Financing Sustainable Development: The Role of Sovereign Wealth Funds for Green Investment

Working Paper

December 2017
Financing sustainable development: The role of SWFs for green investment.
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<tr>
<td>ADIA</td>
<td>Abu Dhabi Investment Authority</td>
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<tr>
<td>AODP</td>
<td>Asset Owners Disclosure Project</td>
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<tr>
<td>AuM</td>
<td>assets under management</td>
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<tr>
<td>CalPERS</td>
<td>California Public Employees Retirement System</td>
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<tr>
<td>CDC</td>
<td>Caisse des Dépôts et Consignations</td>
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<tr>
<td>CIC</td>
<td>China Investment Corporation</td>
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<tr>
<td>CO2</td>
<td>carbon dioxide</td>
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<tr>
<td>CPPIB</td>
<td>Canada Pension Plan Investment Board</td>
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<td>CSP</td>
<td>concentrated solar panels</td>
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<td>DPC</td>
<td>Decarbonization Portfolio Coalition</td>
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<tr>
<td>EDC</td>
<td>Energy Development Company</td>
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<td>EF</td>
<td>Exchange Fund</td>
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<td>ESG</td>
<td>environment, social and governance</td>
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<td>FDI</td>
<td>foreign direct investment</td>
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<td>FF</td>
<td>Future Fund</td>
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<td>FONSIS</td>
<td>Fonds Souverain d’Investissements Stratégiquestes</td>
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<tr>
<td>GAP</td>
<td>Generally Accepted Principles and Practices</td>
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<tr>
<td>GDP</td>
<td>gross domestic product</td>
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<tr>
<td>GGIF</td>
<td>Green Growth Infrastructure Facility for Africa</td>
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<td>GHG</td>
<td>greenhouse gas</td>
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<td>GIIF</td>
<td>Ghana Infrastructure Investment Fund</td>
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<tr>
<td>GPFG</td>
<td>Government Pension Fund Global</td>
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<td>GPIF</td>
<td>Government Pension Investment Fund</td>
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<td>GSIA ??</td>
<td></td>
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<tr>
<td>GW</td>
<td>gigawatt</td>
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<tr>
<td>HKMA</td>
<td>Hong Kong Monetary Authority</td>
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<tr>
<td>HSF</td>
<td>Heritage Stabilization Fund</td>
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<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
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<td>IFSWF</td>
<td>International Forum of Sovereign Wealth Funds</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<tr>
<td>ISIF</td>
<td>Ireland Strategic Investment Fund</td>
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<td>JRE</td>
<td>Japan Renewables Energy</td>
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<td>JV</td>
<td>joint venture</td>
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<tr>
<td>KIA</td>
<td>Kuwait Investment Authority</td>
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<tr>
<td>KIC</td>
<td>Korea Investment Corporation</td>
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<tr>
<td>LDC</td>
<td>least developed countries</td>
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<tr>
<td>MCPP</td>
<td>Managed Co-Lending Portfolio Program</td>
</tr>
<tr>
<td>MIRA</td>
<td>Macquarie Infrastructure and Real Assets</td>
</tr>
<tr>
<td>MSCI</td>
<td>Morgan Stanley Capital International</td>
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<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>MW</td>
<td>megawatt</td>
</tr>
<tr>
<td>N/A</td>
<td>not applicable</td>
</tr>
<tr>
<td>NBIM</td>
<td>Norges Bank Investment Management</td>
</tr>
<tr>
<td>NIIF</td>
<td>National Investment and Investment Fund</td>
</tr>
<tr>
<td>NPRF</td>
<td>National Pension Reserve Fund</td>
</tr>
<tr>
<td>NSIA</td>
<td>Nigeria Sovereign Investment Authority</td>
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<tr>
<td>NZSF</td>
<td>New Zealand Superannuation Fund</td>
</tr>
<tr>
<td>PDC</td>
<td>Portfolio</td>
</tr>
<tr>
<td>PE</td>
<td>private equity</td>
</tr>
<tr>
<td>PIF</td>
<td>Public Investment Fund</td>
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<tr>
<td>PRI</td>
<td>Principles for Responsible Investment</td>
</tr>
<tr>
<td>QIA</td>
<td>Qatar Investment Authority</td>
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<tr>
<td>RDIF</td>
<td>Russian Direct Investment Fund</td>
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<tr>
<td>RE</td>
<td>real estate</td>
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<tr>
<td>SAFE</td>
<td>State Administration of Foreign Exchange</td>
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<tr>
<td>SAMA</td>
<td>Saudi Arabian Monetary Authority</td>
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<td>SDF</td>
<td>sovereign development funds</td>
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<tr>
<td>SDG</td>
<td>Sustainable Development Goal</td>
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<tr>
<td>SOFAZ</td>
<td>State Oil Fund of the Republic of Azerbaijan</td>
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<td>SWF</td>
<td>sovereign wealth fund</td>
</tr>
<tr>
<td>SWLab</td>
<td>Sovereign Wealth Lab</td>
</tr>
<tr>
<td>TCFD</td>
<td>Task Force on Climate-related Financial Disclosures</td>
</tr>
<tr>
<td>UAE</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Commission on Trade and Development</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>US$</td>
<td>United States dollars</td>
</tr>
<tr>
<td>VC</td>
<td>venture capital</td>
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Executive Summary

Sovereign Wealth Funds (SWFs) hold total assets under management worth US$7.5 trillion, and their potential role financing and promoting green investments and Sustainable Development Goals (SDGs) is undeniable yet scarcely explored. SWFs are government-owned investment funds with long-term investment strategies, without pension liabilities. The recent and significant growth of real assets in SWFs’ portfolios, have increased in-house capabilities and aligned more strongly SWFs’ portfolios to long-term investment horizons, which encourage to be positive about the involvement of SWFs in green investments in the near future.

