



The price linkages between the equity fund price levels and the stock markets: Evidences from cointegration approach and causality analysis of Hong Kong Mandatory Provident Fund (MPF)

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ABSTRACT

This paper is the first study to examine the short and long term price level linkages between the equity funds under the Hong Kong Mandatory Provident Fund (MPF) scheme and the benchmark indices proxied by different indices designed by the Hong Kong Investment Fund Association (HKIFA) over the period 2001–2008. Cointegration test is used to identify the long run relationship between the price levels and the stock market index, short run relationship between them is analyzed by the Granger causality test. We find that there is 56.43% of the equity funds have their price levels cointegrated with stock market index. In the short run, the Granger causality test indicates that some funds' price levels have both long and short run comovements with the stock market indices; on the other hand, some equity funds are found to have short run comovements with the stock market index but no long run comovements with the index, this indicates that some equity fund managers have ever tried to design their portfolios trying to win the market. Cointegration analysis is also done to investigate the long run relationship between the price levels of non-Hong Kong equity fund price levels and the local stock market index, Hang Seng Index, to evaluate the existence of benefit from global diversification by investing in the foreign equity funds. The results indicate that the scheme participants may have global diversification benefit by investing in US and Japanese equity funds.

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1. Introduction and previous research

Like many other countries, Hong Kong has an aging population – where people aged 65 and over accounted for only 6.6% of the population in 1981, by 2003, this figure had risen to 11.5% and it is expected to increase to 14% by 2016 and to 24% by 2031. The government is grappling with the policy implications of how best to provide for the retirement needs of this ever increasing group. The first major policy initiative has been the introduction of the Mandatory Provident Fund (MPF) system, which was implemented on 1 December, 2000. Under this scheme, most employees and their employers are required by law to make monthly contributions to a MPF, which are based on the level of salary and the period of employment. These MPFs are managed by approved private organizations according to criteria set out by the government. Prior to the implementation of the MPF system, only one-third of the 3.4 million person Hong Kong workforce had some form of retirement protection, and with the introduction of the MPF system, this figure had risen to 86% by the end of 2001.

The launch of the MPF system has created an entirely new class of asset in the Hong Kong financial markets, which has a very broad base of investor support. These funds represent the cornerstone of the government's policy to deal with the financial burden of the retired population. Given their importance and investor interest in these funds, there is a need for research on the performance of MPFs. It is an important empirical issue as to whether these funds are able to provide a reasonable rate of return to the investors whose future welfare depends so much on their performance. The literature on the performance of mutual funds is extensive in these several decades and many of these studies compare the fund's return with that of the market. Most of them confirm the inability of mutual funds to outperform the market benchmarks or indices (Jensen, 1968; Lehmann & Modest, 1987; Grinblatt & Titman, 1989; Malkiel, 1995; Gruber, 1996; Carhart, 1997). The findings of the studies on performance of mutual funds traded in other countries are consistent with the U.S. evidence (Bauer, Otten, & Tourani Rad, 2006; Cai, Chan, & Yamada, 1997; Hallahan & Faff, 1999; Sawicki & Ong, 2000).

It is interesting to note that while there has been a substantial amount of research undertaken on Hong Kong security and futures markets, the mutual funds industry, and MPFs in particular, have received only scant attention. Chu and McKenzie (2008) is the first study on the MPF equity fund managers' stock-selection and market-

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timing ability during the period 2001–2006. The findings indicate that US equity funds in the scheme consistently underperform relative to the market, while the other fund groups, including Hong Kong equity funds, Japan equity funds, Asia excluding Japan equity funds, Asia excluding Japan and Hong Kong equity funds, European equity funds, and Global equity funds, consistently outperform the market. The stock-selection ability of MPF constituent equity funds in times of changing economic condition is also investigated; the conditional models which incorporate five economic variables decrease the individual fund traditional alpha measure. The market timing models of Treynor–Mazuy and Henriksson–Merton, provide evidence of superior market timing ability except Japan equity funds and Asia excluding Japan and Hong Kong equity funds.

The aim of this paper is to add further evidences of long-run and short-run associations between the MPF equity funds' prices and stock market indices. There are several studies examining the degree of association of country funds and their underlying market returns. [Bosner-Neal, Brauer, Neal, and Wheatley \(1990\)](#) document that a relation exists between announcements of changes in investment restrictions and changes in country fund price-net asset value ratios; suggest that these ratios may be traceable to the existence of government controls and provide the evidence that some foreign markets are at least partially segmented from the U.S. capital market. [Bailey and Lim \(1992\)](#) compare the correlation of country fund and U.S. market returns to the correlation of foreign fund and U.S. index returns to evaluate the benefit of international diversification, and document that the returns of new country funds have significant correlation with the returns of market index.

The primary objective of this paper is to study the possible pattern of cointegration and causality between the price levels of the equity funds in the Hong Kong MPF scheme and their underlying stock market indices and Hong Kong stock market index respectively. Correlations measure the co-movement of two variables, while cointegration analysis tests whether two time series tend to move together with time without deviating from each other and maintaining a long run equilibrium state. The presence of cointegration indicates the existence of long-term equilibrium relationship between MPF's prices and the underlying stock market index; and suggests that the MPFs may be an appropriate substitute for directly investing in the stock market for retirement because it implies that the MPFs may replicate the stock market index over the long run. However, the lack of cointegration between the price levels of non-HK equity funds in MPF scheme and the local stock market index, i.e. Hang Seng Index, indicates that the foreign-equity MPFs do not have co-movement with the local stock market index in the long run and suggests that the Hong Kong investors may be benefit from diversification and may have potential portfolio gain. The Granger causality test may reveal which time-series variable is exogenous and which time-series variable is endogenous. A unidirectional causality from the stock market index to the MPF prices implies that the MPF is representing the pre-existing conditions in the stock market; conversely, a unidirectional causality from the MPF prices to stock market index indicates there may be a possibility of a spillover from the ETF to the local stock market and the reason of such spillover may be due to the role of the fund to serve international investors (see [Ben-Zion, Choi, & Hauser, 1996](#)).

