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Selectivity and Market Timing Performance of Malaysian Unit Trusts

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Abstract. This study uses the quadratic and dual-beta market models with GARCH (1,1) specification to examine the selectivity and market timing performance of 36 unit trusts in Malaysia before, during and after the Asian financial crisis. The results show that there is perverse or no market timing ability in all three periods while there is selectivity performance in the pre- and post-crisis periods only. Model mis-specification problem has worsened over time. Balanced funds performed better than growth funds in the pre-crisis and crisis periods.

1. Introduction

The skills of any investment manager in forecasting the price movements of individual stock prices and that of the general stock market are gauged mostly by his effectiveness as a stock picker and a market timer. Generally, market timing is characterised by the response of the informed manager to private information he obtains (Jensen 1972) while selectivity refers to his ability to pick individual assets. Through strategic timing and selection, the investment managers aim to outperform the market, and naturally such an endeavour would amount to an attempt to challenge the weak form Efficient Market Hypothesis which advocates that any abnormal positive gain can only happen by chance.

Studies on timing and selectivity are mainly conducted within the basic framework of a Capital Asset Pricing Model (CAPM). The beta coefficient represents the systematic risk of the portfolios and it is assumed to be stationary in the Jensen's (1968) performance index. Essentially, it is a measure of uncertainty in the rate of return on an investment due to fluctuations in the market prices. However, when investment managers adjust the composition of their portfolios in tandem with 'up and down' market conditions, the level of systematic risk is not expected to remain constant over time. As a result, the relationship between the portfolio returns and the market returns may not be linear.

Among the earliest researchers on timing and selectivity were Treynor and Mazuy (1966). They used quadratic regression technique to identify non-linear changes in the systematic risk. The value and significance of the constant term in their model indicates

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security selection skills while the coefficient of the quadratic term measures market timing ability.

Admati *et al.* (1986) further validate the use of quadratic regression technique in measuring these phenomena by modelling along their two suggested interpretations of timing and selectivity – the portfolio approach and the factor approach. Chen and Stockum (1986) also refined Treynor and Mazuy's (1966) quadratic regression technique by incorporating a time-varying beta in order to account for not only the timing activities of the fund managers but also the presence of random fluctuations. Lee and Rahman (1990) combined a modified security-market line approach in their quadratic model in an attempt to separate distinctively the measures for selectivity and timing.

An alternative parametric measure of timing and selectivity is put forth by Henriksson and Merton (1981). It is commonly referred to as the dual-beta model. This model is an extension of the work of Merton (1981) where it is assumed that the manager aims to forecast whether the individual securities will outperform riskless bonds. In their study, the authors found that the results obtained via the dual-beta model are the same as those obtained via the quadratic regression technique. Chang and Lewellen (1984) were among the first to apply Henriksson and Merton's (1981) methodology to a sample of domestic mutual funds. Using the same model and a number of alternative benchmark portfolios, Fletcher (1995) examined the market timing and selectivity performance of a sample of UK unit trusts.

Kao *et al.* (1998) employed both ordinary least squares method and Autoregressive Conditional Heteroscedasticity method (ARCH) to estimate the parameters of the dual-beta models in their study on selectivity and market-timing ability of international mutual fund managers. Their justification in utilising the ARCH method is that stock returns in many countries exhibit a time-varying heteroscedastic property and hence it is necessary to capture this property in the error terms.

A report of positive selectivity performance and negative timing performance appears in the results of the majority of the studies (see Fletcher 1995; Kao *et al.* 1998; Dellva *et al.* 2001; Jagannathan and Korajczyk 1986; Chang and Lewellen 1984; Hendriksson 1984). Investigations on the correlations between selectivity and timing invariably show up negative . Such findings suggest an apparent trade-off between selectivity and timing performance. As pointed out by Kao *et al.* (1998), the results seem to suggest that managers with good selection ability tend to fare poorly in market-timing. Fletcher (1995) recommends that if the trade-off is real, the investment managers should focus on identifying mispriced stocks rather than on timing activities.

Various explanations have been offered to account for these negative correlations. There are suggestions such as presence of nonlinearities in the return generating model caused by the option-like characteristics of some securities (Jagannathan and Korajcyzk 1986), mis-specification of the return generating model itself (Fletcher 1995) and the plausible existence of negatively correlated sampling errors for selectivity and timing performance (Coggin *et al.* 1993). Thus far, no one single reason has satisfactorily explained this negative relationship.

On the local front, Annuar *et al.* (1997) used the quadratic regression model estimated by ordinary least squares method to conduct a study on the selectivity and timing performance of 31 unit trusts during the period 1990-1995. Consistent with the findings of studies on other markets, they found very little market timing ability but some evidence of selectivity.

The study also found a positive correlation coefficient of 0.53 between selectivity and timing performance among the unit trusts.

The unit trust industry is relatively young in Malaysia. The net asset value of all the unit trusts in Malaysia constitutes about 10-11 per cent of the total market capitalisation of the Malaysian stock market. The purpose of this study, therefore, is to examine empirically the market timing and selectivity performance of unit trusts in a market which does not have a mature unit trust industry. This study provides not only an update to the work of Annuar *et al.* (1997) by using more recent data, but also compares market timing and selectivity performance of the unit trusts before, during and after the recent East Asian financial crisis. The newly proposed dual-beta model is employed in addition to the quadratic regression approach. The time-varying volatility of asset returns, an issue not addressed by prior studies on the Malaysian unit trust market, is taken into account through the use of generalised ARCH (GARCH) specification for these models. The rest of the paper is structured as follows. Section 2 describes the unit trust data set and the models of selectivity and timing used in the study. Section 3 discusses the empirical results while Section 4 summarises our findings and suggests some extensions of this study.

