PRELIMINARY

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SOVEREIGN WEALTH FUND PORTFOLIOS

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ABSTRACT

Using a novel dataset of Sovereign Wealth Fund (SWF) investments in public equities, private firms, private equity and real estate, we test for the importance of various objectives. We find that financial investor objectives help to explain their investment decisions, but there is great variation across funds. Considering state industrial planning as an alternative objective significantly increases explanatory power, particularly for the less-transparent funds. Consistent with this objective, SWFs are more likely to invest with larger stakes bringing control in particular industries (especially finance, but also transport, telecommunications and energy) and in particular regions (the Middle East and Asia).

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Sovereign wealth funds (SWFs) control $2.7 to $3.2 trillion in assets (GAO, 2008). They are large, have few short-term liabilities, and are free to invest in multiple asset classes. They have the potential to impact global capital allocation, but how they do so depends upon their objectives. We assemble a novel data set of SWF portfolio holdings. We analyze their portfolios, and try to understand the investment objectives driving those portfolio decisions.

We distinguish two broad objectives: portfolio investment vs. industrial planning allocation. One possibility is that they are motivated solely by securing appropriately risk-adjusted financial returns. This view predicts broad industry and geographic diversification in their portfolios, as well as across alternative types of risky assets. An alternative possibility is that they are best thought of as industrial planners, using their financial portfolios of risky assets to try to achieve industrial or political objectives. This objective predicts more domestic and regional investments, and more focused allocations consistent with announced planning objectives.

We assemble data on holdings across all asset classes for all of the important sovereign wealth funds from 1999-2008, including the less transparent Middle Eastern and Asian funds. We include funds with more than $10 billion in assets as of 2007. We have 20 funds averaging $116 billion per fund with $2.03 trillion in assets under management, and $1.43 trillion in risky assets. Our data go beyond holdings of international publicly traded firms to include firm or property-level data for public and privately held assets, complete with a time-series calculation of value. These non-public market holdings are significant, with private equities and real estate accounting for as much as public equity investments (and more than two times the international public equity holdings). They also help greatly to distinguish financial objectives from industrial planning objectives

The dependent variable which we try to explain is SWF risky portfolio weight in particular industries (we focus on thirteen industry categories) and industry-geographies where we look at the industry choices across seven world regions. We put aside data on fixed income holdings, as this choice is likely heavily dependent upon the extent of fixed income holdings elsewhere by the government (e.g. central bank).

The main variables we use to identify the ability of *portfolio investor objectives* to explain these allocation choices for risky portfolios are the world market capitalization weights across these industries (industry-geographies) and the actual weights of an international sample of large pension plans that meet the same size criteria we impose on SWFs (at least $10 billion in assets in 2007) and, like SWFs, have the ability to invest across multiple asset classes. Using the pension plan data also allows for potential home bias in allocations to be accounted for by measures of portfolio investor objectives. Finally, in considering financial objectives, we allow for the possibility that SWF owners will have non-financial wealth sources that may influence their allocations of financial assets, for example providing an incentive for those countries where national income is dependent on oil income to underweight industries with returns highly correlated with oil prices and hence national income. To address such hedging demands we identify the correlations between industry returns and the national income of the country that owns the SWF, and the volatility of national income.

When we examine the ability of these measures for portfolio investor objectives to explain portfolio allocations we find that the main measures have significant explanatory power. The capitalization benchmark has power in explaining SWF choices across asset classes, reflecting the significant weight on private equities and real estate in world capitalization, and show that SWFs are different than even these large pension plans in having greater allocations to these alternative asset classes. The (home-biased) pension fund has power in explaining the allocation across regions and industries. We do not find evidence of hedging related to their non-financial income risk.

The alternative hypothesis we test is that portfolio allocation choices are driven by a desire to achieve *industrial planning objectives*. What distinguishes SWFs from other financial investors is that they are owned and controlled by the state, and the state could use these vehicles to pursue planning or other political objectives. Many countries state a desire to develop industries to help diversify their economic base focusing on industries that will reduce overall income volatility, and that can provide sustainable employment for local citizens. Similarly, they state a desire to develop basic physical and financial infrastructure to facilitate development of such industries. Countries also state a desire to expand in areas where they already have skill and

potentially superior information. This may just be a cover for something else, but it does give a predicted direction to their portfolio allocation.

We construct measures to identify the incentive and execution of these goals, specifically focusing on the industries identified in a government national plan for those countries with a national plan; and, the existence of skills in an industry as captured by having a controlling stake in an industry prior to that investing year. The intensity of planning objectives, we hypothesize, will also be dependent on the perceived need to shift patterns of production, that we attempt to capture by introducing a measure of the time until the natural resource wealth source is going to run out (e.g. years of oil reserves) and alternatively if an economy is starting with a very skewed pattern of production (level of diversification). We also allow for the possibility that it will be dependent upon the skills and experience of the board tasked with overseeing the SWF, and we construct a measure of that experience.

We find that these objectives also have significant explanatory power, with both targeted industries in national plans receiving significantly greater allocations, as well as those industries where the state has some potential skill. The tilt toward industries mentioned for industrial development in the national strategic plans (not SWF mandates) is especially pronounced for countries whose incentive to diversify may be larger – those whose oil reserves are running out sooner. We also find that SWFs allocate portfolios to reflect their perceived skill (measured as the portion of domestic investments in the industry which are invested with control over 20%), especially in private equity and for SWFs in which the board has little external financial education or asset management experience.

The value of allowing for the possibility that SWFs pursue both objectives is seen most clearly when we combine both measures in the same regression and see the significant increase in the incremental explanatory power. In our toughest test looking at the industry-geography choices we find that measures of financial objectives produce an r-squared of 7.7 percent, measures of planning objectives provide an r-squared of 6.1 percent, and including both leads to explanatory power of more than the sum, 14.2 percent. This pattern is repeated in our industry regressions where we collapse the geographic dimension, where we have r squared of 27.4 percent. These patterns are consistent with these two objectives capturing different dimensions

to the same fund, and/or the heterogeneity across funds in these objectives. To disentangle these possibilities we look separately at the explanatory power of these financial and industrial planning variables for each fund and decompose the r-squared based on the objective. This paints an important picture of the heterogeneity across funds.

There are funds whose allocations are clearly captured very well by financial objectives. We find that, as expected, Alaska, GIC Singapore and Norway look very much like financial investors (75-80% of the empirical prediction comes from applying the financial investor estimates). In contrast, for smaller Middle Eastern SWFs and China, industrial planning measures account for over half of the variation. For the large Middle Eastern SWFs we do a good job of explaining their portfolios as a whole, particularly because we allow for industrial planning objectives as well that account for 33-43% of the explained variation. These results suggest the power of these multiple objectives in their allocation choices.

The empirical importance of planning objectives leads to additional predictions about the control rights SWFs will seek in making their investments, for these are more important for SWFs where planning objectives play a larger role, and are predicted to be greatest for domestic investments where planning objectives are ultimately realized, and for industries central to a plan. We find evidence in support of all of these predictions. SWFs own 4.3% and 6.4% of public equity in Asia and the Middle East respectively and 12 % of private equity whereas portfolio investor benchmarks predict stakes of less than one percent. Almost all of these domestic holdings are active, where we identify active as having a 5% stake or greater. In contrast, SWFs own much smaller portions of public market in the West, on the order of 1-2%. They own 4.8% of worldwide public equity in finance companies, and 70% of this is invested actively. They also invest actively in transport, energy and transport manufacturing. These are some of the most commonly cited industries in strategic plans.

In sum, we conclude that you can understand SWFs much better by considering their choices driven both by portfolio investor objectives and by industrial planning objectives. These results suggest that we think about SWFs and their potential impact differently. It suggests that we need to acknowledge and address the significant heterogeneity across funds. The most

transparent funds like Norway that pursue relatively pure portfolio investor objectives are simply not representative of the group as a whole.

This paper is complementary to a growing literature on sovereign wealth funds. A number of papers have focused on SWF investments in international public equities (e.g. Bortolotti, Fotak, Megginson and Miracky (2009), Kotter and Lel (2008), Dewenter, Han and Malatesta (2008), and Fernandes (2009)) and have used this data to document industry and geographical focus as well as testing for potential agency costs by correlating proxies for fund governance with short and long window returns around announced SWF investments.[3] Bernstein, Lerner and Schoar (2009) have focused on a set of private investments by SWF, and have exploited the timing of these investments and their implied returns to test for political, developmental and agency agendas. The main finding is weakness in SWF returns and a negative correlation between fund governance and returns, concluding that the evidence is least consistent with a developmental objective. Our paper differs from these in using a larger set of investments (simultaneously consider international and domestic traded equities, private equities, investments in private equity and real estate), in exploring tilts in these broader portfolios, as well as considering and testing for the empirical importance of economic objectives that predict tilt in portfolios. This provides more nuanced conclusions about SWFs that capture some of the important heterogeneity across these funds. In focusing on portfolios, our paper is closer to Chhaochharia and Laeven (2008), with important distinctions being that we are looking at their full portfolio rather than restricting attention to their international holdings of public equities, our investigation of a much larger (and different set) of SWFs and our consideration of a wide range of economic motivations for explaining portfolio choices.

The rest of the paper is organized as follows. Section I describes the data for constructing the SWF portfolios and summarizes the overall portfolio values. Section II describes alternative objectives that might be driving portfolio choices, introduces measures to capture these objectives in the data, and introduces univariate comparisons of SWF funds against these measures. In section III we test the financial investor and industrial planner hypotheses. We discuss implications of these results in section IV and conclude in section V.

[3] Bortolotti, Fotak, Megginson and Miracky (2009) provides a summary of this literature.

I SWFs and Portfolio Data

There are a number of state-owned entities that are active in global financial markets. Central banks tasked with stabilization usually accumulate and invest foreign exchange reserves in international fixed income. State-owned operating companies often use their profits to extend operations worldwide through acquisitions. State-owned pension funds accumulate savings from individuals and employ them, often internationally, with clear liabilities to existing and future pensioners. The SWFs that have become the focus of most attention in recent years belong to none of these categories. They are instead a state-owned investment company, claiming a long time horizon and consequently the ability to invest in a wide range of asset classes.

