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## **PENSION FUND PERFORMANCE IN EAST ASIA: A COMPARATIVE STUDY <sup>†</sup>**

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### **Abstract**

This paper discusses and analyzes asset allocation and performance of the major pension funds in four East Asia countries, namely Malaysia, Singapore, Hong Kong and South Korea. The respective funds for these countries are Employee Provident Fund (EPF), Central Provident Fund (CPF), Mandatory Pension Fund (MPF) and National Pension Service (NPS). The impact of some economic crises on the fund performance will also be assessed. Besides looking at the individual countries, a comparison of the performance among all the funds will also be done. From the analyses, it is found that the CPF is the most conservative pension fund as it invested most of its funds in fixed income and the investments were made in the local markets, while MPF is the most aggressive pension fund as most of its funds were invested in equities. Performance of the funds was measured in terms of return on investment (ROI). All funds recorded the lowest ROI during the subprime crisis in 2008. Besides the subprime crisis, these funds were also affected by the Japanese earthquake as lower ROI were also observed in 2011.

**Keywords:** Pension Funds, Asset Allocation, Performance, East Asia

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### **1. Introduction**

Many countries in the world create special funds where workers and employers contribute money for usage during retirement. This pooling of fund is commonly called pension fund. There are some variations as for the definition and scope of functions of these funds in different countries. However, generally, the main goal of pension fund is to provide a secure source of income to individuals after retirement. Thus, a country's pension system serves as a basic component of its social safety net.

As the world is witnessing the general increase in the population age and low birth rate in many countries, pressure is exerted on future generations to ensure the financial sustainability of these pension funds. It is therefore crucial to examine the financial nature of these funds by scrutinizing their asset allocation and investment performance.

This paper will study some of the more important pension funds in four East Asia countries, namely Malaysia, Singapore, Hong Kong and South Korea. In addition to giving some

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overview of the selected funds, this paper will also examine the asset allocation of these funds and evaluate their performance. The impact of some economic crises on the fund performance will also be assessed. Besides looking at the individual countries, a comparison of performance among all the funds will also be done.

## 2. Malaysia

The main pension fund in Malaysia is the Employee Provident Funds (EPF). However, there are other smaller pension funds which cater for specific sectors such as the Armed Forces Fund Board (LTAT) that manages compulsory and voluntary pension contributions for both the non-pensionable and pensionable armed forces. Besides, the Public Service Department (PSD) manages and pays pensions for civil servants who opt for pension scheme during their retirement. This section will proceed with the detailed discussion on the EPF and its investment performance as it is the most prominent pension scheme in Malaysia.

### 2.1. Employee Provident Fund (EPF)

The EPF is a social security institution formed under the Employees Provident Fund Act 1991 (Act 452) which provides retirement benefits for members through management of their savings. EPF is responsible in managing pension contribution by two categories of employees. The first category is the private sector employees and civil servants who do not opt for public pension scheme under PSD. These contributors are entitled under the defined mandatory contribution scheme. The second category is the self-employed and individual without fixed monthly income. These employees are entitled under the voluntary contribution scheme.

The EPF, as at 31 March 2013, has a total of 13.69 million members. The total number of active and contributing members is 6.41 million. The total number of active employers is 509,139. Current contribution rate is in accordance with the wage/salary received. For employees with monthly salary of RM5,000 (ringgit Malaysia) and below, the employee's contribution is 11 percent of their monthly salary while the employer contributes 13 percent. For employees whose salary is greater than RM5,000, the employee's and employer's contributions are 11 percent and 12 percent, respectively.

Table 1 presents the ratio of EPF total asset to GDP of Malaysia. The average total assets to GDP for EPF during 2003-2009 was about 40 percent. The ratio rose to 47 percent and 48 percent in 2010 and 2011, indicating an increase in the fund size as relative to GDP. As indicated by Figure 1, the value of EPF total assets has almost double from RM190 billion in 2003 to RM340 billion in 2011.

**Table 1. Relative Size of EPF Assets to Malaysian Economy, 2003-2011**

	2003	2004	2005	2006	2007	2008	2009	2010	2011
TA	190	210	240	204	223	241	257	319	340
GDP	483	516	544	574	610	640	630	675	709
Asset/GDP (%)	39.25	40.76	44.19	35.48	36.48	37.75	40.78	47.30	47.95

**Sources:** EPF Annual Reports (various issues) and World Development Indicators (World Bank, 2013).

**Notes:** TA – total asset; GDP – gross domestic products. TA and GDP are expressed in RM billion.

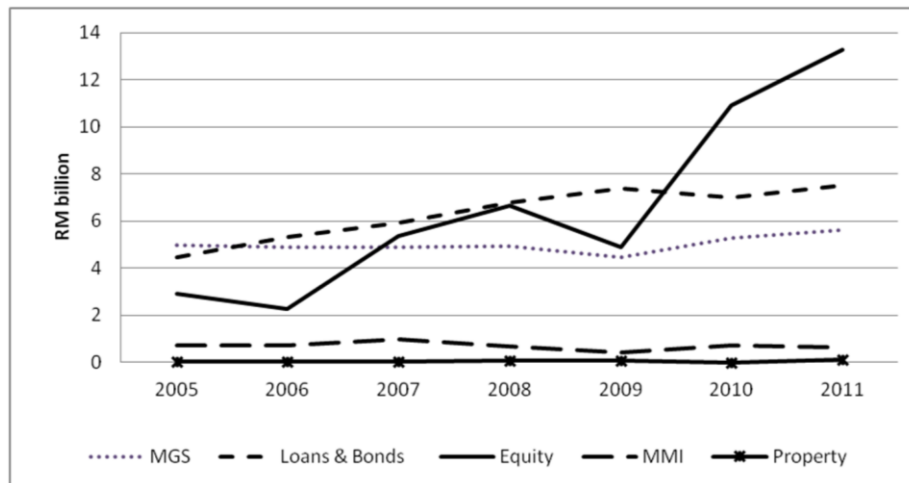
### 2.2. EPF Asset Allocation

This section discusses the EPF investment performance during 2000 until 2011. The discussion will include the types of EPF investment, the distribution of investment based on regions and return on investment (ROI) by asset classes.

EPF invested its funds in equity, money market instruments, the Malaysian government securities (MGS), loans and bonds, and property. Figure 1 shows the investment by EPF based on asset class and the trends for period 2005-2011. From 2006-2009, EPF concentrated most of its investment in loans and bonds. The investment in this asset class was between 35-40

percent of total investment. However, in 2010 and 2011, the proportion of funds invested in loans and bonds had declined to only 29 percent. During 2006-2008, EPF had increased its risk profile by rising its investment in equity. The amount invested in equity rose from RM2.27 billion (17 percent of total investment) in 2006 to RM6.67 billion (35 percent of total investment) in 2008. The amount, however, declined to RM4.9 billion in 2009. By 2011, EPF had increased its investment in equity totaling to RM13.3 billion or 49 percent of total investment. Besides loans and bonds and equity, MGS is the third most important asset class chosen by EPF in its portfolio. The amount invested in MGS averaged around RM5 billion or 28 percent of its total investment. The other two asset classes are money market instruments (MMI) and property. About 4 percent of total investment was placed in the money market. The proportion of investment for property was less than 1 percent during 2005-2011.

Even though Malaysia is the most preferred capital market for EPF, the Fund also diversified its portfolio in the global equity markets. Figure 2 presents the share of EPF equity investment in both domestic and global capital markets during 2000-2011.