There are some studies on the existence of cointegration between the funds' prices and their underlying benchmark index in the literatures. [Chang, Eun, and Kolodny \(1995\)](#) document the existence of cointegration between the closed-end country funds' value and their net asset value for the majority of closed-end country funds from North America and Europe. However, there is no evidence of cointegration between these two time series for Asian emerging markets such as India, Korea, Malaysia, Taiwan and Thailand. [Allen and MacDonald \(1995\)](#) find no evidence of cointegration between the monthly Australian index data supplied by Morgan Stanley Capital International and the other 16 countries including Italy, Japan,

Norway, Malaysia, Singapore, and US etc, which suggests that the Australian investors can be benefit from international diversification. [Ben-Zion, Choi, and Hauser \(1996\)](#) use the cointegration and causality tests to evaluate how three country funds listed in the US are related to market indices of their own national stock markets, which include Germany, UK, and Japan; as well as the US stock markets. The cointegration tests show that pairs of time series of country funds and national stock market indices are not cointegrated, it indicates that the country funds in the sample is far from tight in the long run. The causality test shows the presence of dual causality between the sample fund prices in these three markets and their own stock market indices, but not with the US market. [Matallin and Nieto \(2002\)](#) document little evidence of cointegration between the mutual funds and the Spanish stock market index Ibex 35. Their findings indicate only 11 out of 63 (representing 17.5% of the total) funds are cointegrated with the index. The authors explain that their sample funds have little cointegration with the stock market index may be due to that the funds analyzed are mostly actively managed funds, which portfolios are managed through market timing and asset selection; such trading activities could cause greater or smaller differences with respect to the evolution of the Ibex 35. The authors added that the actively managed mutual funds have to diversify their investments in line with corresponding prevailing legislation and they have to hold a percentage of liquid worth, either to meet legal requirements or as cash for future reimbursements or new share applications, may increase the possibility of little evidences of cointegration.

To limit the scope of this study, only 'equity' funds that are authorized by the Mandatory Provident Fund Scheme Authority to be included in the MPF scheme are considered. The other types of MPF funds: (1) balanced funds, (2) fixed-income funds, (3) money market funds, (4) guarantee return funds, and (5) capital preservation funds, are excluded from this study. Furthermore, mutual funds that are not included in MPF scheme are excluded even though some of them are authorized by the Monetary Authority to sell in Hong Kong. The focus on pension funds to the exclusion of other types of funds is based on the observation that pension fund managers control a larger portion of the aggregate wealth than do mutual fund managers ([Coggin, Fabozzi & Rahman, 1993](#)). Further, pension fund managers and mutual fund managers operate in a different environment. For example, pension fund managers are reviewed periodically by their clients and independent pension consultants. Further, whereas poor performing mutual fund investors may withdraw their money from the funds at any time, such withdrawals are not usually seen in pension funds ([Christopherson, Ferson & Glassman, 1998](#)).

Due to the short history of the MPF scheme, only a relatively small sample of data is available. Further, there is a general lack of information about fund operating characteristics such as the fund size, cash flows, and turnover rates. The MPF funds were not required to release this information to the public before November 2005 and prior to this date, the fund trustees treated such information as confidential. Keeping these data limitations in mind, we argue that while the data is not as comprehensive as would be the case for other markets, a sufficient amount of data is available to allow some preliminary insights into the MPF performance and behavior.

This paper aims to add further evidence on the possible pattern of cointegration and causality between the prices of the equity funds in MPF scheme and their underlying stock market index and Hong Kong stock market index respectively, and the paper is organized as follows. [Section 2](#) describes the data and research methodology employed. [Section 3](#) discusses the findings and the concluding remarks are summarized in [Section 4](#).

2. Research methodology and data

Prior to the causality test, we have to certain that the time series are stationary. A time series is said to be stationary if its mean and

variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed. If the time series is nonstationary, the deflection from the mean will be permanent. A time series is said to be $I(0)$ if it is stationary at the level form. A time series is said to be integrated of order d if it has to be differenced d times to make it stationary. For example if a time series is $I(2)$, then $\Delta\Delta Y_t = Y_t - 2Y_{t-1} + Y_{t-2}$ will be stationary. The unit root test based on the Augmented Dickey–Fuller (ADF) test, which is a widely popular used methodology to examine the presence of stationary in the time series, will be first performed. The augmented Dickey–Fuller test may be used regardless the error term u_t are correlated or not. The augment is conducted by adding the lagged values of the dependent variable ΔY_t . According to Dickey and Fuller (1979; 1981), ADF test consists the following OLS estimation:

$$\Delta Y_t = \beta_0 + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + u_t \tag{1}$$

where u_t is the pure white noise error term and where $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$, etc. The optimal number of lagged difference terms to be included (m) is determined by Akaike's Information Criteria (AIC) which determines the optimal choice of lag length such that the autocorrelations in the error term may be removed (Akaike (1970)). The unbiased estimate of the coefficient of lagged Y_{t-1} can be obtained then. The null hypothesis in ADF, $H_0: \delta = 1$, indicates the time series is nonstationary will be tested against the alternative hypothesis, $H_a: \delta < 1$. The ADF test follows the asymptotic distribution as the DF statistic.

Cointegration test will then be performed to see whether the NAV or simply the price levels of MPF funds and the stock market index are individually non-stationary become stationary when they are linearly combined. Two time series are said to be cointegrated if they have a long-term, or equilibrium, relationship between them although they may deviate momentarily from each other in the short run. Cointegration between the price levels and the stock market index suggests that the two series share the same common trend so that the regression of one on the other will not be necessarily spurious, and the price levels of funds will be subjected to the deviation from the long run movement dictated by the market. Following Engle and Granger (1987), the possible presence of cointegration may be tested by using Dickey–Fuller (DF) test on the error term, u_i from the following regressions:

$$MPF_t = \beta_0 + \beta_1 INDE X_t + u_t \tag{2}$$

and

$$\Delta u_t = -\theta \cdot u_{t-1} \tag{3}$$

where $INDE X_t$ indicates the time series of market index, MPF_t indicates the time series of price levels of funds, and $\Delta u_t = u_t - u_{t-1}$. Eqs. (2) and (3) are generally known as Engle–Granger (EG) test. The null hypothesis in EG test, $H_0: \theta = 0$, indicates the residuals in Eq. (2) are nonstationary and implies the two time series $INDE X_t$ and MPF_t are not cointegrated, will be tested against the alternative hypothesis, $H_a: \theta < 0$. Since the cointegration presumes the individual time series is nonstationary, the EG test is conducted on the price level data. Practically, the fund manager may have different portfolio or trading behavior from that of the market, but we should expect that the managers may react by changing the portfolio that is in line with the market, and which makes the series cointegrated.