SWFs are heterogeneous by size, age, and geographic location. The largest 20 SWFs control 90% of the assets. SWFs derive their wealth from natural resources (57%) and other non-commodity sources such as foreign exchange reserves and fiscal long-term rules (43%). The industry is dominated by developing countries which hold 80% of the assets. Clear leaders in sovereign wealth by the number and size of funds are China, United Arab Emirates and Norway. There are six SWFs based in LDCs.

So far, only few SWFs have invested in renewable energy companies or projects, supporting climate-oriented debt and credit platforms. Over the last three years, the total value of these investments is up to US$11 billion. A very small fraction of the total assets of the SWF industry.

Developed countries-based SWFs such as Norway, New Zealand, Ireland, Australia or France are implementing climate-related investment strategies. Only Norway and New Zealand have integrated climate-risks into the investment processes. So far, the main strategy followed by developed countries-based SWFs is portfolio decarbonization.

SWFs from developing economies such as the United Arab Emirates (UAE), Morocco, Singapore, China, or Saudi Arabia are also investing on green infrastructure assets directly or as limited partners on green infrastructure funds. Yet, there is a need to incorporate climate-specific strategies to the investment process.

Mubadala, from the UAE, through its fully-owned subsidiary Masdar, is a salient investor in renewable energy. With more than US$2.7 billion invested in clean energy projects with 1GW installed capacity and 0.7GW under development. Masdar develops and operates utility-scale projects, and also small-scale applications providing energy access to communities away from the electricity grid in least developed countries.

SWFs are exposed to green assets by committing to green debt platforms (US$4.3 billion), investing in renewable energy companies and projects (US$3.5 billion) or participating in green infrastructure funds (US$2.2 billion). The total value of the divestments made to decarbonize portfolios amounts to US$2.9 billion.
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So far, SWFs do not integrate climate-related risks for several reasons:

a. The apparent conflict between the fiduciary mandate of preserving and growing national wealth through financial returns and the consideration of climate change as a nonfinancial factor.

b. The lack of consensus on performance of greener portfolios. Doubts about the performance of certain green indexes or the idea of missing returns by divesting from oil and gas companies.

c. The lack of enough national sustainable development policies or the lack of a social demand for greener portfolios.

d. The costs of analyzing the carbon footprint of portfolios or the costs of being active owners (exercising voting rights or engaging with companies).

Given the best practices analysed in this study, the main lessons to enhance the mobilization of SWFs’ resources to climate-related investments are the following:

a. **To incorporate climate risk as a long-term financial risk is critical.** To systematically include climate-related risks and opportunities into the strategic asset allocation is the best way to obtain results on this front.

b. To make this risk management change, there is a need of revisiting the beliefs about the long-term mission of the SWF and to understand at the top decision level the need to reconcile a long-term investment horizon with long-term climate-related risks and opportunities. As part of this process, the education of stakeholders (government, regulators, citizenship) is key.

c. Governance plays a fundamental role. The clearer the fiscal rule governing flows in and out of the SWFs, the easier to design a consistent sustainable development strategy. Through clear fiscal rules ensure sustainability of the SWF and their goals, including sustainable and green investment strategies. Transparency enhances accountability and increases stakeholders’ pressure for low-carbon investments.

d. **Stronger in-house capabilities** help to understand, develop and implement sustainable investment strategies. And **more responsible (and active) owners would more effectively demand sustainable strategies** to portfolio companies via engagement and by exercising voting rights.

The International Forum of Sovereign Wealth Funds, which gathers SWFs representing 70% of the industry, and promotes the Santiago Principles, a voluntary code of good governance, transparency and accountability, may work as the initial framework to help incorporate climate-related risks into long-term investment benchmarks.

SWFs would benefit from joining institutional investor groups such as the Principles for Responsible Investment or to incorporate disclosures being designed by the Task Force on Climate-related Financial Disclosure or the Portfolio Decarbonization Coalition.
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1. Introduction

1.1. Sustainable Development Goals and the role of Sovereign Wealth Funds.

The General Assembly of the United Nations signed a critical resolution on 25 September 2015, adopting the 2030 Agenda for Sustainable Development. With 17 development goals and 169 targets, the document aims to stimulate action over the next 15 years in the three dimensions of sustainable development: economic, social and environmental. The Sustainable Development Goals (SDGs) will guide the policies and funding of multiple agencies in the UN network for the next 15 years (United Nations, 2015).

Achieving the SDGs requires the mobilization and effective use of all available sources of financing. A number of resource-rich countries establish sovereign wealth funds (SWFs) as savings vehicles to manage revenues. Typically, SWFs are established to enhance returns on international reserves while minimizing risks over the long-term to provide for future generations, stabilize fiscal revenues, meet future pension liabilities, promote economic growth and support development objectives. Well-managed SWFs can support delivery of the SDGs by helping to improve the quality of public spending, strengthening international competitiveness, earmarking spending for high impact projects, development or green investments and supporting ethical investments. However, using such funds to support long-term development objectives such as the SDGs faces a number of challenges/constraints and requires careful management, supported by substantive transparency requirements, adequate government capacities, and a balanced growth strategy.