2. Data and Methodology

A sample of 36 unit trust funds was selected from four management companies comprising Asia Unit Trust Berhad, BHLB Pacific Trust Management Berhad, Kuala Lumpur Mutual Fund Berhad and Mara Unit Trust Berhad for our study. It consisted of 16 balanced funds, 18 growth funds and 2 income funds. These 36 funds are listed the in the Appendix.

The data consisted of weekly closing prices of the funds over the sample period from January 1995 to June 2001. They were obtained from the leading newspapers, *New Straits Times* and *The Star*. The weekly returns were then calculated with adjustment for bonus issues and dividends obtained from the management companies. The Kuala Lumpur Stock Exchange Composite Index was used to represent the market portfolio. The data on this index were obtained from the database provider Hydra Database.

The sample period spanned the recent Asian financial crisis and thus three periods can be identified for our study. They were the pre-crisis period (January 1995 – January 1997), the crisis period (February 1997 – August 1998) and the post-crisis period (September 1998 – June 2001).

The capital asset pricing model (CAPM) relates the realised returns on a fund to the market returns. The market model of the CAPM takes on the following form:

$$r_{it} = \alpha_i + B_i r_{mt} + u_{it} \tag{1}$$

where r_{it} is the return on fund-*i*, r_{mt} is the market return and u_{it} is the error term. The coefficient B_i is the beta coefficient that measures the systematic or market risk of the fund while α_i provides a measure of the abnormal return not associated with the systematic risk.

Equation (1) assumes that funds have no market timing ability. However, a fund manager who engages in market timing will change his allocation of portfolio between stocks and cash in order to obtain gains in up markets and avoid losses in down markets. Thus, the fund beta should be lowered to reduce market exposure if a down market is anticipated. On the other hand, the fund beta should be increased in anticipation of an up market. The implication is that the fund beta is not constant but time-varying. One specification that allows for this feature is

$$B_{it} = \beta_i + \gamma_i r_{mt} \tag{2}$$

If market timing is superior, $\gamma_i > 0$. On the contrary, if market timing is perverse, $\gamma_i < 0$. To incorporate market timing ability, B_i in equation (1) is replaced by the specification in equation (2) and the result is given as

$$r_{it} = \alpha_i + \beta_i r_{mt} + \gamma_i r^2_{mt} + u_{it} \tag{3}$$

Equation (3) represents the quadratic model proposed by Treynor and Mazuy (1966) and Chen and Stockum (1985). In addition to market timing ability, a fund manager would pick funds that earn more than the normal risk premium associated with the general market price movements. If fund-*i* yields a return greater than that on a combined investment in the market portfolio, then $\alpha_i > 0$. The coefficient α_i thus provides a measure of performance of stock selectivity of the fund manager.

Another approach to market timing is to allow the fund beta to take two discrete values, one for the up markets and the other for the down markets, as stated below:

$$B_{it} = \beta_i + \gamma_i D_t \tag{4}$$

where D_t is a dummy variable which takes a value of -1 if $r_{mt} < 0$, and a value of 0 otherwise. Similarly, superior market timing ability is indicated by $\gamma_i > 0$, and perverse market timing ability is indicated by $\gamma_i < 0$. Replacing B_i in equation (2) with B_{it} from equation (4) results in the following:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \gamma_i D_t r_{mt} + u_{it} \tag{5}$$

This is similar to the market timing model developed by Henriksson and Merton (1981) and is known as the dual-beta market model.

Standard *t*-tests can be applied to test for the significance of γ_i in equations (3) and (5) for examining market timing ability and the significance of α_i for examining selectivity performance. However, the well-known property of time-varying heteroscedasticity or volatility clustering in stock returns must be taken into account to obtain tests that are unbiased. The error term u_{it} in both the market timing models is modelled as a GARCH(1,1) process as follows:

$$u_{it} = z_{it}(a_{0i} + a_{1i} u^2_{i,t-1} + a_{2i} h_{i,t-1})^{1/2} \tag{6}$$

where $u_{it} \sim (0, h_{it})$ and $z_{it} \sim$ i.i.d.(0, 1).

Table 1: Mean market returns and mean returns of the unit trust funds (%)

Type of funds	Pre-crisis	Crisis	Post-crisis
Market	0.2483	-1.5001	0.5434
All unit trusts	0.2405 (29)	-0.8534 (33)	0.2474 (36)
Balanced funds	0.2232 (14)	-0.9219(16)	0.2435 (16)
Growth funds	0.2602 (14)	-0.8486 (16)	0.2603 (18)
Income funds	0.2059 (1)	0.1639 (1)	0.1619 (2)

Note: Figures in parentheses indicate the number of funds used for computation.

Following Hallahan and Faff (1999), we also examined if the quadratic market timing model in (3) and the dual-beta model in (5) were correctly specified. The exclusion restrictions specification tests suggested by Jagannathan and Korajczyk (1986) were applied. To perform these tests, both the market timing models were augmented by an additional variable of a higher order and the specifications are as follows:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \gamma_i r^2_{mt} + \delta_i r^3_{mt} + u_{it} \quad (7)$$

$$r_{it} = \alpha_i + \beta_i r_{mt} + \gamma_i D_t r_{mt} + \delta_i r^2_{mt} + u_{it} \quad (8)$$

If the market timing models are not mis-specified, the additional higher order term should not be significant. Hence, the hypotheses for the exclusion restrictions specification tests are H_0: $\delta_i = 0$ against H_1: $\delta_i \neq 0$.