The Granger's causality test will be finally performed to examine if the indication of presence of cointegration may be due to error correction mechanism; and to determine the presence of short term relationship in the case that the time series are found to be not

cointegrated. The one-way causality test by running a regression of fund price levels on past values of the price levels and the market index as follow:

$$\Delta MPF_t = \sum_{i=1}^m \alpha_i \Delta INDE X_{t-i} + \sum_{j=1}^m \beta_j \Delta MPF_{t-j} + \delta \varepsilon_t + u_i \tag{4}$$

Testing one-way causality is based on the logic that the fund managers should usually change their portfolios to react the changes in the market; on the other hand, the index will not react by returning towards the funds. The optimal choice of lag terms is also determined by the Akaike's Information Criteria (AIC). A unidirectional causality from X to Y is indicated if the estimated coefficients on the lagged X in Eq. (4) are statistically significant as a group and it may be indicated by the following F -statistic:

$$F = \frac{(SSR_R - SSR_{UR}) / m}{SSR_{UR} / (n - k - 1)} \tag{5}$$

where SSR_R is the sum of squares of residuals of the restricted regression which assumes all the coefficients equal zero, SSR_{UR} is the sum of squares of residuals of the un-restricted regression or those of the original regression. The F -statistic follows the F -distribution with m and $n - k - 1$ degrees of freedom. The presence of unidirectional causality implies the MPF fund managers are responding to the past changes in the market index in the short term. Engle and Granger (1987) indicate that the following causality test with error correction, Eq. (6), is preferable to Eq. (4) if cointegration is diagnosed to exist between two time series:

$$\Delta MPF_t = \sum_{i=1}^m \alpha_i \Delta INDE X_{t-i} + \sum_{j=1}^m \beta_j \Delta MPF_{t-j} + \delta \cdot u_t + \theta_i \tag{6}$$

where u_t is the residual term from Eq. (4), δ is an arbitrary coefficient, and θ_i is the new generated residual term. Eq. (4) will be used to test for causality if two series are found not to be cointegrated with each other; while Eq. (6) will be employed to test the existence causality of two cointegrated time series.

The data set consists of monthly prices of all 101 MPF constituent equity funds, from the launch of MPF scheme on December 1, 2000 or the date of the introduction of the fund, to December 31, 2008 giving a maximum total of 97 monthly observations. The names and the types of the all sample MPF are summarized in Appendix 1. All of these data were provided by Lipper Asia Limited. The NAV of these equity funds is reduced by the exact amount of dividends or capital gain distributions paid to the shareholders. Thus, the monthly prices in the database have been adjusted and are inclusive of these distributions. Most previous studies suggest that using monthly data for mutual fund performance studies is appropriate as their distribution is closer to normal than the distribution of daily returns. According to the categories specified by Hong Kong Investment Fund Association (HKIFA), the sample equity funds are separated into (1) Hong Kong Equity, (2) US Equity, (3) Japanese Equity, (4) Asia excluding Japan Equity, (5) Asia Excluding Japan and Hong Kong Equity, (6) Pacific Basin excluding Japan Equity, (7) European Equity, (8) Global Equity and (9) Greater China Equity. This study excludes the category "other equity", which includes only one Korean equity fund because no benchmark is determined for this category. The list of MPF equity funds as at 31 December 2008 and their respective fund type is summarized in Appendix 1.

The stock market portfolios are proxied by nine benchmark indices which should represent the performance that the investors would earn in the same class of securities. These nine stock market indices include: (1) FTSE MPF Hong Kong Index for Hong Kong Equity Funds, (2) FTSE MPF USA (35% HK\$ Hedged) Index for US Equity Funds,

(3) FTSE MPF Japan (35% HK\$ Hedged) Index for Japanese Equity Funds, (4) FTSE MPF Asia Pacific ex Japan and AU and NZ Index for Asia excluding Japan Equity Funds, (5) FTSE MPF Asia Pacific ex Japan ex HK (35% HK\$ Hedged) Index for Asia Excluding Japan and Hong Kong Equity Funds, (6) FTSE MPF Asia Pacific ex Japan (35% HK\$ Hedged) for Pacific Basin excluding Japan Equity Funds; (7) FTSE MPF Europe (35% HK\$ Hedged) Index for European Equity funds, (8) FTSE MPF All-World (35% HK\$ Hedged) Index for Global Equity Funds; and (9) FTSE MPF Greater China Index for Greater China Equity Funds. The data of the quotes of these market indices are obtained from the DataStream.

3. Empirical results

The results of ADF unit root tests on both price levels and first-differences of the MPF equity funds and those of the stock market indices in are presented in panel (a) of Table 1. The results indicate that a few portion of equity funds (9 out of 101) are stationary in price levels at 10% and the remaining 92 are not stationary; however, most of the equity funds are stationary in first differences (89 out of 101) at either 5% or 10% significance level. The funds which are not stationary in first differences are found to have stationary second-differences. The ADF test statistics for the stock market index presented in Table 2 are all not significant for the price level but become significant for first-differences. Hence, it is concluded that most of the equity funds and all stock market indices are first-ordered integrated i.e. $I(1)$ series, and thus the price levels not the first differences are subject to cointegration test.

Panel (b) of Table 1 shows the results of the test of cointegration performed on each equity fund and the benchmark stock market index. The trace statistic of the cointegration test for each equity fund with the benchmark stock market index is the fifth column. The results indicate that 57 out of 101 equity funds are cointegrated with their tracing stock market index at either 5% or 10% significance level. The trace statistics show that no US equity funds are cointegrated with their benchmark index, FTSE MPF US. The respective percentage of equity funds are found to be cointegrated with their benchmark index in each group is 56.67% (17 out of 30) for Hong Kong equity, 57.15% (4 out of 7) for Japanese equity, 90% (9 out of 10) for Asian excluding Japan equity, 60% (3 out of 5) for Asian excluding Japan excluding Hong Kong equity, 40% (2 out of 5) for Pacific Basin excluding Japan equity, 71.43% (5 out of 7) for European equity, 50% (12 out of 24) for Global equity, and 66.67% (4 out of 6) for Greater China equity funds. The absence of cointegration suggests that long run equilibrium relationship does not exist between the fund's price level and the underlying stock market index. There are long run differences between the funds and the stock market index as their prices diverge in the long run.