The study will contribute to bridging knowledge gaps on country experiences with using SWFs to invest in green assets and finance the SDGs. To the extent that recommended guidelines on designing SWFs to finance the SDGs are taken-up by those countries interested in using such funds for these purposes, the study will contribute to the mobilization of resources to support delivery of the SDGs.

Sovereign Wealth Funds are the fourth largest institutional investor group by assets under management. With assets amounting to US$7.5 trillion, it represents a heterogeneous group of government-owned investment funds in multiple geographies, mainly in developing economies. Half of the group is funded via natural resources, whereas the other half is funded from fiscal rules, foreign-exchange excessive reserves or the proceeds of privatizations.

Sovereign wealth funds have been approached in several occasions for their capital potential to solve or help to solve global or regional issues. There is research stating the capacity of SWFs to stabilize the financial markets given their long-term investment horizons may counteract liquidity needs or overheating pressures (Sun and Hesse, 2009). In fact, SWFs from Kuwait, Abu Dhabi, Singapore or China invested US$56.3 billion in the midst of the financial crisis to rescue Western banking institutions such as Barclays, Credit Suisse, Citigroup, Morgan Stanley or Merrill Lynch. Also, SWFs have been asked to contribute for filling the gap of long-term investment needs. That was the case of infrastructure. With global needs beyond US$93 billion per year, a World Bank initiative planned to draw from the large capital base of SWFs to invest in African infrastructure. Specifically, the “One Percent Solution” initiative proposed in 2008 by Robert...
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Zoellick, then President of the World Bank, planned SWFs would invest one percent of their total assets under management in equity infrastructure projects. The initiative never took off.

Nonetheless, the capacity of SWFs to play a central role in achieving the SDGs is undeniable. Most SWFs are located in developing countries with severe social and economic needs. There are also SWFs located in least developed countries (LDC), which host operating SWFs in Angola, Rwanda, Senegal, and Timor-Leste.

The UN Commission on Trade and Development (UNCTAD) has estimated that meeting the key SDG targets in the developing countries will require US$3.5-4.7 trillion in investment each year from 2015-2030. But the UN and member countries cannot deliver on the SDGs alone; only an estimated US$1-1.7 trillion annually is currently invested, leaving a gap of US$2.5-3 trillion annually to fill (UNCTAD, 2014). Here is where SWFs may deploy its capital resources and have a critical impact in the achievement of the SDGs. Yet, there is little evidence of SWFs investments in SDGs. This research paper shows SWFs have invested in green assets worth US$11 billion over the last three years. Investments in green assets, green funds or green agriculture, and decarbonization strategies developed by SWFs still represents a mere 0.15% of the total SWFs equity portfolios.

There is a main challenge related to SWFs financing SDGs and it is the fact that investing at home has proven riskier in terms of poorer governance and weaker performance (Megginson & Fotak, 2015). Those SWFs that invest abroad tend to score better in transparency, reporting, accountability. On the contrary, SWFs that invest only domestically tend to be closer to politicians’ wills, affecting the investment process and resulting in worse financial returns (Bernstein, Lerner, & Schoar, 2013).

Yet, SWFs have the capacity to play a larger role and, in fact, they are acting as powerful development tools in countries such as Bahrein and Singapore. Some SWFs are already influencing SDGs achievements in various forms, from reducing carbon exposure of their portfolios (New Zealand Superannuation Fund), co-investing with foreign development institutions on sustainable infrastructure (Nigeria Sovereign Investment Authority), or investing alongside worldwide renewable energy leaders to develop a more diverse and greener energy mix (Mubadala from the United Arab Emirates).

1.2. Objectives of the study and approach.

The present study has 5 objectives.

1. To understand the particular nature of SWFs and the heterogeneity of this peculiar institutional investor group. (Section I)

2. To show the investment strategies implemented by SWFs since the global financial crisis. (Section I)

3. To provide evidence of the potential role SWFs may play to finance and support SDGs, with particular attention to the “protect the planet” area of the SDGs. (Section II)

4. To study the best cases of SDGs investment strategies of SWFs. (Section II)
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5. To set out guidelines and recommendations for SWFs to successfully implement strategies to achieve the SDGs. (Section III)

The report is divided in three sections. The first section analyses the industry of SWFs, classifies and describes it. It shows the heterogeneity of the industry and SWFs’ main investment trends and objectives. It also covers the role played by governance principles and practices: there are no successful SWFs without strong and sound governance settings. The second section refers directly to the activities developed by SWFs linked to SDGs and SWFs’ investments in green assets. The third section collects the lessons of the report and sets out a list of recommendations and practical guidelines on designing SWFs to support delivery of the SDGs. It accounts for potential challenges and the ways to overcome them.
SECTION I. SOVEREIGN WEALTH FUNDS: A HETEROGENEOUS INDUSTRY.


This Chapter 2 shows the heterogeneity of the industry in terms of size, age, and geographic location. Second, it covers the investment objectives, trends and performance of SWFs. Third, the investment strategies are analysed. Last and fourth, it discusses the outcomes of enhanced in-house capabilities.

