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Abstract

Sovereign wealth funds have recently moved to the front and center of discussion, both within the investment world and the political arena. In this paper we evaluate the differences and common features of these funds. Utilizing an ownership database, we probe the ownership, geographic, and industry concentration of the funds deployed by these entities. We also compare and contrast the main features of two of the largest sovereign wealth funds.

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Sovereign Wealth Funds: An Exploratory Study of Their Behavior

Sovereign wealth funds (SWFs) have been around for decades. Recently, however, and mainly during the third millennium, they have moved to the front and center of discussion within the investment world and the political arena. Two principal reasons may be offered for such attention: The first is rooted in the upward movement of commodity prices, particularly the steady increase in oil prices that began in 2002. This so-called "windfall" created an unprecedented level of funding sources for these funds, which in turn led to a steady and robust rate of growth in assets under management of these funds. As a result, they now play a significant role in the global financial markets.[1] The second reason is rooted in the nature of these funds. By definition, these funds are owned by the governments, rather than the private sectors of their respective countries. As a result, a great deal of rhetoric has been aired over their motives, and their objectives have been much more closely scrutinized, and often with suspicion. The suspicion that SWFs may serve the political objectives of their respective governments has grown with the growth of these funds, and sometimes disproportionately so. These suspicions are often reinforced by the fact that it is very difficult to obtain reliable information about most SWFs investments.[2]

Leaving the investment world aside for now, the political concerns have, for the most part, been expressed by those who fear that through such investments, "non-democratic" countries may take control of their vital companies and jeopardize their security. In the US alone, there have been several congressional hearings on this issue. Additionally, statements made by appointed and elected officials often lay bare such concerns. For example, in response to the news of possible contract for Dubai Port World to manage six US ports, Hilary Clinton (then a Senator representing the State of New York) stated that "In a post 9/11 world, port security is too an important issue to be treated so cavalierly." In November 2009, Marisa Lago, President Obama's Choice for the Treasury Department's Assistant Secretary for international markets and developments stated that "… sovereign wealth funds are not just a private sector investor, but rather arms of government and need to be subject to stricter scrutiny than other foreign investors invested in U.S. assets."

However, apparently all politicians do not share such concerns. Many have expressed their positions in a manner indicating that allowing SWFs to invest in firms within their jurisdictions is in line with the spirit of "globalization" and that of "open economies," and that such investments have the potential to fill the gap in the capital market created by insufficient savings rates in these countries. Furthermore, it can be argued that the business world is, in general, supportive of the notion of providing SWFs easy access to equity markets. For example, Pete Peterson, co-founder and senior chairman of the Blackstone Group has indicated that he does not believe that SWFs' investment strategies are driven by a desire to control. Rather, he has said he believes, they are driven by financially attractive payoffs. In an interview with Charlie Rose on April 3, 2008, he stated that "people who are a bit paranoid about the sovereign funds, I don't know if they have thought through what the alternative is." He then went on to inquire as to whether it would be better if SWFs kept all their funds in hard currencies, which could run around the world and cause a huge problem with the dollar, or if it would be better if they were allowed to invest their funds for the long term.

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[1] Collectively, these funds had $3,938 million asset under management in September 2010 (see Appendix 1).

[2] Only one fund (Norway Government Pension Fund) amongst the top ten funds has a perfect score of 10 on the transparency issue (see appendix 1).

Indeed, if these funds do not follow a buy-and-hold strategy, the magnitude of their trades has the potential to increase the volatility of markets. As such, they can be considered a destabilizing force and, therefore, deserving of close supervision and regulation. On the other hand, if their behavior is dictated by disciplined long-term investment strategies, they can be net contributors to the stability of markets, and could help reduce market volatility. The latter is advocated by Pimco's Mohammad El-Erian: "Patient nature of their large capital pools and the long-term nature of their objective functions are the best set of investment characteristics for virtually all global investors." (El-Erian, 2010).

The former scenario, and its attendant implications, have often been forwarded (and more vigorously so) when SWFs have been observed to increase their equity investment and their influence in the corporate governance of the companies involved. In response, lawmakers in the countries involved have called for new regulations and higher transparency. In a few cases there have even been calls for quantitative disclosure of the investment strategies, outcomes, nature, and the location of actual investments (Truman, 2007).[3]

Given these arguments, one would expect a bountiful supply of academic research on the topic. However, with a few exceptions, the issue has not been adequately dealt with. Interestingly, some of the writings that do exist also incorporate and refer to the dialogue in the political arena. For example, Gilson and Milhuapt (2008), state that "...the principal concern with SWF equity investments is that they may have a significant strategic element driven by self-interest. The fear is that SWFs will use their influence on portfolio companies to secure technology (a concern raised explicitly in the discussion of the Abu Dhabi fund's investment in AMD), gain access to natural resources, improve competitive positions for domestic companies, or in a fashion that has national security concerns for the portfolio company's country of incorporation." As a potential solution to this problem, Gilson and Milhuapt propose that the voting rights of SWF entities be suspended, although they also recognize that the "influence can be exercised by means other than voting; "a significant shareholder need not always cast a vote to sway management."

Baron, Papaioannou, and Petrova (2010) analyze the investment strategy of commodity-based SWFs and link them to the macroeconomic variables of their home countries. However, their analysis is more normative than positive. They argue that in order for SWFs to "perform well in most states of the world," they should consider using the mean-variance Markowitz type model as a good start and complement it with an appropriate method for risk management. To this end, they emphasize investments that are negatively correlated with the SWF country's economic growth. For example, for oil-based SWFs and particularly the oil producing countries with "narrow economic bases", they recommend a bias towards US assets.

This objective-based strategic asset allocation is also in line with the work of Xiang, Wang, Kong, and Li (2009), who propose four different strategic asset allocations based on the characteristics of the underlying economies of the respective countries. Therefore, given that the oil-based countries are vulnerable to global economic conditions, a heavy investment in long-

[3] However, it should be noted that in most cases, these funds do not attempt to take control of the companies they invested in. For example, when in December 2009 the Chicago-based Hyatt Hotels, disclosed that Abu Dhabi Investment Authority (ADIA) has bought 4.8 million (10.9%) of Hyatt's Class A common shares, it was also announced that ADIA intends to remain minority shareholder.