The absence of cointegration between some equity fund prices and stock market indices obviously indicates that some equity fund managers are active in doing stock selection and market timing, and trying to construct their portfolios with an objective to beat the market. Chu and McKenzie (2008) has found some equity funds are superior in stock-selection and market-timing activities. The absence of cointegration might contradict the expectations of most MPF participants because the equity funds are usually thought as a direct investment to the overall stock market and the fund managers should mimic the performance of the stock market index, and thus the movements of price level of equity funds and the stock market index should depend on each other. The absence of cointegration may be due to the fact that the Hong Kong Investment Fund Association (HKIFA) uses the FTSE MPF indices serving as the benchmark for different category of MPF funds but the equity funds may replicate a particular stock market rather than these indices; for example, the US equity funds in the MPF scheme mostly tend to construct their portfolios which replicate the well known stock indices such as Dow

Jones and S&P 500 and thus no cointegration is found between the price levels of US equity funds and the benchmark index, FTSE MPF US. Besides of this, some equity funds may invest the same set of stocks as the stock market index but the percentage of investment in each stock may be different from that in the stock market index, it also weakens the tendency of two time series.

Panel (c) of Table 1 presents the results of the causality test between the fund prices and stock market indices. The results only confirm that 54.39% (31 out of 57) of the equity funds which price levels found to be cointegrated with the benchmark stock index have one-way market-to-fund causality. The remaining 45.61% equity funds have price levels which have long run equilibrium relationship with the stock market but their short run changes are not reflected by those in the stock market. This controversial finding is not surprising because the equity funds in the MPF scheme are pension funds and some fund managers may not be quite responsive to the short term changes in the market.

It is interesting that almost all of the US equity funds which price levels are found not to be cointegrated with the benchmark stock market index, but found having significant causal relations with the benchmark index, FTSE MPF US. These findings suggest that the although the US equity funds in the scheme seems not to construct their portfolios which mimic the FTSE MPF US index, the fund managers of such category of funds are responding to the short-run changes in the US stock market or the constituent stocks in the FTSE MPF US index by adjusting the percentage of investment in each stock in their portfolios.

The absence of cointegration of non-Hong Kong equity funds and the local stock market index indicates that the local investors may be benefit from global diversification if they invest in such investments. The results of cointegration test between the price levels of non-Hong Kong equity funds and the local stock market index, Hang Seng Index, is illustrated in panel (d) of Table 1. The Hong Kong equity funds are excluded in this analysis. The results show that no US equity fund price levels and no Japanese equity fund price levels are cointegrated with Hang Seng Index. It is not surprising because the US equity funds and Japanese equity funds have not any Hong Kong stocks in their portfolios. It obviously shows that the MPF scheme participants may be benefit from international diversification through investing in US and Japanese equity funds in the scheme. On the other hand, the other types of equity funds such as Asian excluding Japan equity funds, Pacific Basin excluding Japan equity funds, and Global equity funds may have some Hong Kong stocks in their portfolios which make some equity funds in these categories may have some evidences of cointegration with Hang Seng Index. It is interesting that the European equity funds which do not have any Hong Kong stocks in their portfolios but most of their (5 out of 7) prices are cointegrated with the Hang Seng Index. A cointegration test on Hong Kong stock market index and major European stock market indices may be performed to investigate their long run relations.

4. Summary and conclusion

Test of cointegration and causality between mutual fund prices and stock market indices investigate whether the MPF equity funds replicate the portfolios of their underlying stock markets and whether the MPF equity funds are a convenient way to invest in the market directly. Cointegration and causality test are done extensively on the mutual funds in developed countries.

This paper is the first to examine the cointegration and causality between the prices of equity funds under the Hong Kong Mandatory Provident Fund (MPF) scheme and the benchmark indices designed by the Hong Kong Investment Fund Association (HKIFA), during the period 2001–2008. It examines how the equity funds related to different stock market index. ADF unit root test is first employed to test the stationarity of price levels and first difference of funds' price

Table 1

Panel (a): tests for unit roots in the price levels and first difference of MPF equity funds

$$\Delta Y_t = \beta_0 + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + u_t$$

$H_0: \delta = 1$ (non-stationary)

Panel (b): tests of cointegration for the price levels of MPF equity funds and stock market indices

Cointegration equation: $MPF_t = \beta_0 + \beta_1 INDEX_t + u_t$

Dickey–Fuller equation: $\Delta u_t = -\theta \cdot u_{t-1}$

$H_0: \theta = 0$ (no cointegration)

Panel (c): tests of causality between the stock market index and price level of MPF equity funds

$$\Delta MPF_t = \sum_{i=1}^m \alpha_i \Delta INDEX_{t-i} + \sum_{j=1}^m \beta_j \Delta MPF_{t-j} + u_t$$

H_0 : The estimated lagged coefficients of α_i are not significant jointly (no causality)

Panel (d): tests of cointegration for the price levels of MPF non-Hong Kong equity funds and local stock market index, i.e. Hang Seng Index

Cointegration equation: $MPF_t = \beta_0 + \beta_1 INDEX_t + u_t$

Dickey–Fuller equation: $\Delta u_t = -\theta \cdot u_{t-1}$

$H_0: \theta = 0$ (no cointegration)

