05$	D-Watson	Adj R^2	$p < 0.05$	D-Watson
0.0445	0.3863	2.0710	0.0273	0.3053	2.0710
(2.6970)	124 funds		(2.1878)	98 funds	

Note: Multivariate regression is run on each of 321 funds with at least 36 monthly returns data. Value in the bracket is the t-stats. All values are the average except those denoted with number of funds.

Next, this study presents in Table 4 the key empirical results from employing the Carhart 4-factor model. Interestingly, both average values of alpha (α) and β_{MT} are negative at -0.0055 and -0.0051, respectively. At the individual fund level, there are more positive alpha coefficients (202) than positive β_{MT} coefficients (127),

indicating that Malaysian equity funds perform better in their stock selection than market timing abilities. Similarly, there are more significant alpha coefficients than significant β_{MT} coefficients (3 and 1, respectively). These results are consistent with those from previous studies (eg., Abdullah et al. 2007; Lee & Rahman 1990; Low 2007; Md Nassir et al. 1997) in concluding that Malaysian funds are weak in market timing skills. In term of fundamental factors in the Carhart model, *HML* seems to play a positive (and more significant) role than *SMB* in creating the funds' returns. This is despite the fact that like *SMB*, *HML* also reports negative average return (Table 2).

An interestingly contradicting result is shown for *UMD*. Despite the positive average mean value reported earlier in Table 2, 77 percent (248) of the funds report their returns are negatively influenced by momentum (*UMD*) investment style, and half of them are significant. This finding suggests that adopting momentum investment style by acquiring previously performing stocks are more likely to reduce the funds' returns in this market. In other words, this finding also implies that the contrarian style should work better in improving the funds' performance in this market.

TABLE 4. Summary of performance results from Carhart model

Summary	Manager Skills		Investment Styles			
	Alpha	β_{MT}	$R_M - R_F$	SMB	HML	UMD
Average Values	-0.0055	-0.0051	0.1114	-0.0048	0.0044	-0.0051
No of +ve coeff.	202 (63)	127 (40)	263 (82)	173 (54)	140 (44)	73
(%) of +ve coeff.						(23)
Sig at 1%	0	0	6	1	3	0
Sig at 5%	3	1	21	1	17	0
No. of Insignificant	199	126	236	171	120	73
No of -ve coeff.			58			
(%) of -ve coeff.	119 (37)	194 (60)	(18)	148 (46)	181 (56)	248 (77)
Sig at 1%	2	0	0	6	0	30
Sig at 5%	15	4	0	17	2	73
No. of Insignificant	102	190	58	125	179	145

Note: N = 321 funds. SMB = premiums on small minus big firms, HML = premiums on high minus low growth (book-to-market) firms, and UMD = premiums on upward minus downward return firms.

Table 5 reports the results from the *q*-factor model. Similar to the results reported from the Carhart model, the *q*-factor model produces an average alpha of -0.0065 indicating that in general the fund managers have underperformed the market. To be specific, there are 173 (54%) of such underperforming funds. Consistent with the results from the Carhart model, *q*-factor model also suggests that these fund managers are also poor in re-allocating their stocks according to changes in the market. Several studies on fund management in Malaysia have been documenting similar poor market timing abilities (Low 2007; Low & Ghazali 2005; Abdullah et al. 2007; Md Nassir et al. 1997). Given that none of the funds report significant role of market timing (β_{MT}), this study opines that this skill may not even been given enough emphasis in managing funds in this market.

As for investment styles, the results show that funds going for small cap stocks as opposed to large stocks (*SMB*) are more likely to suffer deterioration in their performance. For 8 of these funds, the negative effect is significant. This finding is consistent with the large negative mean return reported earlier for *SMB* (-3.88%). Investment styles favouring conservative over aggressive investment firms (*CMA*) do not seem to have any particular bearing in influencing Malaysian fund performance. Meanwhile, those funds that favour robust over weak profitability firms

(*RBW*) would have to face an equal chance of deteriorating or improving their performance.

Results from both multifactor models allow few other deductions about performance of Malaysian equity funds. First, the relatively low R-squared values indicate that these funds have not capitalized on the diversification effect. With market risk premium ($R_M - R_F$) almost consistently show significant effects on returns of all 321 funds in both models, this study also proposes that the fund managers have not been very active in managing the funds. This deduction is supported given the insignificant stock picking and market timing effects on the performance models. As argued by Chang and Lewellen (1984) and Lee and Rahman (1990), funds' overall performance would be downward biased when the timing element is ignored. In a nutshell, the findings suggest that investing in these equity funds could not promise that the investors will fare better than if they engage in passive but direct investment. Overall, this study finds support for the argument that both stock selectivity and market timing skills are important in generating superior performance. In other words, had Malaysian fund managers been effective in delivering those expected skills, the funds could have generated returns that are significantly higher than the market.