To capture these distinctions in our data collection we restrict our attention to those SWFs that satisfy a commonly used definition in the literature (the Monitor Group definition of a sovereign wealth fund, included as appendix A). We further limit our attention to the non-stabilization portions of SWF portfolios, which leads us to exclude from analysis any funds that have a purely stabilization motive. Specifically, we restrict our attention to the risky portfolios that we define to exclude fixed income. Such a filter, for example, leads us not to examine a Chilean fund sometimes described as a SWF that has all of its portfolio in highly liquid fixed income securities. Finally, we restrict our attention to funds with significant investments, which we classify as having at least $10 billion in assets under management in public reports as of end of year 2007. These requirements lead us to focus on 20 funds that we identify in Table 1.[4] This list of funds accounts for almost all of the money in SWFs; namely, $2.33 trillion in end-of-year 2008 wealth according to Preqin (2009), even after recent losses. We gather data on their investments from 1990 until 2008, focusing in this paper on the 1999-2008 where there are more funds and the data quality is better.

Funds in our sample are the largest, most important and widely recognized SWFs. These include old funds, such as the Kuwait Investment Authority, that had its origins back in 1953, as

[4] Abu Dhabi Investment Authority (ADIA), Abu Dhabi Investment Council (ADIC), Alaska Permanent Reserve Fund, Bahrain Mumtalakat Fund, China Investment Corporation (CIC), Dubai Holdings, Dubai World, Government of Singapore Investment Corporation (GIC), International Petroleum Investment Corporation of Abu Dhabi (IPIC), Investment Corporation of Dubai, Kuwait Investment Authority (KIA), Khazanah Nasional of Malaysia, Libya Investment Authority (LIA), Mubadala Development of Abu Dhabi, Norway Government Pension Fund- Local, Norway Government Pension Fund - Global, Qatar Investment Authority (QIA), and Temasek Holdings of Singapore. This draft does not include data for one of these funds -- Khazanah Nasional of Malaysia.

well as recently formed funds such as the China Investment Corporation, founded in 2007. These funds differ not only in age, but also in the primary source of wealth. Many funds, particularly in the Middle East, and the few western funds from Norway and Alaska, rely on wealth arising from natural resource extraction. Others, particularly in Asia such as Singapore's Temasek and GIC, use as the basis for their funds savings, foreign currency reserves from trade surpluses as well as the transfer of wealth with legacy state-owned companies. Finally, we do not employ any filter based on ex ante transparency, which across funds is low.[5] A few funds (e.g., Norway and Alaska) do disclose their holdings, but these are the exception rather than the rule. Even among some high transparency funds (e.g., Singapore's Temasek), transparency does not imply a disclosure of the fund's portfolio.

To put together portfolios, we start at the most direct source, the SWF itself. Like other private investors, SWFs are not required to disclose their portfolios. Some disclose their target asset allocations in percentages, and they all must disclose large stake holdings in public equity as required by regulatory agencies. They often do disclose ownership in select domestic private endeavors (such as building projects) and previously state-owned entities like utilities or transport. Even when a SWF reveals holding equity in a company, the stake held is often not given, and almost always the SWF does not provide a private valuation.

The holdings that are not disclosed are not transparent or easily accessible, but we found that a great number of them are not totally under the radar of public knowledge. The data challenge we undertake is to uncover the existence of a holding, often from range of agencies that specialize in gathering information on financial markets. With this information we then do a case study on each company via international news sources to fill-in missing ownership stakes and transaction histories, dynamically valuing all public companies, private companies, properties, and private equity fund investments, and then doing broad sweeping searches to make sure we did not miss anything. In doing so we are very careful to identify all subsidiaries of the SWF, as often the investments are in the name of a subsidiary rather than the corporate parent.

[5] Two of the more commonly used measures of transparency are the Linaburg Maduaell transparency scores, available at swfinstitute.com and the Truman governance scores (Truman, 2007, 2008).

For domestic and regional public equity holdings we use local sources such as *The Business Times of Singapore* and *AME* and *Zawya* (both Middle Eastern business sources). These sources provide much more comprehensive information on activities and holdings than is available if one restricts attention to standard international sources like Capital IQ or Thomson One Banker. Second, we spend as much attention on gathering enough information to identify, value and determine the ownership stake in private investments as for investments in public equities. Finally, as the public has learned from the challenges facing Dubai, real estate holdings can be significant across SWFs and we use a variety of approaches to value the investments in active as well as properties under development. Because the reconstruction of the portfolios has been a lengthy process, we relegate details of these efforts to the appendix.

Table 1 summarizes the results of this data collection effort for 2008[8], showing that we have identified investments accounting for 2.03 trillion, just 13 percent less than the public estimates of 2.33 trillion (columns 1-2). Our calculated total is based on more than 26,000 unique companies and even more transactions (we have multiple transactions for many companies) in public equities, private equities and real estate. Not surprisingly, the gap between our estimates and public estimates is greatest for the least transparent and large funds of Kuwait and the Abu Dhabi Investment Authority, where public estimates also have significant variance. While we have undoubtedly missed some investments where there is very little publicly available information as to the extent and nature of investments such as hedge fund investments, these data are to our understanding the most comprehensive micro based accounting of SWF investments available to date.

In columns 3-6 of Table 1 we break down our 2.03 trillion estimate along three dimensions. Column 3 reports the value in the risky portfolio in public equities, private equities and real estate for which we know the *individual* investments or know enough to identify industry and geography for these investments. A portion of these amounts are indexed public equities; we infer the industry and geography of these investments by utilizing decompositions of global and local market indexes. In column 4 we identify the number of individual companies, private equity funds and properties used in arriving at these totals for risky investments, with a much greater number naturally coming from Alaska and Norway as these funds provide specific

[8] We have all years from 1998-2008; the choice of presenting 2008 figures in Table 1 is just for clarity of exposition.

holding of even very small stakes. For many of these companies we have multiple transactions, as over time the company has increased or decreased its stakes. In column 5 we report our estimate of fixed income holdings and in column 6 hedge funds/other alternatives holdings (not including real estate and private equity) respectively. To produce these last two columns we use either the exact amounts in these classes provided for those funds which produce such detail or can be inferred from public statements (e.g. Alaska, Norway, CIC, Libya), and when this is not available we take the value of the risky assets which we have identified and apply the percentage in such categories given by the SWF as to how much fall in fixed income and other alternatives asset classes. As mentioned above, because fixed income holdings may be used for stabilization purposes, or are close substitutes for other government funds in central banks that are used for such purposes, we do not consider them in the analysis of risky portfolios we now turn our attention to.

II Objectives

Having assembled the requisite data on SWF investment portfolios, we now identify the measures we use to capture portfolio investment versus industrial planning objectives.

II.1 Primary Measures for Portfolio Investor Objectives

The stated objectives of many, if not most, of the SWFs is to maximize risk-adjusted returns.[10] This is also the view of the objectives of SWFs according to many in the financial community.[11] To capture portfolio investor objectives, we use two benchmarks.

The first benchmark we employ is the proportion of world capitalized value in the asset class, geography and industry. For equities we use the world market capitalization from all traded companies in Datastream broken down by industry and country and do this for each year

[10] The Norwegian Government Pension Fund, for example, states "The Fund shall be safely managed based on the objective of high return subject to moderate risk." And the Alaska Permanent Fund's goal is to achieve a "five percent real (above inflation) rate of return in accordance with the Prudent Expert Rule."[10] Similar language is employed by less transparent funds. The Abu Dhabi Investment Authority, for example states "ADIA's decisions are based solely on its economic objectives of delivering sustained long-term financial returns." The China Investment Corporation states in its annual report that "Our mission is to make long-term investments that maximize risk-adjusted financial returns for the benefit of the State, our shareholder." [10]

[11] For example, "At the end of the day, sovereign wealth funds are just institutional investors that look to make returns for their shareholders," Hani Kablawi, Bank of New York Mellon Corp, Dec 7, 2009

in our dataset. For real estate, we take advantage of an investment advisor method that calculates investable real estate as a function of GDP (Prudential Real Estate Investors, 2010).[12]

The calculation of the capitalized value of investable world private equity is more challenging. We use data from Orbis on private companies in Europe and then extrapolate findings from here for other geographies.[13] Orbis provides data for an extensive set of private companies across eastern and western Europe, much of it drawing on disclosure requirements from European tax authorities.[14] This source consistently reports company revenues, and we combine this with a private firm revenue multiple of 0.7073 calculated in Moskowitz and Vissing-Jorgensen (2002) to produce valuations that we then aggregate to fourteen industries. This suggests the capitalization of private companies is 2.5 times public equities. For non-European countries aside from the US, we take this ratio of private equity-to-public equity capitalization found in Europe (specific for each of the fourteen industries) and apply this to each country's public market capitalization by industry. For the United States, we use Moskowitz and Vissing-Jorgensen (2005) calculated ratio of private-to-public equity capitalization of 0.79 public equities, consistent with the higher fraction of assets in public markets in the US.

As a second benchmark we use the allocation of large pension plans that meet similar criteria as our SWFs – they have $10 billion in assets in 2007 and invest across a range of asset classes.[15] This data is drawn from CEM benchmarking, a Toronto based consultancy that collects information on allocations, costs and returns for a large sample of international pension plans from 1990-2008. The CEM dataset, used in a number of recent papers (French (2009), Dyck and Pomorski (2010) and Bauer and Frehen (2008)), has data on pension fund holdings for 716 funds over the period 1992-2008. In 2008, 345 pension funds participated, accounting for $4.8 trillion in assets, with $2.3 trillion coming from non-US funds. Requiring that funds have

[12] Prudential real estate investors calculates the value of the commercial real estate market as: Value of Real Estate = 45% x GDP x (GDH/Threshold GDH)^1/3, where GDH is per capita GDP and threshold GDP is, for countries with less than the threshold GDP, defined as $20,000 in 2000, adjusted for inflation to be $24,921 in 2009. In 2009, Prudential applied ad hoc adjustments to Singapore, Hong Kong, and the United Kingdom, as well as to the Gulf States. Without a series of adjustments from Prudential, we phased out the Gulf States adjustment prior back to 2006 and kept the other adjustment throughout our sample.

