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PERFORMANCES AND INVESTMENT PATTERNS OF SELECTED SOVEREIGN WEALTH FUNDS: COMPARISON WITH PENSION FUNDS (2010-2015)

Master Thesis, MSc Financial Economics

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ABSTRACT

Sovereign wealth funds (SWFs) are more likely to pursue non-financial purposes. However very little is known about the financial performance of SWFs. This thesis provides an analysis of the investment performance of nine different sovereign wealth funds on a risk adjusted basis using standard investment performance measures and benchmark comparisons between 2010 and 2015.This thesis also shows the asset allocation of sovereign wealth funds in 2015. It compares SWFs with pension funds in terms of asset allocations and risk-adjusted returns. Therefore, the study comes to four conclusions. First, SWFs invest more in risky asset classes than pension funds. Second, while six of the nine SWFs performed better than their countries' own stock indices, four of the nine funds performed better than MSCI All Country World index. Third, OECD countries' SWFs performed better than SWFs of non-OECD countries regarding to Sharpe ratio, Treynor ratio and Jensen's alpha. Fourth, selected SWFs performed better than pension funds in terms of all three risk-adjusted methods.

Keywords: Sovereign wealth funds, investment performance, asset allocation, returns on investment

1. INTRODUCTION

Sovereign wealth funds are a large and growing constituent of global financial markets. According to Sovereign Wealth Fund Institute the size of assets under the control of Sovereign Wealth Funds (SWF) has increased from $500 billion to approximately $7,533.14 billion with forecasting proposing continued growth regarding size and importance. As a result of the increase in oil revenues and trade account surpluses, many countries have recently founded new SWFs.

Due to the most of the SWFs' tendency to disclose limited public information, their investment behaviour and objectives are not apparent. According to Dyck and Morse (2011), the likelihood of managing their portfolios to achieve political in addition to financial objectives is increasing because of being state-owned, and having only long-term expected obligations. As state-owned entities SWFs are formed and administered much differently than big private investment funds and these funds are more likely to pursue non-financial purposes such as national strategic interests, economic development and other similar purposes (Kotter and Lel 2011). Moreover, in spite of stipulated importance of SWFs, very little is known about their performance. The present study plans to investigate whether having strategic objectives that are not financially driven would have an effect on financial performances and asset allocations of selected SWFs focusing on risk-adjusted returns of their portfolios. In this context, this study intends to answer the following research question:

Have SWFs underperformed between 2010 and 2015 because of having additional objectives apart from risk-return maximization such as country development, achieving political and social goals?

Prior research has focused on financial effects of SWFs on target companies. For instance, Dewenter et al. (2010) report that companies benefit from SWFs' investment with excess return as a result of stock purchases. Additionally, Fernandes (2009) points out that there is a positive value premium for the shareholder of the companies that get an investment from SWFs. Moreover, Truman (2007) states that SWFs have a positive effect on market values of the target companies. Contrary to these results, Thomsen et al. (2006) express that SWFs have a negative impact on target companies due to the strategic and political incentives behind their investments.

All of the prior studies are focused on the effects of SWFs on target companies in order to check financial performances of sovereign wealth funds; therefore, they measure the performances of SWFs indirectly. Rather than focusing on target companies, I examine the portfolio returns of SWFs directly and provide the first evaluation of whether SWFs are underperforming because of pursuing non-financial purposes.

Pension funds, SWFs' countries own MSCI stock market indexes and MSCI All Country World index are used as benchmarks in order to analyse the performances of SWFs. The first objective of this thesis is to show the differences in asset allocations between SWFs and pension funds as two different institutional investors. The second objective is to analyse financial performances of SWFs and pension funds in order to check SWFs additional purposes apart from risk-return maximization have affected their performances negatively or not. The last objective is to investigate OECD and non-OECD countries' SWFs financial performances. The performance of SWFs has been analysed by the use of benchmark comparison and risk-adjusted methods.

In this study, I have used the major sources of information on SWFs in order to work with the proper dataset. Firstly, sovereign wealth fund institute's (SWFI) database has been employed as a main source for information of portfolio returns and asset allocations of SWFs. Secondly, SWFs' own websites are used to investigate their annual reports to obtain missing values. Thirdly, MSCI database is used for stock market returns. Lastly, OECD database is utilized in order to collect the data about pension funds.

The structure of this study is as follows. In the second section, I review the earlier studies related to SWFs. Section 3 attempts to explain hypothesis development. Dataset and research design are defined in Section 4 and Section 5 respectively. The result and analysis are shown in Section 6. Conclusion of this study and limitations and directions for future research are presented in Section 7.

2. LITERATURE REVIEW

2.1 Sovereign Wealth Funds: The Definition

SWFs are state-owned investment vehicles that invest in several asset classes in both financial and real assets globally. The investment sources usually come from commodity export proceeds or the transfer of assets from official foreign exchange reserves. Additionally, cases exist where government budget surpluses and pension surpluses are transferred in SWFs (Butt et al. 2008). However there are many other definitions that have been suggested for SWFs, therefore we can say that there is not one definition that is accepted universally. For example, Lyons (2007) highlights that only funds that are owned by nations should be defined as sovereign wealth funds. Therefore based on this definition some of the current SWFs such as the funds of Alaska and Alberta would be excluded. According to Wignall et al. (2008), sovereign wealth funds are the repository of a wide range of assets that are managed by governments directly or indirectly for acquiring national objectives. Balding (2008) defines a sovereign wealth fund as a pool of capital managed by a government or government-linked entity which invests in assets in pursuit of returns more than the risk free rate of return.

Sovereign wealth funds can be mainly divided into two categories regarding the sources of their money. In the first category are funds with wealth from the export of natural resources, especially oil and gas, and funds that get their assets via revenues on commodities or taxes of the government. The Abu Dhabi Investment Authority (United Arab Emirates) and Norway Government Pension Fund can be given as examples of this group. A second group consists of countries that finance their SWFs by transferring assets from foreign exchange reserves such as China, Singapore and South Korea (Balin, 2008). In figure 1 below the ten largest SWFs and their origins can be observed. The Government Pension Fund Global of Norway is currently the largest SWF in the world and it is following by Abu Dhabi Investment Authority in terms of size. Sovereign Wealth Funds can also be classified into five groups as follows: stabilization funds, savings or future generations funds, pension reserve funds, reserve investment funds and strategic development sovereign wealth funds as well (SWF Institute, 2016). Generally, these funds appear in countries that have less stable and a weak private sector, and are characterized by heritages of state ownership (Gomes, 2008).