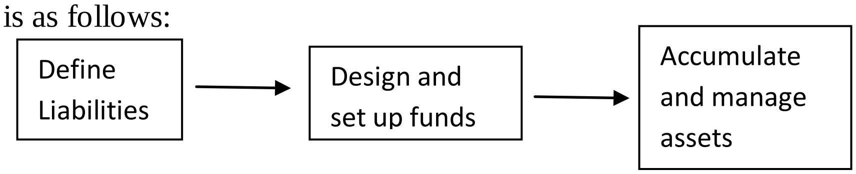
term bonds is proscribed. For net importers of oil and primary commodities, on the other hand, investing in industries that are linked to these commodities is more appropriate. Countries with a long-term horizon should invest in stocks and other long term assets, and those seeking long-term real returns need to invest in TIPS products. The authors further argue that SWFs' investment, and asset mamagement strategies, are more systematic and goal-dependent than many other institutions. In support of their argument they report finding that with shorter-horizon funds invest in short-term and low risk portfolios, while other SWFs adopt longer term, higher risk, investment strategies. Funds with defined liability, in contrast, focus their strategy on asset-liability matching and balance-sheet risk management.
Bernstein, Lerner, and Schoar (2009) investigate SWFs' direct investments in private equity and report several interesting patterns. Consistent with the results reported by Chhochharia and Laeven (2009), they find evidence in support of the presence of a home bias. However, they also report that there is a greater likelihood of home bias where politicians are involved in the management of funds compared to where external managers are the decision makers. Additionally, funds managed by politicians tend to invest in high P/E ratio industries, which experience a negative valuation change one year after their investments. Independent professional managers, on the other hand, tend to invest in low P/E ratio assets that experience a positive value change a year later. They conclude that, overall, "SWFs seem to engage in a form of trend chasing" investment activity. Further, "they are more likely to invest at home when domestic equity prices are higher, and invest abroad when foreign prices are higher."
None of these studies are, however, conclusive in providing us a picture of the behavioral and political motives of the SWFs. This study is designed to shed light on the investment behavior of these entities. We attempt to disentangle facts from fiction, and examine the industry, with an in-depth analysis of two of these funds.

Characteristics and Types

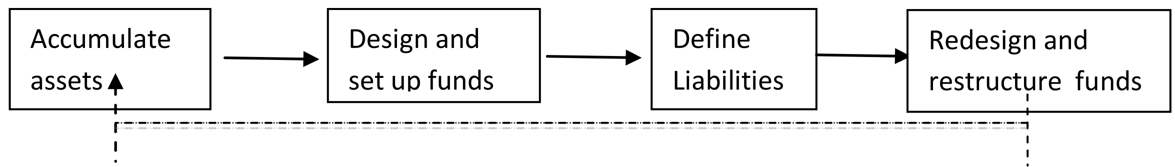
Arguably, the most commonly accepted definition of SWF, is the one adopted by the Sovereign Wealth Fund Institute: "state owned investment fund composed of financial assets such as stocks, bonds, real estate or other financial instruments funded by foreign exchange assets" (SWF Institute, 2011). As of early 2011, these funds had over $4.1 trillion in assets under management, with the ten largest, SWFs holding 79% of total assets. (See Figure 1.) Virtually, all analysts expect these funds and their influence to grow. However, the rate of their asset growth is subject of some disagreement. Some estimates suggest that assets under their management will reach the $12-15 trillion range by 2015[4]. However, Baldwin (2008) maintains that because of a lack of sufficient information these figures are exaggerated.
All sovereign wealth funds share the state ownership feature. However, when it comes to many other characteristics, they are anything but homogenous. Among others, these include the nature of operations, objectives, investment horizon, risk-return profile, asset allocation, and risk tolerance. Their heterogeneity, therefore, makes it difficult to lump them all into one category. Nonetheless, good insight can be had if one starts with gaining an understanding of the purpose for which the fund was set up. As Rozanov (2007) points out, when the required cash outlays and their timing is known with a good degree of certainty, as it is in the case for traditional funds (pension funds, endowment funds, etc.), the process of optimizing funding policies, asset allocation, and risk management follow in a natural progression; all subject to the constraints

[4] Morgan Stanley Global Research (2007).

imposed by the nature of their funds or their governing bodies. Therefore the sequence of events is as follows:



However, when it comes to sovereign wealth funds the process is often not the same. For example, commodity exporting economies may experience unexpected windfall revenues from a positive terms-of-trade shock. This often results in a redesigning of the structure of assets to adjust to the new source of funding. In such cases, the previously identified sequence of events reverses order, with a subsequent 'normalization' of the process at the end.



Following this process, and starting with the nature of liabilities, SWFs can be divided into the five categories of funds: (1) Stabilization/Buffer, (2) Endowment, (3) Pension Reserve, (4) Development, and (5) Government Holdings Management. In a slightly different fashion, Mehrpouya, Huang, & Barnett (2009) divide SWFs into the following six categories:

Types of SWFs	**Objective**	**Attributes**	**Examples**
Stabilization Funds	Aim to insulate the budget and the economy against commodity (usually oil) price swings and crises	Short- to mid-term investment time horizon	Russian Reserve Fund
Intergenerational Wealth Transfer Funds	Aim to convert nonrenewable assets into a more diversified portfolio of assets	Long term	KIA; GPFG (Government Pension Fund Global)
Reserve Investment Corporations	Assets are often still counted as reserve assets, and are established to increase the return on reserves	Long term – more aggressive return requirements	China Investment Corporation (CIC); Government of Singapore Investment Corporation (GIC)
Development Funds	Help fund socioeconomic projects or promote industrial policies that might raise a country's potential output growth	Socially focused – less focus on returns	Nordic Development Fund; European Development Fund
Contingent Pension Reserve Funds	Provide (from sources other than individual pension contributions) for contingent unspecified pension liabilities on the government's balance sheet	Mostly long term; risk appetite and investment time horizon dependent on the trends and timeline of the pension liabilities	Australian Government Future Fund (AGFF)
Government Asset Manager	Primarily manage formerly government-owned companies on behalf of the government	Long-term strategic investor – large stakes	Temasek Holdings (Temasek)

However, neither systems is capable of correctly classifying all funds. For example the Norway Pension Fund would have elements of both “pension reserves” and “intergenerational wealth transfer”. Regardless of these differences, SWFs have important common characteristics:

1. Typically, they are established to invest government funds.
2. With the exception of stabilization funds they have long-term investment horizon.
3. They all have increased their equity investment, which has also increased their influence in corporate governance of the companies involved.

To deal with concerns over the political motives of SWFs, the International Working Group of Sovereign Wealth Funds has created the *Generally Accepted Principles and Practices – Santiago Principles* (IWG, 2008). These principles can be regarded as a framework, providing SWFs guidance for appropriate governance and accountability agreements, and for the implementation of appropriate investment practices. These principles, in essence, were developed to foster trust and confidence that SWFs act and behave like other investment funds. That is, they are driven by the motive to maximize the return on invested capital, and that their investments are devoid of political agenda.

Further, in an apparent attempt to nudge its member funds toward higher degrees of transparency, the SWF Institute has been utilizing the Principles of the Linaburg-Maduell Transparency Index to measure and report member funds’ efforts on that front (SWF Institute, 2010). This index is based on ten indicators of transparency, each assuming a binary value. Measured in this manner, the SWF Institute classifies a fund as “transparent” if it achieves a minimum rating of eight points. Table 1 shows the ten rating principles.

Investment Strategies

When it comes to an evaluation of the investment strategies employed, SWFs are as a heterogeneous of a group as any other, with the type of fund as the best predictor of their strategy. Nonetheless, it can be safely generalized that most SWFs have long-term investment horizons and attempt to achieve long-term stable revenues from their investments in capital markets (Xiang, Wang, Kong, & Li, 2009).