[13] Orbis is a Bureu Van Dijk database that includes all companies in AMADEUS.

[14] We limit our search to active, private companies with more than 1,000,000 USD in revenues in their last reporting year. We use hand and computer searches to avoid duplicate companies and companies that are not investable (e.g. the Post Office which is 100 percent state-owned).

[15] Dyck and Pomorski (2010) show that larger funds are more likely to have higher allocations to alternatives, even controlling for liquidity risk. We can empirically control for potential differences in investment horizon by including a variable for the percentage of liabilities associated with retirees, which is a reasonable proxy for the time horizon of the fund.

over $10 billion in assets in 2007 restricts our attention to 90 pension funds that meet this criteria in 2007.

We use CEM data to construct the pension fund benchmark portfolio. CEM provides the asset class percentage breakdowns directly for each pension fund. Within public equities and real estate, CEM has information on the geographic breakdown of assets to the United States, EAFE (Europe, Australia and Far East) and emerging markets. Within these geographies, most funds indicate that they benchmark to the MSCI index for that region. We reproduce individual companies (and thus countries and industries) of the MSCI indexes annually with IShares portfolios, which are designed to track the MSCI indexes with minimal tracking error.

An important facet of pension investing is a home bias in investments, which we agnostically take as a feature of the pension allocations. CEM provides more detail on geography for Canadian pension funds, which we use to construct a time series of pension home bias (as a percentage of the portfolio). We want to have this home bias in our pension plan benchmark. To accomplish this in our tests we first de-home bias each of the 90 pension fund portfolios by reducing the exposure to the pension fund home country in proportion to Canadian home bias percentage and then, for each SWF, we home bias the allocations to the home country of each SWF, making a benchmark pension allocation as if the pension fund resided in, e.g., Singapore, the Emirates or Kuwait.

The final piece is to allocate geography and industry breakdowns for private equity. As a measure of the industry and geographic mix of private equity investment, we use data from Capital IQ. Finally, we impose the home bias in private equity fund investing implied by the Canadian pension funds.

II.2 Univariate Comparisons of SWF and Financial Investor Benchmarks

Table 2 presents the SWF risky portfolio weights and shows these weights by geographic region. In panel B we present data on regional allocations for our two portfolio investor benchmark portfolios to provide a basis for comparison. To construct panel A, for each SWF we first create a time-series average from the years covered and then take an equally weighted average across SWFs. The non-public parts of SWF portfolios are large with the combined

private equities and real estate account for almost half the portfolio equaling 48% of the portfolio. And the public equities allocation we report is an overstatement of investments where SWF have potential control rights, for it includes large indexed positions by SWFs like ADIA, Kuwait and GIC Singapore, as well as the quasi-indexed investments of Norway and Alaska.[17] The extent of the investments in non-public equities makes them quite distinct from pension plan investors. As we report in Panel B, large pension plans have only 15 percent allocations to these alternative asset classes, 5 percent in private equities and 10 percent in real estate and other real assets. While a significant overweighting relative to pension plans, panel B also shows us that this is an underweighting relative to world capitalization, where investable private equities and real estate, given our estimates described above account for 52 percent and 16 percent of available risky assets worldwide.

The limited ability of portfolio investor objectives to explain these portfolios is evident in the geographical focus of their portfolios in table 2. Public equity allocations are skewed towards the home regions of SWFs with 13.1 percent of equities targeted on Asian firms, whereas world equity capitalization would have this at just 3.9 percent and pension plan allocations only allocate 2.9 percent. For the Middle East, SWFs invest 7.7 percent of their public equity allocations to this region, whereas world and pension plan capitalizations never exceed 1 percent (0.6 and 0.9 percent respectively). The value of our data collection on private equities and real estate is to show that the distortions in public equities are a significant understatement of the tilts in their portfolios. This is seen most clearly in comparing the allocations to the middle East where SWF allocations to these regions account for 14.6 percent of their portfolios in both private equity and real estate, and the combined sum of 28.6 percent of their portfolios to these regions eclipses the 1 percent and 0.4 percent that sum to just 1.4 percent using world capitalization benchmarks. The bottom line from this analysis is provided in columns 5 and 6 of panel A where we present the difference between SWF portfolios and our two benchmarks by regions, with Asia receiving 9.5 percent (19.6) greater allocation than the capitalization (pension plan) benchmark, and the Middle East receiving 34.9 percent (35.9) greater.

[17] Norway invests relatively small stakes in a large number of companies (7,900 in 2008) and only has stakes in excess of 5 percent in 3 companies.

Another way to see if financial investor objectives explain SWF portfolios is to look at whether the industrial patterns in their portfolio allocations are similar. We summarize the differences between SWF allocations and these financial investor benchmarks in their industrial mix in columns 5 and 6 of panel A. This shows significant differences in industrial patterns, most notably overweighting in a few industries. Probably most surprising is the overweighting of energy, with an allocation that exceeds pension plan allocations by 6.4 percent, 76 percent higher than the pension plan allocation to this industry, and this is 11.4 percent higher than the world market capitalization in this sector. We see similar patterns in overweighting both benchmarks in transportation, with a 7.1 percent greater allocation than the pension plan benchmark and a 6.0 percent greater difference than the capitalization benchmark, equivalent to 470 percent (270) greater than pension plan allocation (capitalization).

Taken together, this preliminary data paints a different picture of SWFs. It suggests that they are different than portfolio investors, weighting private equities heavily and, as we will show later, taking significant stakes by company. Second, it suggests that they focus on regional rather than Western markets. Accounting for real estate investments, which are predominantly local, further reinforces the importance of domestic assets in SWF portfolios. And it is precisely in these companies where ownership stakes are largest. Third, it suggests the impact might be greatest for specific industries, rather than equally spread out across all industries.

II.3 Secondary Measures for Portfolio Investor Objectives: Non-Financial Income Hedging Variables

While the comparative statistics suggest financial objectives have only a limited ability to explain investment allocations, this may be a limit of the measures we have used. There is a non-financial income risk literature that emphasizes how financial allocations can be influenced by the presence of non-financial income, hedging this non-financial income risk through their financial portfolios. [18] The nation-states that own SWFs also have non-financial income that is

[18] Guiso, Jappelli, and Terlizzese (1996), Heaton and Lucas (2000), Vissing-Jorgensen (2002) look at fixed income versus equity allocations and find evidence for hedging the variance of non-financial income with portfolios exposure to equities, but little-to-no evidence of hedging of the correlation of income with the market. Dimmock (2009) finds that universities with greater non-financial income risk shift endowments towards fixed income and away from alternative assets. Massa and Siminov (2006) offer evidence that investors in fact tilt their portfolios *toward* industries and geographies correlated with their non-financial income sources of risk, offering an explanation that such behavior reflects investing toward greater familiarity in an information-constrained world.

captured in their gross domestic product. The non-financial income risk literature predicts, first, that SWFs should have a lower appetite for risk if the variance of national income is high, assuming a positive correlation between income and risky asset returns, or vice versa if the correlation between income and risky assets is negative. Following Massa and Siminov (2006), we construct *StDev(National Income)*Sign* as the standard deviation of SWF home country income times the sign of the correlation of the GDP with the market global return. Interestingly, since oil rich countries often do well during periods of down financial markets, this predicts that countries dependent on oil income might prefer investments with more systematic risk.

Second, this literature predicts that SWFs should adjust allocations toward industries or geographies negatively correlated or uncorrelated with their national income stream. For example, this implies that SWFs with national income heavily influenced by trends in oil income would have an incentive to avoid financial investments with returns highly correlated with oil. We try to capture this possible hedging of their financial investments by constructing the 19 year, rolling correlation of SWF country GDP and value weighted returns in the geography-industry sector. As in the variance variable, the sign of the relationship between GDP and market returns matters. Again following Massa and Siminov (2006), we split the correlation effect according to whether national income is positively or negatively correlated with returns. The patterns in industry allocation from table 3, particularly the overweighting in energy, provide a preliminary indication that this hedging may not be evident, but we will leave a more definitive assessment to our regression estimates that we explore below.

We introduce a third variable that might affect hedging through the SWF – the level of foreign reserves expressed as a fraction of GDP. The idea here is that countries will be more willing to take on risky positions if they have a significant amount of reserves and we use the most comprehensive measure of such reserves, including reserves held by the central bank.

Most of the non-financial income literature focuses on individuals' portfolio choice between fixed income and public equities; in these dimensions the notion of hedging away from risk (away from equity) is fairly straightforward. In our case, we have multiple risky asset classes. Dimmock (2009), in studying endowments, also considers multiple risky asset classes. His approach to understanding income risk hedging is to allow hedging to be identified uniquely

for each asset class. At times we follow a similar approach, restricting our attention to public or private equities separately. We also employ a second method of multiplying the hedge variables by the industry-geography betas to see whether hedging alters the appetite for beta-measured risk. This method is straightforward and appealing for public equities. For real estate, we use publicly traded real estate industry betas for the entire real estate holdings.[20] For private equity, we use the public equity betas and multiply each industry-geography beta times 1.73, the beta estimate from Hall and Woodward (2007).[21]

II.4 Industrial Planner Objectives and Measures

The financial investor perspective ignores an essential feature of SWFs - they are owned by the state. As Ang (2010) emphasizes, this makes their management fundamentally different from ordinary investment management companies, and to maintain legitimacy they need to attend to wider political and economic factors.