3. Results

The mean returns of the market and unit trusts are given in Table 1. The mean market return is positive during the pre- and post-crisis periods, but negative during the crisis period. The pre-crisis mean return is lower than that for the post-crisis period. The unit trust returns have the same sign with the market returns. The mean return of the sample unit trusts is very close to the mean market returns for the pre-crisis period, but is only about half of the mean market return for the post-crisis period. This suggests that the overall performance of the unit trusts is not as good as the stock market performance for the post-crisis period. However, they performed better than the stock market during the crisis where their average decline in returns is much less compared to the decline in the market return. The growth funds performed better than the balanced funds in terms of returns for all the three periods.

Tables 2a and 2b report the estimated coefficients of the quadratic and dual-beta market timing models, respectively, for the pre-crisis period. Except for one case of the quadratic model and two cases of the dual-beta model, the estimated β_i coefficients were all significantly positive, suggesting that the unit trust returns move in tandem with the market returns. Only 3 unit trusts exhibited superior market timing performance for the quadratic model and 2 for the dual-beta model. On the other hand, 5 unit trusts exhibited perverse market timing performance for the quadratic model and 6 for the dual-beta model. These results offer little

Table 2a: Results for the quadratic returns market model with GARCH(1,1) specification – pre-crisis period

Unit Trust	α_i	β_i	γ_i	a_{0i}	a_{1i}	a_{2i}	δ_i
BPSFB	0.3510	0.6716**	-0.0387*	0.2069	0.3944	0.5635**	0.0379**
KKLSFB	0.2234**	0.3531**	0.0277**	0.0095*	-0.0810	1.0314**	0.0017
KKLRSFB	0.1722**	0.2568**	0.0104	0.0621	0.2521*	0.6129**	-0.0019
KKLBFB	0.2493**	0.1343**	-0.0023	0.3083**	0.3292	-0.0832	0.0088*
KPBBFB	-	-	-	-	-	-	-
M1B	0.3407*	0.7190**	-0.0684**	0.6163**	1.2459	0.0463	0.0008
M3B	0.0610	0.6810**	0.0063	1.3678**	0.2525*	-0.3577	0.0017
M4B	0.2313*	0.4995**	-0.0196	0.1968	0.2513	0.5606**	0.0036
M5B	-0.0022	0.5411**	-0.0051	0.1421	0.0886	0.8458**	-0.0060
M6B	0.0839	0.6775**	-0.0017	0.2712	0.0701	0.5179	0.0054
M8B	-0.2216	0.7155**	0.0050	0.5891	0.2781	0.3309	0.0035
M10B	-0.1795	1.0282**	0.0088	4.5721	0.1589	-0.2267	0.0106
M11B	-0.0657	0.8194**	0.0730*	7.8766**	0.1372*	-0.6346*	0.0167
MMPFB	0.0626	0.4001**	0.0105	2.0895	0.2001	-0.1134	-0.0020
MTPBFB	-	-	-	-	-	-	-
MPTNBB	0.3101*	0.2834*	-0.0160	0.1361	-0.0004	0.9296**	0.0155*
AMIFG	0.1479*	0.7891**	-0.0028	1.0917**	0.5293	-0.1136*	0.0067
AMPFG	0.5280*	0.7126**	-0.0416	4.0497*	0.3182	-0.0779	0.0083
ATABG	0.0508	0.6850**	-0.0118	2.4049	0.1078	-0.5627	0.0001
AMBFG	1.2707**	0.8378**	-0.0837**	7.5532**	1.9408	-0.0020**	0.0188*
AMEFG	0.0639	0.8791**	0.0173	2.5585*	0.1706	-0.2897	0.0137**
BDGFG	0.1112	0.9226**	-0.0159	0.5037**	0.8734	0.0201	0.0049
BECGFG	0.2635	0.5803**	-0.0441**	1.5393	0.1700	-0.2302	0.0047
BHGFG	0.2039**	0.5898**	-0.0704**	0.2718**	0.3896	-0.1172	0.0034
BDAIG	-	-	-	-	-	-	-
BILFG	-	-	-	-	-	-	-
KKLGFG	0.0686	0.3727**	0.0181	0.7807**	0.4465	-0.0596	0.0070
KKLIXG	0.0664	0.3459*	0.0097	0.2079	0.0829	0.6663**	-0.0001
KKLIFG	0.1114	0.2733**	-0.0077	0.0900	0.0860	0.7617**	0.0010
KKLAFG	-0.2044	0.2863**	0.0205**	0.3409*	0.9233	0.2902*	-0.0015
KKLITG	-	-	-	-	-	-	-
KKLSCG	-	-	-	-	-	-	-
M2G	0.1047	0.5396**	-0.0078	0.0709	0.1705	0.8137**	0.0024
M7G	-0.1546	0.7780**	0.0262	4.7062**	0.1044*	-0.9592**	0.0039
BPBFI	-	-	-	-	-	-	-
KKLBFI	0.0991*	0.0256	-0.0037	0.1015**	-0.3094*	0.6873**	-0.0037

** and * denote significance at 1 per cent and 5 per cent respectively.
δ_i is the coefficient of the cubic term for market return to test for model specification.

evidence of market timing ability. Comparing across types of funds, the balanced funds seem to perform marginally better than growth funds. The results are more encouraging for security selection performance. Evidence of selectivity performance is detected in 11 (38 per cent) unit trusts with the quadratic model and 6 (21 per cent) unit trusts with the dual-beta model. The results of the exclusion restrictions specification tests are also reported in the same tables. Significant δ_i coefficients are found for 5 (17 per cent) unit trusts with the quadratic model and 9 (31 per cent) unit trusts with the dual-beta model. The degree of mis-specification is thus more serious for the dual-beta model.