2.1. What are SWFs and what do we know about them?

- Sovereign wealth funds manage US$7.5 trillion.
- There are 100 established SWFs, 80 are in operation.
- SWFs industry is dominated by developing country-based SWFs.
- SWFs vary substantially by age, size, and geographic allocation.
- The top 10 SWFs control 74% of the total assets. Top 20 controls 90%.
- SWFs derive their wealth from natural resources (57% of total assets) and non-commodities: foreign exchange reserves and fiscal long-term rules (43%).
- 6 operating SWFs are based in LDCs. 4 more countries consider establish one.

Sovereign Wealth Funds are government-owned investment funds without current pension liabilities which typically pursue long-term investment strategies (Aguilera, Capape, & Santiso, 2016). To define SWFs has been a difficult task. SWFs should be understood as living creatures, evolving in time. There have been efforts in the past to impose a strict definition on SWFs but the efforts have waned given the dynamism of the concept.

The International Forum of Sovereign Wealth Funds (IFSWF), which is a voluntary organization run for and by the SWFs and is the largest group of SWFs, has its own definition. The definition appeared in a document released in 2008, the Generally Accepted Principles and Practices (GAPP), the so-called Santiago Principles (IWG-SWF, 2008). The definition states that SWFs are:

special purpose investment funds or arrangements, owned by the general government. Created by the general government for macroeconomic purposes, SWFs hold, manage, or administer assets to achieve financial objectives, and employ a set of investment strategies which include investing in foreign financial assets. The SWFs are commonly established out of balance of payments surpluses, official foreign currency operations, the proceeds of privatizations, fiscal surpluses, and/or receipts resulting from commodity exports. (Santiago Principles, p. 27)

1 See Table 1 for details of the top 20 SWFs.
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There are three aspects that summarize SWFs: they are owned by the government (at the state or federal/country level). SWFs operate as investment funds (some SWFs have a more hands-on investment approach and act as quasi-public private equity funds whereas others act as passive institutional investors); and SWFs are established by the general government for macroeconomic purposes, SWFs are created to invest government funds to achieve financial objectives, and (may) have liabilities that are only broadly defined, thus allowing SWFs to employ a wide range of investment strategies with a medium- to long-term timescale.

The emphasis on the definition of SWFs derives from the need to differentiate SWFs from other institutional investors: private equity funds, hedge funds and pension funds. The group of institutional investors—including pension funds, mutual funds, insurance companies, private equity and hedge funds—own the majority of shares listed globally. A conservative estimate is that these owners control 65% of all listed equities globally.

However, SWFs are a particular class of institutional investors. Indeed, SWFs are:

- **Not private equity funds.** SWFs have longer time horizons and are by nature open-end funds in comparison to closed-end private equity funds.
- **Not hedge funds,** because they do not typically employ leverage, and do not articulate their investment strategies around niche market opportunities, or against macro events.

- **Neither private equity nor hedge funds,** because SWFs do not have limited partners: the sole owner of a SWF is the government or state.

- **SWFs are not public pension funds.** SWFs do not pay pensions. Some SWFs, as described below in the classification of SWFs by mission, are named pension reserve funds because they preserve wealth to face pension costs of the future, but they are not currently paying pension plans such as the California Public Employees Retirement System (CalPERS) or the Canada Pension Plan Investment Board (CPPIB). As the report shows in the next section, the fact that SWFs face no liabilities influences their investment strategies and allows them to hold riskier assets without liquidity constraints.

Indeed, the lack of liquidity constraints provide SWFs the “freedom” to deploy capital into complex, illiquid and long-term investment strategies. This special feature would facilitate mobilization of resources towards sustainable goals. SWFs do not face liquidity constraints such as pension funds, so they can invest in less liquid sustainable assets. SWFs may commit to very long-term projects and companies without the limitations of closed-end private equity funds. All these features make SWFs good candidates to support the transition towards low carbon economic growth models.

---

2 Some SWFs use leverage for particular deals. The recent massive acquisition of Logicor by CIC, obliged CIC to raise a US$8 billion loan from two major Chinese banks. Other Asian SWFs such as Temasek from Singapore or Khazanah from Malaysia have also raised funds in the loan market. On the contrary, Kuwait law, for instance, prohibits KIA from borrowing.

3 In fact, a common mistake is to misclassify Norway’s Government Pension Fund – Global (GPFG) as a public pension fund. Despite its naming, it is not a pension fund. It devotes not a single krone to pay pensions. Instead, it was established to accumulate enough wealth to help cover the pension burden of future generations. Its income comes fully from the revenues obtained from natural resources (oil and natural gas) and its own investment income.
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Size, age, and geographic distribution.

SWFs hold US$7.5 trillion globally. But the distribution of assets is far from evenly distributed. The top 10 SWFs by size hold US$5.5 trillion, that is, 74% of the assets of the SWF industry is concentrated at the top 10 largest funds. The top 20 gathers 90% of total assets (See Table 1). In short, the bulk of assets managed by the SWF industry is in the hands of 10 funds, representing just 6 governments (China controls four, Saudi two, and Norway, Kuwait, UAE and Singapore complete the list). All of the funds at the top 10 manage above US$200 billion of assets each. Yet, the average SWF is US$92 billion while the majority of funds manage less than US$20 billion.