We hypothesize, and then examine, that states use SWFs to achieve industrial planning objectives, using these vehicles as one tool to achieve specified national developmental goals and/or exploiting perceived skills the state has in particular industries. In short, we are asking whether at least part of their portfolio operates either explicitly or implicitly as a sort of sovereign development fund. We do this, in part, because this is what a number of funds explicitly say is motivating their investment patterns. For example, Mubadala, an Abu Dhabi SWF states: "Mubadala is a catalyst for economic diversification of Abu Dhabi."[22] It has bought stakes in foreign companies, and/or established domestic joint ventures with the desire to exploit foreign firms knowledge and skill and bring them to bear for domestic development purposes. Or consider the statement of the objectives behind the largest CIC controlled holding that "was established to invest exclusively in domestic state-owned financial institutions on behalf of the

[20] This is imperfect in that the real estate betas from the market will be higher than for private property holdings, but since beta risk for real estate is not a perfect concept for portfolio risk, we think the bias goes in the correcting direction.
[21] The beta estimates for venture capital range from less than 1 to 3.2. Buyout is thought to be closer to 1. We cannot disentangle private equity in buyout versus venture, although the bulk of firms are startup, and thus choose to use Hall and Woodward's (2007), relatively conservative venture estimate of 1.73 for both.
[22] Mubadala Annual Report 2008.

state in order to improve governance and preserve and enhance the value of state-owned financial assets." [23]

The desire to use a sovereign wealth fund to pursue developmental objectives can be rationalized on social welfare grounds, although it need not be driven by such logic and could emerge for other political reasons. This can also be seen as an alternative hedging strategy, but instead of predicting not investing in industries highly correlated with current income risk, it predicts investing in industries that have the long-run potential to diversify the employment returns to the economy. In the short run, these industries may even be highly correlated with their background risk. A developmental agenda may be social welfare maximizing if the overall returns to its citizens are higher because sector development enhances the present value of future returns to human capital or because citizens benefit from a more diversified economy. For example, investments that generate spillover effects on local companies by enhancing transmission of knowledge and technology may increase the returns to the stock of domestic human capital. Or it may be that society utility (not just financial wealth) may be higher when labor income is less tied to a dominant income sector (e.g., oil).

The SWF may also be used as a tool to exploit perceived skills the state has in particular industries or superior information it has about particular industries. For a number of countries, the initial 'endowment' of the fund includes state-owned enterprises that may or may not be partially privatized, or alternatively the state has controlling stakes in enterprises for many years. This close proximity to industries may lead SWF managers to believe they have superior information or skill about the industry, and they may seek to exploit this in their investment patterns, producing a geographic or industry tilt to their portfolios. For example, Temasek of Singapore was given the state's stake in Singapore airlines, and Temasek's subsequent investments in a series of airlines in the region could be related to a perceived ability and knowledge in this sector. This argument is closely related to the explanation offered for the patterns of investing in Massa and Siminov (2006).

[23] This industrial planning perspective has been underemphasized in the academic literature, but has not been ignored in policy-oriented papers (e.g. Santiso (2009)).

We construct state industrial planner variables to attempt to capture the presence of industrial planning objectives, and the industry or geographic direction in such objectives. Our primary measure of industrial planning is based on the existence of a national (not SWF) strategic plan for the nation, and if so the specific industries highlighted in that plan. We search for a plan that predates our data and code things straightforwardly with dummy variables if one of our fourteen industries is featured prominently in the industrial plan. These plans tend to feature vertical industries targeted for development, as well as in some cases industries like finance and telecommunications, that are viewed as infrastructure and aid in development across a set of industries.

The second state planning variable we construct we label S*kill* and this is intended to capture the possibility that the state possesses information and potentially skills in that industry and is willing to take active positions to capitalize on that knowledge. Here we take advantage of the fact that we have also collected information on the ownership stakes in all investments. The skill variable in an industry can take a value between 0 and 1 and is based on the proportion of the domestic investment in that industry that is invested with controlling stake in the prior year (where we define a controlling stake as a stake over 20%). Note, this is not based on the level of investment in that sector, solely on whether the proportion of the assets in that sector where the state has control. To avoid extreme values, for industries in which the SWF has no investment, we use the mean proportion from all SWFs.

In looking at industrial planning objectives we are not assuming that all SWFs will have this as a significant objective. Some funds organization design and charters for example forbid them from making domestic investments (e.g. Norway Pension Fund Global), and this makes it far less likely that they will be used as a tool for industrial planning. We also recognize that the strength of this objective is likely to depend upon a variety of additional factors that can increase the perceived need to enhance development or exploit skill. We attempt to capture these factors by introducing a measure of the time until the natural resource wealth source is going to run out (e.g. years of oil reserves) and alternatively if an economy is starting with a very skewed pattern of production (level of diversification). We also allow for the possibility that the focus on planning will be dependent upon the skills and experience of the board tasked with overseeing the SWF. To do this we identify all board members and identify measures of their experience

and politicization. As measures of experience we look at four dimensions: their level of education, whether their education was abroad, at whether they had prior operational or investment management experience at home or abroad.

As a final note, we recognize that the fact of state ownership of SWFs might lead SWF managers to pursue this objective poorly, or that they may also pursue other political or personal objectives or face additional constraints in trying to realize their objectives. For now we focus solely on the industrial planning objective to see what power this has in explaining allocation, and leave questions of ability to realize, and possibly additional objectives to future work (e.g. Dyck and Morse (2010b)).

II.5 Specification & Summary Statistics

To explore the power of financial and industrial planner objectives to explain patterns in portfolio allocation we employ a simple linear specification:

$$\omega_{bft} = X_{bft}\mathrm{B} + S_{bft}\Psi + \varepsilon_{bft}.$$

In particular, we regress the SWF portfolio weight ω on financial investor benchmark variables *X* and state industrial planner variables S. We include 20 SWFs denoted by index *f*, unbalanced covering the years 1998-2008 with time denoted *t*. To simplify discussion, we refer to the asset class-industry-geography "bin" as *b*, with at most three asset classes (private equity, public equity, real estate), seven geographies (including the home country) and thirteen industries for the equities asset classes and just one industry for real estate. Thus, at most there are 2x7x13+1x7= 189 bins in which a SWF can invest its risky portfolio.

Following on the discussion above, we employ a number of measures to capture financial investor objectives (*X)* and State industrial planner objectives (IP). These measures are:

(X.1) *Capitalization* benchmark: *Mean Asset Class* allocation,
(X.2) *Capitalization: Bin* allocation (which sum to 1 across bins),
(X.3) *Pension Fund* benchmark: *Mean Asset Class* allocation,
(X.4) *Pension Fund: Bin* allocation (which sum to 1 across bins),

(X.5) Correlation of the industry-geography bin's performance with the SWF country GDP $(Corr(GDP,IndustryRegion))^{+}$, scaled by the log of national income over the SWF time series average portfolio size, if the sign of the correlation of the bin's performance with SFW country GDP is positive, or zero otherwise,

(X.6) Correlation of the industry-geography bin's performance with the SWF county GDP $(Corr(GDP, IndustryRegion))^{-}$, scaled by the log of national income over the SWF time series average portfolio size, if the sign of the correlation of the bin's performance with SFW country GDP is negative, or zero otherwise,

(X.7) Standard deviation of SWF country GDP, (*StDev(GDP)*Sign*), scaled by log of national income over the SWF time series average portfolio size, times the sign of the correlation of country GDP with world market returns,

(X.8) Log of *Foreign Reserves* divided by national income.

IP.1 Whether or not the industry is in the country strategic *Industrial Plan*

IP.2 *Importance of Industrial Plan*. The primary measure we use is the number of years until the natural resource is predicted to run out for those SWFs reliant on natural resource wealth to fund the SWF and zero otherwise. As a robustness check, we also examine the current diversification of the economy, defined as the sum of the squared shares in 9 industry categories using data for 2005.

IP.3 *Perceived Skill* of the SWF in the industry, defined as the percentage of domestic investment in the industry invested with control (>20% stake), or the mean of skill across all SWFs if the particular SWF does not invest in the bin industry.

IP.4 *Perceived Skill* times *Board Experience*

In Table 4 we provide summary statistics for variables not introduced previously.

While largely self-explanatory, we draw your attention to a few important features of these variables. We include the average benchmark allocations to the asset class (X.1, X.3) as separate variables from the overall allocation weights to bins so that we can investigate

allocations across asset classes. Second, as noted earlier the pension fund benchmarks have built-in home bias specific to the SWF, whereas the capitalization benchmark does not. Third, we scale the hedging variables by GDP to reflect the importance of hedging to the portfolio following, e.g., Heaton and Lucas (2000).

III Results

III.1 Econometric approach

Given that positions are often held for long periods of time, SWFs no doubt have serial correlation in asset allocations. To capture this, our main regressions use a very conservative model in which we cluster standard errors at the SWF level following Bertrand, Duflo and Mullainathan (2004). We also employ a less conservative way to capture the same correlation concern, implementing a GLS model with an AR1 component, estimated in the two-step (Prais-Winsten) method in which the serial correlation parameter is first estimated from residuals and then inserted in the equation.[25]

III.2 Estimations

We estimate two main sets of regressions in tables 5 and 6 using data from 20 SWFs where we have an unbalanced panel with an average of 6 years of data per SWF. In the first set of regressions in table 5 we focus solely on SWF allocations across industries, collapsing the geography dimension. In the second set of regressions in table 6 we make a more demanding test of the explanatory power provided by objectives, looking at industry and geography and asset class, increasing the number of bins.

[25] We recognize that technically a cleaner implementation would involve a model in which a portfolio adding-up condition is implemented via a constrained system (e.g., McGuire and Weiss (1976) applied to portfolios in Dimmock (2009)). Because of the limited number of SWFs, particularly in the clustered standard errors model that we use for our main specification, we do not have sufficient observations to implement this model. What we can and did do, was to follow the approach of Beckwith (1972) by examining robustness of our findings to a model in which one bin (real estate) is left out, such that the residual can force the adding-up. Since this did not have a material effect on our results, and forces coefficients to be interpreted as comparisons to the omitted categories, we do not follow this approach in our main specifications.