Asset Allocation:
SWFs’ asset allocation models vary from the very traditional to the more advanced cathegory (IMF, 2008). A few invest only in highly rated government securities, but most invest in several different asset classes. The majority of SWFs invests in a mix of equity and fixed income assets, while many also invest in private equity, real estate and alternative investments. According to a 2008 IMF survey, all SWFs make investments in fixed income assets, 60 % in public equities, 40 % in private equity and real estate, and only about 20 % in commodities (see Figure 2).
Results of the same IMF survey indicate that a typical fund now invests 40–70% of its funds in equity, 4–10% in private equity funds, 13–40% in fixed income, 2–5% in infrastructure, 2–5%in commodities, and 8–10% in real estate. Therefore, it can be concluded that over time: (1) SWFs have moved away from the US Government long-term bonds, (2) have increased their allocation to equity investments, (3) have increased diversification by moving into

alternative investments, (4) have migrated from a purely passive management style to a more active and dynamic one.

Sector Allocation:
SWFs invest in a broad range of industries. However, financial services and real estate are usually overweighed. Their investments in the finance sector are, however, not limited to banks. They also invest in alternative assets such as hedge funds, asset management companies, private equity investment firms and the operators of stock exchanges (Xiang, Wang, Kong, & Li, 2009). Further, all indicators are that, following the 2008 global financial crisis, many of these funds have increased their exposure to the financial services sector. In some cases, they have played a role as the rescuer of last resort. SWFs have also increased their investments in strategic sectors such as energy companies, the operators of ports, and financial exchanges in America and Europe, stirring a debate about their political objectives. Motivated partly to avoid being forced to discuss their objectives, some of these funds have self-imposed limitations on their sector allocation. The Chinese Investment Corporation (CIC), for example, has indicated it does not plan to invest in sensitive industries such as airlines, telecom, tobacco or weapons by any manufacturers.

Geographic Allocation:
As a general rule, sovereign wealth funds have a heavy home and regional bias in their investments. Chhaochharia and Laeven (2009) find that SWFs "tend to invest in countries with common cultural traits." They argue that this bias is driven by a pre-disposition by all investors to invest in the "familiar". However, they hypothesize that the cultural bias of SWFs is more pronounced than that of other funds. Bernstein, Lerner, and Schoar, (2009) report findings in support of the presence of the home bias. They further report that there is a greater likelihood of home bias when politicians manage these funds.
Two other explanations for this observed home bias have also been offered. One is based on the diversification principle and the other on information arguments. The former posits that a nation with a narrow base of economic activities (e.g., an oil-based economy) can, and should, diversify its economic base by investing in unrelated businesses that broaden its local economic base. Abu Dhabi's investments in the financial services industry are often offered as a good example of such an approach (e.g. see Balding 2008).
The latter reason is based on the difficulty and the cost of investing beyond the country's (or region's) borders. Advances in technology have significantly reduced the barriers to the free flow of capital between nations. Nonetheless, the "asymmetry of information between local and non-local investors", the differential information acquisition costs, and the incremental political and foreign currency conversion costs, create a net advantage for domestic investments relative to the international ones. In this spirit Coval and Moskowitz (1999) attribute the home (and region) bias more to the geographic distance than to the political boundary. Disadvantaged in terms of access to information, and the ability to recruit talented managers and employees, SWFs shy away from the international setting in favor of home investments. Both explanations are useful in describing the reasons for a greater likelihood of home bias when politician manage these funds.
Whatever the motives, the home and regional biases are ever present. Contemporary examples include the August 2010 attempt by the Malaysian government to call on the member countries of the Islamic Development Bank to establish "the world's first supra-

sovereign wealth fund" for the purpose of investing in Muslim economies, as well as the French President Nicolas Sarkozy's similar call (following the 2008 global financial crisis) to the European countries to set up a European Sovereign Wealth Fund to invest in capital-hungry European firms.

Ownership:
Although most SWFs do not hold majority stake in individual companies, they often do exercise their voting power. The Norwegian Pension Fund, for example, uses its voting rights in more than 90% of the occasions that call for stockholders' vote. In terms of concentration of holdings, 70% of the SWFs included in the IMF survey confirm that they have large holdings of particular firms, often along with their other portfolio holdings. Only two of the SWFs state that they are pure portfolio investors. These funds often use their voting power to have some control over the governance of the companies they own.

Management:
Due to lack of in-house capacity to invest in certain asset classes (Mehrpouya, Huang, & Barnett, 2009), most SWFs do not have in house managers and use external managers for their investments. Thus, the SWFs rely on external fund managers to implement their strategic asset allocation in areas where their capacity is limited. Another reason to use external managers is to avoid the potential discussion of the investment and how the SWFs execute their voting rights (Xiang, Wang, Kong, & Li, 2009). As funds grow, their tendency for having in-house managers grows as well. For example, the Norwegian Fund now manages about 83% of its assets.

Analysis

In this section we analyze the investment behavior of SWFs through an evaluation of their investment activities, as reported by the companies in which they have made investments. To this end, we utilize the OSIRIS ownership database. This database identifies the investors in all publicly traded firms, within a jurisdiction, who hold more than a certain percentage of shares in those firms[5]. Relying on the International Security Identification Number (ISIN), to determine the home country for each company, we evaluate the ownership data of public companies in 46 countries searching for sovereign wealth funds as owners[6]. Altogether, the search for owners of public companies in these 46 countries resulted in the identification of 15 sovereign funds with ownership in publicly traded companies surpassing the minimum reporting requirements.

[5] The minimum percentage ownership beyond which firms have to identify the owner is usually low, but varies for different countries. The lowest minimum is 2% in Italy and the highest minimum is 25% in Russia. See Schouten and Siems (2010) for a listing of the thresholds in various countries.

[6] The 46 countries included consist of Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Republic of Korea, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Kingdom, and United States.

It should be noted that the, so obtained, ownership reports add up to just a portion of the total assets under control of each fund, and that in some cases this portion is very small (see Table 2). The missing portion is comprised of three components. First, investments in privately held corporations that are not subject to ownership disclosure requirements. Second, investments in publicly traded firms that are below the threshold triggering disclosure reports. Finally, the funds' domestic and regional investments in countries not covered in our database, or those that do impose ownership disclosure requirements.

In order to determine if these funds follow a strategy of concentrating their investments in certain industries, we calculated each fund's Herfindahl Concentration Index. The results are reported in Table 3. Results for 2009 indicate the presence of high concentration of investments in certain industries by a few funds; while UAE's RAK Investment Authority invests exclusively in diversified metal and mining firms, China Investment Corporation and Investment Corporation of Dubai invest almost all their funds in banks and financial services firms. We note, however, that although these results are influenced by the absence of data for other investments, they are indicative of a presence of heavy concentrations where data is available. Nonetheless, given that these concentrations are calculated based on small fractions of total assets invested, the resulting indexes tend to overestimate their true underlying values. Therefore, we suspect that had it been possible to obtain the entire data for each fund, the resulting concentration indexes would have assumed smaller values. It is also worthwhile to note that, for the four funds with data availability for 2005 and 2007 (Abu Dhabi Investment Authority, Government of Singapore, Kuwait Investment Authority, and Temasek Holdings), concentration ratios show a pattern of steady decreases over time.