Country	SWF Name	Assets USD-Billion	Inception	Origin
Norway	Government Pension Fund-Global	922.11	1990	Oil
UAE-Abu Dhabi	Abu Dhabı Investment Authority	828	1976	Oil
China	China Investment Corporation	813.8	2007	Non-Commodity
Kuwait	Kuwait Investment Authority	524	1953	Oil
Saudi Arabia	SAMA Foreign Holdings	514	1952	Oil
China-Hong Kong	Hong Kong Monetary Authority Investment Portfolio	456.6	1993	Non-Commodity
China	SAFE Investment Company	441	1997	Non-Commodity
Singapore	Government of Singapore Investment Corporation	350	1981	Non-Commodity
Qatar	Qatar Investment Authority	335	2005	Oil & Gas
China	National Social Security Fund	295	2000	Non-Commodity

Figure 1 Sovereign Wealth Fund Institute estimates as of 2016

SWFs are the one of the key actors in the financial landscape and their investment size increased substantially by tripling between 2000 and 2008 in number of deals, accounting for an increase from USD 4 billion to nearly USD 130 billion (Avendano and Santiso, 2009). While The Norwegian Global Pension Fund alone indicates that it owns almost 1% of all global equities, the China Investment Corporation is the world's biggest bank-holding organization. It staffs offices around the world by conducting a range of investments in different currencies. The ADIA invests by its own statements across twenty-two asset classes (Balding, 2012). However, SWFs are not the dominant player in the world economy because of the fact that even SWFs are two times bigger than hedge funds in terms of their size, they hold just one-twentieth of the private holdings of total world GDP (Balin, 2008).

As can be seen from the Figure 2, oil and gas related SWF's are larger than others: while oil and gas related parts account for 56,6%, others captures the 43,4% in all SWFs in terms of their size. When we look at the region breakout in Figure 3 we see that biggest SWFs are located in Asia and the Middle East, accounting for 39,74% and 40,24% respectively and forming approximately 80% of all SWFs. Gompers and Metrick (2001) state that SWFs distinguish themselves from other institutional investors in terms of investment strategies and returns. Sovereign wealth funds are now quite large in size and are prognosticated to grow in

the coming years ahead. According to the Sovereign Wealth Fund Institute today, SWFs' total size is about 7.395 billion dollars and as their relative size increases they are more likely to be a an important topic in economics and play a bigger role in financial markets globally.
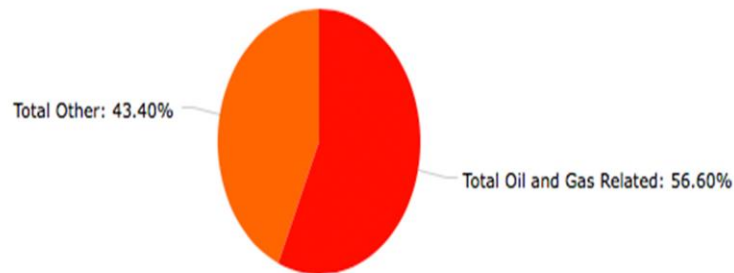

Figure 2 Oil&Gas Related vs. Others June 2015.
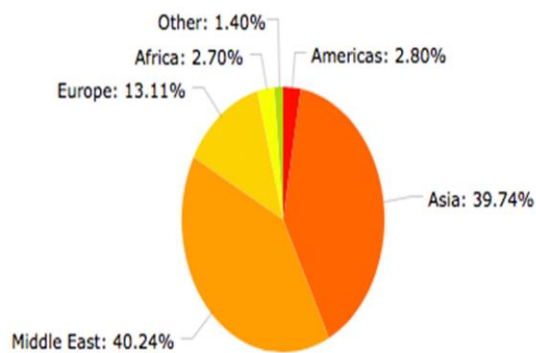Source: SWF Institute

Figure 3 Region Breakout June 2015
Source: SWF Institue

2.2 The History of Sovereign Wealth Funds

Sovereign wealth fund's starting date goes back to as many as sixty years. The first SWFs were founded in the Gulf States in the 1950s. Kuwait established the first modern SWF, named Kuwait Investment Authority, in 1953 for the objective of investing the excess oil proceeds in order to accumulate in future years, and offset the high volatility of commodity prices and the government's dependence on royalty revenue (Weiner, 2000). The Fund started as an operation for managing the country's oil proceeds surpluses via its London Office (Alhasel 2014). Other oil producing countries created the first wave of sovereign wealth funds after the increase in oil prices in the 1970s and 1980s.The reasoning was that oil was a non-renewable source and consequently the government should propagate the benefits of this capital through the following generations via managing this endowment by investing a piece of today's income in various financial assets (Fernandes, 2009). Countries that were exporters such as Saudi Arabia and the United-Arab Emirates exerted these funds as a method of managing the negative effects of excess liquidity that could potentially overheat their economies (Balin, 2008). The second wave occured after the crisis in East Asia in the late 1990s. Just as was the case in several other markets, growth in the manufacturing industry was not matched by higher domestic investment and spending. Consequently, income from the manufacturing industry commenced to accumulate in foreign reserves and were sometimes used to fund a SWF. This also led to the creation of the Chinese Investment Corporation which is one of the largest SWF accounting for more than US$200 billion in assets under management (Fernandes 2009). Kotter and Lel (2009) report that funding of this quick growth has been made feasible as a part of accumulation of foreign currency reserves and increase in oil revenues via interventions in FX markets.

Most of the known SWFs transformed in some way from commodity stabilization fund pioneers (Megginson and Fotak, 2014). Countries founding sovereign wealth funds experienced several fundamental economic troubles. While economic activities of these governments substantially depended on natural resources that experienced boom and bust periods on a regular basis, expenditures and liabilities of the governments depend on foreseeable undertakings (Spatafora and Tytell 2009;Choe 1990). Some empirical observations were necessary for the creation of SWFs and stabilization funds (Ping and Chao, 2009). After realizing the necessity for managing the money coming from oil price boom and experiencing subsistent commodity volatility, many governments established new funds

devised to mitigate these risks with their newly discovered wealth (Cuddington, 1989). The stabilization funds were created by countries that were small, open, commodity and trade dependent economies (Balding, 2012). High oil prices during the early 1970s led to establishment of many stabilization funds. Nine funds were formed between the early 1970s and the early 1990s, including several significant ones such as ADIA, GIC, Temasek Holdings and SAMA (Balding, 2012). Because of a protracted era of low commodity prices, no new sovereign wealth funds or stabilization funds were established, from 1990 to around 2000 (Davis, 2001). Most of the more recently established SWFs have been founded since 2005 (Balding, 2012).

2.3 Investment Strategies and Objectives

As state-owned entities, SWFs are formed and administered much differently than big private investment funds and these funds are more likely to pursue non-financial purposes such as national strategic interests, economic development and other similar purposes. Even though the increasing magnitude of sovereign wealth funds implies that they are becoming significant actors in the financial markets, their behaviour and objectives are often not explicitly known (Kotter and Lel 2009). Sovereign wealth funds share both similarities and differences with other institutional investors with regards to their investment patterns and objectives. Compared with other institutional investors such as hedge funds and mutual funds, SWFs have longer-term investment horizons. Additionally, while hedge fund or mutual fund investors seek to maximize risk-adjusted returns, sovereign wealth funds are more prone to chase strategic objectives (Chesterman, 2008). SWFs that are more transparent and have better governance standards are more prone to being under scrutiny for their investment performance and as a result these types of funds would have more incentives to increase target firms' value (Shleifer and Vishny, 1997). Consequently, there is a relation between the investment purposes of SWFs and the degree of accountability and transparency to which they are held (Kotter and Lel, 2011).