In Table 5 column 1 we see the importance of financial objectives as these variables alone produce an r-squared of 19.1 percent. Consistent with data in table 2 and 3, some of the power comes from the ability of the statistically significant capitalization benchmark to explain choices across asset class, but within the asset class what is most important is the pension benchmark. However, this is an overstatement of the ability to explain choices using financial variables alone because our hedging variables come in with the opposite to the predicted sign, a fact we return to below. In column 2 we see that industrial planner objectives similarly have power to explain patterns in industry choices producing an r-squared of 11 percent with significant signs on all variables, consistent with our expectations. This is particularly powerful as a number of the planner variables are expected to have no power for SWFs in countries without strategic plans, or that do not rely upon natural resource wealth to fund the SWFs.

The statistically significant coefficients on all of our IP variables in column 2 also show that SWFs allocate a significantly greater proportion of their portfolios to industries identified in national strategic plans, and in those sectors where they have potential skill or superior information. Moreover, we find that the importance of industrial planning depends upon the perceived need to focus on planning, with a significant negative interaction with the years until the oil reserves are going to run out indicating that countries are more inclined to focus on planning when they have limited time left in their natural resource. In unreported regressions we also examined the impact of replacing oil reserves with existing diversification as another measure of need, finding similar results on the interaction but since these two country-level variables were highly correlated, we cannot include them in the same regression. Finally, we find that the importance of perceived skill in driving industry choices is influenced by the level of experience on the board, with the negative and significant coefficient showing that the tilt towards industries with perceived skill is most pronounced in the boards with the least experience.

We see the real value of considering both portfolio investor and industrial planning objectives in column 3. Including both variables boosts our explained variation to 27.4 percent, consistent with the two sets of objectives picking up different dimensions. Again, the industrial planner variables are strongly significant and have identical signs. The important change in column 3 is that we find encouraging results in the financial investor hedging. In particular, once

the industrial planning is incorporated, SWFs appear to take on more risk if they have greater country foreign reserves, and SWFs whose income is negatively correlated with the world market (oil countries) hedge toward more risk, consistent with theory.

Column 4 reproduces the results of column 3 using the Prais-Winsten AR-1 GLS estimation. Note that the serial correlation rho (reported at the bottom of the table) is substantial, at 0.858, as we would expect. However, this specification produces very similar results to column 3, with less conservative standard errors. It does reinforce the robustness of these results.

The final four columns look within the allocations of public equity (columns 5-6) and private equity (columns 7-8). We only include the pension benchmark because the capitalization benchmark across industries within an asset class has no power (and with the clustering, we need to be somewhat parsimonious). The pension benchmark is very large in magnitude and significant for public equities and weaker for private equities. Hedging is almost absent. The industrial planning variables show up strongly significant in both public and private equity, with the role of the strategic industrial plan being augmented in private equity.[26] In fact, because of the importance of industrial plan for private equity allocations, the R-Square is higher in the private equity specifications (0.210) than the public equity ones (0.146).

In Table 6, we re-examine the ability of portfolio investor and industrial planner perspectives to explain variation in allocations, this time focusing on the more demanding industry choice across geography. Recall that geography includes the home country as one region, and that the pension benchmark is home-biased as if it were a pension fund in the SWF country. We find similar patterns in results. Measures of financial objectives provide significant explanatory power producing an r-squared of 7.7 percent, while leaving much to be explained. The pension benchmark keep their significant power across geographies, while the capitalization benchmarks provide more puzzling results, producing a negative and significant sign.[27] Industrial planning variables similarly have explanatory power, producing an r-squared of 6.1 percent. Combining measures to capture these two different objectives significantly increases the explanatory power up to 14.2 percent, more than the sum of the two regressions alone and

[26] We will discuss the economic meaning of these coefficients in a future draft. We apologize for the omission.
[27] Given this puzzling result, we exclude the capitalization benchmarks from the remaining specifications.

consistent with the two objectives picking up different dimensions. These results are robust to the GLS-AR1 specification, as shown in column 4.

As we saw in table 5, the industrial planner variables come in significant and with the predicted signs. Here we add an additional interaction, of skill interacted with a dummy variable to capture if the geography is the home country. The significant positive sign here suggests that SWFs are most likely to tilt towards industries where they have skill if the industry is located in the home country. The estimated coefficients allow us to say more. The majority of the economic magnitude on perceived skill is for investing at home. Perceived Skill* Domestic has a coefficient of 2.807 relative to 0.470 without the interaction. Nevertheless, both coefficients are positive and significant. SWFs are six times more likely to use perceived skill at home, but they do significantly tilt their portfolios abroad to perceived alpha industries.

Columns 5-8 repeat the exercise from Table 5 of just looking within the public equities portfolio (columns 5-6) and then within private equities (7-8). Here, we find that the pension allocations fail at being able to explain the private equity portfolio. We find some evidence for correlation hedging, in both public and private equities. The industrial planning variables also seem to explain the portfolio allocations in both public and private equities, although the perceived skill variables are much weaker in public equities in the AR specification.

III.3 Heterogeneity in the Importance of Financial and Industrial Planning Objectives

These patterns are consistent with these two objectives capturing different dimensions to the same fund, and/or the heterogeneity across funds in these objectives. To disentangle these possibilities we look separately at the explanatory power of these financial and industrial planning variables for each fund and decompose the r-squared based on the objective.

To explore heterogeneity we begin by breaking down R-Square:

$$R\text{-}Square = 1 - \frac{SSE}{SST} = 1 - \frac{\sum\left(\omega - \hat{\omega}_{FI} - \hat{\omega}_{IP}\right)^2}{\sum\left(\omega - \bar{\omega}\right)^2}$$

ω, $\hat{\omega}_{FI}$, $\hat{\omega}_{IP}$ and $\bar{\omega}$ respectively refer to (without fund, time and asset-class-industry-geography bin subscripts) the SWF portfolio allocation (the dependent variable), the predicted portfolio

weight using just the financial investor variables, the predicted portfolio weight using just the industrial planning variables and the average allocation (which equals 1 divided by the number of bins). The summation is over all observations in a general setting, but we are going to do this summation over all observations for each SWF, creating an R-Square$_{SWF}$. With a little algebra, we decompose the R-square into three components:

$$R\text{-}Square = R\text{-}Square_{FI} + R\text{-}Square_{IP} - \left(1 - \frac{\sum 2\hat{\omega}_{FI}\hat{\omega}_{IP}}{\sum\left(\omega - \bar{\omega}\right)^2}\right),$$

In short, an R-Square for each of the set of objective variables and then a "covariance R-Square", the part of the explained sum of square errors which both variables explain.

Figure 1 presents the results of this decomposition, focusing on column 3, Table 6 results. As we noted in the prior section, the financial investor and industrial planner model explains 14.2 percent of the variation in risky portfolio holdings across industries and three asset classes. This does not mean that the model does equivalently well across SWFs. In Figure 1, the first bar (the medium grey/blue one) presents the R-Square$_{SWF}$, with the SWFs ordered on this variable. The model fits the portfolios best for the Kazakh Global Fund (a pure indexer). Some other portfolios are explained extremely well by the model, including SWFs one might guess – GIC Singapore, Alaska, and Norway – and including ones one might not expect – Bahrain, Qatar, all three Dubai funds, Kuwait, Mubadala and ADIA.

The remaining two bars in Figure 1 allow us to show is that the SWFs explained extremely well by the model are primarily financial investors, but the large Middle Eastern SWFs explained still quite well are a mix of state planners and financial investors. For ease of exposition, we start by looking at the large SWFs (>$50 billion), for whom the model explains at least 10 percent of the portfolio variation. Within this group, GIC Singapore, Norway, and ADIA are primarily explained by financial investor variables. A second set of these large funds, Qatar and Dubai World, have a third-to- half of their variation explained by industrial planning. For the final set of large funds, Kuwait, Investment Corporation of Dubai, Dubai Holding, and Singapore Temasek, the industrial planning variables explain the majority of explained variation. Together, these two groups of SWFs account for $650 billion in wealth by our estimates, of which $553

billion is invested in risky assets. The smaller funds are more polar: most are industrial planning focused with the exception of Kazakhstan Global, Alaska, and Mubadala.

IV Discussion

Recognizing the importance of industrial planning objectives generates additional predictions about the size of SWF stakes. Where SWFs have industrial planning objectives they will be more interested in assembling larger stakes that provide them information or influence to address their planning goals. In particular control rights are more important for SWFs where planning objectives play a larger role, and are predicted to be greatest for domestic investments where planning objectives are ultimately realized, and for industries central to a plan. To explore these predictions, in Table 7 we look again at the regions and industries and arrive at some preliminary assessments as to the real impact of SWFs.

We find support for all of these predictions. Table 7 panel A shows allocations by region. Consistent with expectations, active stakes are most likely in the two regions home to most SWFs of Asia and the Middle East, with 80% or greater of the stakes having control rights. In addition we document that SWFs own 4.3% and 6.4% of public equity in Asia and the Middle East respectively and 12 % of private equity whereas portfolio investor benchmarks predict stakes of less than one percent. They own much smaller portions of public market in the West, on the order of 1-2%. In panel B we explore industry allocation. Here we see that a few industries stand out in terms of active investing. These include finance (where more than 70 % of statkes are invested actively) as well as energy, transportation, and transportation manufacturing.[30] Across these main four industries, SWFs hold active investments with control interest in 70% of the asset value; these assets account for 3% of world private and public capitalization for these four industries.[31]

[30] From having done case studies on all of these companies, the reason for this fact seems to be that SWFs a combination of SWFs' inheriting state owned enterprises and SWFs using the personnel inherited from running state-owned enterprises to seek investments in sector in which they believe to have expertise.

[31] In the next draft, we will show that the financial investor SWFs (i.e., the Western ones) are not the funds dominating the Asian and Middle Eastern markets and are not the funds investing with active control interests. Rather, it is the Middle Eastern funds and Singaporean Temasek for whom our state planning variables have explanatory power and who invest with active control interest in a concentrated set of (state planned) industries. It is not the fact that these SWFs are Middle Eastern that is the relevant take-away, but that these funds do have both industrial agenda and enough capital to impact industries and regional markets.

V Conclusion

In this paper we have assembled a novel data set of SWF portfolio holdings. We analyze their portfolios, and try to understand the investment objectives driving those portfolio decisions. We distinguish two broad objectives: portfolio investment vs. industrial planning allocation. We then introduce measures to capture these objectives and examine their power to explain portfolio allocations.