We next examine the geographic concentration of these funds by calculating Herfindahl Index for the geographic distribution of their asset allocation. As shown in Table 4, the data indicates the presence of high geographic concentrations in a few funds: UAE's RAK Investment Authority has an exclusive concentration of investments in Australia, as does the Australia Future Fund; Sovereign Fund of Brazil and Alberta Heritage Fund have an exclusive concentration in their respective countries of Brazil and Canada; and the Investment Corporation of Dubai has an almost exclusive concentration of its investments in the US. We note that while concentration indexes are driven by the regional and domestic preferences of these funds, the fact that we only work with a small fraction of these funds' investments creates an upward bias in these calculated indexes. Here, again, had it been possible to obtain the entirety of ownership data for these funds, lower concentration indexes would have been observed. Further, for the three funds with data availability for 2005 and 2007 (Government of Singapore, Kuwait Investment Authority, and Temasek Holdings), geographic concentration ratios show a pattern of steady decreases over time.

Given the more stringent disclosure requirements that prevail among the G8, it may be instructive to further evaluate the industry and geographic concentration of SWFs that operate within the jurisdictions of theses countries. Calculations of Herfindahl Concentration Index for industry and geographic concentrations (among the G8 countries) are reported in Tables 5 and 6, respectively. As can be seen in Table 5, only 11 of the 15 funds were found in the ownership database of the G8 countries. Here, again, we find high concentrations in certain industries with Alberta Heritage Fund investing exclusively in agricultural products and the Abu Dhabi Investment Fund investing exclusively in specialized finance. As we did in explaining the results for the entire sample in Table 3, we hypothesize that the high concentration indexes are partly attributable to the lack of the availability of all investment data for these funds. (Availability of data on investments in privately held corporations that are not subject to ownership disclosure requirements; investments in publicly traded firms that are below the threshold triggering disclosure reports; and the funds' domestic and regional investments in countries not covered in our database, or those that do impose ownership disclosure requirements would have resulted in lower estimates of these indexes.) We further note that for the four funds with data availability for 2005 and 2007 (Abu Dhabi Investment Authority, Government of Singapore, Kuwait Investment Authority, and Temasek Holdings), concentration ratios show steadily decreasing patterns over time. Table 6, shows the geographic distribution of ownership of these funds among G8 countries. These results indicate the presence of high geographic concentrations of a few funds: Investment Corporation of Dubai has an exclusive concentration of investments in the US, while Alberta Heritage Fund has its concentrated in Canada. Kuwait Investment Authority, and Temasek Holdings have more than 80% concentration in the U.K., and France's Strategic Investment Fund more than 80% inside that country. Here, too, it should be noted that while concentration indexes are driven by the regional and domestic preferences of these funds, the fact that we only work with a small fraction of these funds' investments tends to create an upward bias in these calculated indexes. Finally, note that for the three funds with data availability for 2005 and 2007 (Government of Singapore, Kuwait Investment Authority, and Temasek Holdings), geographic concentration ratios show a pattern of steady decreases over time.

An Examination of Two Sovereign Wealth Funds

Temasek Holdings: The fund dates back to 1974 when it was established in order to manage Singapore government's investments in local industry. The fund's charge was later expanded to include holdings in the global markets as well. To finance its new investments, the fund relies upon dividends received from existing investments, proceeds from divestments, and commercial loans (Temasek Holdings, 2009). The fund operates as an independent investment holding company, with the Ministry of Finance as the sole shareholder. Although it operates as an arm of the Government of Singapore, it has its own independent board of directors.

Investment Strategy: The fund invests primarily in equity market and has a strong regional and country bias. As of March 31, 2010, the fund had 78 % of its investments in Asia (up from 74% in 2009) with a main focus on Singapore (32% in 2010, up from 31% in 2009). The remaining 22 % is invested in OECD economies (20%) and other parts of the world (2%) such as Latin America, Eastern Europe, the Middle East and Africa (see Table 7, Panel A). Temasek Holdings defines its investment strategy as centered around four themes Transforming Economies, Growing Middle Class, Deepening Comparative Advantages, and Emerging Champions (Temasek Holding, 2010). This gives rise to a strategy of investing in companies and industries that are believed to be able to sustain economic growth because their growths are positively correlated with one or more of these four themes. The fund believes that this strategy will result in obtaining higher long-term risk-adjusted returns.

Asset Allocation: A broad range of industries make up Temasek's portfolio with the financial services sector claiming the lion's share. As of March 31, 2010, 37% of its $186 billion investment was allocated to this sector (up from 33% in 2009). The other major components are telecommunication, media & technology (24%), transportation & industrials (18%), life sciences, consumer products & real estate (11%), energy & resources (6%), and other (4%). Its heavy emphasis on the financial services firms is rooted in Temasek's management's belief that the sector driven by continued strong demand for the financial services products by the Asian middle class population (see Table 7, Panel B) has the best potential for continued high growth.

Ownership: Temasek appears to be fairly active in the corporate governance of the firms making up its portfolio, and possibly more so than other SWFs. Its holdings consist of blocks of 20% or more in the equity of 43% of its listed investments (Table 7, Panel C). The fund appoints individuals to the boards of directors of these firms and utilizes its voting power. Therefore, in many ways Temasek seems different than the average SWF. It is an active investor that attempts to make strategic purchases and become involved in the corporate governance of the companies it acquires. At the same time Temasek shares some of the general features of all SWFs; it is a long-term investor, does not have any short-term liabilities, holds many different assets, its largest holdings are in the financial services sector.

The Government Pension Fund Global: This is the largest investment mandate of the Norges Bank Investment Management (NBIM) that manages the fund on behalf of the Norwegian Government. It was set up in 1990 to undertake long-term management of the country's petroleum revenue (NBIM, 2010). It is the second largest Sovereign Wealth Fund in the world, which holds more than 12% of all assets under management of SWFs. (Prior to 2006, the fund's official name was the "Petroleum Fund".) Although the fund was established as a fiscal policy tool for the government to deal with the fluctuation in the oil prices, it has been designed in a manner that makes it possible for the government to draw from it should it be determined that such withdrawals are required in order to deal with the needs of the country's aging population. Therefore, this fund can be categorized as an "intergenerational wealth transfer" fund.

Investment Strategy: The investment objective of the fund is to maximize return with moderate risk. The risk level is set by the Ministry of Finance (Caner and Grennes, 2008). Owing to the long-term nature of its liabilities, it has a much longer investment horizon when compared to the average household or institutional investor. The fund has a high risk-bearing capacity because there is no concrete commitment linked to the asset pool and no short-term liquidity requirements (Norwegian Ministry of Finance, 2009). Further, the fund strives to hold a diversified portfolio consisting of investments in firms that follow specific ethical guidelines in the course of conducting their business. As a result, over the course of the last few years, a number of large multinational firms, including Boeing, Rio Tinto and

Wal-Mart, have been removed from the portfolio because of various violations of the fund's ethical guidelines.[7]

Asset Allocation: As shown in Table 8, the current target asset allocation model of the fund calls for weights of 60% equity, 35% fixed income, and 5% real estate[8]. As of May 2010, its fixed income portfolio consisted of 60% investment in Europe, 35% in America and 5% in Asia and Oceania. The equity portfolio was made up of 50% investment in Europe, 35% in Americas and 15% in Asia and Oceania (Norwegian Ministry of Finance May 2010)[9]. Unlike Temasek, which routinely holds a minimum 20% stake in firms that it invests in, the Government Pension Fund used to restrict its investments in individual companies to less than 5% of the equity outstanding. However, this limit was raised to 10% in 2008 (Norwegian Ministry of Finance, 2009). The Fund's benchmark portfolio consists of almost 7,700 companies across 46 countries. Its benchmark index for bonds includes more than 10,000 individual securities across some 1,600 issuers in the currencies of 21 different countries. As a consequence of the low percentage stake held in each company, and the well-diversified portfolio that it holds (made up of a large number of different assets) its investment style can be best characterized as passive (or indexing). Nevertheless, parts of the fund's assets are also managed actively through investments in securities other than the ones in their respective benchmark portfolios[10].