Yermo et al. (2008) ask the following questions: what are the differences between SWFs and public pension funds as two different kinds of state-owned entities? They report that the purposes of these funds are different. While public pension plans work as long-term financing vehicles and have clearly defined liabilities, SWFs have a propensity to have extensive objectives and do not have any specific liabilities to meet mostly, therefore public pension plans have longer and better defined investment horizon than SWFs. According to

the Sovereign Wealth Fund Institute (SWFI) due to the fact that all funds have their own reasons for why they were created, the purposes of these funds are different from each other. Common objectives of SWFs are: protection and stabilization of the budget and the economy from excess volatility in revenues and exports, diversification of the portfolio from non-renewable commodity exports, fund social and economic development, political strategy and increasing savings for next generations.

Studies have shown that SWFs meet political pressures to support short-term and domestic goals (Shleifer and Vishny, 1994). Consequently, SWFs do not have just financial purposes (Alsweilem et al. 2015). Political pressure affecting SWFs' decision-making process could cause them to make distorted investment decisions. SWFs direct their investments towards local industries where social needs are more sensitive, consequently they admit the trade-off between financial return and social benefit. Bernstein (2013) argues that higher domestic investment leads to home bias, which is an indication of poor diversification. SWFs with higher involvement of politicians have a higher likelihood of investing at home comparing with SWFs where external managers are involved. Biases are more apparent for SWFs that are owned by less democratic and less transparent countries (Chhaochharia and Laeven, 2008). Knill et al. (2012) find that political relations play a significant role in SWFs' investment decisions. As opposed to what is recommended in the foreign direct investment literature, SWFs have a tendency to invest in countries where they have weaker relations. Even though there are many contradicting papers, Avendano and Santiso (2009) state that investment decisions of SWFs are not politically biased, using equity mutual funds as an evaluation criteria.

Macroeconomic factors are another consideration, together with political relations, for investment decision of these funds. SWFs diversify their portfolios away from their home; however they usually invest in countries that have institutional and economic stability. SWFs' investment criteria differ between OECD and non-OECD countries and these funds have a propensity to re-invest in a country after an initial investment (Candelon et al. 2011). SWFs also have a preference to invest in countries that have solid legal institutions (Chhaochharia and Laeven, 2008).

SWFs' asset allocations are diversified across risky asset classes and have a strong bias unto

telecommunication, transportation, energy and especially finance industries (Dyck and Morse, 2011). Chaaocharia and Leaven (2008) show that SWFs are prone to possess conservative portfolios poorly diversified in terms of geography and industry. They hold incommensurably large parts of their stocks in oil companies and are more likely to invest in large cap stocks.

Bortolotti et al. (2010) ascertain that another characteristic of SWFs is that publicly listed companies capture the big fraction of their equity investments. While Bortolotti and Miracky (2010) state that SWFs stock holdings of listed firms are often large enough to be a block holder in a target company, Fernandes (2009) reports that they do not have the objective of controlling target companies and that the average amount invested is US$46.3 million dollar accounting for 0.74% of the shares of target companies. Rose (2008) expresses that SWFs investments in the US have not displayed any activities that could be seen as having control over the target firms. Contrary to this, Dewenter et al. (2010) argue that SWFs take an active role in some decisions of target firms such as management turnover, assignment of directors and governmental action.

Bernstein and Lerner (2013) studied the private equity (PE) investment of SWFs and find that they have a tendency to invest in PE when domestic prices are higher, and when foreign prices are higher they make their investments abroad. The P/E ratios for their domestic investments are less than their international investments. However Kotter and Lel (2008) state that SWFs have a preference to invest in undervalued stocks. According to Avendano (2009) compared with other institutional investors, they are less likely to make PE investments. Kotter and Lel (2010) report that sovereign wealth funds like better firms that are large, poorly performing, experience financial difficulties, multinational and located in financially developed countries. These findings are partially supported by Fernandes (2009) who discusses that SWFs tend to select stocks of large and profitable firms in countries that have strong governance standards with high analyst scrutiny.

2.4 The Impact of Sovereign Wealth Funds

Several academic studies have examined the effect of SWFs on target companies. According to Raymond (2008) these effects could result in three different outcomes. Firstly, the target company's stock follows the movements of global capital markets which means that SWFs do not have any influence on a firm. This usually occurs in the event of small stake purchases. The second possibility is that the announcement has a short-term impact on target companies, which is more likely to occur in cases of large stake purchases. The last possible outcome is that companies' share prices can be affected persistently. This result can occur as a result of the market's expectations that SWFs will have an effect on firm's governance structure, and therefore its profitability.

Kotter and Lel (2011) examined SWF investments in listed firms between 1980 and 2009 using a sample of 417 investments and find that SWFs' investments yield positive initial returns accounting for 2.25%, especially for companies that are more transparent and facing financial difficulties. These findings are supported by Dewenter et al. (2010), they report that companies benefit from SWFs' investments with excess returns, resulting in 1.52% over the event window (– 1, +1) as a result of stock purchases. However, Megginson et al. (2014) state that even though both SWFs and other private entities have positive announcement effects regarding to abnormal returns, private entities' impact is more than SWFs. Fernandes (2009) analyses one of the largest datasets in the SWFs literature and point out that there is a SWF premium for the shareholder of the companies which get an investment from SWFs. Compared with other firms, these firms value is higher by 10-15%, ceteris paribus. Research conducted by Anderloni and Vandone (2012) indicates that banks that obtained SWF investments had better capital adequacy ratios after the 2008 financial crisis compared with other banks that did not receive SWF investments. Furthermore, according to Bertoni and Lugo (2014), firms benefit from SWF's investment by experiencing a decline in their credit default swap premiums. As we have seen, SWFs have significant positive short-term impact on target companies. Soji and Tham (2011) explain this positive short-term impact by pointing out that the market increases its expectations in terms of corporate monitoring, while Kotter and Lel (2009) account for this influence by citing the liquidity effect of buying by SWFs.

Regarding SWFs' long-term impact, Knill et al. (2012) argue that SWFs do not have any benefits for target firms compared to other institutions. Apart from their short-term influence, Kotter and Lel (2009) find that SWF investments do not have influence on companies' profitability, governance and growth in the three years following their investment. Moreover, Malatesta et al. (2010) report that SWFs' investments have insignificant, slightly negative, abnormal returns in the long run. These results are supported by Knill et al. (2012) who find that oil-producing countries have negative abnormal returns for their investments in non-financial targets. Chhaochharia and Laeven (2008) also document poor long-run performances for the SWFs' target firms. Sojli et al. (2011) states that due to the heavy media supervision, SWFs have a tendency to reduce their own benefits and work on creating value for the target firm in the long run. Consequently, if SWFs have strategic objectives that are incoherent with companies' profit maximizations goals, it could influence companies in a negative way.