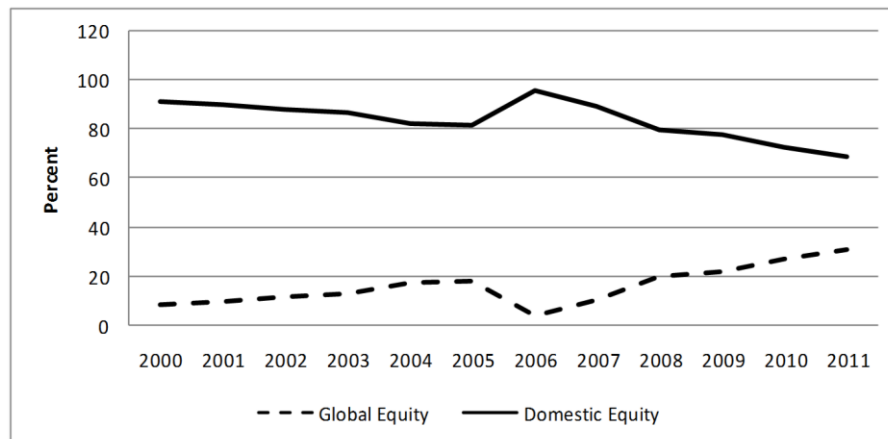


**Figure 1. EPF: Types of Investment**

**Source:** Figures are derived from EPF Annual Reports (various issues).

**Notes:** MGS - Malaysian Government Securities; MMI - money market instruments

During 2000 until 2005, EPF had gradually reduced its investment in the domestic market and increased its investment in the global capital markets. Its investment in global capital markets in 2005 had doubled compared to year 2000 (from 9 percent in 2000 to 18 percent in 2005). However, EPF was quite conservative in 2006 and 2007 when the proportion of its international equity investment declined to 4 percent and 11 percent, respectively. Despite the uncertainties in the global capital markets, the Fund had become more aggressive in later years when a sharp rise in the proportion of its international investment was observed during 2008 until 2011. The figure rose from 20 percent in 2008 to 31 percent in 2011, an increase by eleven percentage point in three years. An increasing trend in the proportion of global equity investment is reflected in the sharp rise in its equity holdings from RM4.9 billion in 2009 to RM13.3 billion or 49 percent of its total investment in 2011 (see Figure 1).



**Figure 2. EPF: Domestic versus Global Equity**

**Source:** Figures are derived from EPF Annual Reports (various issues).

In terms of country diversification, the United States (US) is the most preferred foreign capital market chosen by EPF (Table 2). The share of global EPF investment in the US rose from 25 percent in 2010 to 27 percent in 2011. United Kingdom (UK) is the second preferred global investment market for EPF with a share of 10 percent and 18 percent in 2010 and 2011, respectively, followed by Singapore (17 percent in 2010 and 13 percent in 2011). To a lesser extent, EPF also invested in the Asian capital markets including Hong Kong, Indonesia, Thailand, South Korea, and Japan.

**Table 2: Global Investment by Countries (%)**

	2010	2011
US	25	27
United Kingdom	10	18
Singapore	17	13
Hong Kong	8	8
Indonesia	5	7
Thailand	6	6
South Korea	8	5
Japan	6	5
Others	15	11

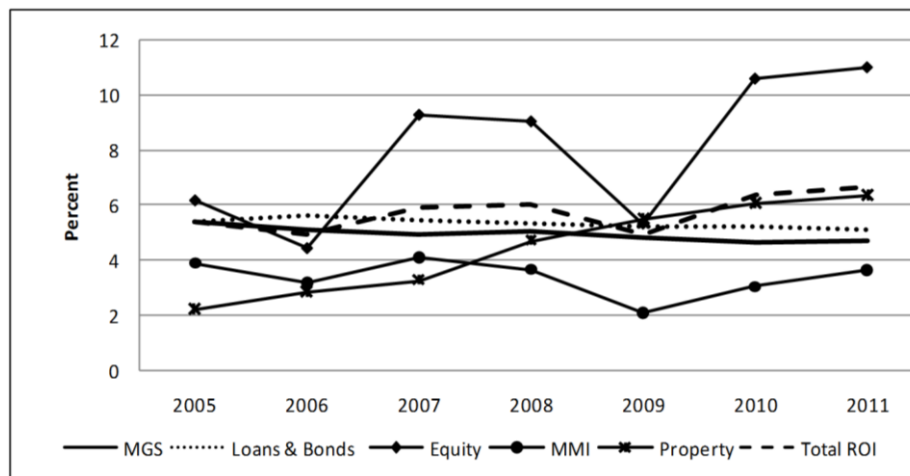
**Source:** EPF Annual Report (2011)

### 2.3. EPF Performance

In order to measure the performance of EPF, the return on investment (ROI) is used. ROI by asset class for EPF during 2005-2011 is presented in Figure 3. Equity recorded the highest ROI throughout 2007-2011 among all asset classes even though the figures were quite volatile owing to the uncertainties in the domestic and global capital markets. In 2007 and 2008, equity provided a satisfactory level of returns of 9 percent. Even though about 70 percent of its equity investment was concentrated in Malaysia, EPF was not able to weather the effect of global economic crises during the decade. The effect of crises can be observed from the poor performance in equity return in 2009 where the figure was recorded at only 5 percent in 2009. The poor performance in the US and UK stock market in 2008 and 2009 due to the subprime and European crises may contribute to the low equity returns to EPF during the year since the US and the UK were the EPF's top two most preferred international capital markets. In 2010 and 2011, there was a positive turnaround in the Kuala Lumpur Composite Index (KLCI). The

positive impact of the market can be observed from the rise in the return on equity to 11 percent in 2010 and 2011.

Even though EPF total investment in property is less than 1 percent (see Figure 1), property markets showed a positive development during 2005-2011. This is evident from the rise in the property returns during the period. ROI on property rose from 2 percent in 2005 to 6 percent in 2010 and 2011, implying that property is another good investment after equity. While the return on property showed a rising trend, the performance of MMI was slightly volatile during the period. Returns on MMI fluctuated between 2-4 percent during 2005-2011. The highest return was recorded in 2005 and 2007 while 2009 recorded the lowest return for this asset class.



**Figure 3. EPF: ROI by Asset Classes**

Source: Figures are derived from EPF Annual Reports (various issues).

Returns on loans and bonds and MGS were quite stable throughout the entire period with the returns on loans and bonds were slightly higher than the returns on MGS. The higher returns on loans and bonds were expected as they are riskier than MGS.

### 3. Singapore

The pension system in Singapore essentially revolves around the single-tier, defined contribution system administered by the Central Provident Fund (CPF), a statutory body under the Ministry of Manpower. Though there exists some Government Pension Scheme for some civil servants, and Savings and Employee Scheme for certain group of the armed forces personnel, the landscape of the pension system is largely dominated by the CPF. Hence, this section will solely focus on CPF in discussing the pension system in Singapore.

#### 3.1. Central Provident Fund

Historically, the Central Provident Fund was created by the British colonial in 1955 so that people can save for their old age. The CPF is currently managed by a tripartite board of government, employee, employer and industry representatives that is appointed by the minister. The CPF covers private and most public sector employees. The self-employed can join on a voluntary basis. The contribution by the workers and their employers will go to (1) Ordinary Account, which is for housing, CPF insurance, investment and education; (2) Special Account, which is for old age and investment; (3) Medisave Account, which is for medical-related expenses; and (4) Retirement Account, which is created when a worker is 55 and is used to meet basic needs during old age.

As of June 2012, the total number of members was 3.4 million. In terms of the size of assets, as at the end of December 2012, the total assets held by CPF was more than S\$232

billion (Singapore dollar). This is shown in Table 3 below. This is equivalent to about 67 percent of the country's GDP. In fact, as can be seen from the table, for the last ten years, the average proportion of CPF assets relative to the GDP of Singapore was about 60 percent.

**Table 3. Relative Size of CPF to Singapore Economy, 2003-2012**

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
TA	105.24	113.59	121.59	127.69	138.54	153.36	168.97	188.17	210.00	232.74
GDP	167.17	190.48	208.76	231.41	268.06	269.66	274.66	315.92	334.09	345.56
TA/GDP	62.95	59.63	58.24	55.18	51.68	56.87	61.52	59.56	62.86	67.35

**Source:** CPF Annual Reports (various issues) and Department of Statistics Singapore

**Notes:** TA – Total Assets; GDP – Gross Domestic Products. TA and GDP are expressed in S\$ billion. TA/GDP is in percentage

### 3.2. Asset Allocation of CPF

Essentially, the investment policy of Central Provident Fund is quite rigid. The CPF allocates almost all of its funds in the fixed income securities issued by the government. For example, of the S\$229.86 billion investment in 2012, S\$229.60 or 99.88 percent was used to invest in fixed income securities (see Table 4 below). These are in the form of Singapore Government securities, issued specifically to the CPF to meet its interest and other obligations. The vast majority of these bond securities are on floating rate basis, whereby the interest rate of as low as 2.5 percent to as high as 5 percent are pegged to the rates at which the CPF pays interest to its members. Besides the non-tradable floating rate government securities, the CPF also invests in fixed rate special issues of Singapore Government securities which are issued specifically to CPF to meet its interest and other obligations for Retirement Accounts of members. The effective interest rate on these securities in 2012 was 4.00 percent per annum. In addition to the above non-tradable fixed income securities, CPF also invest some amount in tradable Singapore Government fixed income securities, statutory bonds and corporate bonds. In 2012, the total amount allocated to these three types of fixed income securities was only S\$1.481 billion (0.64 percent). Equity is another type of investment made by CPF. However the amount is very small. For example, in 2012, merely S\$0.197 billion was used to buy equity securities. This represented only 0.08 percent of total investment. The last type of investment is property. However, just like the equity, investment in property is negligible.