Fund number	(a)		(b)		(c)		(d)	
	Price level	First difference	Independent: market index	Trace statistic	Market index	F-statistic	Independent: market index	Trace statistic
1	-1.7097	-3.6705*	FTSE MPF HK	12.6295	FTSE MPF HK	1.3508	NA	NA
2	-1.6918	-3.6843*	FTSE MPF HK	11.0334	FTSE MPF HK	1.1662	NA	NA
3	-1.4713	-5.2280*	FTSE MPF HK	12.5280	FTSE MPF HK	0.1304	NA	NA
4	-1.0155	-4.4228*	FTSE MPF HK	6.2938	FTSE MPF HK	1.7022	NA	NA
5	-1.9898	-2.5692**	FTSE MPF HK	32.9535*	FTSE MPF HK	12.4033*	NA	NA
6	-0.3599	-2.1959	FTSE MPF HK	16.4657*	FTSE MPF HK	1.2579	NA	NA
7	-1.6686	-2.6273**	FTSE MPF HK	31.0076*	FTSE MPF HK	12.6170*	NA	NA
8	-1.0749	-4.8375*	FTSE MPF HK	19.4564*	FTSE MPF HK	3.6612*	NA	NA
9	-1.7361	-4.1403*	FTSE MPF HK	17.8439*	FTSE MPF HK	1.6326	NA	NA
10	-1.1923	-3.2890*	FTSE MPF HK	10.8443	FTSE MPF HK	1.8626	NA	NA
11	-1.8766	-3.0353*	FTSE MPF HK	16.7045*	FTSE MPF HK	2.4334**	NA	NA
12	-1.9048	-3.0353*	FTSE MPF HK	14.2282**	FTSE MPF HK	2.2961	NA	NA
13	-1.9048	-3.0353*	FTSE MPF HK	14.2282**	FTSE MPF HK	2.2961	NA	NA
14	-1.9261	-2.3719	FTSE MPF HK	12.7871	FTSE MPF HK	1.6196	NA	NA
15	-1.9261	-2.3719	FTSE MPF HK	12.7871	FTSE MPF HK	1.6196	NA	NA
16	-1.9261	-2.3719	FTSE MPF HK	12.7871	FTSE MPF HK	1.6196	NA	NA
17	-1.9261	-2.3719	FTSE MPF HK	12.7871	FTSE MPF HK	1.6196	NA	NA
18	-1.1556	-2.8959*	FTSE MPF HK	23.7926*	FTSE MPF HK	2.5406**	NA	NA
19	-1.1556	-2.8959*	FTSE MPF HK	23.7926*	FTSE MPF HK	2.5406**	NA	NA
20	-1.7699	-3.1318*	FTSE MPF HK	18.3270*	FTSE MPF HK	3.6358*	NA	NA
21	-2.1444	-2.7696**	FTSE MPF HK	13.6218**	FTSE MPF HK	0.6724	NA	NA
22	-0.8719	-2.9928**	FTSE MPF HK	12.9836	FTSE MPF HK	1.6004	NA	NA
23	-1.8345	-4.0088*	FTSE MPF HK	5.4267	FTSE MPF HK	0.4242	NA	NA
24	-2.2067	-3.3512*	FTSE MPF HK	14.8570**	FTSE MPF HK	1.4005	NA	NA
25	-0.2802	-3.3888*	FTSE MPF HK	15.6453*	FTSE MPF HK	4.1363	NA	NA
26	-1.3773	-5.4270*	FTSE MPF HK	15.6453*	FTSE MPF HK	2.4214**	NA	NA
27	-2.0632	-2.8338**	FTSE MPF HK	20.2084*	FTSE MPF HK	4.2028*	NA	NA
28	-1.9306	-2.9899*	FTSE MPF HK	14.3678**	FTSE MPF HK	1.9009	NA	NA
29	-1.0921	-3.4719*	FTSE MPF HK	10.4089	FTSE MPF HK	1.1079	NA	NA
30	-2.3472	-3.8879*	FTSE MPF HK	5.2845	FTSE MPF HK	0.2320	NA	NA
31	-1.1616	-7.6381*	FTSE MPF US	4.8628	FTSE MPF US	4.0025*	Hang Seng Index	11.9237
32	-1.1797	-7.5894*	FTSE MPF US	4.6904	FTSE MPF US	3.9758*	Hang Seng Index	11.9237
33	-2.1497	-7.9348*	FTSE MPF US	4.8897	FTSE MPF US	2.5853**	Hang Seng Index	4.5962
34	-2.1497	-7.9348*	FTSE MPF US	4.8897	FTSE MPF US	2.5853**	Hang Seng Index	4.5962
35	-1.9314	-7.8052*	FTSE MPF US	4.6897	FTSE MPF US	1.8573	Hang Seng Index	5.3328
36	0.8467	-3.6906*	FTSE MPF US	8.4073	FTSE MPF US	3.8810*	Hang Seng Index	6.6741
37	-1.7661	-7.8497*	FTSE MPF US	10.2525	FTSE MPF US	4.4994*	Hang Seng Index	8.2221
38	-1.5554	-3.3561*	FTSE MPF Japan	16.5709*	FTSE MPF Japan	4.4547*	Hang Seng Index	13.7517
39	-1.5450	-3.4177*	FTSE MPF Japan	14.0306**	FTSE MPF Japan	3.9313*	Hang Seng Index	13.7517
40	3.7954	0.4091	FTSE MPF Japan	17.6971**	FTSE MPF Japan	1.4245	Hang Seng Index	13.5326
41	0.8596	-3.8296*	FTSE MPF Japan	7.8930	FTSE MPF Japan	2.1082	Hang Seng Index	7.2274
42	0.9193	-3.4559*	FTSE MPF Japan	10.2922	FTSE MPF Japan	1.3363	Hang Seng Index	7.6793
43	-1.1414	-7.1399*	FTSE MPF Japan	14.5559**	FTSE MPF Japan	3.1303*	Hang Seng Index	12.5269
44	0.2871	-4.0055*	FTSE MPF Japan	3.9770	FTSE MPF Japan	1.2953	Hang Seng Index	7.0592
45	-0.2791	-4.2179*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	14.7021**	FTSE MPF Asia Pacific ex Japan & Australia & NZ	0.9193	Hang Seng Index	19.8511*
46	-2.7971**	-5.9496*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	18.1389*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	2.2596	Hang Seng Index	18.6283*

(continued on next page)

Table 1 (continued)