2.5 Transparency and Corporate Governance Issues

The increment in the number and size of SWFs reflect a huge increase in the role of states in the management and ownership of international assets. Therefore, the management of these funds and their potential influences on economic systems leads to increasing scrutiny. The main concerns of the foregoing research are related to the likelihood of SWFs bringing about harmful effects to the corporate governance structure of target companies as a result of the pursuit of political objectives, the lack of sophistication in their approach, the lack of transparency, the risk of the occurrence of a new style of financial protectionism and the possibility that they can use their capital for political purposes to acquire stakes in strategic industries (Fotak et al. 2014). Any SWF actions apart from being passive investors can result in political repression or legislative adverse effect from receiver state governments (Dinç and Erel, 2013).

Few SWFs release information about their operations and financial positions, as most of them have a tendency to not disclose that kind of information. SWFs are regulated by their own government. Being the sole owner of the funds liable to its own regulation, governments have a tendency to be pretty liberal regarding to defining a governing legal base. As a result the decision of maintaining a degree of transparency is deemed to be a voluntary decision rather than an obligation, hence accountability and transparency practices differ from fund to fund. While countries such as Norway and Singapore put an effort to raise the level of their SWF

transparency, most of the world's largest SWFs especially those from China and the Middle East keep their objectives undisclosed. Since they are state-owned investment funds with immense capital bases, purchasing listed shares across borders without the need to make liquid investments (Fotak et al. 2014), the objectives and operations of such SWFs should not be kept secret (Johnson, 2015). In this regard, the Santiago Principles were prepared to encourage good governance, accountability and transparency among SWFs, in order to foster an environment that allows for a more open and deeper understanding of SWF activities (IFSWF 2014).

Another issue is that SWFs are more likely to have small staffs, despite dealing with a large amount of assets, typically worth more than $100 million. While GPFG, CIC, and ADIA, who are the first three biggest funds have aggregately fewer than 3,000 employees, Fidelity Investment manages assets of comparable worth with 38,000 people. Due to their small staff, SWFs are unlikely able to play a significant role in active monitoring of the corporate governance of the companies in which they invest, according to Magginson et al. (2014).

3. HYPOTHESIS DEVELOPMENT

According to Blundell et.al (2008), the purposes of SWFs and pension funds are different. While pension funds have clearly defined liabilities, SWFs have a wide range of objectives and do not have any specific liabilities that have to be met usually. Additionally these funds diversify their foreign holdings into assets that have more potential to get a higher return. According to Figure 4 we can observe that SWFs' investments in safe assets are significantly less than other type of SWFs' investments hence, I believe that SWFs invest in more risky asset classes than pension funds.

H1: SWFs invest in more risky asset classes than pension funds.
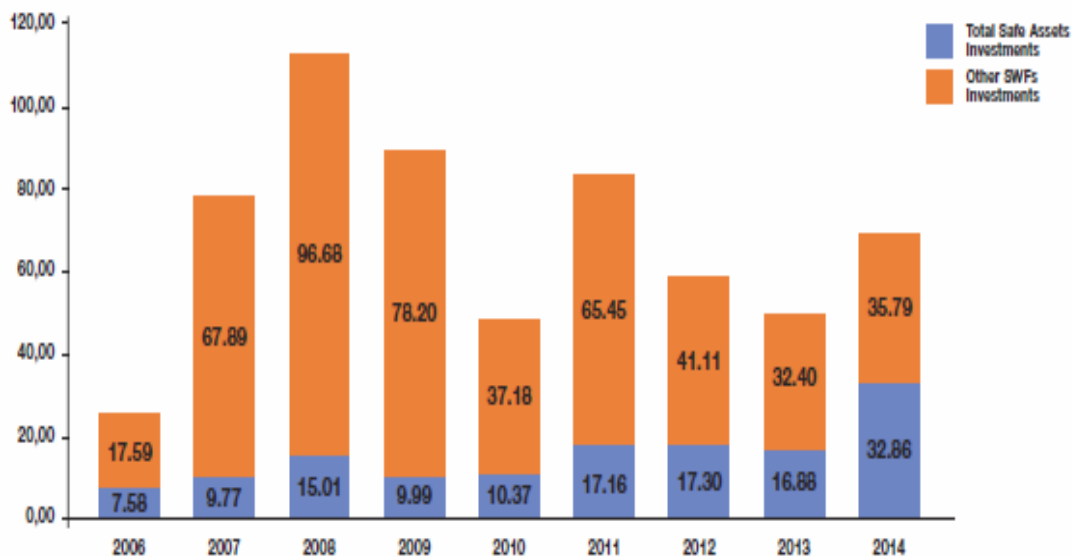

Figure 4: SWF investments in safe vs. other assets. SWF Annual Report (2015)
Source: Sovereign Investment Lab
*Safe assets category includes infrastructure, real estate, hotels sectors and fixed income securities.

According to Kotter and Lel (2011) as state owned entities, SWFs are formed and administered much differently compared with other big public or private investment funds.

Additionally, SWFs are more prone to pursue non-financial purposes such as national strategic interests, economic development of the country and political objectives. While hedge funds or mutual funds seek maximization of risk-adjusted returns, SWFs are more likely to chase strategic aims (Chesterman, 2008). Several studies have indicated that SWFs meet political pressures to support local goals (Shleifer and Vishny, 1994). Political pressure affecting SWFs' decision-making process may cause them to make distorted investment decisions, not fully focused on returns. SWFs may direct their investments towards local industries where social needs are more sensitive, consequently making a trade-off between financial return and social benefits. Therefore I hypothesize that SWFs underperform regarding to yearly portfolio return compared with their countries' own stock indices and MSCI All Country World index.

H2: SWFs did not perform better than their countries' own stock market index and the MSCI All Country World index between 2010 and 2015.

Bernstein et al. (2013) argue that higher domestic investment leads to home bias, which is an indication of poor portfolio diversification. SWFs that are more highly involved by politicians have a higher likelihood of investing at home compared to SWFs where external managers are involved. This bias is more apparent for SWFs that are owned by less democratic and less transparent countries (Chhaochharia and Laeven, 2008). OECD countries are more democratic and transparent therefore it is possible to expect that SWFs' that are owned by OECD countries perform better than non-OECD countries.

H3: OECD countries' SWFs performed better than non-OECD countries' regarding to risk adjusted returns between 2010 and 2015.

Both sovereign wealth funds and pension funds have longer time horizons therefore they have less of a need to invest only in highly liquid assets. Both of type of funds have a preference to invest in multiple asset classes including government bonds, corporate bonds, stocks, real estate and private equity for diversification and for return generation. However, some of the objectives of sovereign wealth funds and pension funds are different. Pension funds can be considered as a long-term financing vehicle of pensions and other relevant benefits. While pension funds have clearly defined liabilities, SWFs have a wide range of

objectives and do not have any specific liabilities that have to be meet usually (Blundell et al. 2008). Because of not having clearly defined liabilities, higher involvement of politicians and political and strategic motives behind the investments, SWFs can act opportunistically and led by non-financial objectives, therefore I expect that SWFs perform worse than pension funds regarding to risk-adjusted return.

H4: SWFs perform worse than pension funds in terms of risk-adjusted returns between 2010 and 2015.