Table 4 below shows the portfolios of investment made by CPF in 2003 until 2012. As can be clearly seen, almost all invested funds went to fixed income securities. In fact, from 2003 to 2005, the only assets bought were in the form of fixed income securities. CPF only started to invest in property starting in 2006 and later diversified to equity in 2008. However, one interesting trend to note is that though the amount is still small, the growth rate in equity investment was mostly double on a year-to-year basis in recent years.

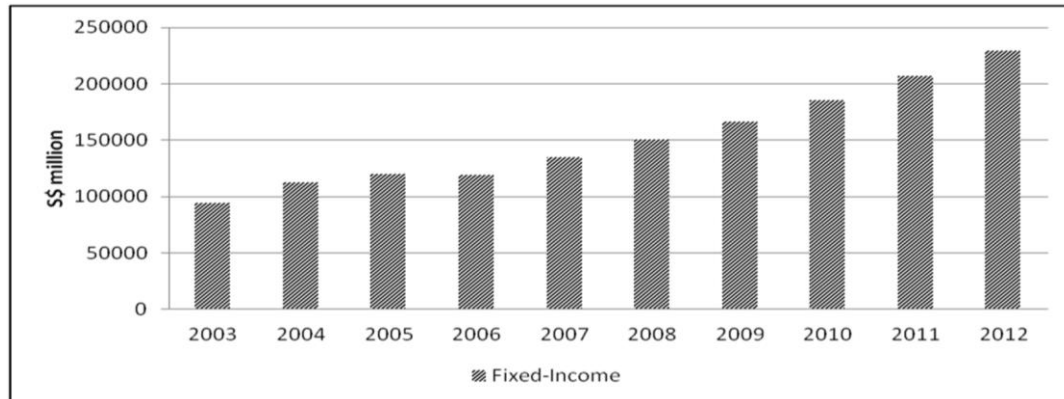
**Table 4. CPF: Investment Portfolios (S\$ billion)**

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Fix-Income	93.92	112.23	120.00	118.92	134.91	150.84	166.45	185.39	207.06	229.60
Equity	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.08	0.20
Properties	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.04	0.19	0.06
<b>Total</b>	<b>93.92</b>	<b>112.23</b>	<b>120.00</b>	<b>118.97</b>	<b>134.96</b>	<b>150.89</b>	<b>166.51</b>	<b>185.47</b>	<b>207.33</b>	<b>229.86</b>

**Source:** CPF Annual Reports (various issues)

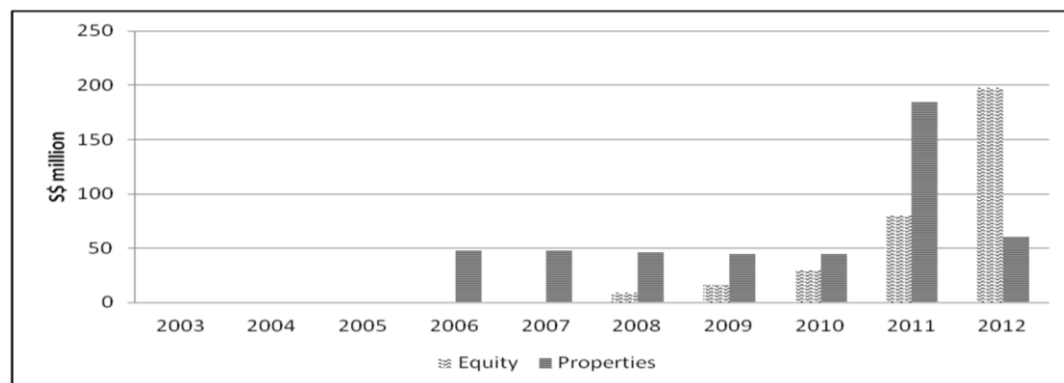
Figures 4 and 5 are another way to look at the amount and trend of these investments made by CPF. In Figure 4, it can be seen that the trend in fixed income investment was increasing. However, the growth in this investment is not as high as the growth in equity and

property investment illustrated in Figure 5. Investment in equity has started to grow steadily starting in 2008.



**Figure 4. Trend of CPF Investment in Fixed Income Securities**

Source: Figures are derived from CPF Annual Reports (various issues).



**Figure 5. Trend of CPF Investments in Equity and Properties**

Source: Figures are derived from CPF Annual Reports (various issues).

### 3.3. CPF Performance

Due to its rigid investment policy, whereby almost all investment went to the fixed income securities issued by the government, the ROI of CPF did not vary too much. As mentioned previously, these securities paid interest between 2.5 to 5 percent annually to the members. Perhaps it is more meaningful to look at the performance of CPF in relation to the performance of the other funds, which will be done in the last part of this paper.

## 4. Hong Kong

There are four main pension fund schemes in Hong Kong. They are the (1) civil service pension scheme, which is created for the employees of the civil services; (2) aided schools pension scheme, which is created for school teachers; (3) occupational retirement scheme ordinance (ORSO) which is a voluntary pension fund set up by employers; and (4) Mandatory Pension Fund (MPF) scheme. Of these four, the most dominant is the MPF. The next section will discuss the background of MPF and then proceed with the investment performance of the MPF scheme as this scheme is the most important pension scheme in Hong Kong.

#### 4.1. Mandatory Provident Fund (MPF)

The MPF scheme was established in December 2000 under the Mandatory Provident Fund Ordinance. It is a mandatory privately managed pension scheme regulated and supervised by the Mandatory Provident Fund Authority (MPFA). Employees from eighteen to sixty five of age are eligible to join the scheme. The Scheme was launched in December 2000 under the Mandatory Provident Fund Schemes Ordinance (MPFSO) established in 1995. The main purpose of the Scheme is to help the employees save for their retirement.

There are three types of MPF schemes. The most common one is the Master Trust Scheme. This scheme pools together funds contributed by both the participating employers and employees and self-employed persons. This scheme is the most efficient scheme due to its large number of contributors. The second type is the Employer-sponsored Schemes. The participants for this scheme are the employees of a single employer and their associated companies. The third scheme is the Industry Scheme. The contributors to this scheme are mainly from employees from the catering and construction industries.

Table 5 presents the ratio of MPF total assets to GDP. The size of MPF assets was about 0.30 percent of GDP, on average, during 2004 until 2009. The asset size declined to 0.26 percent and 0.24 percent of GDP in 2010 and 2011 respectively.

**Table 5. Relative Size of MPF Assets to Hong Kong Economy**

	2003	2004	2005	2006	2007	2008	2009	2010	2011
TA	3	5	5	5	5	5	5	5	5
GDP	1,305	1,418	1,523	1,630	1,736	1,773	1,729	1,847	1,936
TA/GDP (%)	0.23	0.33	0.32	0.32	0.30	0.26	0.29	0.26	0.24

**Sources:** MPF Annual Reports (various issues) and World Bank (2013).

**Notes:** TA – total asset; GDP – Gross domestic products. TA and GDP are expressed in billion HK\$.

#### 4.2. Types of Funds under MPF Scheme

There are six main categories of fund types under the MPF scheme. They are (1) Money Market Fund and Others; (2) Guaranteed Fund; (3) Bond Fund; (4) Balanced Fund; (5) Equity Fund and (6) Capital Preservation Fund. Money Market Fund and Others consists of MPF Conservative Fund and Money Market Fund. MPF Conservative Fund earns rate of return nearly equivalent to the Hong Kong saving rates. The investment instruments for this scheme are short-term bank deposits and short-term bonds. This fund incurs very low risk associated with the changes in interest rates. Money Market Fund earns higher returns than the bank deposits and short-term certificate of deposits. The investment instruments for this fund include short-term bank deposits, government bills and commercial papers. Its risk level is low and the major sources of risk are changes in interest rates and exchange rates.

Guaranteed Fund guarantees the rate of return to the investors. Bonds, stocks or short-term interest bearing money market instruments are the common investment instruments under this fund. The risk level is relatively low and the major source of risk is the changes in the guaranteed rate of returns. Bond Fund provides stable income to investors through periodic interest payments and capital gains. The level of risk can range from low to medium and the major sources of risk are changes in interest rates, exchange rates and bond credit ratings.