Sector allocation: The fund is diversified across many sectors. However, like many other SWFs, the financial sector is overweighed by 23.1%. This is followed by industrials (12.6%), consumer goods (11.7%) and oil and gas (9.8%) sectors. Table 8 shows these details.

A Comparison of Temasek and the Government Investment Holding Company:
Whereas Temasek was established to manage companies that were formerly owned by the Government of Singapore (i.e., designed to become a government investment holding company), the Norwegian Fund was originally established as a fiscal policy tool. However, the latter's orientation was subsequently altered to fit the purpose of transferring some of the wealth created by its petroleum revenue to the country's future generations.

When compared on the basis of investment strategy, Temasek's can be best described as active, and the Norwegian Fund's as passive (with an active element built in). Further, whereas Temasek gets actively involved in the corporate governance of its invested firms, the Norwegian Fund shies away from such involvement. However, the latter avoids (or divests of) those firms that are not governed well, as judged by a set of ethical guidelines.

In terms of asset allocation, the Norwegian Fund is mainly invested in publicly traded equity and fixed income, with real estate as a recent addition to its benchmark's classes of assets.

[7] For a comprehensive example of companies that are excluded see http://www.swfinstitute.org/swfs/norway-government-pension-fund-global/

[8] Prior to 2007 the equity weight was limited to 40%. Raising the upper limit for equity investments from 40% to 60% and allocating up to 5 % of the fund's capital to real estate (first real estate investments having been made in 2010), were the two most important changes in the last few years.

[9] Caner & Grennes (2008) argue that the fund has become more exposed to risk over time, and refer to the losses caused by holdings of Lehman Brothers assets in 2008 as an evidence for this increased exposure. Of course, part of the increase in risk is due to the lifting of the equity weight in the benchmark from 40% to 60%.

[10] However, the Ministry of Finance has established an upper limit of 1.5% tracking error.

Temasek's investments, on the other hand, are almost entirely in equities, and a large portion of these investments is in privately held firms.

The difference in these two funds' desire to exercise their ownership rights may be best explained by the stakes they maintain in individual firms. With more than 43% of its investments, Temasek holds an equity stake of more than 20% of the shares. The Norwegian Fund, however, limits itself to less than 10%, and in most cases its investments do not approach that limit. Temasek, therefore, positions itself to control the companies by vigorously exercising its voting rights (see, for example, Mehrpouya, Huang, & Barnett, 2009). Although the Norwegian fund exercises its voting rights to safeguard its interest and to encourage ethical, social and environmental standards in corporate governance, its small minority stake limits its ability to do so effectively.

Both funds have their largest investments in the financial services sector. However, it appears that the Norwegian Fund keeps a more balanced holding between sectors than does Temasek. Further, both funds have regional biases, and hold the majority of their investments in their respective local regions. The Norwegian Fund does not invest in Norway but keeps over 50% of its investments in Europe. Temasek, on the other hand, invests 78% of its capital in Asian assets. As such, it is reasonable to conclude that Temasek has a higher country (and regional risk) exposure than does the Norwegian Fund. Finally, both of these funds have a long-term investment horizon.

Summary and Concluding Remarks

In this study we analyze sovereign wealth funds through a close examination of their characteristics, practices, strategies and their other features. To gain better insight into their strategy, we also examine their holdings through an evaluation of the information extracted from ownership disclosure requirements imposed on firms headquartered in 46 different countries. Further, we perform an in-depth analysis of two of these funds: Temasek and the Government Pension Fund of Norway, both enjoying the highest transparency index of 10.

Depending on the nature of their liabilities, SWFs can be divided into five distinct groups. However, they all share a few important common characteristics: Their investment horizon is much closer to the long-term end of the spectrum, they have a higher than average degree of risk tolerance, and in their investment decisions are more geared toward stability as opposed to turnover. They all have reduced their portion of investments allocated to fixed income in favor of larger allocations to equities. Some have also added other asset classes such as real estate, private equity, and other alternative investments to their allocation models. Finally, they exhibit a tendency toward a more active investment style and more active involvement in corporate governance of firm they invest in.

Our analysis of these funds' holdings indicates the presence of heavy industry concentration for some of these funds. Although, the Herfindahl Index that this conclusion is based on may be upwardly biased, these funds' tendency to heavily invest in the financial sector is well supported even through a casual observation. Interestingly, where data is available, we detect a clear pattern of reduction in these degrees of concentration. Further, our calculated Herfindahl index indicates the presence of heavy geographic concentration for some of these funds, which confirms the presence of a domestic and regional preference for some of these funds. Here, too, where date is available, we detect a clear pattern of declining concentration over time. When we limit our analysis to the investment holdings of SWFs in G8 countries, we observe heavy, but declining, geographic concentration in the US and UK, as well as a heavy concentration in the financial services sectors.

Sovereign wealth funds are not of the plain vanilla type that can be easily understood. Their opacity adds further complication to the process of a complete analysis. Therefore, it is not surprising that their investment motives are often subject of political controversy. If there are any, our analysis fails to uncover the presence of disruptive effects, which can be attributed to their investment behavior. To the contrary, it can be argued that the relatively long investment horizon of these funds, acts as a stabilizing force, and specially so at times of high market volatility. Nonetheless, these funds should take greater steps toward a high degree of transparency.

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Table 1: Principles of the Linaburg-Maduell Transparency Index

Point	Principles of the Linaburg-Maduell Transparency Index
1	Fund provides history including reason for creation, origins of wealth, and government ownership structure
1	Fund provides up-to-date independently audited annual reports
1	Fund provides ownership percentage of company holdings, and geographic locations of holdings
1	Fund provides total portfolio market value, returns and management compensation
1	Fund provides guidelines in reference to ethical standards, investments policies and enforcer of guidelines
1	Fund provides clear strategies and objectives
1	If applicable, the fund clearly identifies subsidiaries and contact information
1	If applicable, the find identifies external managers
1	Fund manages its own web site
1	Fund provides main office location address and contact information such as telephone and fax number

Source: SWF Institute, 2010

Table 2: Total Assets of Sovereign Wealth Funds and the Percentage of Their Assets Retrieved From OSIRIS.