One view is that they are motivated solely by securing appropriately risk-adjusted financial returns, predicting broad industry and geographic diversification in their portfolios, as well as across alternative types of risky assets. This portfolio investor view has power to explain portions of their portfolio allocations, but leaves much to be explained. We find that considering the possibility that portions of their portfolios are driven by a desire to achieve industrial planning objectives provides significant additional explanatory power. This objective predicts more domestic and regional investments, and more focused allocations consistent with announced planning objectives, and we also see this in the data. Considering both objectives also helps us to understand better the heterogeneity across funds, with some driven solely by portfolio investor objectives, others by industrial planning objectives, and many apparently addressing both. State industrial planning is important for all of the large Middle Eastern and some of the Asian SWFS.

Showing that funds pursue industrial planning objectives does not mean that they necessarily do this well, or that this is the best mechanism to achieve these objectives. The attempt to achieve planning objectives by taking equity stakes in private companies also raises questions whether this is the best mechanism to achieve these objectives, and how sustainable is this approach. There are alternatives, including direct state subsidies delivered either through state owned enterprises or through direct subsidies to private firms. This could very well be done poorly, or a mechanism that provides some political cover for other activities. Looking solely at portfolios cannot address these questions, but we need to turn to returns, a topic we pick up in ongoing work (Dyck and Morse (2010)).

Appendix A – What is a SWF?

We employ a commonly used definition provided by the Monitor group, which defines SWF to be: (a) wholly owned by a sovereign government, but organized separately from the central bank or finance ministry; (b) an investment fund rather than an operating company; (c) an investor that makes international and domestic investments in variety of risky assets, (d) and is charged with seeking a commercial return; and (e) a wealth fund rather than a pension fund – not financed with contributions from pensioners and does not have a stream of liabilities committed to individual citizens and state-owned enterprises.

Appendix B – SWF Portfolio Data Collection

The strategy to re-construct hidden portfolios has three steps. First we identify all of the subsidiaries acting as the investing entities. SWFs usually only partially disclose their organizational structure delineating the names of the investing entities underneath the SWF. We cross-reference our entity list with subsidiaries listed in Bloomberg, Capital IQ, Zawya, Thomson, and the SWF Institute. To ascertain that we capture the all SWF entities which are making investments of any magnitude for the parent SWF, we work backwards from the known portfolio companies owned by the SWF. Knowing these companies allows us to search Factiva news articles and SDC transaction data to identify the exact entity doing the investing. Our overlap is high across these methods, but each step added more entities and allowed us to understand the relationships among entities.

Second, we search for transactions and ownership data involving these entities through a host of possible sources – including entity websites, Amadeus, Bloomberg, Capital IQ, Compact D, Datastream, Dealscan, Dow Jones Zawya, Edgar/SEC, Galante's Alternative Investment Sources, SDC/Thomson One Banker, and Venture Xpert. These sources do not capture all of the investments and usually do not give us the value of the holdings unless the transaction is a high-profile event. However, the union of transactions and holdings captured in these data sources provide a starting point for performing case studies of each transaction. By this we mean that for each company the SWF supposedly invests in, we search extensively in world news sources (via Factiva and Google in multiple languages sometimes) to ensure that we have multiple records of the initial transaction or certification that the holding exists, that we reconcile any increases in stake or divestments with additional transactions, and that we can put a stake on each holding. In

the process, we get a very detailed picture of the SWF's operations and are often led to additional investments made by the funds either from articles on known transactions or via broad sweep searches.

Third, we value the holdings dynamically. The valuation of each company at each point in time is particularly tricky. For publicly traded companies, this is a straightforward task, and a dynamic picture of equity stakes is sufficient. However the private equity and real estate holdings require some assumptions. In particular, the best that we can often do is the equity stake (usually), an initial transaction value (sometimes) and yearly revenue or net income numbers (often) for the company to which we apply an industry-region multiple. When we only observe revenue numbers for some points in time, we have to infer growth with the industry. We mark these for incorporating this forcing in the analysis. If we are missing financials altogether, we use output measures (e.g., dry weight tons for shipping and passengers for airlines), which we try to capture yearly. Although our valuations are far from perfect, we think that our errors will not create biases in the residual portfolio and note that our errors are likely to be the greatest for the smaller companies in the portfolios who are less likely to issues newswires on performance or publish financials.

The next step is to value each of the assets dynamically for the three asset classes. For publicly traded companies, this is a straightforward task; we simply download stock trading data from Thomson and Bloomberg and apply the prices or market capitalizations to the dynamic picture of shares held or equity stakes.

For direct private equity holdings, we have a few different levels of data availability and thus approaches. If we know the investment and divestment amount (or a valuation at an IPO), we calculate the gross return and allocate this return over time scaled to be proportional to the three-digit SIC code return for the region.[33] If we observe the investment, the percentage held, and either a revenue, income or asset figure, we calculate a firm-specific multiple at the point of investment to allow the investment to grow with the firm. If we observe only the percentage held and a revenue, income or asset figure, we apply the three-digit industry multiple specific to region and year. Within these last two scenarios, when we lack the financials data, we capture

[33] The return for year *t* is $exp(ln(X/YearsHeld)*IndustryReturn_t$, where *X* is the investment gross return (divestment divided by the investment) scaled by the region industry return over the period. The regions are defined as Asia, Europe, Latin America, Middle East & Africa, North America, Pacific and home country. To calculate the region returns and the region multiples, we use all firms in the Thomson OneBanker database, which includes Worldscope and Datastream data.

yearly output measures (e.g., dry weight tons for shipping and passengers for airlines) and apply up publicly traded comparables output-to-value multiples. Finally, in the few cases in which we only know the investment amount and nothing else, we apply industry growth for the region.

The third asset class needing valuations are properties. As in private equity, if we know the transacted prices of buying and selling a completed structure, we calculate the gross return and allocate this return over time scaled to the real estate return for the regional area. If we know the purchase price only, we grow the transacted price with the regional area return for the years held. If we know when a property was purchased but not the price, we use heuristics valuation based on property size, location and type, assuming that all properties are class A commercial, residential, retail, or lodging. After looking up the sizes in Factiva, Google or Zawya, we convert all size measures (e.g., apartment units, retail spaces, hotel rooms) to square footage and use the Collier data for region price per square foot for the transacted year as the purchase price. We then grow this value with the region area growth rate.

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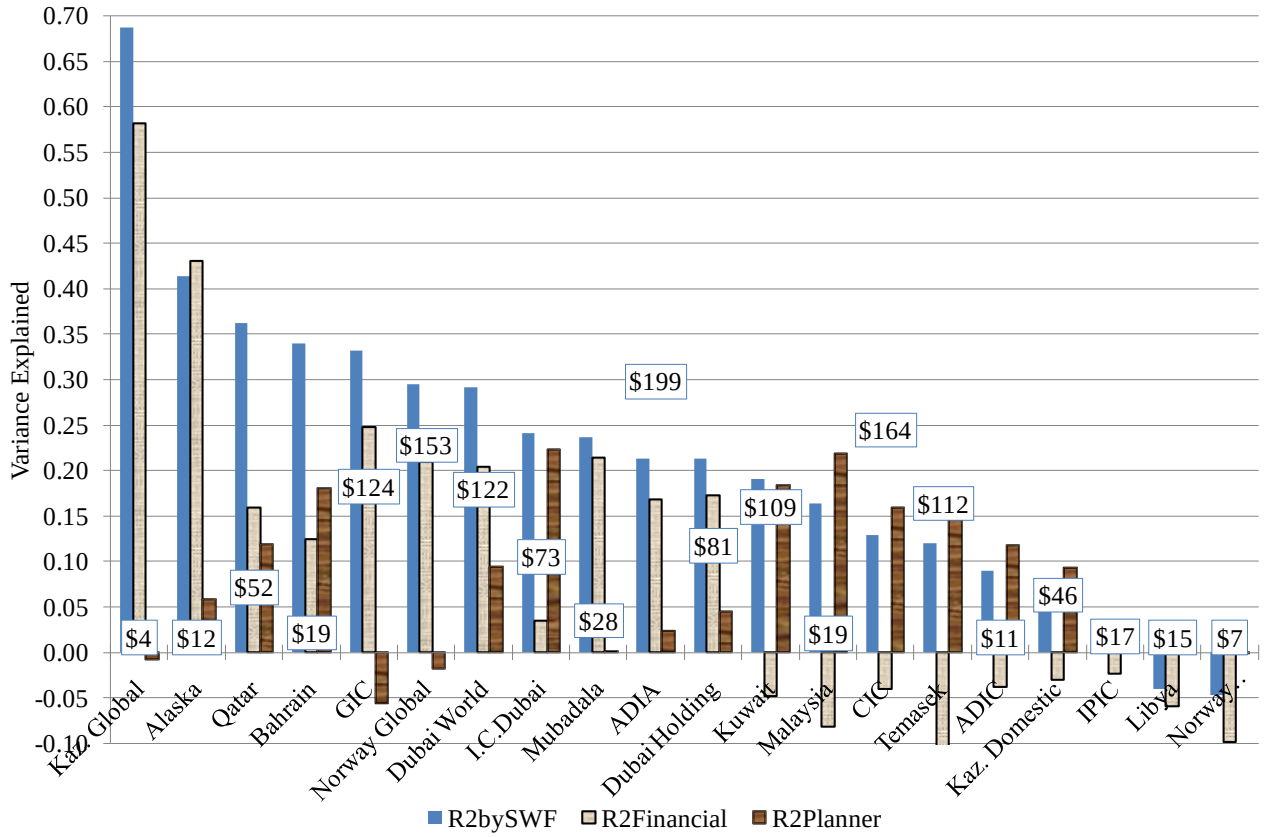


Figure 1: Proportions of Explained Portfolio Weights Explained by the Financial Investor and State Planner Variables by Sovereign Wealth Fund

The proportions plotted result from Column 3 estimates from Table 6. As described in the text, we decompose the SWF Overall RSquare (in blue, the first bar) into RSquare Financial Planner (in textured grey, the second bar), RSquare Industrial Planner (in dark brown, the third bar) and a covariance RSquare. Thus the bars display the proportion of variance explained overall and by each of the objective variable sets. The blocks over each column report the 2008 SWF value, for reference.