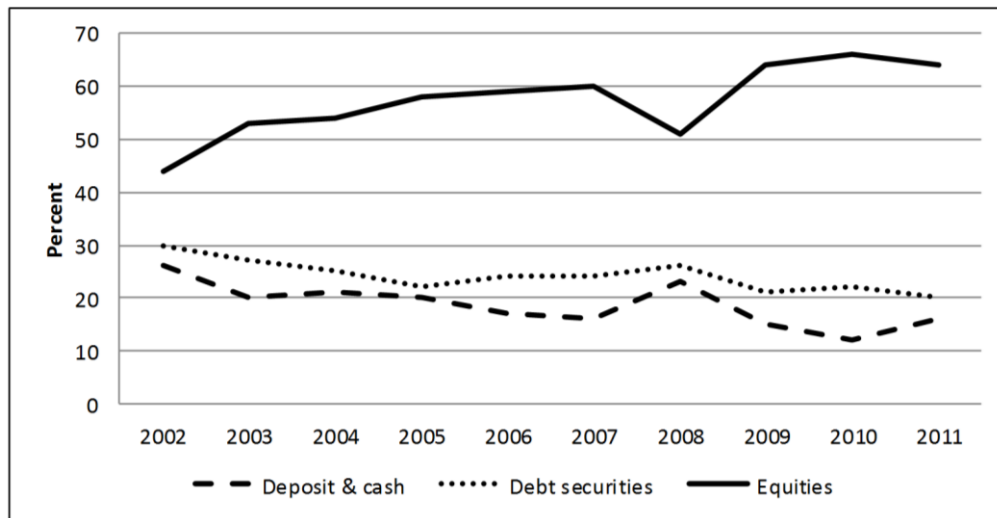
Balanced Fund provides returns in terms of capital gains from investment in both stocks and bonds. The risk level ranges from medium to high depending on the type of stocks and bonds in the Fund's portfolio. Major sources of risk include volatility in the stock markets, changes in interest rates, exchange rates and bond credit ratings. Equity Fund provides returns through capital gains from investment in stocks. The risk level is relatively higher than that of the funds discussed above and the major sources of risk are stock market volatility and changes in exchange rates. Capital Preservation Fund earns returns similar to market returns that the fund



replicates through forming a portfolio consisting of stocks with similar weights of stocks of the market index that it is based on. The risk level ranges from medium to high.

#### 4.3. Asset Types and Allocation by Geographical Region

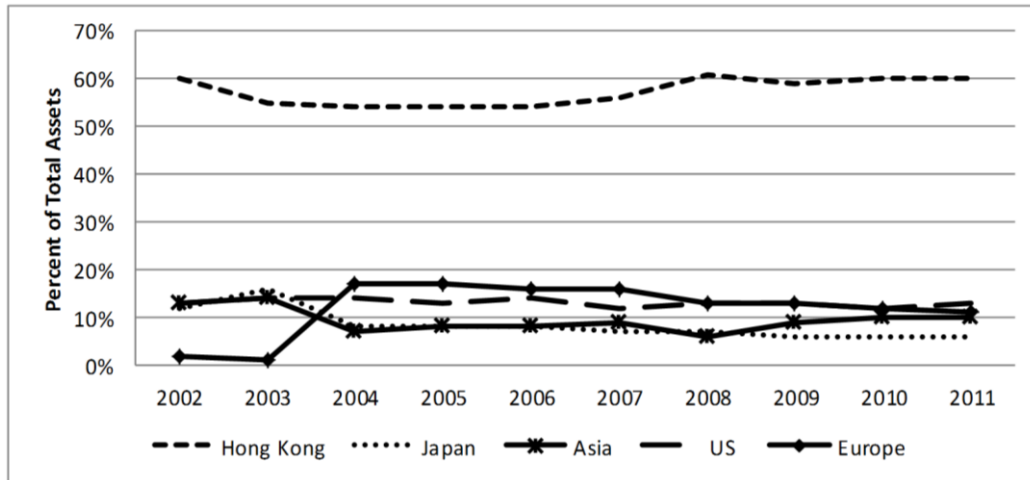
There are three main asset classes under the MPF scheme. Equity is the most preferred asset class as most of the MPF funds were invested in equity (Figure 6). In 2005, MPF allocated 45 percent of its funds in equity. The Fund increased the proportion over the years. At the end of 2007 the share of equity was 60 percent of total asset allocation. The figure, however, dropped to 50 percent in 2008 before rising to 65 percent in 2009 until 2011. Investment in debt securities averaged around 25 percent during 2002 until 2011. Deposit and cash is the third most important asset class for MPF investment. The proportion invested in deposit and cash averaged around 20 percent during 2002 until 2008. The figure declined to an average of 14 percent during 2009-2011.



**Figure 6. MPF: Asset Allocation of Constituent Funds by Asset Class**

Source: Figures are derived from MPF Annual Reports (various issues).

MPF diversified its investment in different countries and regions. Most of the assets (50-60 percent) are invested in Hong Kong (Figure 7). Besides Hong Kong, MPF also invested in Japan, Asia, the US, and Europe. On average, about 30 percent of total assets was invested in the US and Europe during 2002-2011. The remaining portion was invested in Asia and Japan.



**Figure 7. MPF Asset Allocation by Geographical Region**

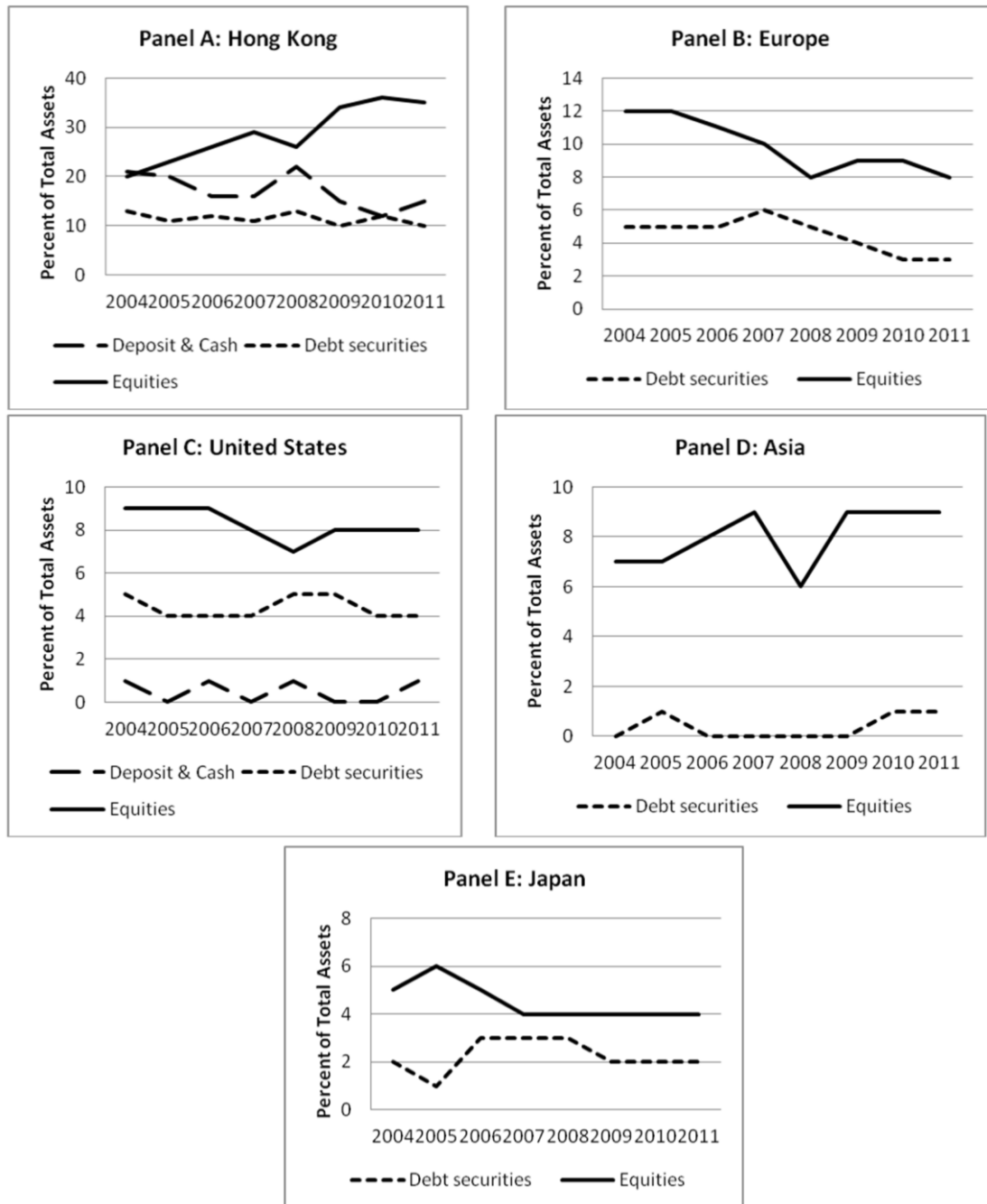
**Source:** Figures are derived from MPF Annual Reports (various issues).