Fund	Country	Assets (Billion)[1]	Percentage of Total[2]
Abu Dhabi Investment Authority	Abu Dhabi (UAE)	$627.0	0.54%
Alberta Heritage Fund	Canada	$14.4	2.10%
Australian Future Fund	Australia	$67.2	8.63%
Brunei Investment Agency	Brunei	$30.0	2.33%
China Investment Corporation	China	$332.4	10.20%
Government of Singapore	Singapore	$247.5	0.97%
Government Pension Fund - Global	Norway	$512.0	44.94%
Investment Corporation of Dubai	Dubai (UAE)	$19.6	5.61%
Kuwait Investment Authority	Kuwait	$202.8	3.55%
New Zealand Superannuation Fund	New Zealand	$12.1	19.83%
Public Investment Fund	Saudi Arabia	$5.3	22.64%
Qatar Investment Authority	Qatar	$85.0	13.53%
Rak Investment Authority	UAE	$1.2	10.83%
Sovereign Fund of Brazil	Brazil	$8.6	11.63%
Strategic Investment Fund	France	$28.0	82.86%
Temasek Holdings	Singapore	$133.0	51.22%

1- Sovereign Wealth Fund Institute (January 2011).
2- Based on 2009 data.

Table 3: Herfindahl Concentration Index for Industry Distribution of the SWFs

Fund	Concentration Index			Largest Share in 2009
	2005	2007	2009	
Abu Dhabi Investment Authority	100%	87.4%	20.2%	IT Consulting & Services, 27%
Alberta Heritage Fund	NA	NA	100%	Agriculture
Australian Future Fund	NA	NA	29.2%	Integrated Telecom Services,51%
China Investment Corporation	NA	NA	99.7%	Diversified Banks, 99.8%
Government of Singapore	100%	22.6%	15.6%	Diversified REITs, 23%
Government Pension Fund - Global	NA	4.2%	2.6%	Diversified Banks, 9%
Investment Corporation of Dubai	NA	NA	99.9%	Specialized Finance, 99.9%
Kuwait Investment Authority	90.7%	32.5%	24.6%	Automobile Manufacturers, 75%
New Zealand Superannuation Fund	NA	NA	7.2%	Airport Services, 17%
Public Investment Fund	NA	21.2%	5.0%	Diversified Banks, 34%
Qatar Investment Authority	NA	47.8%	34.2%	Automobile Manufacturers,52%
Rak Investment Authority	NA	NA	100%	Diversified Metal &Mining
Sovereign Fund of Brazil	NA	NA	19.8%	Steel, 33%
Strategic Investment Fund	NA	6.9%	8.4%	Diversified Banks, 21%
Temasek Holdings	100%	22.6%	16.9%	Integrated Telecom Services, 30%
All Funds			5.4%	Diversified Banks, 19%

Table 4: Hertfindahl Concentration Index for Geographic Distribution of SWFs

Fund	Concentration Index			Largest Share in 2009
	2005	2007	2009	
Abu Dhabi Investment Authority	NA	NA	22.7%	India, 29%
Alberta Heritage Fund	NA	NA	100%	Canada
Australian Future Fund			99.3%	Australia,99%
China Investment Corporation			86.7%	China,92%
Government of Singapore	100%	72.1%	20.7%	India,34%
Government Pension Fund - Global	NA	24.5%	13.9%	Argentina,2%
Investment Corporation of Dubai	NA	NA	99.9%	USA, 99%
Kuwait Investment Authority	100%	44.0%	50.7%	U.K., 57%
New Zealand Superannuation Fund	NA	NA	27.2%	New Zealand,43%
Public Investment Fund	NA	100%	51.8%	Malaysia,64%
Qatar Investment Authority	NA	67.7%	42.9%	Germany,51%
Rak Investment Authority			100%	Australia
Sovereign Fund of Brazil			100%	Brazil
Strategic Investment Fund	NA	83.1%	59.2%	France, 76%
Temasek Holdings	100%	72.1%	47.6%	Singapore, 65%
All Funds			8.5%	United Kingdom, 15%

Table 5: Herfindahl Concentration Index for Industry Distribution of SWFs within the G8

Fund	Concentration Index			Largest Share in 2009
	2005	2007	2009	
Abu Dhabi Investment Authority	100%	87.4%	30.9%	Other Financial Services, 45.0%
Alberta Heritage Fund	NA	NA	100%	Agricultural Products
Government of Singapore	100%	22.6%	18.6%	Diversified Banks, 38.3%
Government Pension Fund - Global	NA	4.3%	2.7%	Integrated Oil & Gas, 9.1%
Investment Corporation of Dubai	NA	NA	100%	Specialized Finance
Kuwait Investment Authority	90.8%	32.5%	24.6%	Automobile manufacturer, 37.9%
New Zealand Superannuation Fund	NA	NA	8.1%	Retail REITs, 16.2%
Public Investment Fund	NA	21.2%	5.0%	Integrated Oil & Gas, 14.8%
Qatar Investment Authority	NA	47.8%	34.2%	Automobile manufacturer, 45.4%
Strategic Investment Fund	NA	7.0%	8.45%	Multi- Utilities, 18.7%
Temasek Holdings	100%	22.6%	18.6%	Diversified Banks, 38.3%
All funds	33.2%	4.2%	4.1%	Diversified Banks, 12.7%

Table 6: Herfindahl Concentration Index for Geographic Distribution of SWFs within the G8

Fund	Concentration Index			Largest Share in 2009
	2005	2007	2009	
Abu Dhabi Investment Authority	100%	87.4%	31.1%	France, 23.8%
Alberta Heritage Fund	NA	NA	100%	Canada
Government of Singapore	100%	72.1%	87.1%	U.K., 93.2%
Government Pension Fund - Global	NA	24.5%	24.2%	U.S., 41.6%
Investment Corporation of Dubai	NA	NA	100%	U.S.
Kuwait Investment Authority	100%	44.3%	50.8%	U.K., 57.3%
New Zealand Superannuation Fund	NA	NA	50.9%	U.S., 68.0%
Public Investment Fund	NA	100%	55.5%	U.K., 66.5%
Qatar Investment Authority	NA	67.7%	48.6%	U.K., 52.8%
Strategic Investment Fund	NA	83.2%	82.6%	France, 90.7%
Temasek Holdings	100%	72.1%	87.1%	U.K., 93.2%
All funds	93.4%	21.39%	21.67%	U.K., 29.8%

Table 7: The Breakdown of Temasek's Investments by Geographic Area, Sector and Asset Type as of March 31, 2010 ($186b)

Distribution		2009	2010
Panel A: Geographic[1]	Asia	43	46
	Singapore	31	32
	OECD	22	20
	Others	4	2
Panel B: Sectors[2]	Financial Services	33	37
	Telecommunications Media and Technology	27	24
	Transportation and Industrials	19	18
	Life Sciences, Consumer Products and Real Estate	10	11
	Energy and Resources	5	6
	Others	6	4
Panel C: Asset Type[3]	Liquid & Sub 20% Listed assets	34	34
	Listed Large Blocks (>20% share)	38	43
	Unlisted Assets	28	23