Table 1 - Sovereign Wealth Funds Holdings for 2008: Our Bottom Up Data and Market Estimates

Included SWFs meet the Monitor definition of a SWF and had at least $10 billion in assets as of end of year 2007. Market estimates of SWF size come from Preqin and the Sovereign Wealth Fund Institute. The data presented here are for 2008, with our unbalanced panel starting in 1999. The asterisk * denotes a SWF for whom a portion of the column 3 total is indexed public equities. To ensure no double-counting, we do not include SWF operating subsidiaries. Column 4 lists the number of companies over the sample period, not the number of companies in 208 or the number of transactions as many companies have multiple transactions. The number in parentheses excludes Alaska and Norway.

			Of this Paper's Calculated Total:			
	Estimates in Market	This Paper's Calculated Total	Risky Portfolio Specifically Identified: Equities & Real Estate	Number of Unique Companies, P.E. Funds & Properties	Bottom-up Inferred Fixed Income	Bottom-up Inferred Hedge Funds, Alternatives
	1	2	3	4	5	6
Abu Dhabi Investment Authority*	627,000	289,114	217,692	101	70,922	40,058
Abu Dhabi Investment Council	combined	14,973	20,524	33	7,277	4,154
Alaska	26,700	23,307	12,247	10,172	6,580	4,480
Bahrain - Mumtalakat	14,000	19,249	19,249	37	0	0
China Investment Corporation	200,000	261,411	164,243	16	97,168	0
Dubai Holding	103,000	81,483	81,363	191	0	120
Dubai World	120,000	121,782	121,782	153	0	0
GIC - Singapore*	220,000	237,294	150,975	333	79,200	7,119
Investment Corp. of Dubai	82,000	74,067	73,420	79	0	647
IPIC - Abu Dhabi	16,000	18,661	16,863	19	1,798	0
Kazakhstan National Fund*	22,700	22,072	4,139	n/a	17,934	0
Kazyna-Samruk (Kazakhstan)	52,000	46,208	46,208	101	0	0
Khazanah Malaysia	18,243	18,612	18,612	92	0	0
Kuwait Investment Authority*	228,000	186,715	112,442	157	60,410	13,863
Libya Investment Authority	65,000	76,051	15,314	83	60,692	45
Mubadala (Abu Dhabi)	13,300	28,262	28,012	68	0	250
Norway Fund - Global	323,505	316,228	153,267	14,482	162,961	0
Norway Fund - Domestic	12,342	12,342	6,541	253	5,801	0
Qatar Investment Authority*	60,000	58,119	51,923	80	5,351	845
Temasek Singapore*	122,000	127,965	111,686	309	14,072	2,207
Total Funds	2,325,790	2,033,915	1,426,500	26,759	590,165	73,789
Average Size	116,290	101,696	71,325	1,408 (124)	29,508	3,689

Table 2: Geography of SWF and Benchmark Portfolio Allocations

Table A presents the equally weighted SWF portfolio allocations, where each SWF is based on its time series average. As a point of reference we present in panel B the same allocations based on world market capitalization and for the CEM sample of large pension plans that meet our same size criteria of having at least $10 billion in assets in 2007. In panel B the median pension benchmark real estate allcoation is indexed to the home country, and thus the region is left blank. The last two columns of panel A show the difference between the average SWF allocations and the capitalization and the home-biased pension fund benchmarks.

Panel A: Average SWF Allocations (in percent of portfolio)

	SWF Allocations				Excess over	Excess over
	Public Equity	Private Equity	Real Estate	Total	Capitalization	Pension Fund
Asia (excl Japan & Middle East)	0.131	0.093	0.007	0.231	**0.095**	**0.196**
Europe	0.170	0.048	0.010	0.228	-0.112	-0.011
Latin America	0.006	0.000	0.000	0.006	-0.051	0.001
Middle East & Africa	0.077	0.146	0.146	0.369	**0.349**	**0.359**
North America	0.108	0.005	0.018	0.130	-0.164	-0.369
Pacific	0.029	0.005	0.006	0.039	-0.115	-0.073
Total	0.520	0.296	0.187	1	0	0

Panel B: Benchmark Allocations (in percent of portfolio)

	Capitalization Benchmark Allocations				Pension Fund Benchmark Allocations			
	Public Equity	Private Equity	Real Estate	Total	Public Equity	Private Equity	Real Estate	Total
Asia (excl Japan & Middle East)	0.039	0.085	0.012	0.136	0.029	0.006		0.035
Europe	0.096	0.181	0.062	0.339	0.227	0.012		0.239
Latin America	0.010	0.041	0.006	0.056	0.004	0.000		0.005
Middle East & Africa	0.006	0.010	0.004	0.020	0.009	0.000		0.010
North America	0.135	0.106	0.053	0.294	0.465	0.035		0.500
Pacific	0.039	0.094	0.021	0.154	0.111	0.001		0.112
Total	0.324	0.516	0.160	1	0.846	0.054	0.100	1

Table 3: Industry Breakdown of SWF and Benchmark Portfolio Allocations

Table A presents the equally weighted SWF portfolio allocations, where each SWF is based on its time series average. As a point of reference we present in panel B the same allocations based on world market capitalization and for the CEM sample of large pension plans that meet our same size criteria of having at least $10 billion in assets in 2007. The last two columns of panel A show the difference between the average SWF allocations and the capitalization and the home-biased pension fund benchmarks.

Panel A: Average SWF Allocations (in percent of portfolio)

	SWF Allocations				Excess over	Excess over
	Public Equity	Private Equity	Real Estate	Total	Capitalization	Pension Fund
Consumer Goods	0.018	0.008		0.026	-0.012	-0.027
Consumer Services	0.049	0.020		0.069	-0.264	-0.034
Energy	0.051	0.097		0.148	**0.114**	**0.064**
Fabricated Products	0.007	0.000		0.007	-0.019	-0.027
Finance	0.163	0.044		0.207	**0.100**	0.011
Food	0.015	0.003		0.018	0.000	-0.006
Healthcare	0.025	0.003		0.028	-0.004	-0.056
Materials	0.028	0.023		0.051	-0.028	-0.011
Real Estate	0.001	0	0.188	0.188	0.012	0.087
Technology	0.022	0.005		0.027	-0.014	-0.058
Telecommunications	0.061	0.011		0.073	0.032	0.001
Transportation	0.036	0.050		0.086	**0.060**	**0.071**
Transportation Manufacturing	0.019	0.012		0.031	0.005	-0.013
Utilities	0.028	0.014		0.042	0.019	0.000
Total	0.520	0.292	0.188	1	0.0	0.0

Panel B: Benchmark Allocations (in percent of portfolio)

	Capitalization Benchmark Allocations				Pension Fund Benchmark Allocations			
	Public Equity	Private Equity	Real Estate	Total	Public Equity	Private Equity	Real Estate	Total
Consumer Goods	0.020	0.018		0.038	0.050	0.003		0.053
Consumer Services	0.043	0.290		0.333	0.096	0.007		0.103
Energy	0.027	0.007		0.034	0.078	0.005		0.084
Fabricated Products	0.007	0.019		0.026	0.033	0.001		0.034
Finance	0.065	0.042		0.107	0.185	0.010		0.196
Food	0.009	0.009		0.018	0.022	0.002		0.024
Healthcare	0.027	0.005		0.032	0.079	0.006		0.085
Materials	0.023	0.055		0.079	0.058	0.003		0.062
Real Estate	0.004	0.012	0.160	0.176	0.001	0.000	0.100	0.102
Technology	0.028	0.013		0.041	0.080	0.005		0.084
Telecommunications	0.034	0.007		0.041	0.067	0.005		0.072
Transportation	0.007	0.019		0.026	0.014	0.001		0.015
Transportation Manufacturing	0.015	0.011		0.026	0.042	0.002		0.044
Utilities	0.015	0.008		0.023	0.040	0.003		0.043
Total	0.324	0.516	0.160	1	0.846	0.054	0.100	1

Table 5: Explanations of SWF Portfolio: Industry Estimation

In this table the dependent variable is the SWF portfolio weight for 20 SWFs to public or private equity in one of 13 industries (26 obs) or to real estate for all available years 1999-2008. The mean number of years in the sample is 6 years. Cap Benchmark and Pension Benchmark are the portfolio allocation weights based on total capitalization and CEM pension funds, respectively. The mean weight variable is the mean weight to the asset class (private equity, public equity and real estate) for these benchmarks. Correlation(GDP, Industry) is the correlation of the SWF country GDP with the industry. StDev(GDP)* I+/- is the standard deviation of home country GDP times the sign of the correlation of GDP with the industry. Both are multiplied times the industry beta, where the beta for private equity is further multiplied times 1.73 as described in the text. Measures to capture industrial planner objectives include Industrial planwhich which takes a value of 1 if the industry is mentioned in the country's strategic plan. Board_Experience is the average value of the boards experience based on four measures of financial education or asset management experience. SkillIndustry is the proportion of domestic investment invested in that industry with control (>20% stake). OilDepletion is years until depletion of oil reserves. Standard errors are clustered at the SWF level in all columns except 4, 6 and 8, in which a GLS -AR1 estimation uses the Prais Winsten procedure.