**Note:** Asia (excluding Hong and Japan, including New Zealand, Australia and India)

Figure 8 presents the proportion of MPF investment by asset types in different regions. Equity and debt securities are invested in all five regions. However, deposit and cash are invested only in Hong Kong and the US. Among the three asset classes, equity is the most preferred investment type of asset, followed by debt securities and deposit and cash.

As discussed in the previous section, most of the investment assets are allocated in Hong Kong (Panel A). Equity made up the highest proportion of all assets invested in Hong Kong. The proportion of equity investment rose from 20 percent in 2004 to 30 percent in 2007. The proportion, however, declined to 26 percent in 2008. During 2009 until 2011, MPF placed an average of 35 percent of its total invested assets in the local stock market.

Deposit and cash is the second most important type of asset invested in Hong Kong. Even though the proportion of MPF investment in deposit and cash rose from 15 percent in 2006 and 2007 to 23 percent in 2008, the share had declined to only 15 percent in 2011. From the figure, it is observed that an increase in the equity proportion is matched with the reduction in the deposit and cash proportion. The opposite trends in these two types of assets imply that MPF was willing to take on higher risk in recent years. During the seven-year period, MPF invested about 13 percent, on average, of its total assets in debt securities in Hong Kong.



**Figure 8. MPF: Asset Types by Regions**

**Source:** Figures are derived from MPF Annual Reports (various issues).

**Note:** Asia (excluding Hong and Japan, including New Zealand, Australia and India)

European capital market is the second most important place for MPF asset investment. Even though MPF had reduced its equity investment in Europe in recent years, the proportion was maintained at an average of 8.5 percent during 2008-2011 (Panel B). Investment in the European debt securities had also declined from 6 percent in 2007 to only 3 percent in 2010-2011. The US is another preferred location for MPF asset investment. During 2004 until 2006, MPF invested 9 percent of its total assets in the US stock markets (Panel C). The 2009-2011 period marked a reduction of MPF exposure in the US stock markets with the proportion of

investment dropped to 8 percent. The share of debt securities investment was maintained at an average of 4 percent during 2004-2011. MPF placed about 1 percent of its total asset in the form of deposit and cash in the US capital market.

During 2004 until 2005, MPF invested about 7 percent of its assets in the Asian stock markets (Panel D). The Fund had increased its exposure to the Asian markets by increasing the proportion to 9 percent in 2007. The figure, however, declined to 6 percent in 2008. The share was maintained at 9 percent throughout 2009-2011 period. Even though MPF also invested in Asian debt markets, the proportion was less than 2 percent during the entire period. In 2005, MPF invested 6 percent of its total assets in the Japanese stock market (Panel E). The proportion declined to 4 percent during 2007 until 2011. MPF also invested in the Japanese debt market with an average of 3 percent of its total assets during 2004-2011.

#### 4.4. Investment Performance of MPF Scheme

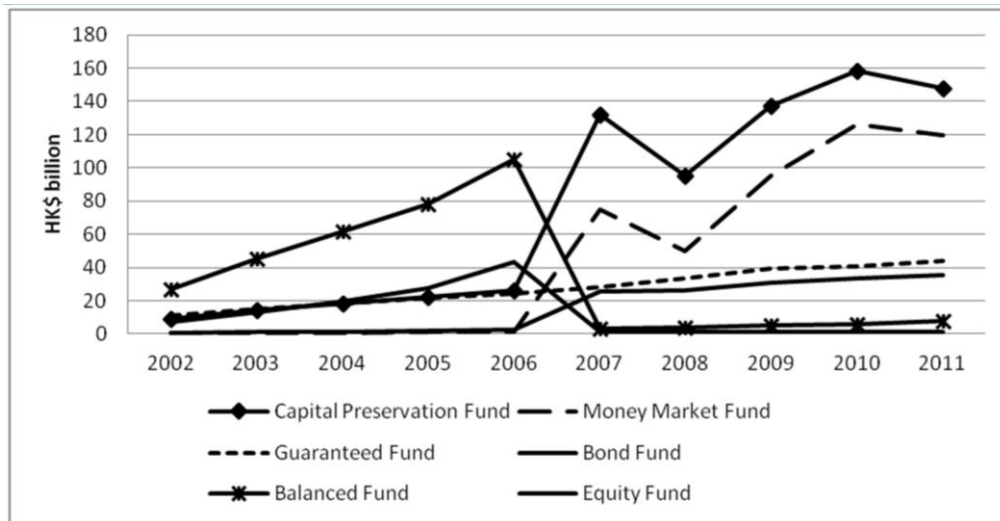
Table 6 presents the net asset values for the three types of scheme discussed above. The Master Trust Scheme has the highest asset values. The value rose from HK\$53.3 billion in 2002 to HK\$346 billion in 2011, an increase by six folds in nine years. The improvement in asset values was mainly due to the large number of contributors to this scheme. The asset value for the Industry Scheme had also shown improvement from HK\$1.35 billion in 2002 to HK\$7.08 billion in 2011. For the Employer Sponsored Scheme, the asset value showed a small increment since 2002. The value at the end of 2002 stood at HK\$2.72 billion. This was due to the fact that this scheme was established voluntarily by the employer. Thus the amount of asset value is low due to the small number of contributors of a particular employer.

**Table 6. Net Asset Values by Scheme Type (HK\$ billion)**

Year	Master Trust Scheme	Industry Scheme	Employer Sponsored Scheme	Total
2002	53.30	1.35	0.41	55.06
2003	86.64	2.11	0.67	89.42
2004	116.51	2.75	0.92	120.18
2005	146.92	3.26	1.18	151.36
2006	196.89	3.99	1.53	202.41
2007	257.99	4.80	2.00	264.79
2008	203.36	4.31	1.82	209.47
2009	300.68	5.91	2.29	308.88
2010	355.93	6.82	2.69	365.44
2011	346.23	7.08	2.72	356.03

Source: MPF Annual Reports (various issues)

Figure 9 presents the net asset values of approved constituent funds by types of fund for the period 2002-2011. During 2002-2006, the Balanced Fund shows the highest asset value with the value increased from HK\$20 billion in 2002 to HK\$110 billion in 2006. However, in 2007, the asset value of the Balanced Fund declined to HK\$3 billion. During 2007-2011, the average value of the fund was HK\$5 billion.



**Figure 9. MPF: Net Asset Values of Approved Constituent Fund by Type**

Source: Figures are derived from MPF Annual Reports (various issues).

Since 2007, Capital Preservation Fund shows the highest asset value followed by money market fund. Assets values of both the Capital Preservation Fund and Money Market Fund (MMF) showed an upward trend from 2007 onwards except in 2008. The values of Capital Preservation Fund and MMF declined from HK\$132 billion and HK\$75 billion in 2007 to HK\$95 billion and HK\$50 billion, respectively, in 2008. The drop in the values of these two asset classes was due to the poor performance of the equity markets during the subprime crisis. After the subprime crisis, the asset values of both funds recovered. In 2011, the asset values of Capital Preservation Fund and MMF rose to HK\$148 billion and HK\$120 billion, respectively. Throughout the entire period, Guaranteed Fund outperformed the Bond Fund. During 2002 until 2006, the average values of Guaranteed Fund and Bond Fund were HK\$18 billion and HK\$1.5 billion, respectively. After 2007, the average value of Guaranteed Fund stood at HK\$35 billion, while for the Bond Fund, the average value was HK\$30 billion.

From 2002 to 2006, Equity Fund showed an increase in its asset value from HK\$7 billion to HK\$44 billion, an increase by five-fold in four years. The bullish market during this period, as indicated by upward trends in the Hang Seng Index, Dow Jones Industrial Averages and Financial Times Stock Exchange, was translated into excellent performance of the Fund. A drastic change in trend occurred after 2006 where the asset declined to HK\$1 billion and this value remained until 2011. Equity Fund showed the lowest asset value among all funds since 2007.

The Balanced Fund performance was excellent during the first four years with the value rose from HK\$27 billion in 2002 to HK\$105 billion in 2006. However, a drastic drop in the asset value was observed in 2007, where the value of the assets was recorded at only HK\$3 billion at the end of the year. By 2011, the asset value recovered to HK\$7.6 billion.