Fund number	(a)		(b)		(c)		(d)	
	Price level	First difference	Independent: market index	Trace statistic	Market index	F-statistic	Independent: market index	Trace statistic
47	-2.8071**	-5.9708*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	18.7701*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	2.4196**	Hang Seng Index	18.6604*
48	-1.4672	-4.8034*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	20.1695*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	6.0849*	Hang Seng Index	18.5841*
49	-1.1151	-8.8580*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	17.6350*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	1.8392	Hang Seng Index	23.8035*
50	0.7412	-3.0753*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	15.9992*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	0.1868	Hang Seng Index	14.8771**
51	-2.7457**	-2.7963**	FTSE MPF Asia Pacific ex Japan & Australia & NZ	10.1418	FTSE MPF Asia Pacific ex Japan & Australia & NZ	0.6402	Hang Seng Index	20.0131*
52	-1.7662	-3.2226*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	15.8435*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	0.6038	Hang Seng Index	16.7892*
53	-2.8532**	-2.4614	FTSE MPF Asia Pacific ex Japan & Australia & NZ	19.0799*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	3.2717*	Hang Seng Index	20.0784*
54	-1.3348	-2.6009**	FTSE MPF Asia Pacific ex Japan & Australia & NZ	19.6640*	FTSE MPF Asia Pacific ex Japan & Australia & NZ	3.6080*	Hang Seng Index	20.9928*
55	-2.7059**	-5.0259*	FTSE MPF Asia Pacific ex Japan & HK	14.9195**	FTSE MPF Asia Pacific ex Japan & HK	6.2839*	Hang Seng Index	16.6182*
56	-2.6896**	-5.0198*	FTSE MPF Asia Pacific ex Japan & HK	15.4958**	FTSE MPF Asia Pacific ex Japan & HK	5.7886*	Hang Seng Index	16.6550*
57	-0.7873	-4.1882*	FTSE MPF Asia Pacific ex Japan & HK	4.9249	FTSE MPF Asia Pacific ex Japan & HK	2.6019**	Hang Seng Index	16.4397*
58	0.1238	-4.2505*	FTSE MPF Asia Pacific ex Japan & HK	15.8371*	FTSE MPF Asia Pacific ex Japan & HK	1.6204	Hang Seng Index	16.5004*
59	-2.3878	-1.6616	FTSE MPF Asia Pacific ex Japan & HK	5.6426	FTSE MPF Asia Pacific ex Japan & HK	5.4468*	Hang Seng Index	16.4482*
60	0.0353	-3.6056*	FTSE MPF Asia Pacific ex Japan	20.9219*	FTSE MPF Asia Pacific ex Japan	0.1158	Hang Seng Index	11.3109
61	-0.3312	-3.8404*	FTSE MPF Asia Pacific ex Japan	9.0009	FTSE MPF Asia Pacific ex Japan	1.0309	Hang Seng Index	13.7455**
62	-1.5040	-4.9639*	FTSE MPF Asia Pacific ex Japan	13.2187	FTSE MPF Asia Pacific ex Japan	0.7046	Hang Seng Index	17.8572*
63	-1.5040	-4.9639*	FTSE MPF Asia Pacific ex Japan	13.2187	FTSE MPF Asia Pacific ex Japan	0.7046	Hang Seng Index	17.8572*
64	-2.6032**	-2.2157	FTSE MPF Asia Pacific ex Japan	29.5561*	FTSE MPF Asia Pacific ex Japan	2.2245	Hang Seng Index	19.0029*
65	-1.3736	-5.7069*	FTSE MPF EU	16.8546*	FTSE MPF EU	0.5160	Hang Seng Index	17.2855*
66	-1.3852	-5.6888*	FTSE MPF EU	17.0499*	FTSE MPF EU	0.4951	Hang Seng Index	17.4763*
67	-0.1133	-1.6345	FTSE MPF EU	24.1724*	FTSE MPF EU	4.2961**	Hang Seng Index	60.3747*
68	-1.1219	-7.2523*	FTSE MPF EU	21.8962*	FTSE MPF EU	0.4393	Hang Seng Index	17.0122*
69	-1.1219	-7.2523*	FTSE MPF EU	21.8962*	FTSE MPF EU	0.4393	Hang Seng Index	17.0122*
70	-1.5407	-7.2732*	FTSE MPF EU	6.3772	FTSE MPF EU	2.5682**	Hang Seng Index	5.8964
71	1.8329	-3.9763*	FTSE MPF EU	8.2966	FTSE MPF EU	5.5510*	Hang Seng Index	7.7816
72	-0.5964	-3.4674*	FTSE MPF World	9.3822	FTSE MPF World	2.8462**	Hang Seng Index	10.4245
73	-0.5817	-3.5005*	FTSE MPF World	8.8109	FTSE MPF World	2.3997	Hang Seng Index	10.3555
74	0.8730	-2.5044	FTSE MPF World	24.3433*	FTSE MPF World	0.3247	Hang Seng Index	34.9275*
75	0.7489	-2.4456	FTSE MPF World	13.3979	FTSE MPF World	0.5489	Hang Seng Index	19.8483*
76	-1.6435	-7.7074*	FTSE MPF World	7.5185	FTSE MPF World	3.2038*	Hang Seng Index	5.43797
77	1.1826	-2.9621**	FTSE MPF World	14.2808**	FTSE MPF World	4.5919	Hang Seng Index	9.14385
78	-1.4298	-6.0718*	FTSE MPF World	20.3842*	FTSE MPF World	5.3786*	Hang Seng Index	22.7357*
79	-1.4009	-5.8826*	FTSE MPF World	22.4802*	FTSE MPF World	6.9175*	Hang Seng Index	22.8240*
80	-1.6536	-5.7729*	FTSE MPF World	10.2742	FTSE MPF World	1.3223	Hang Seng Index	16.5075*
81	-0.2653	-4.5010*	FTSE MPF World	4.6421	FTSE MPF World	1.7777	Hang Seng Index	12.7594
82	-1.6428	-5.1644*	FTSE MPF World	19.3355*	FTSE MPF World	4.0205*	Hang Seng Index	16.2990*
83	0.1385	-1.9287	FTSE MPF World	69.3549*	FTSE MPF World	4.7600**	Hang Seng Index	22.1188*
84	0.1385	-1.9287	FTSE MPF World	69.3549*	FTSE MPF World	4.7600**	Hang Seng Index	22.1188*
85	-1.0392	-8.2329*	FTSE MPF World	28.2059*	FTSE MPF World	3.1021*	Hang Seng Index	20.8876*
86	-1.0392	-8.2330*	FTSE MPF World	28.2059*	FTSE MPF World	3.1021*	Hang Seng Index	20.8876*
87	-1.3169	-7.0625*	FTSE MPF World	6.5148	FTSE MPF World	0.3623	Hang Seng Index	10.5735
88	-1.5518	-6.2451*	FTSE MPF World	22.9726*	FTSE MPF World	11.3077*	Hang Seng Index	24.0808*
89	-1.1775	-6.8118*	FTSE MPF World	9.5993	FTSE MPF World	0.8539	Hang Seng Index	11.8152
90	-0.9783	-8.1999*	FTSE MPF World	25.7660*	FTSE MPF World	5.0002*	Hang Seng Index	25.8007*
91	-1.0347	-7.0239*	FTSE MPF World	8.0447	FTSE MPF World	0.3734	Hang Seng Index	15.8985*
92	-1.1366	-7.4330*	FTSE MPF World	7.7719	FTSE MPF World	1.4038	Hang Seng Index	21.8977*
93	-1.1070	-7.2075*	FTSE MPF World	24.4911*	FTSE MPF World	2.3966**	Hang Seng Index	24.0273*
94	-1.4003	-7.0946*	FTSE MPF World	12.0701	FTSE MPF World	2.7602**	Hang Seng Index	10.2122
95	-1.4678	-8.1072*	FTSE MPF World	15.6454*	FTSE MPF World	3.7910*	Hang Seng Index	8.6682
96	-2.9363**	-5.6058*	FTSE MPF Greater China	11.8672	FTSE MPF Greater China	3.9851*	Hang Seng Index	17.3978*
97	-2.9189**	-5.5894*	FTSE MPF Greater China	11.0192	FTSE MPF Greater China	3.6863*	Hang Seng Index	17.3816*
98	-0.5671	-4.3589*	FTSE MPF Greater China	16.8836*	FTSE MPF Greater China	2.9612**	Hang Seng Index	17.4949*
99	-1.0207	-5.1267*	FTSE MPF Greater China	16.1353*	FTSE MPF Greater China	0.8667	Hang Seng Index	13.1706
100	-1.5964	-2.6461**	FTSE MPF Greater China	13.4755**	FTSE MPF Greater China	2.2780	Hang Seng Index	19.2153*
101	-0.6064	-3.7434*	FTSE MPF Greater China	14.4627**	FTSE MPF Greater China	0.3380	Hang Seng Index	10.6029