TABLE 5. Summary of performance results from q-factor model

Summary	Manager Skills		Investment Styles			
	Alpha	β_{MT}	$R_M - R_F$	SMB	CMA	RMW
Average Values	0.0065	-0.0124	0.1304	-0.0014	-0.0031	0.0018
No of +ve coeff.						
(%) of +ve coeff.	148 (46)	150 (47)	256 (80)	116 (36)	162 (50)	155 (48)
Sig at 1%	1	0	36	0	0	0
Sig at 5%	1	0	36	0	0	9
No. of Insignificant	146	150	184	116	162	146
No of -ve coeff.			65			
(%) of -ve coeff.	173 (54)	171 (53)	(20)	205 (64)	159 (50)	166 (52)
Sig at 1%	0	0	0	2	0	1
Sig at 5%	4	0	0	6	9	6
No. of Insignificant	169	171	65	197	150	159

Note: N = 321 funds. SMB = premiums on small minus big firms, CMA = premiums on conservative minus aggressive investment firms, and RMW = premiums on robust minus weak profitability firms.

CONCLUSION AND IMPLICATION

This study examines the performance of 321 Malaysian equity funds for the period that spans for nearly 18 years from June 1998 to May 2015 on a monthly return basis. The results show that during this study period majority of these funds have underperformed the market. A closer look at the individual funds reveal that only 60 (83) of these 321 funds report returns (risk-adjusted returns, Jensen's α) that are higher than the market. To some extent, the poor performance can be attributed to the weak stock selection and more so on the poor market timing skills of the fund managers. The results from Carhart and *q*-factor models indicate that none of the investment styles associated with these models' fundamental factors (i.e., size, value/growth, investment and profitability) is of particular importance in explaining the funds' performance. This finding seems to suggest two possibilities about Malaysian fund managers in regards to their investment styles. First, they are not in favor of these investment styles because certain investment styles specifically *SMB* and *HML* report large negative returns. Meanwhile, they might be avoiding momentum investment style (*UMD*) because it often gives a negative effect on the fund performance. The second possibility is that the fund managers apply the investment styles in manners that may not be conductively supported in this market. For instance, they should have adopted the size in the reverse manner and opt for value rather than growth stocks. Similarly, the fund managers should be following a contrarian investment style rather than momentum style.

Above all, since market risk premium apparently is the most influential factor in explaining the funds' returns, the poor performance of the funds can be attributed to the Asian Financial Crisis and Global Financial Crisis. As clearly shown in Figure 2, the financial crises have adversely influenced the Malaysian stock market. Overall, the results of this study implies that the sample equity funds need to be actively managed to produce returns that would have been expected from fund management firms which charge service and management fees. Allowing

the funds to drift with the market would be as good as suggesting the investors are better off investing directly and passively in the equity market.

The results of this study are however still subjected to several limitations that are worth mentioning. First, some funds in this market are allowed to invest in foreign equities. That is, starting from 2005, Bank Negara Malaysia (the central bank) has liberalized the restrictions on funds management by allowing up to 30 percent investment in foreign assets. These funds might differ in their performance than those that are limited to the local market because the fund managers would have access to a greater geographical scope for diversifying their portfolios particular in times of bearish market. Second, Malaysian mutual funds are also unique in the sense that they may be categorized into Islamic versus conventional funds. Shariah rules prohibiting illegitimate (*haram*) businesses such as those in gambling and weaponry and risky (*gharar*) investments associated to speculative activities would mean limited investment universe for Islamic fund managers, causing some disadvantages in their performance. Future studies should consider alienating these factors when addressing stock selection and market timing abilities of the funds.

END NOTES

- ¹ All investment must be made through the fund management companies approved by the Ministry of Finance (MoF). The principal and returns from the investment must remain in the member's Account 1 and are not eligible for withdrawal until the member reaches the retirement age. There are around 20 Fund Management Companies with a total of around 220 funds registered with the MoF.
- ² Withdrawal for investments from Account 1 can be made at an interval of three months from the last withdrawal date and a minimum of RM1,000 and up to 20 percent of the amount exceeding "the required basic savings in Account 1".

- ³ To create the 3 indexes or factor risk premiums (SMB, HML and UMD) in Carhart model, 27 (3 x 3 x 3) portfolios are constructed by triple sorting all listed stocks on Bursa Malaysia according to their market capitalization, book-to-market of equity ratio and previous returns using the 30% highest and 30% lowest cut-off points. Next, the returns of each portfolio are calculated as the weighted average of component stocks' returns. Finally, to calculate risk factor premiums, for instance;

$$SMB = \left[\frac{(SHh + SHm + SHl + SMh + SMm + SMI + SLh + SLm + SLl)}{9} - \frac{(BHh + BHm + BHI + BMh + BMm + BMI + BLh + BLm + BLl)}{9} \right]$$

Similar procedure will be repeated on the stocks to calculate HML and UMD. Construction of the portfolios are done on yearly basis, i.e., at the end of the year.

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