Dependent Variable: SWF Portfolio Weight X 100					Within Public Equity		Within Private Equity	
	Cluster	Cluster	Cluster	GLS - AR1	Cluster	GLS - AR1	Cluster	GLS - AR1
	1	2	3	4	5	6	7	8
Pension Benchmark Weight	63.23***		55.60***	54.58***	80.90***	81.03***	46.98*	41.81***
	[13.29]		[13.37]	[7.029]	[16.07]	[11.68]	[22.89]	[9.337]
Pension: Asset Class Mean Weight	49.53		46.76*	23.09**				
	[29.81]		[24.50]	[9.810]				
Cap Benchmark Weight	-1.677		-2.421	-0.627				
	[1.717]		[2.805]	[4.127]				
Cap: Asset Class Mean Weight	106.3**		103.7***	73.14***				
	[43.82]		[34.62]	[8.303]				
Foreign Reserves*Beta	0.058		0.333***	0.136*	0.353	0.266	0.460*	0.192
	[0.052]		[0.093]	[0.074]	[0.282]	[0.349]	[0.237]	[0.165]
$Corr_{GDP,Industry}^{+}$*Beta	0.058		-0.072	-0.382	0.519	0.656	0.316	-0.180
	[0.208]		[0.481]	[0.393]	[1.424]	[1.743]	[0.508]	[0.855]
$Corr_{GDP,Industry}^{-}$*Beta	0.296		0.896***	0.425*	0.928	0.722	0.467	0.513
	[0.194]		[0.296]	[0.232]	[0.845]	[1.137]	[0.749]	[0.528]
$StDev_{GDP}$ *$I^{+/-}$*Beta	1.373***		0.074	0.473	3.329*	3.119	-0.834	0.184
	[0.382]		[0.599]	[1.064]	[1.637]	[4.000]	[1.602]	[2.153]
Industrial Plan		41.81**	33.37**	36.40***	32.10**	46.64***	60.79***	68.84***
		[14.63]	[11.74]	[3.515]	[11.74]	[13.86]	[17.44]	[13.28]
Industrial Plan *Oil Depletion		-0.439**	-0.346**	-0.386***	-0.317**	-0.480***	-0.602***	-0.699***
		[0.155]	[0.123]	[0.0385]	[0.125]	[0.150]	[0.186]	[0.143]
Perceived Skill		6.766***	7.890***	2.202***	12.38***	7.279***	26.28***	12.14***
		[1.497]	[1.417]	[0.785]	[3.349]	[2.710]	[4.411]	[2.173]
Perceived Skill*Board_Experience		-8.442***	-7.883***	-2.430*	-9.373**	-6.076	-29.44***	-17.96***
		[2.173]	[1.767]	[1.345]	[4.073]	[4.527]	[6.868]	[3.693]
Constant	-4.271	1.935***	-5.125**	-2.824***	-1.416	-0.622	-1.813*	0.47
	[2.489]	[0.615]	[1.965]	[0.513]	[1.332]	[1.304]	[0.990]	[1.091]
Observations	3321	3321	3321	3321	1599	1599	1599	1599
Rho (Two Step Prais)				0.858		0.700		0.802
R-squared	0.191	0.110	0.274	0.139	0.146	0.071	0.210	0.074

Table 6: Explanations of SWF Portfolio: Industry-Geography Estimation

In this table the dependent variable is the SWF portfolio weight for 20 SWFs to public or private equity in one of 13 industries or to real estate in one of 7 regions or to real estate for all available years 1999-2008. The mean number of years in the sample is 6 years. Cap Benchmark and Pension Benchmark are the portfolio allocation weights based on total capitalization and CEM pension funds, respectively. The mean weight variable is the mean weight to the asset class (private equity, public equity and real estate) for these benchmarks. Correlation(GDP, Industry) is the correlation of the SWF country GDP with the industry. StDev(GDP)* I+/- is the standard deviation of home country GDP times the sign of the correlation of GDP with the industry. Both are multiplied times the industry beta, where the beta for private equity is further multiplied times 1.73 as described in the text. Measures to capture industrial planner objectives include Industrial planwhich which takes a value of 1 if the industry is mentioned in the country's strategic plan. Board_Experience is the average value of the boards experience based on four measures of financial education or asset management experience. SkillIndustry is the proportion of domestic investment invested in that industry with control (>20% stake). OilDepletion is years until depletion of oil reserves. Standard errors are clustered at the SWF level in all columns except 4, 6 and 8, in which a GLS -AR1 estimation uses the Prais Winsten procedure.

Dependent Variable: SWF Portfolio Weight X 100					Within Public Equity		Within Private Equity	
	Cluster	Cluster	Cluster	GLS - AR1	Cluster	GLS - AR1	Cluster	GLS - AR1
	1	2	3	4	5	6	7	8
Pension Benchmark Weight	56.09***		57.61***	49.60***	41.41***	32.29***	-2.942	-1.785
	[14.45]		[13.03]	[2.287]	[9.380]	[4.335]	[4.618]	[3.490]
Pension: Asset Class Mean Weight	58.28**		53.44**	29.82***				
	[20.93]		[18.88]	[7.493]				
Cap Benchmark Weight	-10.35**							
	[4.708]							
Cap: Asset Class Mean Weight	113.7**		105.9**	72.16***				
	[48.67]		[37.85]	[7.387]				
Foreign Reserves*Beta	-0.0088*		0.0104	-0.00124	-0.0172	-0.0163	-0.00673	-0.0096
	[0.0046]		[0.0068]	[0.0073]	[0.0237]	[0.0324]	[0.0151]	[0.0165]
$Corr_{GDP,IndustryRegion}^{+}$*Beta	-0.023		-0.026	-0.044	-0.240*	-0.267	-0.188***	-0.159*
	[0.026]		[0.043]	[0.046]	[0.131]	[0.174]	[0.063]	[0.094]
$Corr_{GDP,IndustryRegion}^{-}$*Beta	-0.001		-0.017	-0.007	0.019	0.004	0.046	-0.004
	[0.008]		[0.019]	[0.020]	[0.060]	[0.092]	[0.037]	[0.046]
$StDev_{GDP}$ *$I^{+/-}$*Beta	-0.168***		-0.068	-0.035	-0.287*	-0.270	-0.069	-0.065
	[0.035]		[0.048]	[0.082]	[0.147]	[0.297]	[0.108]	[0.165]
Industrial Plan		3.194***	3.094***	4.645***	5.260**	7.401***	6.949***	11.20***
		[1.037]	[0.876]	[0.268]	[1.967]	[0.715]	[2.325]	[0.695]
Industrial Plan *Oil Depletion		-0.031**	-0.029***	-0.047***	-0.047**	-0.072***	-0.062**	-0.110***
		[0.012]	[0.010]	[0.003]	[0.022]	[0.008]	[0.025]	[0.008]
Perceived Skill		0.470***	0.553***	0.118	0.953**	0.439	2.933***	1.553***
		[0.148]	[0.166]	[0.115]	[0.357]	[0.393]	[0.576]	[0.332]
Perceived Skill*Domestic		2.807***	3.022***	1.068***	6.169***	4.304***	6.212**	1.576***
		[0.653]	[0.801]	[0.104]	[1.557]	[0.369]	[2.598]	[0.307]
Perceived Skill*Board_Experience		-0.965***	-0.896***	-0.278	-1.423***	-0.887	-4.259***	-2.598***
		[0.172]	[0.184]	[0.196]	[0.467]	[0.649]	[0.872]	[0.558]
Constant	-0.652*	0.308***	-0.872**	-0.449***	0.068	0.320***	0.0624	0.388***
	[0.362]	[0.070]	[0.312]	[0.072]	[0.174]	[0.123]	[0.117]	[0.113]
Observations	23247	23247	23247	23247	11193	11193	11193	11193
Rho (Two Step Prais)				0.866		0.701		0.794
R-squared	0.077	0.061	0.142	0.052	0.098	0.038	0.127	0.038

Table 7: Sovereign Ownership of World Markets & Active Investments: 2008 Snapshot

This table presents information on control rights associated with investments, classifying a stake as active if the SWF has 5% or more of the shares of a firm. Panel A breaks down stakes by region, and panel B by industry, in both cases presenting data for public equities and private equities separately.

	Public Equity				Private Equity			
	Market Capitalization (billions USD)	SWF Investments (billions USD)	% World Market Capitalization Held by SWFs	% of SWF Holdings Invested Actively	Private Capitalization (billions USD)	SWF Investments (billions USD)	% World Private Equities Capitalization Held by SWFs	Acitve % of Overall SWF Portfolio
Panel A: by Region	1	2	3	4	5	6	7	8
Asia	5,842	250	4.3%	79.3%	12,412	135	1.1%	86.6%
Europe	10,016	221	2.2%	15.9%	19,259	24	0.1%	24.0%
Latin America	1,648	12	0.8%	1.7%	5,759	0	0.0%	1.7%
Middle East & Africa	763	49	6.4%	80.8%	1,364	164	12.0%	95.6%
North America	12,714	154	1.2%	14.1%	10,044	8	0.1%	18.4%
Pacific	4,304	45	1.0%	8.3%	10,837	11	0.1%	26.5%
Total	37,447	731	2.0%	40.8%	59,675	342	0.6%	59.7%
Panel B: by Industry	1	2	3	4	5	6	7	8
Consumer Goods	1,959	24	1.2%	6.0%	2,135	6	0.3%	25.4%
Consumer Services	4,527	69	1.5%	9.3%	33,500	28	0.1%	35.1%
Energy	4,002	59	1.5%	10.5%	848	96	11.3%	66.0%
Fabricated Products	895	11	1.3%	4.4%	2,229	0	0.0%	8.2%
Finance	6,221	297	4.8%	70.3%	5,015	83	1.7%	76.8%
Food	1,144	17	1.5%	18.0%	1,059	1	0.1%	23.8%
Healthcare	2,874	35	1.2%	4.7%	582	3	0.5%	11.4%
Materials	3,095	43	1.4%	13.3%	6,975	14	0.2%	35.0%
Technology	1,943	23	1.2%	11.3%	1,440	0	0.0%	11.3%
Telecommunications	3,598	66	1.8%	45.2%	756	3	0.4%	47.7%
Transportation	928	27	2.9%	65.5%	2,354	18	0.7%	79.0%
Transportation Manufacturing	1,230	21	1.7%	33.3%	1,261	41	3.2%	77.4%
Utilities	2,359	38	1.6%	19.3%	977	19	1.9%	46.3%
Total (excluding real estate)	34,773	731	2.1%	40.8%	59,130	311	0.5%	58.5%