(a) * Indicates significant at 5%; ** indicates significant at 10%; the critical values of the ADF tests are developed by McKinnon (1996).

(b) * Indicates significant at 5%; ** indicates significant at 10%; the critical values of the ADF tests are developed by McKinnon, Haug, and Michelis (1999).

(c) * Indicates significant at 5%; ** indicates significant at 10% to reject the null hypothesis of no causality.

(d) * Indicates significant at 5%; ** indicates significant at 10%; the critical values of the ADF tests are developed by McKinnon, Haug and Michelis (1999).

Table 2

Tests for unit roots in the price levels and first difference of MPF stock market indices

$$\Delta Y_t = \beta_0 + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + u_t$$

$$H_0 : \delta = 1 \text{ (non-stationary)}$$

Stock market index	Price level	First difference
FTSE MPF Hong Kong	−1.1101	−46.0461*
FTSE MPF USA	−1.0244	−45.7622*
FTSE MPF Japan	−0.8812	−46.0085*
FTSE MPF Asia Pacific ex Japan and Australia and NZ	−1.0833	−45.5569*
FTSE MPF Asia Pacific ex Japan ex HK	−1.0909	−45.6614*
FTSE MPF Asia Pacific ex Japan	−1.0621	−45.6614*
FTSE MPF Europe	−0.7754	−45.7429*
FTSE MPF All–World	−0.8047	−45.7231*
FTSE MPF Greater China	−1.0286	−32.6090*

* Indicates significant at 5%; the critical values of the ADF tests are developed by McKinnon (1996).

levels and stock market indices, the results indicate that almost all of the funds and the entire stock market index are first order integrated, i.e. their first differences are stationary. Cointegration and causality tests are then performed and these two tests may imply the efficiency of the funds in long and short terms.

The results of the cointegration tests reveal that 56.43% of the equity funds have long run equilibrium, i.e. cointegration, with the benchmark index of their respective category. This suggests that the long run relationship does not exist between the funds and the stock market indices, and implies that some of the equity fund managers try to construct their portfolios beating the market and having superior stock selection and market timing ability, or they design the portfolios which is different from that of the benchmark designed by HKIFA. The other cointegration test on the fund prices and local stock market index, Hang Seng Index, indicates that the scheme participants may benefit from global diversification through choosing US equity funds and Japanese equity funds because these two categories do not have any evidences of cointegration with Hang Seng Index.

The causality test shows that more than half of the funds which prices have no long term equilibrium relationship with the stock market index have short term relationship with the market, i.e. one-way causality relationship. This interesting finding justifies the existence of stock selection and market timing abilities among the fund managers. Because there are some categories of equity funds which invest in international stock markets and their returns are subject to exchange rate risk, the examination of a three-way relationship which involves exchange rates may be done.

Appendix 1. List of MPF equity funds at 31/12/2008

No.	Fund name	Fund type
1	AIA-JF MPF Scheme–HK Equity	Hong Kong Equity
2	AIA-JF Premium MPF–HK Equity	Hong Kong Equity
3	AXA-Elite MPF–Multi-Manager HK Equity	Hong Kong Equity
4	BCOM Joyful HK Dynamic Equity (CF) Fund	Hong Kong Equity
5	Bank Consortium MPF–HK Equity	Hong Kong Equity
6	Bank Consortium MPF–China & HK Equity	Hong Kong Equity
7	Bank Consortium Industry–HK Equity	Hong Kong Equity
8	BEA (MPF) HK Growth Fund	Hong Kong Equity
9	BOC-Prudential Easy-Choice MPF S–HK Equity	Hong Kong Equity
10	Fidelity Retirement MT–HK Equity	Hong Kong Equity
11	Fortis Master Trust MPF–HK Fund	Hong Kong Equity
12	HSBC MPF–Super Trust Plus–HK & China Equity	Hong Kong Equity
13	Hang Seng MPF–Super Trust Plus–HK & China Equity	Hong Kong Equity
14	HSBC MPF–Super Trust–HS Index Tracking	Hong Kong Equity
15	Hang Seng MPF–Super Trust–HS Index Tracking	Hong Kong Equity

Appendix 1 (continued)