The estimated quadratic and dual-beta market models for the crisis period are presented in Tables 3a and 3b, respectively. A significant positive relationship between the market returns and returns of the unit trusts are found in all but two of the cases for the quadratic model. The β_i coefficients, however, are much less than unity and also lower compared to the period before crisis. This may explain why the overall decline in the returns of unit trusts in this period was less than the decline in the market returns. The evidence of positive relationship between the market returns and returns of the unit trusts is much weaker for the dual-beta model. In fact, some of the estimated β_i coefficients were significantly negative. No evidence of market timing ability is found for the crisis period. The poor stock market performance could have caused market timing for the growth funds to be worse than that of the balanced funds. In the quadratic model, the estimated γ_i coefficient is significantly negative for 13 (72 per cent) of the growth funds and 11 (69 per cent) of the balanced funds. The corresponding number of cases is 13 and 9, respectively for the dual-beta model. Only 2 unit trusts showed selectivity performance with the quadratic model, but 17 unit trusts with the dual beta model exhibited the same ability. The problem of mis-specification is worse than the pre-crisis period for both the models. This is found in 8 (24 per cent) cases of the quadratic model and 17 (52 per cent) cases of the dual-beta model. The problem for the dual-beta model is more serious than that for the quadratic model.

A significant positive relationship between market and unit trust price movements is found in all but two of the unit trusts reported in Tables 4a and 4b for the post-crisis period. Market timing ability is exhibited in only one unit trust for the quadratic model. Evidence of perverse market timing ability is less compared to the crisis period, but worse compared to the pre-crisis period. This provides a possible explanation of the lower mean return of the unit trusts in the post-crisis period than the pre-crisis period. In addition, the post-crisis period also witnessed poorer selectivity performance. Only 4 (11 per cent) unit trusts using the quadratic model and 6 (17 per cent) unit trusts using the dual-beta model exhibited significantly better stock selection performance. The mis-specification problem is most serious for this period with 16 (44 per cent) unit trusts using the quadratic model and 18 (50 per cent) using the dual-beta model.

Overall, the evidence of good market timing ability is sparse. Both the quadratic and dual-beta specifications suggest that market timing ability is the best in the pre-crisis period and worst in the crisis period. While no clear pattern emerged from the results of the dual-beta model, the results of the quadratic model suggest that selectivity performance was the best in the pre-crisis period and worst in the crisis period. There is some evidence that the balanced funds performed better in selectivity and market timing ability than the growth funds for the pre-crisis and crisis periods, while the results are not so clear for the post-crisis period. The mis-specification of both the models has become increasingly serious over

Table 2b: Results for the dual-beta market model with GARCH(1,1) specification – pre-crisis period

Unit Trust	α_i	β_i	γ_i	a_{0i}	a_{1i}	a_{2i}	δ_i
BPSFB	0.5332*	0.4461**	-0.4715**	0.1905	0.4596	0.5389**	0.0511
KKLSFB	0.2350**	0.2708**	-0.1430	0.0140**	-0.0944*	1.0226**	-0.0729**
KKLRSFB	0.1414	0.3102**	0.0986	0.0608	0.2697*	0.6025**	0.0113
KKLBFB	0.2038*	0.1531*	0.0517	0.3158**	0.2977	-0.0847	-0.0528
KPBBFB	-	-	-	-	-	-	-
M1B	0.4564*	0.4671**	-0.5547**	0.7818**	1.0016	0.0832	-0.1354**
M3B	0.0328	0.7118**	0.0657	1.3539**	0.2560*	-0.3437	0.0063
M4B	0.3410**	0.3759**	-0.2354*	0.1872	0.2767*	0.5512**	0.0119
M5B	0.1099	0.4664**	-0.1593	0.1439	0.0998	0.8334**	0.0467
M6B	0.1567	0.6228**	-0.1024	0.1381	0.0217	0.7584	0.0449
M8B	-0.2755	0.7621**	0.0909	0.5803	0.2415	0.3294	-0.1168**
M10B	0.2549	0.9284**	-0.2026	4.5485**	0.1370*	-0.2988	0.2699**
M11B	-0.5892**	1.3267**	0.6052*	6.7028	0.1769	-0.4657	0.0660
MMPFB	-0.0145	0.5338**	0.2187	2.0967	0.2201	-0.1233	-0.0575
MTPBFB	-	-	-	-	-	-	-
MPTNBB	0.1994	0.2644*	0.1000	0.0968	0.1187	1.0853**	-0.0947*
AMIFG	0.1636	0.7677**	-0.0521	1.2570**	0.4456	-0.1468	0.0190
AMPFG	0.6023	0.5259*	-0.3314	4.1204	0.3243	-0.0852	-0.1075
ATABG	-0.0446	0.6936**	0.0491	2.3625	0.0797	-0.5026	-0.1329**
AMBFG	1.5642**	0.0597	-1.4593**	1.3678	2.4743	-0.0013**	0.3188**
AMEFG	0.0198	0.9619**	0.1548	2.5865*	0.1677	-0.2982	0.0332
BDGFG	0.2113	0.8112**	-0.2285	0.5174**	0.8293	0.0202	0.0295
BECGFG	0.4505	0.3449**	-0.4728**	1.6334	0.1513	-0.2805	-0.0217
BHGFG	0.4495**	0.2307**	-0.7325**	0.2362*	0.4765	0.0908	-0.0627**
BDAIG	-	-	-	-	-	-	-
BILFG	-	-	-	-	-	-	-
KKLGFG	-0.0257	0.4785**	0.2099	0.7795**	0.4515	-0.0608	-0.0058
KKLIXG	0.0331	0.3972**	0.0956	0.2067	0.0782	0.6713**	0.0006
KKLIFG	0.1028	0.2515**	-0.0365	0.0948	0.0957	0.7441**	-0.0454*
KKLAFG	-0.2920**	0.3872**	0.2037*	0.3320*	1.0030	0.2720*	0.0358
KKLITG	-	-	-	-	-	-	-
KKLSCG	-	-	-	-	-	-	-
M2G	0.2136	0.4609**	-0.1620	0.0684	0.1783	0.8079**	0.0493
M7G	-0.1934	0.9171**	0.2639	4.6231**	0.1066	-0.9523**	0.0492
BPBFI	-	-	-	-	-	-	-
KKLBFI	0.1257	-0.0108	-0.0628	0.0938*	-0.2533	0.6307**	0.0305