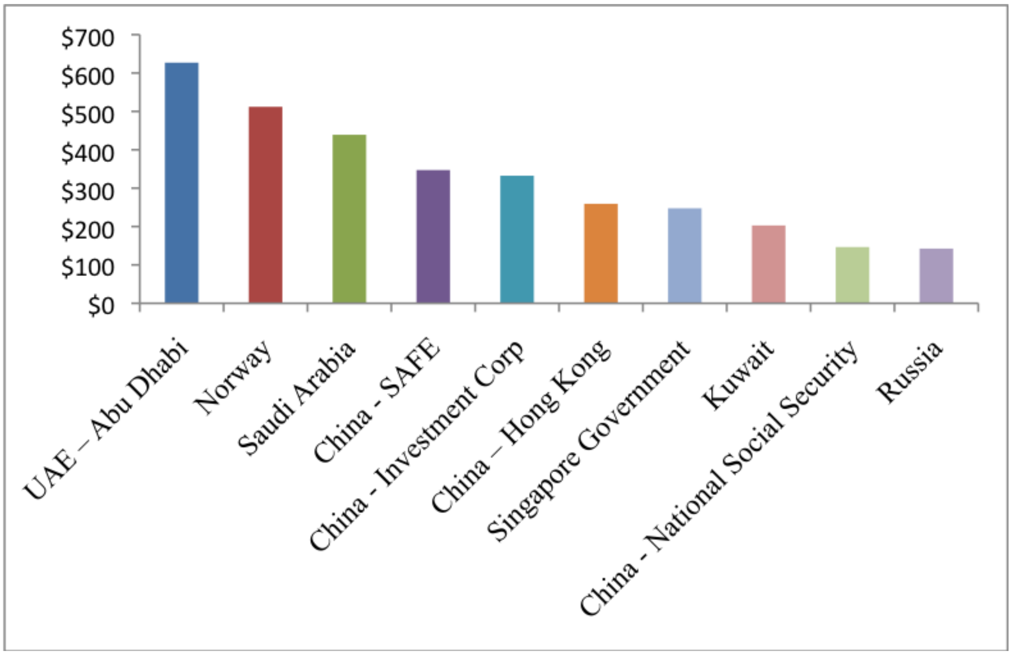
1. Source: http://www.temasekholdings.com.sg/our_portfolio_portfolio_highlights_geography.htm
2. Source: http://www.temasekholdings.com.sg/our_portfolio_portfolio_highlights_sector.htm
3. Source: http://www.temasekholdings.com.sg/our_portfolio_portfolio_highlights_liquidity.htm

Table 8: Benchmark and Diversification Goals of Norway's Government Pension Fund-Global

Strategic Benchmark for the Government Pension Fund-Global[1]									
Equities; 60%				Fixed Income; 35%				Real Estate; 5%	
America and Africa; 35%	Europe; 50%	Asia and Oceania; 15%		America; 35%	Europe; 60%	Asia and Oceania 5%			
Portfolio Diversification by Sector of Government Pension Fund- Global [2]									
Financial	Industrials	Consumer Goods	Oil & Gas	Consumer Services	Technology	Basic Materials	Health Care	Telecoms	Utilities
23.1%	12.6%	11.7%	9.8%	8.6%	8.3%	7.7%	7.6%	5.3%	5.2%

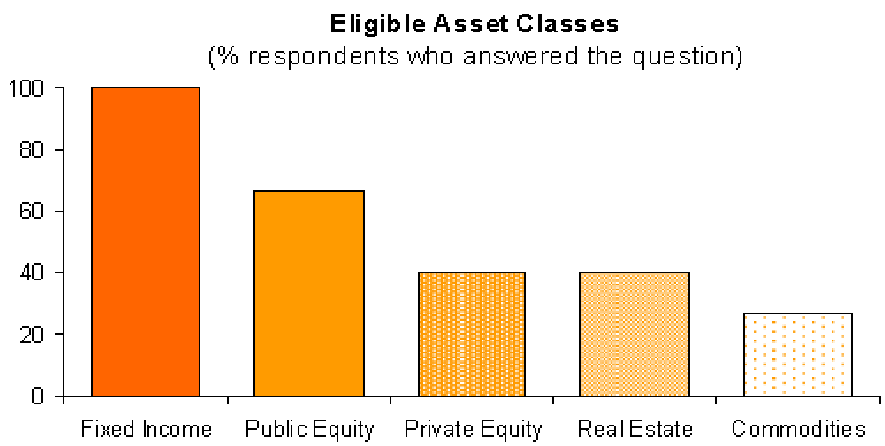
1. Source: Norwegian Ministry of Finance, May 2010
2. December 2007

Figure 1: The Ten largest Sovereign Wealth Funds, January 2011



Source: SWF Institute, 2011

Figure 2: Percentage of SWFs that Invest in Specific Asset Classes.



Source: IMF 2008

Appendix 1:
Sovereign Wealth Fund Rankings by Assets Under Management

Country	Fund Name	Assets $Billion	Inception	Origin	Linaburg-Maduel Transparency Index
UAE – Abu Dhabi	Abu Dhabi Investment Authority	$627	1976	Oil	3
Norway	Government Pension Fund – Global	$512	1990	Oil	10
Saudi Arabia	SAMA Foreign Holdings	$439.1	n/a	Oil	2
China	SAFE Investment Company	$347.1**	1997	Non-Commodity	2
China	China Investment Corporation	$332.4	2007	Non-Commodity	6
China – Hong Kong	Hong Kong Monetary Authority Investment Portfolio	$259.3	1993	Non-Commodity	8
Singapore	Government of Singapore Investment Corporation	$247.5	1981	Non-Commodity	6
Kuwait	Kuwait Investment Authority	$202.8	1953	Oil	6
China	National Social Security Fund	$146.5	2000	Non-Commodity	5
Russia	National Welfare Fund	$142.5*	2008	Oil	5
Singapore	Temasek Holdings	$133	1974	Non-Commodity	10
Qatar	Qatar Investment Authority	$85	2005	Oil	5
Libya	Libyan Investment Authority	$70	2006	Oil	2
Australia	Australian Future Fund	$67.2	2004	Non-Commodity	10
Algeria	Revenue Regulation Fund	$56.7	2000	Oil	1
Kazakhstan	Kazakhstan National Fund	$38	2000	Oil	6
South Korea	Korea Investment Corporation	$37	2005	Non-Commodity	9
US – Alaska	Alaska Permanent Fund	$37	1976	Oil	10
Malaysia	Khazanah Nasional	$36.8	1993	Non-Commodity	4
Ireland	National Pensions Reserve Fund	$33	2001	Non-Commodity	10
Brunei	Brunei Investment Agency	$30	1983	Oil	1
France	Strategic Investment Fund	$28	2008	Non-Commodity	n/a
Iran	Oil Stabilization Fund	$23	1999	Oil	1
Chile	Social and Economic Stabilization Fund	$21.8	1985	Copper	10
Azerbaijan	State Oil Fund	$21.7	1999	Oil	10
UAE – Abu Dubai	Investment Corporation of Dubai	$19.6	2006	Oil	4
Canada	Alberta’s Heritage Fund	$14.4	1976	Oil	9
UAE – Abu Dhabi	International Petroleum Investment Company	$14	1984	Oil	n/a