When classified by age, SWFs show a very uneven distribution. Despite the term was coined in 2005, the oldest SWFs were established in the 1950s in Kuwait, Saudi Arabia, New Mexico (US), and Kiribati. Other important SWFs by size, such as Abu Dhabi Investment Authority (1976), GIC (1973) and Temasek (1981) from Singapore, and Norway (1998) have been established in three waves in the last quarter of the 20th century.

Table 1. Top 10 Sovereign wealth funds.

<table>
<thead>
<tr>
<th>RANK</th>
<th>SOVEREIGN WEALTH FUND</th>
<th>AuM* (US$ billion)</th>
<th>COUNTRY</th>
<th>EST.</th>
<th>UN GROUPING</th>
<th>SOURCE OF WEALTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Government Pension Fund Global</td>
<td>977.8</td>
<td>Norway</td>
<td>1998</td>
<td>Developed</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>2</td>
<td>China Investment Corporation</td>
<td>813.8</td>
<td>China</td>
<td>2007</td>
<td>Developing</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>3</td>
<td>SAMA - Foreign Holdings</td>
<td>633.5</td>
<td>Saudi Arabia</td>
<td>1952</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>4</td>
<td>State Administration of Foreign Exchange</td>
<td>612.3</td>
<td>China</td>
<td>1997</td>
<td>Developing</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>5</td>
<td>Abu Dhabi Investment Authority</td>
<td>589.8</td>
<td>UAE</td>
<td>1976</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>6</td>
<td>Kuwait Investment Authority</td>
<td>515.0</td>
<td>Kuwait</td>
<td>1953</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>7</td>
<td>Hong Kong Monetary Authority</td>
<td>500.4</td>
<td>Hong Kong (China)</td>
<td>1993</td>
<td>Developing</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>8</td>
<td>GIC</td>
<td>353.6</td>
<td>Singapore</td>
<td>1981</td>
<td>Developing</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>9</td>
<td>Public Investment Fund</td>
<td>250.0</td>
<td>Saudi Arabia</td>
<td>1971</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>10</td>
<td>National Social Security Fund</td>
<td>247.4</td>
<td>China</td>
<td>2000</td>
<td>Developing</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>11</td>
<td>Qatar Investment Authority</td>
<td>235</td>
<td>Qatar</td>
<td>2005</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>12</td>
<td>Investment Corporation of Dubai ^</td>
<td>200.6</td>
<td>UAE</td>
<td>2006</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>13</td>
<td>Temasek Holdings</td>
<td>175.2</td>
<td>Singapore</td>
<td>1974</td>
<td>Developing</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>14</td>
<td>Mubadala Investment Company</td>
<td>122.4</td>
<td>UAE</td>
<td>2002</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>15</td>
<td>Korea Investment Corporation</td>
<td>110.8</td>
<td>South Korea</td>
<td>2005</td>
<td>Developing</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>16</td>
<td>Abu Dhabi Investment Council</td>
<td>110</td>
<td>UAE</td>
<td>1999</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>17</td>
<td>Future Fund</td>
<td>98,29</td>
<td>Australia</td>
<td>2004</td>
<td>Developed</td>
<td>Non-commodity</td>
</tr>
<tr>
<td>18</td>
<td>National Wealth Fund</td>
<td>74,72</td>
<td>Russia</td>
<td>2008</td>
<td>Economies in Transition</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>19</td>
<td>National Development Fund</td>
<td>68</td>
<td>Iran</td>
<td>2011</td>
<td>Developing</td>
<td>Hydrocarbon</td>
</tr>
</tbody>
</table>

4 There is even an older fund that can be considered today a SWF, it is the Texas Permanent School Fund, established in 1854.
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Source: Author’s elaboration based on websites of SWFs and estimates from Sovereign Wealth Lab (IE Business School), Preqin, and Sovereign Wealth Center. * Assets under Management. Note: Non-commodity SWFs include those which manage foreign exchange reserves and those funded through fiscal long-term rules. Hydrocarbon refers to SWFs funded via natural gas or oil.

The third source of heterogeneity of the SWFs industry comes from the geographic distribution. There can be identified four different poles of SWFs: The Middle East, China, Norway and Southeast Asia (See Figure 1). The Middle East is the region with the largest concentration of SWFs, both by assets and the number of funds. There are 22 SWFs in operation managing US$2.9 trillion. The Gulf Cooperation Council countries are a clear leader group within the area with 97% of the assets in the region^5.

The second region, by size, is China itself. With US$2.2 trillion and seven SWFs, China is the most important single country in the SWF industry. Even if we exclude from the list the two quasi-SWFs such as the State Administration of Foreign Exchange and the Hong Kong Monetary Agency, the Chinese SWFs would manage US$1.1 trillion, still representing the most important single country in parallel to the United Arab Emirates. The largest SWF in China is China Investment Corporation (US$814 billion), a particular SWF with two main goals: on one hand, to invest excessive foreign exchange reserves abroad in a commercial basis looking for long-term returns; and on the other hand, to guarantee the governmental shareholding control of the largest public banks of China including Industrial and Commercial Bank of China, China Construction Bank, Agricultural Bank of China and Bank of China.

Figure 1. Sovereign wealth funds by region.

Assets under management (US$ billion).