** and * denote significance at 1 per cent and 5 per cent respectively.
δ_i is the coefficient of the quadratic term for market return to test for model specification.

Table 3a: Results for the quadratic returns market model with GARCH(1,1) specification – crisis period

Unit Trust	α_i	β_i	γ_i	a_{0i}	a_{1i}	a_{2i}	δ_i
BPSFB	1.3400	0.3084**	-0.0157**	24.0993	0.6275	-0.6067**	-0.0001
KKLSFB	-0.1470	0.2356**	-0.0077**	1.4451*	0.8346	-0.0154	-0.0001
KKLRSFB	0.0556	0.1846**	-0.0068**	1.8651*	0.3977	-0.0498	0.0000
KKLBFB	0.2475	0.2526**	-0.0094**	1.2775	-0.0328**	0.5788	0.0000
KPBBFB	0.0778	-0.0038	-0.0022	0.0276	-0.1182	0.7596	-0.0003
M1B	0.7589	0.7950**	-0.0296	15.0135	-0.0267**	0.5895	-0.0003
M3B	0.4461	0.5171**	-0.0192**	6.8243*	-0.0358*	0.5296	-0.0008**
M4B	0.1707	0.5227**	-0.0064	1.4368	2.8270*	0.0000	-0.0003*
M5B	0.0586	0.5626**	-0.0157*	1.1147	0.5682**	0.4823**	-0.0004
M6B	0.0806	0.5266**	-0.0141**	10.0418**	0.5729	-0.0221	-0.0008*
M8B	0.3051	0.3086**	-0.0150*	1.7203*	1.0572*	0.3195**	0.0004
M10B	1.4733	0.9947**	-0.0122	74.7823**	0.2775**	-0.4916**	-0.0012*
M11B	0.6047	0.6729*	-0.0249	12.0458**	-0.0242	0.5950**	-0.0005
MMPFB	0.2109	0.5034**	-0.0348**	0.2723	1.2895*	0.4051**	0.0004
MTPBFB	0.7141**	0.1765**	-0.0097**	3.7978*	0.4149	-0.1491	0.0002
MPTNBB	0.8248	0.7453**	-0.0279**	12.2901	0.0283**	0.5823	-0.0003
AMIFG	-0.6523**	0.6662**	-0.0042	1.2369**	2.1490	-0.0082	-0.0006**
AMPFG	0.0372	0.4139**	-0.0124*	1.4423	0.4209*	0.4831**	-0.0001
ATABG	0.2062	0.4710**	-0.0172*	2.5169	-0.0388**	0.6417	-0.0002
AMBFG	0.8334	0.7056*	-0.0264	5.2146**	-0.0258	0.6596**	-0.0005**
AMEFG	0.7525	0.5870**	-0.0221**	6.7257	-0.0290**	0.5725	-0.0003
BDGFG	-0.0538	0.5620**	-0.0005	0.5394	0.7615*	0.3929**	-0.0003
BECGFG	0.0976	0.2426**	-0.0089**	0.0426	-0.0489	1.0416**	-0.0001
BHGFG	0.2308	0.3143**	-0.0113**	1.0963	-0.0356*	0.7281**	-0.0002*
BDAIG	0.0580	-0.0006	-0.0033*	0.0309	-0.1906	0.8804	0.0010*
BILFG	-	-	-	-	-	-	-
KKLGFG	0.1503	0.2891**	-0.0107**	0.5563	-0.0240	0.8954**	-0.0001
KKLIXG	0.1505	0.3849**	-0.0040**	-0.0882**	-0.0762	1.0494	0.0002
KKLIFG	-0.0362	0.2093**	-0.0221**	5.0474**	0.7176	-0.0163*	-0.0006
KKLAFG	0.7297*	0.4120**	-0.0159**	3.2453	-0.0344**	0.5780	0.0002
KKLITG	0.1467	0.1615**	-0.0058**	0.0426	-0.0720	1.0944**	-0.0001
KKLSCG	-	-	-	-	-	-	-
M2G	0.5917	0.5265**	-0.0197**	5.5020	-0.0342**	0.7079	-0.0004
M7G	0.3458	0.4914**	-0.0142**	1.2961	0.2359	0.5912**	-0.0003
BPBFI	-	-	-	-	-	-	-
KKLBFI	-0.0116	-0.0252*	0.0010	1.3889	0.3513	-0.0282	0.0000

** and * denote significance at 1 per cent and 5 per cent respectively.
δ_i is the coefficient of the cubic term for market return to test for model specification.