No.	Fund name	Fund type
16	HSBC MPF–Super Trust Plus–HS Index Tracking	Hong Kong Equity
17	Hang Seng MPF–Super Trust Plus–HS Index Tracking	Hong Kong Equity
18	ING MPF MT Basic–HK Equity Pf	Hong Kong Equity
19	ING MPF MT Comprehensive–HK Equity Pf	Hong Kong Equity
20	INVESCO Strategic MPF S–HK and China Equity	Hong Kong Equity
21	Manulife Global Select MPF–HK Equity	Hong Kong Equity
22	Mass MPF Scheme–HK Equity	Hong Kong Equity
23	Principal MPF Scheme S800–HK Equity	Hong Kong Equity
24	Rainbow 65–Sun Life MPF First State HK Equity	Hong Kong Equity
25	Rainbow 65–Sun Life MPF INVESCO HK & China Equity	Hong Kong Equity
26	RCM MPF Plan–RCM HK Fund	Hong Kong Equity
27	Standard Chartered MPF–Adv–Legg Mason HK Equities	Hong Kong Equity
28	Standard Chartered MPF–Adv–HSBC MPF A–HK & China Equity	Hong Kong Equity
29	Schroder MPF MT–HK Portfolio	Hong Kong Equity
30	Taifook MPF Retirement Fund–HK SAR	Hong Kong Equity
31	AIA-JF MPF Scheme–North American Equity	United States Equity
32	AIA-JF Premium MPF–North American Equity	United States Equity
33	HSBC MPF–Super Trust Plus–North American Equity	United States Equity
34	Hang Seng MPF–Super Trust Plus–North American Equity	United States Equity
35	Manulife Global Selected MPF–North American Equity	United States Equity
36	Mass MPF Scheme–US Equity	United States Equity
37	Principal MPF Scheme S800–US Equity	United States Equity
38	AIA-JF MPF Scheme–Japan Equity	Japanese Equity
39	AIA-JF Premium MPF–Japan Equity	Japanese Equity
40	AXA-Elite MPF–Multi-Manager Japan Equity	Japanese Equity
41	BEA (MPF) Japan Growth Fund	Japanese Equity
42	BOC-Prudential Easy-Choice MPF S–Japan Equity	Japanese Equity
43	Manulife Global Select MPF–Japan Equity	Japanese Equity
44	Mass MPF Scheme–Japan Equity	Japanese Equity
45	BCOM Joyful Asian Dynamic Equity (CF) Fund	Asian ex Japan Equity
46	Bank Consortium MPF–Asian Equity	Asian ex Japan Equity
47	Bank Consortium Industry–Asian Equity	Asian ex Japan Equity
48	BEA (MPF) Asian Growth Fund	Asian ex Japan Equity
49	ING MPF MT Comprehensive–Asian Equity Pf	Asian ex Japan Equity
50	Mass MPF Scheme–Asian Pacific Equity	Asian ex Japan Equity
51	Principal MPF Scheme S800–Asian Equity	Asian ex Japan Equity
52	RCM MPF Plan–RCM Asian Fund	Asian ex Japan Equity
53	Standard Chartered MPF–Adv–Schroder MPF Asian	Asian ex Japan Equity
54	Schroder MPF MT–Asian Portfolio	Asian ex Japan Equity
55	AIA-JF MPF Scheme–Asian Equity	Asian ex Japan ex HK Equity
56	AIA-JF Premium MPF–Asian Equity	Asian ex Japan ex HK Equity
57	Fidelity Retirement MT–Asia Pacific Equity	Asian ex Japan ex HK Equity
58	INVESCO Strategic MPF S–Asian Equity	Asian ex Japan ex HK Equity
59	Taifook MPF Retirement Fund–Asia Pacific (ex-HK)	Asian ex Japan ex HK Equity
60	AXA-Elite MPF–Multi-Manager Asia Pacific (ex-Japan) Equity	Pacific Basin ex Japan Equity
61	BOC-Prudential Easy-Choice MPF S–Asia Equity	Pacific Basin ex Japan Equity
62	HSBC MPF–Super Trust Plus–Asia Pacific Equity	Pacific Basin ex Japan Equity
63	Hang Seng MPF–Super Trust Plus–Asia Pacific Equity	Pacific Basin ex Japan Equity
64	Manulife Global Select MPF–Pacific Asia Equity	Pacific Basin ex Japan Equity
65	AIA-JF MPF Scheme–European Equity	European Equity
66	AIA-JF Premium MPF–European Equity	European Equity
67	Bank Consortium MPF–European Equity	European Equity
68	HSBC MPF–Super Trust Plus–European Equity	European Equity
69	Hang Seng MPF–Super Trust Plus–European Equity	European Equity
70	Manulife Global Select MPF–European Equity	European Equity
71	Mass MPF Scheme–European Equity	European Equity
72	AIA-JF MPF Scheme–Green	Global Equity
73	AIA-JF Premium MPF–Green	Global Equity
74	AIA-JF MPF Scheme–World Equity	Global Equity
75	AIA-JF Premium MPF–World Equity	Global Equity
76	AXA Double Easy MPF–Top Select	Global Equity
77	AXA-Elite MPF–Multi-Manager Global Equity	Global Equity
78	Bank Consortium MPF–Global Equity	Global Equity

(continued on next page)

Appendix 1 (continued)

No.	Fund name	Fund type
79	Bank Consortium Industry—Global Equity	Global Equity
80	BOC-Prudential Easy-Choice MPF S—Global Equity	Global Equity
81	China Life Retire-Easy Global Equity Fund	Global Equity
82	Fidelity Retirement MT—Global Equity	Global Equity
83	HSBC MPF—Simple Choice—Global Equity	Global Equity
84	Hang Seng MPF—Simple Choice—Global Equity	Global Equity
85	ING MPF MT Basic—International Equity Pf	Global Equity
86	ING MPF MT Comprehensive—International Equity Pf	Global Equity
87	Manulife Global Select MPF—International Equity	Global Equity
88	Mass MPF Scheme—Global Equity	Global Equity
89	Principal MPF Scheme S800—International Equity	Global Equity
90	Prosperity MPF MT—Templeton Global Equity	Global Equity
91	Standard Chartered MPF—Adv—RCM Growth	Global Equity
92	Standard Chartered MPF—Adv—INVECO Global Equities	Global Equity
93	Standard Chartered MPF—Adv—Templeton MPF Global Equity	Global Equity
94	Schroder MPF MT—International Portfolio	Global Equity
95	Taifook MPF Retirement Fund—Global Diversification	Global Equity
96	AIA-JF MPF Scheme—Greater China Equity	Greater China Equity
97	AIA-JF Premium MPF—Greater China Equity	Greater China Equity
98	BEA (MPF) Greater China Growth Fund	Greater China Equity
99	BOC-Prudential Easy-Choice MPF S—China Equity	Greater China Equity
100	Manulife Global Select MPF—China Value	Greater China Equity
101	Principal MPF Scheme S800—China Equity	Greater China Equity

Source: Hong Kong Mandatory Provident Fund Schemes Authority (MPFA).

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