<table>
<thead>
<tr>
<th>Region</th>
<th>SWFs</th>
<th>Assets (US$ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East</td>
<td>22</td>
<td>2882</td>
</tr>
<tr>
<td>China</td>
<td>7</td>
<td>2230</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
<td>574</td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>3</td>
<td>579</td>
</tr>
<tr>
<td>Central Asia</td>
<td>1</td>
<td>574</td>
</tr>
<tr>
<td>ROW</td>
<td>1</td>
<td>262</td>
</tr>
</tbody>
</table>

^5 Iran is the only country in the Middle East region with an operating SWF which is not part of the Council. Its National Development Fund manages assets worth US$68 billion.
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Source: Author’s elaboration based on data from Sovereign Wealth Lab at IE Business School.

The third main pole of SWFs is Norway. Again, a single country controls near to US$1 trillion of sovereign wealth. The case of Norway is different than UAE or China, because Norway manages all its natural resources wealth using a single SWF. The Government Pension Fund – Global (GPFG) is managed by the Norges Bank Investment Management (NBIM), an asset manager within the central bank of Norway (Norges Bank). GPFG is also the most transparent SWF on earth and provides detailed information about its portfolio and responsible investments.

The fourth pole of SWFs is Southeast Asia with six SWFs and near to US$600 billion of assets under management. The region is home to two of the most active SWFs on Earth, the Singapore’s Temasek and GIC. It also includes Malaysia’s Khazanah, a US$34 billion fund established in 1993 which has huge potential to foster SDGs given the central role it plays in the economy of the Asian country.

Other important countries by sovereign assets not included in the four main poles are the United States (US$130 billion), Kazakhstan (US$129 billion), South Korea (US$111 billion), Russia (US$102 billion), and Australia (US$99 billion).

The rest of the world owns 32 SWFs with assets amounting to US$283 billion. North Africa, Latin America, and Oceania lead this group. It is important to notice the rise of SWFs in Sub-Saharan Africa. It has established 14 SWFs, some of them are just registered and still waiting to start operations after new oil and gas discoveries. The total assets under management is still low (just US$11 billion), but the potential remains high. Other countries are now considering establishing such vehicles too (Mozambique, Uganda, Zimbabwe, have all passed laws to establish such vehicles but they are not yet in operation).

The sources of wealth: from natural resources to fiscal policies.

Another stream of diversity of SWFs refers to their sources of wealth. The classical grouping distinguishes SWFs by the source of wealth in three groups: hydrocarbon, non-commodity and other-commodity SWFs (See Figure 2).

There are 36 hydrocarbon-based SWFs, deriving their wealth mainly from oil and natural gas. This group manages US$4.3 trillion. Middle East, North America and Sub-Saharan SWFs dominate this group along with Central Asia, Russia and Norway, which hosts the largest SWF.

On its part, there are 34 non-commodity SWFs which collectively manage US$3.2 trillion, led by China, Singapore and Australia. These SWFs receive their funds from multiple sources, typically through contributions from the government budget via fiscal rules or the proceeds of sales of state-owned assets.

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6 GIC was formerly known as Government of Singapore Investment Corporation. It changed its name in 2013.

7 Many SWFs specialists do not consider the 9 state-owned SWFs in the United States as SWFs, with the exception of the Alaska Permanent Fund. This study includes a total of 9 SWFs from the USA, given the criteria of dynamic nature of SWFs that this study follows.
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GIC manages the financial assets of Singapore and receives its funds from proceeds from securities issued, and government surpluses. In the case of the Future Fund of Australia or the New Zealand Superannuation Fund, the funds were established from a combination of budget surpluses and contributions, and also proceeds from the sale of government’s holdings (Australia). In China, SWFs have received their funds from foreign exchange holdings (CIC), central budget or state-owned capital transfers (National Social Security Fund). Other quasi-SWFs as described above are established within or are part of the national central bank: This is the case of the foreign holdings managed by the State Administration of Foreign Exchange and the Exchange Fund managed within the Hong Kong Monetary Authority. The “holding SWF model” is a particular group within non-commodity SWFs and its main representatives are Temasek (Singapore), Samruk-Kazyna (Kazakhstan), Khazanah (Malaysia), and Mumtalakat (Bahrain), which have inspired other recent Holding-SWFs such as FONSIS (Senegal), State Capital Investment Corporation (Vietnam), and Turkiye Wealth Fund (Turkey).

Figure 2. Sovereign wealth funds by source of wealth (% total assets)

The rest of SWFs accumulate (“Other” in Figure 2) their wealth from other commodities and resources different from hydrocarbons such as copper (Chile, Mongolia), water (Quebec, Canada), diamonds (Botswana), land (Idaho, United States) or phosphates (Kiribati). In the case of Rwanda, the Agaciro Development Fund is a unique case given it was established based on the voluntary contributions from Rwandans at home and abroad as well as friends of Rwanda.

Types of Sovereign Wealth Funds by mission

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8 SWFs established to control state shareholdings and normally to improve the governance and performance standards of state-owned enterprises, in order to prepare them for eventual listings in exchange markets or selling to other investors.
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According to the IFSWF⁹, SWFs have five different objectives. SWFs received different fund mandates and their investment strategies adjust to these goals. Given the living nature of SWFs, and the change in missions they may have, SWFs can be classified into six different classes:

- **Fiscal stabilization**: These SWFs have the mission of supporting macroeconomic stability by managing the fiscal impacts of resource price volatility. This is the case of Mexico, Algeria, or the Russia’s Reserve Fund. These fiscal stabilization funds face higher risks of depletion of their resources during a continued period of low resource price (gas, oil, copper, etc.)