4. DATA AND SAMPLE

Most sovereign wealth funds only release limited public information. Therefore, measuring the financial performance and investigating the asset allocation of sovereign wealth funds' is a challenging task. In this study, I have tried to use the major sources of information in order to construct a proper dataset. Firstly, sovereign wealth fund institute's (SWFI) database has been employed as a main source for information of portfolio returns and asset allocations of SWFs. SWFI is a global organization that is formed in order to do research on sovereign wealth funds and other long-term public investors in the fields of asset allocation, investing, risk as well as other pertinent issues. Secondly, some missing values have been obtained from SWFs' own websites by investigating their annual reports. Thirdly, MSCI Australia, Hong-Kong, China, Norway, USA, Singapore and Korea indexes are used to obtain gross return of the each country indexes. Additionally, MSCI All Country World index is utilized. All returns are gross returns and denoted in USD. Lastly, I have used the OECD database in order to obtain the data for pension funds.

The sample of this research consists of yearly portfolio returns (USD) of SWFs and pension funds between 2010 and 2015. Due to the data restrictions, I have used nine SWFs that are Australian Future Fund, Hong-Kong Monetary Authority Investment Portfolio, China Investment Corporation, Norway Government Pension Fund, Alaska Permanent Fund Corporation, Texas Permanent School Fund, Government of Singapore Investment Corporation, Temasek Holdings and Korea Investment Corporation that have information on yearly portfolio returns. In Appendix A and B, I provide both qualitative and quantitative general information about SWFs that are used in this thesis.

The data includes aggregate statistics about the mean returns and asset allocations of all pension plans (occupational and personal, mandatory and voluntary) from Norway, South Korea, Hong Kong, China, Australia and the USA.

5. RESEARCH DESIGN

5.1 Research Methodology

Portfolio performance evaluation assesses how one particular portfolio has performed compared with a certain benchmark. The methods of portfolio performance assessment generally can be divided into two different categories, namely conventional and risk adjusted methods. I have used both conventional and risk-adjusted methods to evaluate SWFs' performances. While most of the conventional methods consist of style and benchmark comparison, the risk-adjusted methods correct an investment returns by gauging the risk that is included in production of that return. This study uses benchmark comparison for the conventional methods. Even though there are many methods for the calculation of risk-adjusted returns such as Sharpe ratio, Treynor ratio, Jensen's alpha, Treynor squared and Modigliani and Modigliani, these are the more salient ones. I have used the first three excluding the last two measures regarding to risk-adjusted methods in this study.

5.2 Measuring Portfolio Performances

5.2.1 Benchmark Comparison

The benchmark portfolio is an applicable alternative to a managed portfolio versus which performance is measured. The most obvious conventional method contains comparison of the managed portfolio against a broad market index. If the investment portfolio gained returns more than benchmark portfolio during the same period, then the portfolio is said to have outperformed the benchmark. I have used countries' own stock indices (MSCI) for each SWF as a benchmark. Apart from this, MSCI All Country World index has been used as a benchmark for each SWF as well.

Even though this method is widely used in the world, it is subject to special problems. The risk of the investment portfolio and the benchmark index may not be same. Therefore, the gain could come higher risk taking. It means that if the portfolio has performed better than

the benchmark portfolio, it may be a result of a managed portfolio being more risky than the benchmark portfolio. Consequently, that kind of comparison could lead to incomplete conclusions.

5.2.2 Sharpe Ratio

The Sharpe ratio (Sharpe, 1966) is maybe the simplest measure of risk-adjusted performance. This measure was first used by Sharpe (1966) to assess the performances of mutual funds. The Sharpe ratio for an investment portfolio is as follows:

$$Sharpe\ Ratio = \frac{(Rp - Rf)}{\sigma p}$$

Rp = the observed average return;

Rf = the average risk free return;

σp = the standard deviation of fund returns.

The Sharpe ratio is the average excess return over the risk-free rate for per unit of total risk. As a performance measure, higher Sharpe ratio implies better risk-adjusted performance when we compare an investment portfolio and a benchmark portfolio.

This model is used to measure the performance of SWFs and pension funds. This ratio also measures the ability of the funds with the rate of return performance and diversification by considering total risk of the portfolio. SWFs and pension funds are thought as a two different portfolios in this study and I have calculated the ratio of yearly historical average returns (ex-post returns), in excess of the risk free rate to the standard deviation of the portfolio returns of the funds for the horizon between 2010 and 2015. Average ten-year treasury bond rates of each countries has been used as a risk free rate. Pension funds have been selected from same country or region as SWFs.

However, the Sharpe ratio can be improper when returns have a highly non-normal distribution. If the returns are highly negatively skewed such as in options trade or have high degree of kurtosis, the Sharpe ratio can be deceptive. Additionally, the Sharpe ratio is also more prone to be misleading, when it comes to analyse portfolios that have significant non-linear risks.

In spite of these limitations, the Sharpe ratio is widely used in the investment world as a portfolio performance measure and it is still significant in empirical asset pricing as well (Aragon and Ferson, 2007).

5.2.3 Treynor Ratio

The Treynor ratio (Treynor, 1965) is the second risk-adjusted measure in this study calculates the risk premium for per unit of systematic risk. The Treynor ratio is given by the following equation:

$$Treynor\ Ratio = \frac{Rp - Rf}{\beta p}$$

Rp = The observed average return

Rf = The average risk free rate of return

βp = The beta of the portfolio

As a performance measure, the portfolio which presents the highest award / risk (systemic risk) should be the only risky portfolio which will be chosen by investors.

Contrary to Sharpe ratio, this method normalizes excess return relative to beta or systematic risk, not volatility or total risk. The Treynor ratio relies on beta which is the measure of systematic risk or volatility in relation to the market (or to alternative benchmarks). Systematic risk can be defined as the part of total risk of an asset which cannot be removed by diversification. A beta of equal to 1 implies that the security's prices will move in line with the market or selected benchmark. While a beta of less than 1 indicates that security is less volatile than market, a beta of higher than 1 means that security is more volatile than market.

Treynor ratio is used to measure the performances of the SWFs and pension funds regarding to return per unit of risk (systemic risk) in this study. This ratio also measures the ability of the funds relying on the rate of return performance and diversification by considering the systemic risk of the portfolio. The study computes the ratio of yearly historical returns, in excess of the risk free rate to the beta (systemic risk) of the portfolio returns between 2010 and 2015. Local market indexes are used as a benchmark to estimate beta. The same countries and funds are used as in Sharpe ratio for pension funds and SWFs.

However, due to the fact that, most of the SWFs are more likely to release limited public information, in this study I have only 6 year annual returns of 9 funds. Consequently, this issue reduces the reliability of the components of these ratios.

5.2.4 Jensen's Alpha

Jensen's alpha is another risk-adjusted measure that is based upon capital asset pricing model (CAPM). The alpha indicates the average return on a managed portfolio above or below the required return estimated by CAPM given the portfolio's beta and the average market return. In other words, the Jensen's alpha demonstrates the excess return gained after adjusting for exposure to the benchmark. Investors are seeking portfolios that have positive alphas because of the fact that a portfolio with positive alpha has a higher return than the risk-adjusted return that is predicted by the CAPM. Jensen's measure is computed as follows:

$$Jensen\ alpha = Rp - (Rf + \beta p(Rm - Rf))$$

Rp = The observed returns of the portfolio

Rf = The risk free rate

Rm = The return on the market index

βp = The beta of the portfolio

The Jensen's alpha measure is applied on the data of SWFs and pension funds between 2010 and 2015. Local market indexes are used as a benchmark in order to estimate alpha. The data that is used in Jensen's alpha for pension funds and SWFs is same as both in Sharpe and Treynor ratio.