## 5. South Korea

Pension system in South Korea was started in 1960 when the Government Employee Pension System was created. This was followed by other public sector employee based funds, such as the Military Personnel Pension System (1963) and the Private School Teachers Pension System (1975). But by-and-large, the biggest pension fund in terms of asset size and number of contributors, in the public sector in South Korea is the National Pension Fund managed by the National Pension Service (NPS).

Like those in other countries, the National Pension Service ("NPS") was established in 1988 with the important objective of promoting welfare of South Korean nationals by providing pension benefits, for those in need due to old-age, disability, or those surviving the death of the

insured, thereby contributing to social stability. More than 50 percent of workforce in the country are covered by this service.

The NPS is a partially funded, defined benefit system, whereby both employees and employers contribute 4.5% each of their wages. The benefits formula consists of basic and earnings-related portions. Benefits are paid mainly in the form of an annuity, which is indexed to prices, with the full pension available at age 60.

Besides the public sector pension funds, there are also funds in the corporate pension system which are an alternative to the corporate severance system for private sector employees in South Korea. The system works mostly on a voluntary basis based on mutual agreement from both employees and employers.

National Pension Fund by the NPS will be examined in details in this section. This selection is made simply because it is the largest fund in the country. Being the largest pension fund, the NPS fund is chosen in order to facilitate country comparison later in this paper.

### 5.1. National Pension Service

As stated above, the NPS fund is the largest fund in South Korea, both in terms of asset size and number of contributors. By end of 2012, more than 20 million workers are contributors. In terms of the size of assets, NPS funds are equivalent to about 25 percent of gross domestic products of South Korea in 2006, growing to about 28-percent in 2011. In fact, NPS was the fourth largest pension funds in the world in 2011 (NPS Annual Report, 2011). Table 7 depicts the relative size of NPS based on total assets to the country's economy as measured by the gross domestic products (GDP) in the period 2006-2011. The last row of the table reveals the ratio of asset size of the funds to the size of the economy as represented by the GDP figures.

**Table 7. Relative Size of NPS to South Korean Economy**

	2006	2007	2008	2009	2010	2011
TA (KRW trillion)	189.73	220.13	241.96	283.10	325.67	350.46
GDP (KRW trillion)	759.20	796.80	1026.45	1065.04	1173.28	1235.16
TA/GDP (%)	24.99	27.63	23.57	26.58	27.76	28.37

**Sources:** NPS Annual Reports (various issues) and Statistics Korea.

**Notes:** TA –Total assets; GDP – Gross domestic products

### 5.2. Asset Allocation of NPS

This section will present the asset allocation of NPS fund for the period 2003-2011. The period is chosen based on the availability of data gathered from the annual reports of the fund. A description of asset allocation of the fund is first given, followed by the presentation of the performance of the fund in the next section. To measure performance, the return on asset invested (ROI) is used. Table 8 below shows the types of investment chosen by the NPS fund.

**Table 8. Investment Portfolios of NPS, 2003-2011(KRW trillion)**

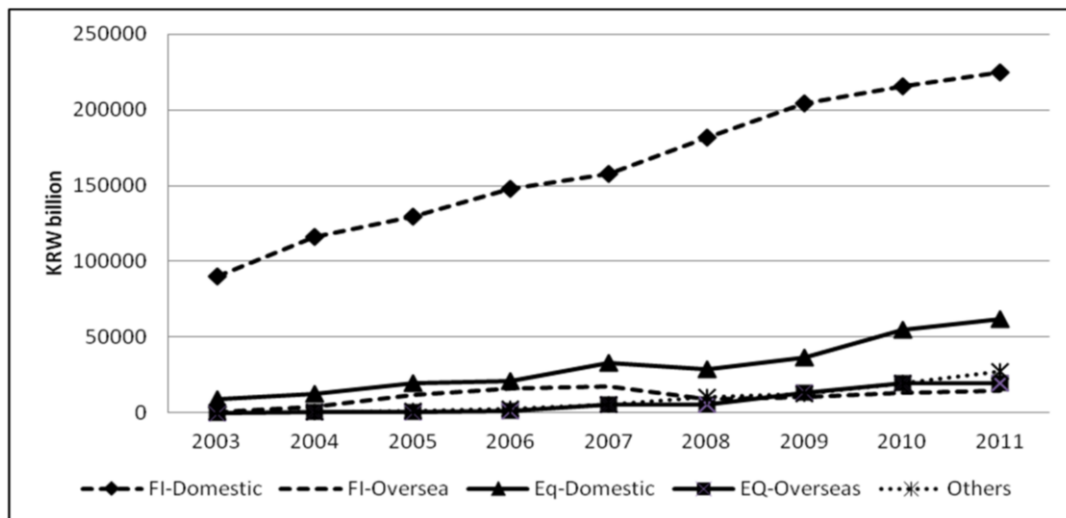
	2003	2004	2005	2006	2007	2008	2009	2010	2011
FI-D	90.42	116.31	129.52	148.00	157.48	181.91	204.57	215.88	224.85
FI-O	0.60	4.30	11.96	16.42	17.35	9.22	10.52	13.29	14.56
EQ-D	8.97	12.36	19.71	20.72	33.04	28.60	36.33	55.06	62.14
EQ-O	0.16	0.34	0.68	1.26	5.37	5.67	13.39	19.92	19.72
Others	0.74	0.75	1.45	2.62	5.84	10.48	12.87	19.54	27.19
Total	100.89	134.06	163.33	189.03	219.09	235.87	277.67	323.68	348.47

**Source:** NPS Annual Report (various issues)

**Notes:** FI-D – Fixed income domestic; FI-O – Fixed income overseas; EQ-D –Equity domestic; EQ-O – Equity overseas

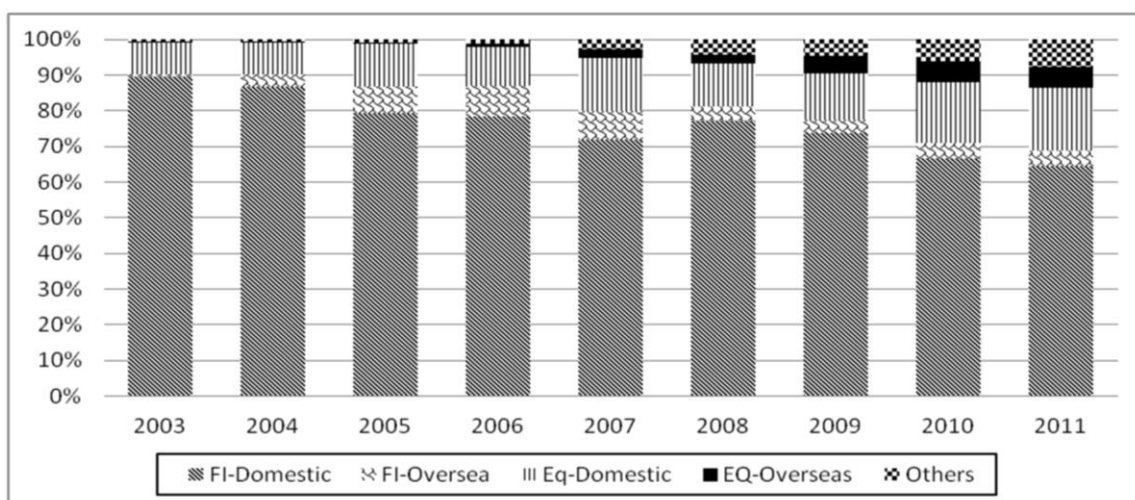
From the table, it is observed that during 2003-2011, NPF mostly invested its assets in domestic fixed income securities such as loan and bonds. Combined with the overseas portion, fixed income investment totalled almost KRW240 trillion in 2011. Equity securities were the distance second in terms of asset allocation in the NPS investment portfolio. From the table, it is shown that equity securities in domestic and overseas markets amounted only about KRW82 trillion in 2011. Besides fixed income and equity securities, NPS also invested in other securities such as real estates and infrastructures, and private equity funds. Though the amount was not significant, its amount has been increasing steadily from only KRW0.742 trillion (0.7 percent) in 2003, to KRW27 trillion (7.8 percent) in 2011.

Figures 10 and 11 illustrate the trend of asset allocation of NPS and the proportion of types of assets in NPS investment portfolio respectively. From Figure 13, it can be seen that except for investment in overseas fixed income securities, the trends for other securities were increasing.



**Figure 10. NPS: Trends of Investment Portfolios**

Source: Figures are derived from NPS Annual Reports (various issues).