- **Intergenerational savings**: SWFs with the mandate of preserving and grow wealth for the benefit of “future generations” – a long-term savings function. Heritage Savings Trust Fund from Alberta (Canada), ADIA in Abu Dhabi, or Oman’s SGRF, and the Alaska Permanent Fund (APF) are noted examples.

- **Pension reserve**: Funds are designed to fund future retirement liabilities and are examples of funds with pension reserve mandates. Good examples of this type are the Australia’s Future Fund and the New Zealand Superannuation Fund. Government Pension Fund Global from Norway is a particular case within this group of pension reserve SWFs given its size, and its strong focus on intergenerational savings.

- **Economic development**: Most sovereign wealth funds have financial objectives. However, some promote economic development and diversification too, including investment in local infrastructure, private equity or agriculture. They are so-called Sovereign Development Funds. Key SWFs with a clearly articulated economic development mandate include the Public Investment Fund in Saudi Arabia, ISIF in Ireland, Samruk-Kazyna in Kazakhstan, Khazanah in Malaysia, or Ithmar Capital in Morocco. Within this group, Samruk-Kazyna, Khazanah, and Temasek (a hybrid case) can be renamed “Holding SWFs” given they hold controlling stakes in key national companies, with direct impact in the domestic economic development.

- **Reserves management**: Reserve management is sometimes cited as an objective of sovereign funds. The Kazakh National Investment Corporation’s mandate involves managing the alternative assets held among Kazakhstan’s foreign reserves. SAMA in Saudi Arabia, SAFE in China and HKMA in Hong Kong China, are three SWFs that fall within this category. Some analysts do not include them as SWFs given the preeminence of their foreign exchange management mandate. However, in the three cases, the forex management is executed with very particular risk models that allow them to place large fractions of their portfolios into foreign equities worldwide. Both SAFE and HKMA have backed initiatives that promote investments in sustainable infrastructure projects.

- **Hybrid mandates**: Several funds have multiple or hybrid mandates. Most common is a dual stabilization and savings mandate, as the case with Angola’s Fundo Soberano, SOFAZ, Botswana’s Pula Fund, and the HSF in Trinidad and Tobago. Other SWFs isolate mandates using discrete sub-funds, like the Nigeria’s NSIA, which has three sub-funds focused discretely each on stabilization, savings, and investment in local infrastructure.

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⁹ The usage of these categories should be flexible, as SWFs evolve in time adopting new roles and amplifying or reducing their scope of action.
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Chile, in fact, has two funds with distinct mandates. These are respectively for stabilization and the management of pension reserves. In general, most SWFs have a fiscal rule that governs the resources that come into the funds and how much the government may withdraw for fiscal stabilization or economic development purposes. This is the case of some of the largest SWFs: Norway, Kuwait, GIC and Temasek, etc.

All kinds of SWFs, excluding stabilization funds, are well equipped to invest in green assets, to include green investment criteria and have a strong impact in sustainable development goals. Stabilization funds require very liquid portfolios to combat unexpected resource price changes or unanticipated currency extreme situations. Yet, both intergenerational saving and pension reserves would align their long-term investment strategies with sustainable goals and green wise investments. Also, those SWFs classified as “reserve management” may have a role investing in green assets if the excess of reserves allows to play a long-term strategy entering into alternative asset classes such as real estate or infrastructure, as commented for the cases of SAFE and SAMA, which are further discussed in Section II.

Lastly, the economic development SWFs, known as sovereign development funds (SDFs) may play a crucial role of aligning national economies towards SDGs given the central role of the SWF for the economic transformation and development. The cases of PIF in Saudi Arabia, Mubadala in the United Arab Emirates, Khazanah in Malaysia, or ISIF in Ireland, will be described in Section II. Sovereign development funds like these may shape national policies, as normally are tools of the government to transform and diversify the economy. To introduce sustainable development criteria would have enormous impact and may generate a deep imitative process among other investors and corporations in the country.

Developing and Developed Countries.

If we classify SWFs according to the United Nations groupings (United Nations, 2014), we find that Developing economies represent 80% (US$6 trillion) of all assets. It shows that SWFs is a story of developing economies. The group is greatly led by the Middle East, China and Singapore. On the contrary, developed countries represent only 17% (US$1.3 trillion) of the industry assets. The group is led by Norway and, apart from that, there is no fund above US$100 billion. The rest 3% of assets is managed by Economies in Transition (Russia, Kazakhstan, and Azerbaijan).

There are 6 countries within the group of the Least Developed Countries (LDCs) which have an operating SWF: Timor-Leste, Angola, Senegal, Kiribati, Equatorial Guinea and Rwanda (Table 2). Another 4 countries have already established SWFs but are not funded and operationalized yet (Mozambique, and Uganda) or the information of the fund is not publicly disclosed (Democratic Republic of Congo and Sao Tomé and Príncipe).

The case of Senegal is studied in detail in the Section 5.3. and a discussion on the risks and opportunities of SWFs for LDCs is presented. In total, LDCs manage sovereign wealth worth US$23 billion. Both Timor-Leste and Kiribati parked the hydrocarbon and phosphates revenue into their SWFs. The size of the fund is three times the size of the country gross domestic product. In contrast, the size of the SWFs of Angola or Senegal, represent only 2% of the national economy. It is smaller in the case of Rwanda and Equatorial Guinea. The room for having an impact in terms of sustainable development is high in the four cases.
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**Figure 3. Distribution of Sovereign wealth funds by UN country groupings**

![Pie chart showing distribution of SWFs by UN country groupings]

Source: Author’s elaboration. Share of total SWFs’ assets under management (%).