Due to the data restrictions, limitations that I mentioned above are also valid for Jensen's alpha.

6. RESULTS AND ANALYSIS

6.1 Descriptive Statistics

In Table 1 the descriptive statistics of the yearly SWFs and pension funds returns between 2010 and 2015 are shown.

	Mean	Min.	Max.	Standard Deviation	Skewness	Kurtosis
SWF Return	0,07	-0,043	0,26	0,066	0,361	-0,023
Pension Fund Return	0,052	-0,113	0,129	0,053	-1,034	2,089

Table 1: The yearly mean, minimum and maximum return, standard deviation skewness and excess kurtosis of the selected SWFs and pension funds between 2010 and 2015.

The table shows the mean returns, minimum and maximum returns, standard deviation, skewness and excess kurtosis. As could be observed, mean returns for SWFs and pension funds in this thesis differ. For SWFs we observe a mean return of 7% per year while for pension funds the average yearly return is 5,29%. We observe lower standard deviation for the pension funds return compared to SWFs. The average standard deviation for the SWFs is 6,6% compared to a standard deviation of 5,3% for the pension funds. When we look at the skewness and kurtosis we see positive skewness for SWFs and negative skewness for pension funds. While SWFs have negative excess kurtosis, pension funds' excess kurtosis is positive.

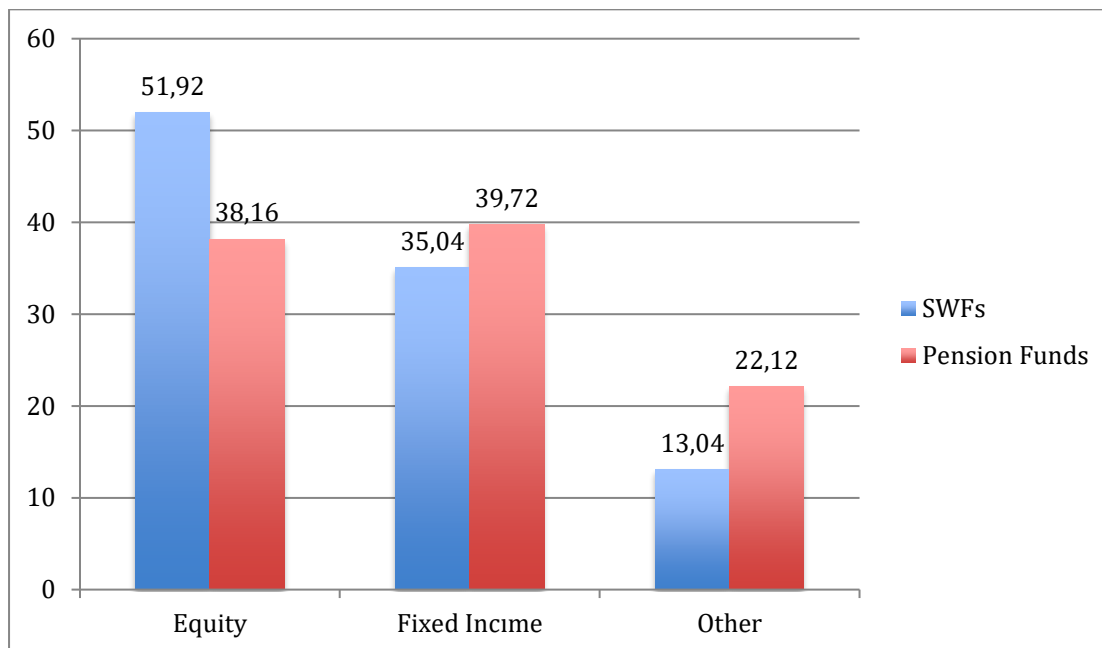## 6.2 Asset Allocations of SWFs And Pension Funds

Table 2: Asset Allocation of Selected SWFs and Pension Funds in 2015

*Other category includes loans, land and buildings, unallocated insurance contracts, structured products that are not invested in cash, bonds and bills and equities.

The asset allocation of SWFs and pension funds are shown in Table 2. As it can be seen from Table 2 above, equity investment takes the largest part at 51,92% of total investment, followed by fixed income investment at 35,04% and other part is account for 13,04%. On the other hand, equity investment of pension funds is less than fixed income investments account for 38,16% and 39,72% respectively. Other part is less than both equity and fixed income investments at 22,12%. Equity investment is riskier than investing in fixed income securities. The table shows that SWFs make more equity investment than pension funds by approximately 13%. As a result, I can conclude that SWFs invest more in risky asset classes than pension funds, which means that the first hypothesis is supported by the results.

6.3 Financial Performances of SWFs

Fund Name	Origin	Fund Returns	MSCI Country Index Return	MSCI-All Country World Index Return	Excess Return (MSCI Country Index)	Excess Return (MSCI-All Country World Index)
Australian Future Fund	Australia	11,0%	2,93%	8,24%	8,07%	2,76%
Hong Kong Monetary Authority Investment Portfolio	Hong Kong	2,10%	8,52%	8,24%	-6,42%	-6,14%
China Investment Corporation	China	5,96%	2,38%	8,24%	3,58%	-2,28%
Norway Government Pension Fund	Norway	7,80%	-0,45%	8,24%	8,25%	-0,45%
Alaska Permanent Fund Corporation	USA	10,60%	13,48%	8,24%	-2,88%	2,36%
Texas Permanent School Fund	USA	8,89%	13,48%	8,24%	-4,59%	0,65%
GIC Private Limited	Singapore	6,15%	3,24%	8,24%	2,91%	-2,09%
Temasek Holdings	Singapore	10,0%	3,24%	8,24%	6,76%	2,04%
Korea Investment Corporation	Korea	4,34%	4,01%	8,24%	0,33%	-3,91%

Table 3: Benchmark comparison of SWFs between 2010-2015

In Table 3 the results of yearly average fund returns, countries' own MSCI index gross returns and MSCI All Country World index gross return between 2010 and 2015 are shown. As could be observed, the average return for the funds studied in this thesis differs from each other. While Australian Future Fund has the highest return, Hong Kong Monetary Authority Investment Portfolio's return is the lowest one 11% and 2,10% respectively.

Six of the nine funds excluding the Alaska Permanent Fund Corporation, Texas Permanent School Fund and Hong Kong Monetary Authority Investment Portfolio performed better than

their countries' own stock indices. According to Table 3, Norway Government Pension Fund performed the best compared to the domestic country index, with an outperformance of 8,25%.

Looking at the comparison between the average return of the funds and MSCI All Country World index return, I find that while four of the nine funds (that are Australian Future Fund, Alaska Permanent Fund Corporation, Texas Permanent School Fund and Temasek Holding) performed better than MSCI All Country World index, rest of the funds' return performance is lower than MSCI index. According to Table 3, Australian Future Fund performed best in the group regarding to the benchmark comparison with the MSCI All Country World index.