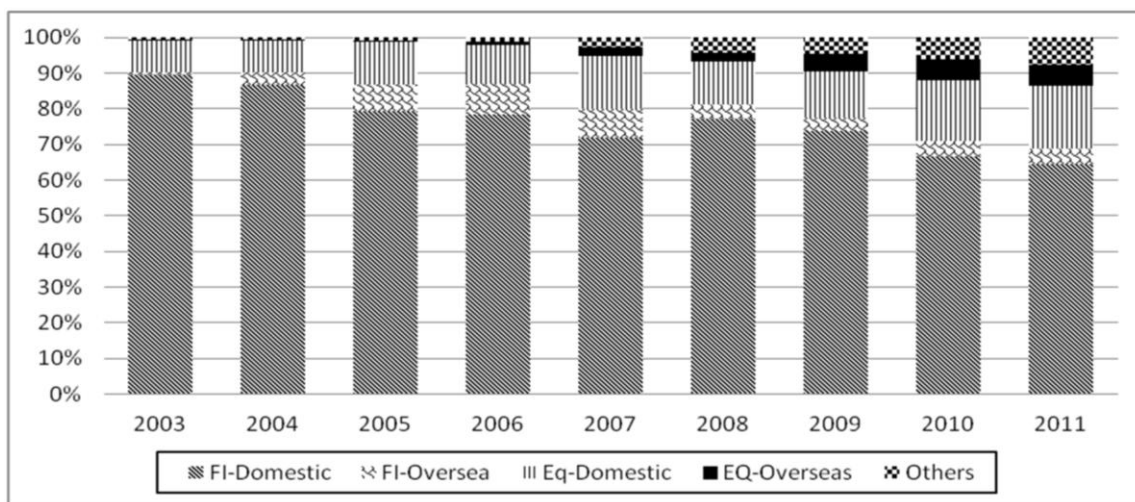


**Figure 11. Proportion of Assets invested by NPS**

Source: Figures are derived from NPS Annual Reports (various issues).

Figure 11 shows clearly that for the period 2003-2011, the biggest portion of funds was allocated for fixed income investment, followed by equity securities. The proportion of fixed income investment, though, was steadily decreasing throughout the period. In 2003, about 90 percent of funds were allocated for fixed income securities, but dropped to less than 70 percent in 2011. The proportion that goes to equity securities was between 10 to 24 percent in the same period. Finally, it is interesting to note that though small, the portion of investment in other assets was constantly increasing throughout the period. In 2011, it reached almost 8 percent.

Figure 12 below summarizes the NPS investment in equity according to regions. As can be seen, the top equity market chosen by the fund is the North American markets, followed by European markets. Together, they make up between 60 to more than 80 percent of equity investment destination of NPS fund in the period 2004-2011. The rest went to other markets, including Japan.



**Figure 12. NPS: Equity Investment based on Regions**

**Source:** Figures are derived from NPS Annual Reports (various issues).

**Notes:** Prior to 2009, developed Asia refers to Japan only, while from 2009 onward, it refers to Japan, Hong Kong and Singapore.

### 5.3. Investment Performance of NPS

Next, a comparison of performance between the types of asset invested by NPS will be given. Table 9 below shows the return on investment (ROI) of the types of assets, and followed by Figure 13 which illustrates the trend of ROI.

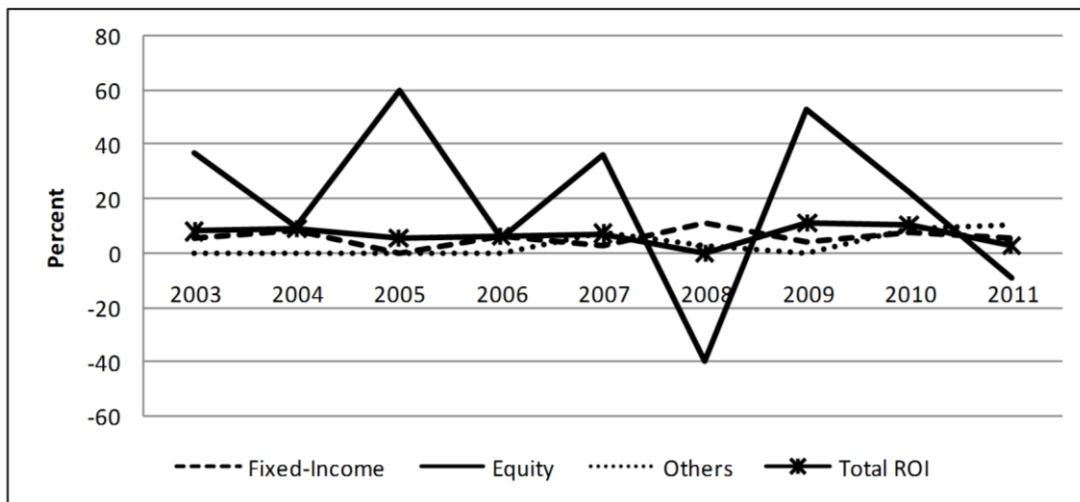
From Table 9, it is shown that NPS had recorded as low as -0.21 percent total ROI in 2008 to as high as 10.84 percent in 2009. The range of ROI for fixed income investment was between 0.15 percent in 2005 to 11.07 percent in 2008. The return for equity, as expected, is the most volatile for the 2003-2011 period. In 2008, NPS recorded a negative ROI of 39.98 percent. This may be attributable to the US subprime crisis in the year. In fact, the South Korean equity market dropped significantly in 2008, perhaps due to its exposure to the US market. The main stock market indicator for South Korea, the Korea Composite Stock Price Index (KOSPI), was at 1162 points in 2008 compared 1625 in 2007. In 2009, the equity market recovered, hence return rebounded to 10.84 percent, the highest in the study period. Besides the 2008 US subprime crisis, the Japan earthquake 2011 may also have affected returns from the equity investment. The return from other investment was as low as 2.93 percent in 2008, to as high as 10.22 percent in 2011.



**Table 9. Return on Investment by Type of Assets (in percentage)**

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Fixed-Income	5.5	8.4	0.15	6.01	2.69	11.07	4.09	7.55	5.74
Equity	36.82	9.76	59.9	5.31	36.39	-39.98	53.11	21.86	-9.46
Others	N/A	N/A	N/A	N/A	7.73	2.93	0.32	8.66	10.22
Total ROI	7.85	8.61	5.39	5.87	6.98	-0.21	10.84	10.37	2.31

**Source:** All figures are derived from NPS Annual Reports (various issues).



**Figure 13. NPS: Trends of ROI for Asset Types**

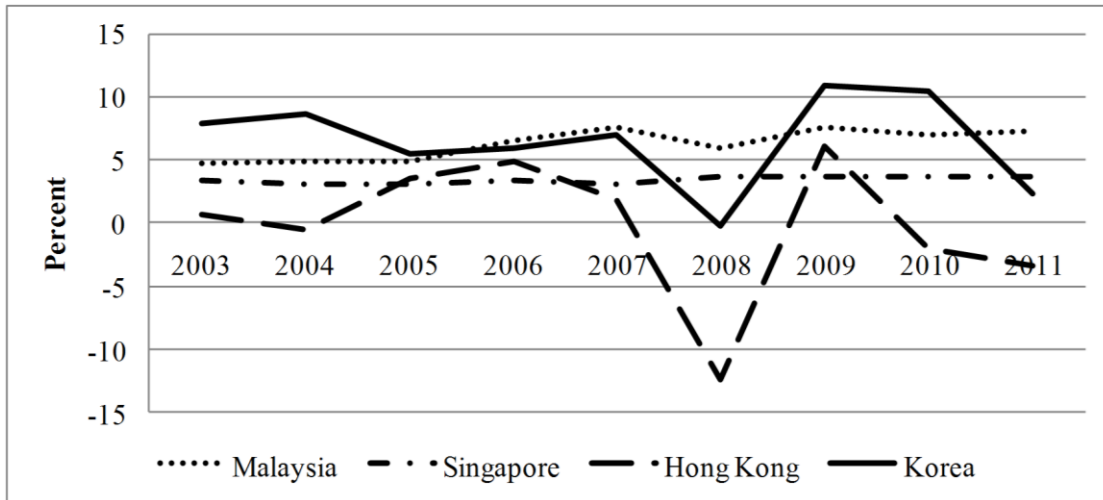
**Source:** Figures are derived from NPS Annual Reports (various issues).