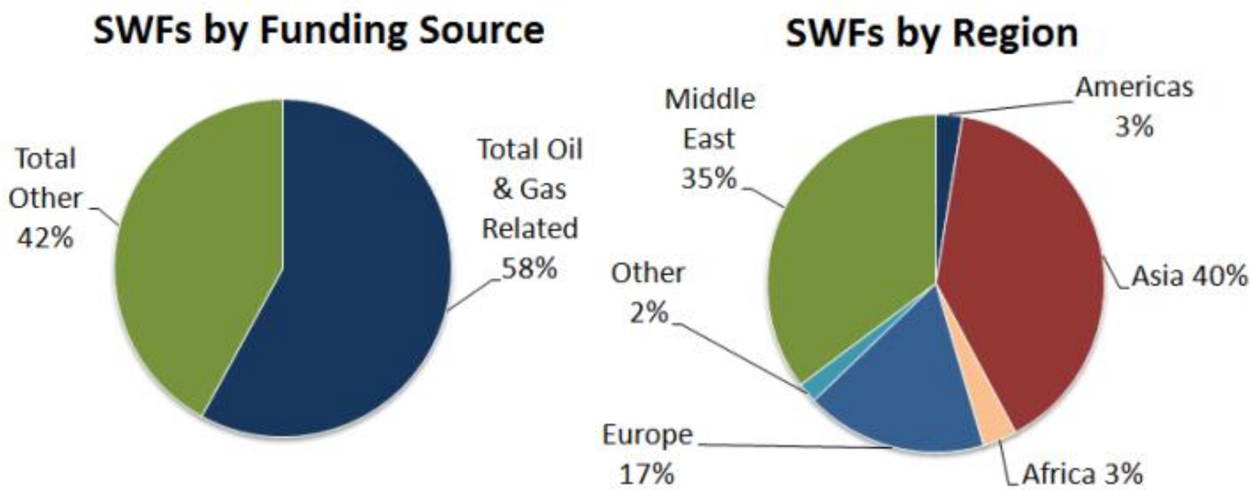
US – New Mexico	New Mexico State Investment Council	$13.8	1958	Non-Commodity	9
UAE – Abu Dhabi	Mubadala Development Company	$13.3	2002	Oil	10
New Zealand	New Zealand Superannuation Fund	$12.1	2003	Non-Commodity	10
Bahrain	Mumtalakat Holding Company	$9.1	2006	Oil	8
Brazil	Sovereign Fund of Brazil	$8.6	2009	Non-Commodity	new
Oman	State General Reserve Fund	$8.2	1980	Oil & Gas	1
Botswana	Pula Fund	$6.9	1994	Diamonds & Minerals	6
East Timor	Timor-Leste Petroleum Fund	$6.3	2005	Oil & Gas	6
Saudi Arabia	Public Investment Fund	$5.3	2008	Oil	3
China	China-Africa Development Fund	$5.0	2007	Non-Commodity	4
US – Wyoming	Permanent Wyoming Mineral Trust Fund	$4.7	1974	Minerals	9
Trinidad & Tobago	Heritage and Stabilization Fund	$2.9	2000	Oil	8
UAE – Ras Al Khaimah	RAK Investment Authority	$1.2	2005	Oil	3
Venezuela	FEM	$0.8	1998	Oil	1
Vietnam	State Capital Investment Corporation	$0.5	2006	Non-Commodity	4
Nigeria	Excess Crude Account	$0.5	2004	Oil	1
Kiribati	Revenue Equalization Reserve Fund	$0.4	1956	Phosphates	1
Indonesia	Government Investment Unit	$0.3	2006	Non-Commodity	n/a
Mauritania	National Fund for Hydrocarbon Reserves	$0.3	2006	Oil & Gas	1
UAE – Federal	Emirates Investment Authority	n/a	2007	Oil	2
Oman	Oman Investment Fund	n/a	2006	Oil	n/a
UAE – Abu Dhabi	Abu Dhabi Investment Council	n/a	2007	Oil	n/a
	Total Oil & Gas Related	$2,380.7			
	Total Other	$1,741.9			
	TOTAL	**$4,122.6**			

Source: SWF Institute, January 21, 2011

Appendix 2: Recent Sovereign Wealth Fund Market Size by Quarter**
Source: SWF Institute, January 21, 2011

Sep2007	**Dec2007**	**Mar2008**	**Jun2008**	**Sep2008**	**Dec2008**	**Mar2009**
3,190	3,130	3,300	3,789	3,927	3,976	3,587
Jun2009	**Sep2009**	**Dec2009**	**Mar2010**	**Jun2010**	**Sep2010**	**Dec2010**
3,628	3,752	3,809	3,839	3,891	3,938	4,111

**The above data has been extracted on specific dates. Market size reflects official disclosure, fund creation, investment activity, capital injections, and other variables.



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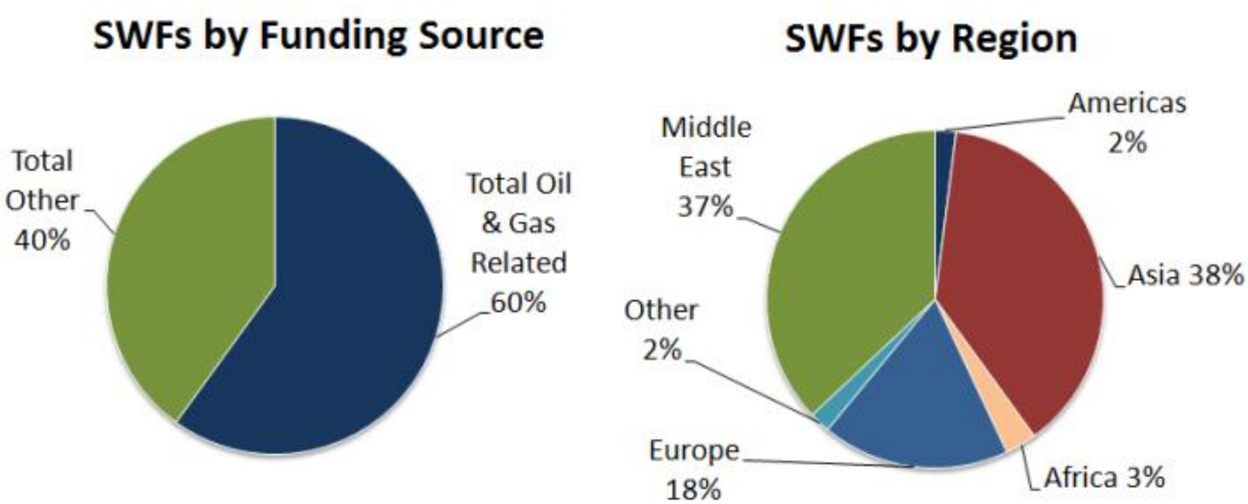

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Appendix 3:
Countries from Which the Ownership Report of Sovereign Wealth Funds Are Obtained

Argentina	Hong Kong	Philippines
Australia	Hungary	Poland
Austria	India	Portugal
Belgium	Indonesia	Russian Federation
Brazil	Ireland	Singapore
Canada	Israel	South Africa
Chile	Italy	Spain
China	Japan	Sweden
Colombia	Republic of Korea	Switzerland
Czech Republic	Luxembourg	Taiwan
Denmark	Malaysia	Thailand
Egypt	Mexico	Turkey
Finland	Netherlands	United kingdom
France	New Zealand	United States
Germany	Norway	
Greece	Peru	