Table 3b: Results for the dual-beta market model with GARCH(1,1) specification – crisis period

Unit Trust	α_i	β_i	γ_i	a_{0i}	a_{1i}	a_{2i}	δ_i
BPSFB	1.3783	0.1789	-0.3436	3.0184	2.2002	-0.0020	-0.0028
KKLSFB	0.3357	0.0727	-0.3035**	1.1313*	0.8339	0.0836	-0.0039
KKLRSFB	0.4055*	0.0186	-0.2790**	1.7562*	0.4637	-0.0398	-0.0027
KKLBFB	0.9040**	-0.0260*	-0.4608**	0.9236	-0.0288	0.6492	-0.0068**
KPBBFB	0.2815	-0.0433	-0.0968	0.0463	-0.1574	0.6947	0.0042
M1B	2.0758*	0.0242	-1.2553**	15.7581	-0.0259	0.5977	-0.0244
M3B	0.8716*	-0.0148	-0.7240**	0.1386	-0.0458	1.0565**	-0.0119
M4B	-0.2003	0.8307**	0.2587	1.6559*	2.4517*	0.0048	-0.0337**
M5B	0.3881	0.3817*	-0.3686	1.1508	0.6174**	0.4477**	-0.0357**
M6B	0.0704	0.5553**	-0.0472	5.6013**	1.4683*	0.0015	-0.0328**
M8B	0.8741*	-0.0940	-0.5796**	0.4860	0.8047*	0.5082**	-0.0290**
M10B	0.9495	0.8208**	-0.2031	80.1704	0.2794**	-0.6065**	0.0450*
M11B	0.9873**	0.0316	-0.9629**	0.1214	-0.0279	1.0651**	-0.0377**
MMPFB	0.6729	-0.1248	-0.7165	0.3109	0.7680*	0.5498**	-0.0351**
MTPBFB	0.6168**	-0.0454	-0.2380**	-0.0118	3.2084**	-0.0040	0.0021
MPTNBB	0.9095**	0.0353	-0.9828**	0.2135	-0.0433	1.0717**	-0.0383**
AMIFG	-0.5909**	0.6124**	-0.1017	1.0149**	2.7345	-0.0054	-0.0041
AMPFG	0.4317	0.2102	-0.3822	1.4462	0.4397	0.4721**	-0.0075
ATABG	0.6557	0.0256	-0.6664**	0.0965	-0.0435	1.0545**	-0.0158
AMBFG	0.2240	0.4559**	-0.4169**	0.6580	2.5124	0.0366	-0.0305
AMEFG	0.6827**	0.0670	-0.7590**	0.0975	-0.0437	1.0850**	-0.0294**
BDGFG	-0.1054	0.5778**	0.0203	0.5497	0.7717*	0.3829**	-0.0090
BECGFG	0.4148	0.0182	-0.3601**	0.0352	-0.0490	1.0491**	-0.0131**
BHGFG	0.9399**	-0.0298*	-0.5057**	0.1650**	-0.0378	0.9754**	-0.0169**
BDAIG	0.1388**	-0.0348*	-0.0750*	0.0186	-0.2332	1.0290	-0.0197*
BILFG	-	-	-	-	-	-	-
KKLGFG	0.7334**	-0.0087	-0.4962**	0.5022	-0.0284	0.9128**	-0.0025
KKLIXG	0.4504*	0.2576**	-0.2379**	0.4273**	-0.0588**	0.8637**	0.0009
KKLIFG	1.1012**	-0.3224*	-0.9029**	0.4722	1.5665**	0.1940**	-0.0110
KKLAFG	1.2447**	-0.0387*	-0.6773**	2.2946	-0.0307	0.6841**	-0.0123**
KKLITG	0.4123*	0.0030	-0.2415**	0.0648	-0.0971	1.1135**	-0.0102**
KKLSCG	-	-	-	-	-	-	-
M2G	0.4633	0.1564	-0.5526**	0.1054	-0.0571	1.0917**	-0.0380**
M7G	0.6735**	0.0615	-0.6085**	0.3035	-0.0634	1.0332	-0.0290**
BPBFI	-	-	-	-	-	-	-
KKLBFI	-0.1895	0.0189	0.0827	1.3304	0.3720	-0.0234	0.0069*

** and * denote significance at 1 per cent and 5 per cent respectively.

δ_i is the coefficient of the quadratic term for market return to test for model specification.

Table 4a: Results for the quadratic returns market model with GARCH(1,1) specification – post-crisis period