Overall, the ROIs for NPS during 2003-2011 were fairly stable. As depicted in Figure 13, though equity returns were very volatile, this was offset by the relatively more stable returns of fixed income investments. In fact, due to its dominance, it is expected that fixed income returns influenced the overall ROI of NPS. It is also interesting to note that the trend of movements of these main asset investments by NPS was the opposite of each other.

## 6. Comparison of Pension Fund Performance

In this section, the investment performance of EPF, CPF, MPF and NPS representing Malaysia, Singapore, Hong Kong and South Korea respectively, will be compared. To measure performance, the return on investment or ROI, will be used. It is calculated by dividing investment incomes by the amount of invested assets. Both nominal and real ROIs are calculated and the trends of these figures will be discussed. The trends in the inflation rates will also be presented to see the impact of inflation on ROI.

Figure 14 presents the trends in nominal ROI for EPF, CPF, MPF and NPS from 2003 until 2011. Nominal ROIs for EPF and CPF were quite stable with an average of 6 percent and 4 percent, respectively. On the other hand, some volatility was observed in the nominal ROI of MPF and NPS. MPF recorded the lowest average nominal ROI of -0.5 percent. MPF and NPS may have been affected by the subprime crisis as depicted by their lowest nominal ROI during 2008.

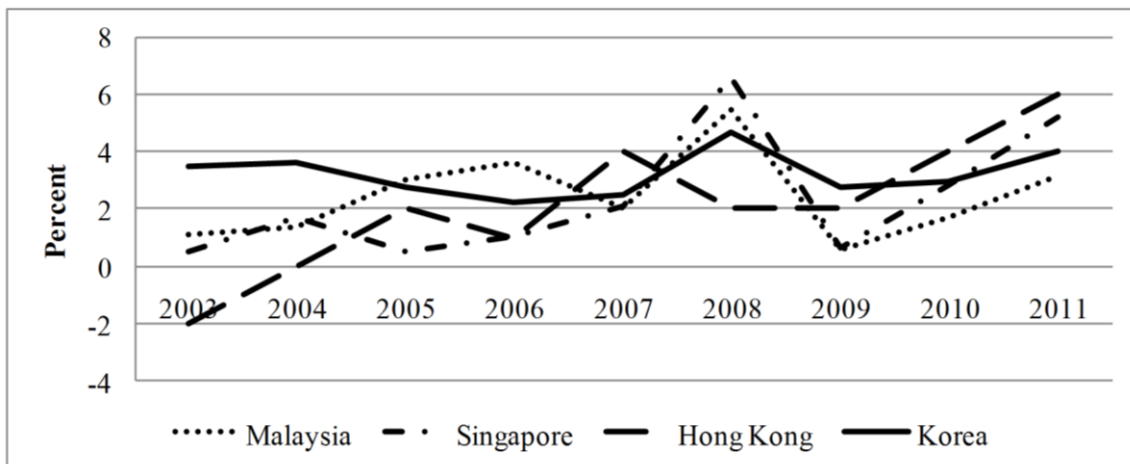


**Figure 14. Nominal ROI for EPF, CPF, MPF and NPS**

**Sources:** Figures are derived from EPF Annual Reports (various issues); CPF Annual Reports (various issues); MPF Annual Reports; NPS Annual Reports (various issues).

**Notes:** Malaysia – EPF; Singapore – CPF; Hong Kong – MPF; South Korea – NPS

Perhaps with the exception of South Korea, inflation rates were quite volatile for these countries during 2003 until 2011 (see Figure 15). Additionally, the subprime crisis seemed to have adverse effect on the Malaysian, Singaporean and South Korean economy as there was an increase in the inflation rates of these countries during 2008. In 2009, the inflation rates declined to the levels slightly lower than the levels before the crisis. The rates followed an upward trend in 2010 and 2011. The high inflation in 2011 could be associated with the Japanese earthquake that destructed the country's economy. As Japanese is one the major trading partners of Malaysia, Singapore, Hong Kong and South Korea, the impact of the earthquake in Japan had been spilled to its trading partners.

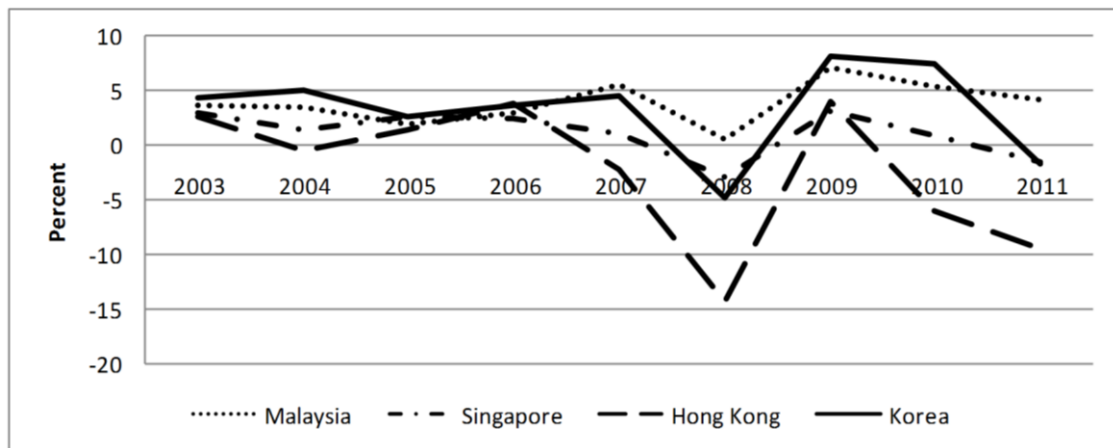


**Figure 15. Trends of Inflation in Malaysia, Singapore, Hong Kong and South Korea**

**Sources:** Bank Negara Malaysia (2013); Department of Statistics Singapore (2013); Hong Kong Census & Statistics Bureau (2013); Korea Statistics (2013)

In terms of real ROI, the performance of all the funds were quite stable before 2008. During the subprime crisis, all funds recorded negative real ROIs except for EPF which recorded real ROI of 0%. MPF generated the lowest real ROI of -15 percent followed by NPS (-5 percent) and CPF (-3 percent). Real ROI recovered to positive values in 2009 before declining again in 2010 and 2011. EPF registered a real ROI of about 5 percent while for both CPF and

NPS, the real ROI was -1 percent. MPF recorded the lowest real ROI of -10 percent in 2011. The poor performance of these funds in 2011 could be due to the Japanese earthquake which is the main export markets for these countries. Furthermore, the earthquake also adversely affected the Japanese economy and its stock market. Since EPF, MPF and NPS invested some proportion of their assets in Japanese equity, the poor performance of Nikkei Stock Exchange had been translated into poor performance of the funds in terms of real ROI.



**Figure 16. Real ROI for EPF, CPF, MPF and NPS**

**Sources:** Figures are derived from EPF Annual Reports (various issues); CPF Annual Reports (various issues); MPFA Annual Reports (various issues); NPS Annual Reports (various issues)

**Notes:** Malaysia – EPF; Singapore – CPF; Hong Kong – MPF; South Korea – NPS

## 6. Conclusion

This paper discusses and analyzes asset allocation and performance of pension funds in Malaysia, Singapore, Hong Kong and South Korea during 2000 until 2011. The respective pension funds for these countries are the Employee Provident Fund (EPF), Central Provident Fund (CPF), Mandatory Pension Fund (MPF) and National Pension Scheme (NPS). Among these pension funds, CPF is relatively the largest in comparison to the country's economy. This is reflected in the fund total asset to GDP ratio. CPF has the highest ratio followed by EPF, NPS and MPF.

These funds invested their proceeds in assets such as government securities, money market instruments, bonds, properties and equities. CPF is the most conservative pension fund as it invested most of its funds in Singapore's government fixed income securities. Furthermore, almost all of its assets were invested in the local markets. On the other hand, MPF is the most aggressive pension fund as most of its funds were invested in equities. Despite the uncertainties in the global capital markets, EPF, MPF and NPS invested their funds in foreign capital markets to diversify their investment portfolios and to increase investment returns.

In this paper, both the nominal and real ROI of the funds were calculated to assess the fund performance. Though generally the inflation levels of the four countries were low and stable in the study period, all the pension funds under study were adversely affected by the US subprime crisis. This is evident from the poor ROI performance of these funds in 2008. EPF showed the highest ROI while MPF showed the lowest ROI during the crisis. The poor ROI of MPF may be explained by its asset portfolio consisting mainly of equities with 40 percent of them were invested in the US, European, Asian (excluding Japan), and the Japanese stock markets. Besides the subprime crisis, these funds were also affected by the Japanese earthquake as lower ROI were also observed in 2011.

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