As a result I can conclude that while six of the nine funds performed better than their country stock indices, the number of the funds that performed better than the MSCI All Country World index return is four, consequently my second hypothesis is only partially supported.

	Sharpe	Treynor	Jensen's alpha
OECD SWFs	0,97	0,34	0,06
NON-OECD SWFs	0,60	0,04	0,02

Table 4:Risk adjusted returns of selected OECD and non-OECD countries' SWFs

To test whether OECD countries SWFs' performed better than non-OECD countries' SWFs between 2010 and 2015, I have applied risk-adjusted return methods. As we can infer from the Table 4 above, SWFs that belong to member of the OECD countries performed better than non-OECD countries' SWFs in terms of Sharpe ratio, Treynor ratio and Jensen's alpha. Sharpe ratio of OECD countries' SWFs is higher than non-OECD countries' by approximately 0,35. While Jensen's alpha of OECD countries' SWFs is 0,06, this ratio is 0,02 for non-OECD's. When we look at the Treynor ratios, OECD countries' SWFs performed better than sovereign wealth funds of non-OECD countries account for 0,34 and 0,04 respectively. Consequently, I can state that my third hypothesis is supported. SWFs

owned by OECD countries performed better than non-OECD countries' SWFs in terms of Sharpe ratio, Treynor ratio and Jensen's alpha.

	Sharpe	Treynor	Jensen's alpha
SWFs	0,80	0,32	0,04
Pension Funds	0,56	0,16	0,03

Table 5:Risk adjusted returns of selected SWFs and pension funds.

For the fourth hypothesis I am trying to test whether SWFs performed better than pension funds in terms of risk-adjusted returns. Portfolio performance measurement of SWFs and pension funds can be seen above in Table 5 that shows that SWFs have a relatively higher Sharpe ratio at 0,80 in comparison to pension funds at 0,56. Higher Sharpe ratio implies that selected group of SWFs performed better than group of pension funds. Looking at Treynor ratio I find that this measure is higher for SWFs than pension funds account for 0,32 to 0,16 respectively. When we look at the last measure that is Jensen's alpha, Table 5 shows that Jensen's alpha of SWFs is also higher than pension funds' at 0,04 and 0,03 respectively. Therefore, I can conclude that SWFs performed better than pension funds regarding to three different risk-adjusted measures between 2010 and 2015. As a result, I can state that my hypothesis is not supported.

7. CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

7.1 Conclusion

Sovereign wealth funds manage and invest assets worth about $7,4 trillion (SWFI, 2017) and it is expected that their size will increase in the next years. Compared with private equity funds and hedge funds, the size of SWFs is larger. Even though the increasing magnitude of SWFs indicates that they are becoming one of the significant actors in the financial markets, their behaviour and objectives are often not explicitly known (Kotter and Lel 2010). The purpose of the study was to answer the following question:

Have SWFs underperformed due to the having additional objectives apart from risk-return maximization such as country development and achieving domestic, political and social goals?

In this thesis I undertake an analysis of financial performances and asset allocation of SWFs. Several insights emerge from my analysis. Firstly, I find that, SWFs invest more in risky asset classes than pension funds by approximately 13% in 2015. Secondly, while six of the nine SWFs performed better than their countries' own stock indices, four of the nine funds performed better than MSCI All Country World index between 2010 and 2015. In addition, I find that OECD countries' SWFs performed better than SWFs of non-OECD countries in terms of Sharpe ratio, Treynor ratio and Jensen's alpha. Lastly, results reveal that SWFs performed better than domestic pension funds regarding to all three risk-adjusted methods that I have used.

These results contribute to strands of literature on the financial performances of SWFs. Overall, my findings suggest that generally having additional objectives apart from risk-return maximization have not affected selected SWFs negatively.

7.2 Limitations and recommendations for future research

This study is subject to certain limitations regarding the number of the observations. As I mentioned before, SWFs tend to disclose very limited public information. Therefore there is not a well-designed and advanced database or other sources that give proper and complete data about SWFs' transactions. Consequently I have worked with six-year returns of nine funds. There is no doubt to say that, ıf I had more observations, my results would be more reliable. However, I think that this work has made a contribution to the current literature, because this study is the first to investigate the financial performances of SWFs directly. Also, it is the first study that tries to evaluate directly the performances of SWFs, even with limited data.

This work has not conducted any econometric analysis related with SWFs' financial performances due to the problem that I mentioned above. As many funds now seem to release more information, it could be possible to make more in-depth investigation of the financial performance of SWFs in the near future. Additionally, it would be good to do a research on the effect of SWFs on their economies. For instance, checking whether SWFs have affected their domestic financial and industrial development would be one interesting research topic.

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APPENDIX A

GENERAL INFORMATION ABOUT SELECTED SWFs

All information in this section is obtained from the Sovereign Wealth Fund Institute's (SWFI) and SWFs' own websites.

1. Norway Government Pension Fund

Norwegian Petroleum Fund was founded in June 1990 after a decision of the legislature assembly Stortinget in order to manage the decline in income and reduce the effects of highly fluctuating oil prices.

Norwegian petroleum income is the source of the surplus of the government pension funds global (GPFG). While the petroleum fund was first directly controlled by Norway's Ministry of Finance, funds is managed by Norges Bank Investment Management that is part of Norges Investment Bank since 1998. The fund's name changed in January 2006 from the Petroleum Fund Norway. The fund is not actually a pension fund, because the source of the fund comes from oil surpluses, not from pensioners. All of the government income related with oil and gas is given to GPFG.

In 2013, the fund established a corporate governance advisory board in order to reinforce its long-term active ownership. The advisory board will be responsible in board nomination decision with respect to fund's listed equity investments. Moreover, the board will regularly evaluate sovereign wealth fund's ownership activities relative to optimal practices. Listed companies that expose to structural strategic changes or takeovers should have board advices. Additionally, target companies should be firms in which the GPFG has more than $1 billion in shareholdings.

Currently, the fund mostly hires external managers for equity investments. The initial funding of each external manager is between $50 million and $250 million. Additionally, the fund has mandates for external managers to work in emerging markets such as the China, Latin America, India and Middle East. A large portion of its assets is invested in fixed income securities and equities. Lastly, the fund prefers well-developed markets for new property investments.

2. China Investment Corporation

China Investment Corporation (CIC) that invests in different kind of asset classes including,

direct investments, institutional real estate and infrastructure was established in September 2007 as a wholly state-owned company. CIC has three subsidiaries, CIC International, CIC Capital Corporation and Central Hujin Investment. CIC is responsible for managing part of China's foreign exchange reserves. While CIC International and CIC Capital is responsible for overseas investment and management activities, Central Hujin makes equity investments in state-owned institutions in China.

CIC is more prone to using external managers and joining in indirect equity holdings via using different investment funds. Additionally, some of the funds' money is being used to support different state-owned enterprises that operate in places like Russia, Africa, Asia, the USA and Australia.