Unit Trust	α_i	β_i	γ_i	a_{0i}	a_{1i}	a_{2i}	δ_i
BPSFB	0.0282	0.6646**	0.0048	0.2531**	0.0320	0.6330**	-0.0005
KKLSFB	0.0434	0.5966**	-0.0151*	3.8409	0.1730	-0.1263	-0.0014**
KKLRSFB	0.6475	0.5983**	-0.0219	28.4084**	0.2596	-0.2391	0.0002
KKLBFB	-0.0866	0.4696**	-0.0115**	4.2425**	0.1565**	-0.9179**	-0.0007*
KPBBFB	0.1354	0.4553**	-0.0154**	4.4198**	0.1201**	-0.6192*	-0.0010**
M1B	0.1422	0.7002**	-0.0014	2.3198**	0.8379*	0.0096	0.0002
M3B	-0.2031	0.7896**	-0.0086	0.7983	0.0954	0.7414**	-0.0034*
M4B	0.2224	0.7791**	-0.0178**	9.1630**	0.0914**	-1.0246**	-0.0007
M5B	0.2808**	0.8674**	-0.0305**	11.9705**	0.1650**	-0.9727**	-0.0004
M6B	0.1363	0.6954**	-0.0172**	2.1320**	0.5610	0.0040	-0.0009*
M8B	-0.0352	0.6631**	-0.0150**	5.8417*	0.4530	-0.0332	-0.0006
M10B	0.0474	0.9957**	-0.0056	-0.6706**	0.3591**	0.6205**	0.0004
M11B	-0.1351	0.8363**	0.0081**	1.2069**	1.3748*	0.0077	-0.0002
MMPFB	0.1546	0.8143**	-0.0289*	5.1107**	0.3757	-0.0868*	-0.0015**
MTPBFB	0.0175	0.4498**	-0.0075*	3.1683**	0.1142	-0.5781*	-0.0003
MPTNBB	0.3849	1.0192**	-0.0158**	1.3232	0.2673	0.6959**	0.0002
AMIFG	0.1900	0.9284**	-0.0079	1.0187**	0.6801	-0.0055	-0.0012
AMPFG	0.1993	0.7239**	-0.0140*	4.4143*	0.1877	-0.1647	-0.0010*
ATABG	0.0832	0.6159**	0.0028	0.1519**	-0.1147*	1.0332**	-0.0014**
AMBFG	0.1797	0.8593**	-0.0016	0.3282	0.0228	0.7410**	0.0004
AMEFG	0.1698	0.8480**	-0.0076	0.9336	0.0838	0.4727	-0.0011**
BDGFG	0.0908	0.8122**	-0.0055	0.5999**	0.0317	0.5623**	-0.0015**
BECGFG	0.2791*	0.9810**	-0.0445**	1.6777**	2.0553*	0.0013	-0.0002
BHGFG	0.1957	0.8081**	-0.0035	3.0334	0.1242	0.2347	-0.0028**
BDAIG	-0.0989	0.6036**	0.0045	0.5052**	0.5945**	0.2613**	-0.0020**
BILFG	-0.0353	0.9021**	-0.0040	0.0865**	0.6104	0.0754	-0.0013
KKLGFG	0.1015	0.5457**	-0.0130**	3.4812**	0.2350	-0.1112	-0.0006
KKLIXG	-0.0558	0.5986**	-0.0041	2.6988	0.2399	-0.0453	-0.0009**
KKLIFG	0.1206	0.4952**	-0.0044	27.0027*	0.1399	-0.6947**	-0.0015**
KKLAFG	0.0284	0.6719**	-0.0141*	5.3147	0.2263	-0.0302	-0.0009
KKLITG	-0.3373	0.4748**	-0.0115**	9.2726	-0.0128	0.5912	-0.0008
KKLSCG	0.0564	0.0552**	-0.0131**	0.0445**	-0.1084	1.1176**	0.0015
M2G	0.1249	0.7223**	-0.0116**	0.3568	0.3125*	0.5263**	-0.0006*
M7G	0.0443	0.7465**	-0.0201**	4.8126*	0.1756	0.0447	-0.0009
BPBFI	0.1425**	-0.0048	-0.0015	0.0268*	-0.0507**	0.7652**	0.0002*
KKLBFI	0.1606**	0.0010	0.0005	0.0015	0.1837	0.8241**	0.0000

** and * denote significance at 1 per cent and 5 per cent respectively.
δ_i is the coefficient of the cubic term for market return to test for model specification.

Table 4b: Results for the dual-beta market model with GARCH(1,1) specification – post-crisis period

Unit Trust	α_i	β_i	γ_i	a_{0i}	a_{1i}	a_{2i}	δ_i
BPSFB	-0.0366	0.7122**	0.0884	0.2494**	0.0261	0.6465**	0.0067
KKLSFB	0.0638	0.4809**	-0.1999	3.5824*	0.2582	-0.0739	-0.0302**
KKLRSFB	0.4503	0.3783**	-0.3068	23.9664	0.3084**	-0.1637**	-0.0261
KKLBFB	-0.0737	-0.4023**	-0.0397	1.7064	0.2097	0.0501	-0.0138*
KPBBFB	0.3494	0.2866**	-0.2711	3.7744	0.1932	-0.2312	-0.0311**
M1B	0.2242	0.6679**	-0.0685	2.3287**	0.8320*	0.0104	0.0173
M3B	0.0333	0.6736**	-0.2381	0.8084	0.0987	0.7365**	0.0245
M4B	0.5752*	0.5566**	-0.5166**	10.5625**	0.1187**	-1.0403**	-0.0106
M5B	0.7215**	0.4840**	-0.5637**	12.6116**	0.1764**	-0.9598**	-0.0292**
M6B	0.4015	0.5167**	-0.3507*	2.0478**	0.6278*	-0.0018	-0.0131
M8B	0.2473	0.4899**	-0.2928	5.3710*	0.6414**	-0.0241*	-0.0157
M10B	0.2912	0.8985**	-0.1978*	0.6117*	0.3712*	0.6769**	-0.0003
M11B	-0.2830	0.9392**	0.1780	1.8184**	1.4069*	0.0073	0.0083
MMPFB	0.1735	0.5844**	-0.0225	3.1050**	0.8953	-0.0388**	-0.0280**
MTPBFB	0.1453	0.3454**	-0.1620	3.1498**	0.1213	-0.5320*	-0.0122
MPTNBB	0.9898*	0.7359**	-0.5216*	1.2702	0.2735*	0.6981**	-0.0081
AMIFG	0.3065	0.8454**	-0.1629	1.0146**	0.7112	-0.0054	-0.0138*
AMPFG	0.3711	0.5907**	-0.2347	3.5442*	0.2645	-0.1034	-0.0204*
ATABG	-0.0143	0.6587**	0.1007	0.1372**	-0.1089*	1.0346**	-0.0331**
AMBFG	0.1888	0.8462**	-0.0203	0.3464	0.0268	0.7239**	-0.0161**
AMEFG	0.1876	0.7927**	-0.0843	0.9047	0.0779	0.4884	-0.0304**
BDGFG	0.1311	0.7643**	-0.0817	0.6289**	0.0378	0.5372**	-0.0207
BECGFG	1.1601**	0.4388**	-1.0037**	2.2466**	1.1524	-0.0010	-0.0541**
BHGFG	0.2627	0.7687**	-0.0787	3.0087	0.1220	0.2387	-0.0385**
BDAIG	-0.1682	0.6563**	0.0984	0.4808**	0.5559**	0.2963**	0.0019
BILFG	0.0143	0.8660**	-0.0778	0.0873*	0.6193*	0.0685	-0.0029
KKLGFG	0.3363	0.3821**	-0.2937*	0.5638**	0.2550	-0.1113	-0.0214**
KKLIXG	-0.1148	0.5877**	0.0036	2.6433	0.2664	-0.0382	-0.0184*
KKLIFG	-0.2073	0.4930**	-0.0296	11.5397	0.2668	-0.0991	-0.0218*
KKLAFG	0.1866	0.5245**	-0.2401	5.3683	0.2403	-0.0288	-0.0009
KKLITG	-0.1390	0.3414**	-0.1658	9.4594	-0.0130**	0.5903	-0.0190*
KKLSCG	-0.0018	0.0865	0.0314	0.0258	-0.0967	1.1286**	-0.0385
M2G	0.2360	0.6341**	-0.1918*	0.2942	0.2161*	0.6283**	-0.0161**
M7G	0.4071	0.5013*	-0.4263*	4.8353*	0.1941	0.0505	-0.0244**
BPBFI	0.1592**	-0.0214	-0.0317	0.0207	-0.0407*	0.7883**	0.0020
KKLBFI	0.1569**	0.0056	0.0078	0.0015	0.1886	0.8225**	0.0009

** and * denote significance at 1 per cent and 5 per cent respectively.
δ_i is the coefficient of the quadratic term for market return to test for model specification.

time, with the quadratic model having a lesser incidence of mis-specification compared to the dual-beta model.

4. Conclusion

The results of our study on selectivity and market timing ability of a sample of unit trusts in Malaysia show that they are generally consistent with those reported by Annuar *et al.* (1997) on the Malaysian market and by other authors on unit trusts in other countries. Fund managers have no or perverse market timing ability in all three periods. However, they showed evidence of good selectivity performance in the pre-crisis period and more so in the post-crisis period but not during the crisis period of high return volatility. There is some evidence that balanced funds performed better than growth funds. But these results should be viewed with some caution as both the quadratic and dual-beta market models even with GARCH (1,1) specification used in our study suffered some degree of mis-specification especially in the more recent periods.

One limitation of the study is the relatively small number of unit trusts used in our analysis. This study can be extended to include a wider range of unit trusts with very different objectives such as balanced funds, growth funds, income funds, index funds and *syariah* funds so that comparison of the selectivity and market timing ability could be made among the different types of funds.

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Appendix 1

The Sample Unit Trust Funds

ID	Code	Unit Trust Fund	Category
1	BPSFB	BHLB Pacific Savings Fund	Balanced
2	KKLSFB	Kuala Lumpur Savings Fund	Balanced
3	KKLRSFB	Kuala Lumpur Regular Savings Fund	Balanced
4	KKLBFB	Kuala Lumpur Balanced Fund	Balanced
5	KPBBFB	Public Bank Balanced Fund	Balanced
6	M1B	Amanah Saham Mara First Public Fund	Balanced
7	M3B	Kumpulan Modal Bumiputera Yang Ke-3	Balanced
8	M4B	Kumpulan Modal Bumiputera Yang Ke-4	Balanced
9	M5B	Kumpulan Modal Bumiputera Yang Ke-5	Balanced
10	M6B	Kumpulan Modal Bumiputera Yang Ke-6	Balanced
11	M8B	Kumpulan Modal Bumiputera Yang Ke-8	Balanced
12	M10B	Kumpulan Modal Bumiputera Yang Ke-10	Balanced
13	M11B	Kumpulan Modal Bumiputera Yang Ke-11	Balanced
14	MMPFB	Amanah Saham Mara Premier Fund	Balanced
15	MTPBFB	Amanah Saham Tanjung Piai Balanced Fund	Balanced
16	MPTNBB	Amanah Saham Pekerja TNB	Balanced
17	AMIFG	Malaysian Investment Fund	Growth
18	AMPFG	Malaysia Progress Fund	Growth
19	ATABG	Tabung Amanah Bakti	Growth
20	AMBFG	Malaysia Berjaya Fund	Growth
21	AMEFG	Malaysia Equity Fund	Growth
22	BDGFG	BHLB Pacific Double Growth Fund	Growth
23	BECGFG	BHLB Pacific Emerging Companies Growth Fund	Growth
24	BHGFG	BHLB Pacific High Growth Fund	Growth
25	BDAIG	BHLB Pacific Dana Al-Ihsan	Growth
26	BILFG	BHLB Pacific Index-Linked Fund	Growth
27	KKLGFG	Kuala Lumpur Growth Fund	Growth
28	KKLIXG	Kuala Lumpur Index Fund	Growth
29	KKLIFG	Kuala Lumpur Industry Fund	Growth
30	KKLAFG	Kuala Lumpur Aggressive Fund	Growth
31	KKLITG	Kuala Lumpur Ittikal Fund	Growth
32	KKLSCG	Kuala Lumpur Smallcap Fund	Growth
33	M2G	Second (Mara) Bumiputera Investment Fund	Growth
34	M7G	Kumpulan Modal Bumiputera Yang Ke-7 (Accumulation)	Growth
35	BPBFI	BHLB Pacific Bond Fund	Income
36	KKLBFI	Kuala Lumpur Bond Fund	Income