CIC currently has three-floor asset allocation structure: strategic asset allocation, policy portfolio and tactical asset allocation. Strategic asset allocation represents asset classes and investment interval in accordance with return and risk tolerance, acting as a long-term investment counseling. Policy portfolio defines the asset allocation plan that is based on mid-term economic expectations. Tactical asset allocation aspires to grab investment opportunities emerging from market volatility.

3. Hong-Kong Monetary Authority Investment Portfolio

The Hong-Kong Monetary Authority (HKMA) was established in April 1993 after the merger of the Office of the Exchange Fund and the Office of the Commissioner Banking. The HKMA conducts the Exchange Fund that acts as a stabilizer and invests more in its local exchange. The Investment Portfolio that is one of two portfolios in the Exchange Fund invests in primarily in the equity and bond markets of the OECD countries. The fund hires global external asset managers to conduct one third of its total assets.

The HKMA has a portfolio that targets real estate and private equity. It hires external managers for all equity portfolios to reduce the conflict with private sector entities which it invests in. The Fund mainly prefers energy, technology, media, telecommunication and healthcare sectors that have favorable prospects for private equity investments. HKMA works with major international real estate managers to help determine high-quality commercial properties in major foreign cities.

4. Government of Singapore Investment Corporation

The Government of Singapore Investment Corporation (GIC) which was established in 1981 with authorized capital of 2 million is completely owned by the government of Singapore.

GIC is divided into three major sovereign wealth enterprises: GIC Asset Management Pte. Ltd., GIC Real Estate Pte. Ltd. and GIC Special Investments Pte. Ltd. By the fourth quarter of 1981, GIC had consisted in just three investment parts that are Japanese equities, U.S. equities and real estate. However, GIC invests in a wide range of asset classes globally now. GIC manages most of the Government's financial assets for the long-term.

GIC's portfolio strategy consists of reference portfolio, active portfolio and policy portfolio. Reference portfolio comprises of 65% equities and 35% global bonds that is consistent with government's command for GIC. Active portfolio is established for skill-based strategies in line with GIC management recommendations. The policy portfolio aims to achieve superior returns via diversification.

Currently, the fund receives an annual government contribution, however, the amount of this contribution is not fixed and is an issue of the government.

5. Korea Investment Corporation

Korea Investment Corporation (KIC) is a government-owned investment company that was established in July 2005 with the capital worth $17 billion. This capital came from the foreign exchange reserves of the Bank of Korea. Additionally, $3 billion were added to this amount from the foreign exchange stabilization fund by the Korean Ministry of Finance and Economy in 2005. KIC first launched its global fixed income investment program in 2006 and it expanded the alternative assets such as infrastructure, hedge funds and private equity after 2007.

In 2016, KIC invests in a number of fixed income securities across 58 countries and 22 currencies. Apart from internal management, external managers are responsible for generating excess returns in bonds.

While, passive investing was the initial strategy for equities, the team employed and extended equity strategy based on quantitative features.

6. Temasek Holdings

Temasek Holding was established in 1974 after a fast and rapid industrial development in the early 1960s in Singapore's economy. During this industrial development period, the government of the Singapore took an active role by purchasing stakes in a wide range of companies in the, manufacturing, trading, transportation, shipbuilding and services sectors.

Afterwards, these companies became government-linked entities. The Ministry of Finance was the holder of the stakes of that companies. As a result, Ministry of Finance founded Temasek Holdings in order to manage these assets.

The portfolio of Temasek includes a broad range of sectors such as telecommunications, media, technology, financial services, real estate and energy sectors. The fund reports that their investment activities are guided by four factors and the long-term trends that are growing middle-income populations, transforming economies, deepening comparative advantages and emerging champions.

Temasek Holding is a direct equity investor and it had allocation about 30 different return funds in the USA, Asia, Europe and Australia. Only 10% of all assets are externally managed.

7. Australian Future Fund

The Australian Government Future Fund was established in 2006 in order to offset Australia's debt position and invest for the benefit of future generations. At the beginning, the Fund received base capital of AUD$ 18 billion in May 2006. Currently, its capital comes from budget surpluses of the Australian government. Additionally, the government of Australia transferred its remaining 17% share in Telstra that is Australia's leading provider of mobile phones, mobile devices, home phones and broadband-internet.

The Australian Future Fund invests in domestic and international debt securities, equities, real estate, private equity funds and infrastructure. The fund is required to earn an average annual return at least 4,5% to 5,5% higher than consumer price index. In 2014, the fund's management decided an acceptable upper threshold for the level of illiquid investments. Therefore, the fund probably has a great tolerance comparing with many different institutional investors. Lastly, the fund has an absolute return mandate instead of relative return concept.

8. Alaska Permanent Fund Corporation

Alaska Permanent Fund Corporation (APFC) was founded after constitutional amendment to create a Permanent Fund in 1980 by Alaska State Legislature. The legislation reported that at least 25% of the mineral proceeds would be used by the fund. The APFC manages part of the certain oil revenues in line with the benefit of the current and future Alaska citizens.

One of the most significant characteristics is that the board tries to make asset allocation that achieves five percent real rate of return coherent with the Prudent Expert Rule. The Prudent Expert Rule is responsible for behaving with caution and intelligence to pursue reasonable income, preserve capital and keep away from speculative investments. APFC diversifies assets including stocks, private equities, bonds, real estate and infrastructure in order to reduce risk exposure. Both internal and external managers are hired in the APFC.

9. Texas Permanent School Fund

Texas Permanent School Fund (TPSF) was established in 1854 with an appropriation of $2 billion particularly for the benefit of Texas public schools. The Constitution of 1876 committed that certain lands and all of the income of these lands should formed the capital of the Fund.

The fund uses both internal and external management and invests in bonds, stocks, real estate and private equity. The investment advisory committee is authorized by the Permanent School Fund Investment Policy to scrutinize investments and make suggestions for the potential strategies. Additionally, TPSF has moved forward to make direct hedge fund investing strategy with 5 hedge fund-of-fund managers since 2013. TPSF also invests in futures, the fund invested in S&P 400 e-mini futures in 2014. Lastly, TPSF has extended its institutional real estate portfolio expressly in European countries and has attempted to allocate its capital to real estate funds in a different range of strategies including: core, opportunistic, mezzanine lending and mortgages.

APPENDIX B

AVERAGE RETURN, STANDARD DEVIATION, BETA AND ALPHA OF SELECTED SWFs

Fund Name	Average Return	Standard Deviation	Beta	Alpha
Australian Future Fund	0,11	0,053	0,306	0,081
Hong Kong Monetary Authority Investment Portfolio	0,021	0,017	0,092	0,001
China Investment Corporation	0,059	0,055	0,355	0,027
Norway Government pension fund	0,078	0,062	0,283	0,068
Alaska Permanent Fund Corporation	0,106	0,073	0,42	0,039
Texas Permanent School Fund	0,089	0,061	0,185	0,047
GIC Private Limited	0,062	0,031	0,034	0,041
Temasek Holdings	0,10	0,092	0,15	0,079
Korea Investment Corporation	0,043	0,060	0,30	0,022

Table 6: The average return, standard deviation, beta and alpha of each selected SWFs between 2010 and 2015.