The example of Agaciro, the SWF of Rwanda, is very innovative. It is the only SWF established out of the voluntary contributions of Rwandans at home and abroad via remittances. Risks related with accountability and transparency, clear fiscal rules and mandates, are critical for achieving a positive outcome of these SWFs in LDCs.

**Table 2. Sovereign wealth funds from the Least Developed Countries**

<table>
<thead>
<tr>
<th>RANK</th>
<th>SOVEREIGN WEALTH FUND</th>
<th>AuM (US$bn)</th>
<th>COUNTRY</th>
<th>EST.</th>
<th>% SWF/GDP</th>
<th>Source of wealth</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Timor-Leste Petroleum Fund</td>
<td>16.60</td>
<td>Timor-Leste</td>
<td>2005</td>
<td>361%</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>54</td>
<td>Fundo Soberano de Angola</td>
<td>4.75</td>
<td>Angola</td>
<td>2012</td>
<td>2%</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>65</td>
<td>Fonds souverain d’investissement stratégiques (FONSIS)</td>
<td>1.00</td>
<td>Senegal</td>
<td>2012</td>
<td>2%</td>
<td>Holding SWF</td>
</tr>
<tr>
<td>68</td>
<td>Revenue Equalization Reserve Fund</td>
<td>0.68</td>
<td>Kiribati</td>
<td>1956</td>
<td>309%</td>
<td>Phosphates</td>
</tr>
<tr>
<td>77</td>
<td>Fund for Future Generations ^</td>
<td>0.08</td>
<td>Equatorial Guinea</td>
<td>2002</td>
<td>0,26%</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>78</td>
<td>Agaciro Development Fund</td>
<td>0.05</td>
<td>Rwanda</td>
<td>2012</td>
<td>0,20%</td>
<td>Remittances</td>
</tr>
<tr>
<td></td>
<td>Fonds de Stabilisation des Recettes Budgétaires ^</td>
<td>N/A</td>
<td>Democratic Republic of the Congo</td>
<td>2005</td>
<td></td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td></td>
<td>Permanent Fund for Future Generation</td>
<td>N/A</td>
<td>São Tomé e Príncipe</td>
<td>2004</td>
<td></td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td></td>
<td>Mozambican Sovereign Wealth Fund</td>
<td>N/A</td>
<td>Mozambique</td>
<td>2017</td>
<td></td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td></td>
<td>Petroleum Revenue Investment Reserve</td>
<td>N/A</td>
<td>Uganda</td>
<td>2015</td>
<td></td>
<td>Hydrocarbon</td>
</tr>
</tbody>
</table>
2.2. Investment objectives, trends and performance.

- SWFs invest in diversified global portfolios.
- SWFs are increasing their exposure towards alternative asset classes.
- Infrastructure and real estate are the preferred asset classes for SWFs direct transactions.
- Large SWFs are sophisticated investors leading venture capital deals and complex infrastructure deals globally.
- SWFs prefer developed markets to developing economies.
- Professionalization should facilitate increased exposure towards long-term investments, including sustainable assets.

This sub-section covers the main investment trends among SWFs. It analyses the growing exposure of SWFs to real assets, technology and green investments. It also describes the geographic allocation of SWFs’ investments. Then, it continues with the co-investment and solo strategies followed by SWFs. It concludes with a reflection on the risks and advantages of having stronger in-house investment capabilities.

**Where are SWFs investing since the global financial crisis of 2008?**

Available datasets on SWFs transactions show that the industry has made an impressive shift towards private markets. The Sovereign Wealth Lab at IE Business School in collaboration with the Sovereign Wealth Center Transaction Database showed one of the most important and relevant data trends of the SWFs industry. In 2002, SWFs managed less than US$600 billion, and almost half of the assets were allocated on listed equities, the other half was cash and fixed income securities (See Figure 4). The remaining 9% was invested in private markets. In 2007, at the dawn of the global financial crisis, the figures were still quite similar: listed equities (47%) and fixed income (41%) dominated over private markets (12%). However, the trend changed since then.

At the end of 2015, SWFs flipped the relationship and private markets represented 29% of SWFs portfolios. For the first time, SWFs invested more in private markets than in cash and fixed income (28%), keeping listed equities at the same levels (42%). This change represents one of the big investment trends in the industry, chiefly if we consider that the size of the industry has almost tripled since the global financial crisis. The 12% allocated to private markets in 2007 were “just” US$288 billion. In eight years, the sum increased 460% to US$1.6 trillion. In comparison, total cash and fixed income allocation have only increased 66% and listed equities 113%. The massive injection in the global private markets represents US$1.3 trillion of new capital in areas such as real estate, infrastructure, or venture capital.

In 2016 the same trends continue. SWFs, directly or via fully-owned subsidiaries, completed 291 transactions in 2016, 248 of which were acquisitions. Temasek - and its affiliates (including its venture capital holdings) led all funds by a significant margin, having completed 89 transactions in 2016, 38 of which in various technology sectors. SWFs participated in deals...
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with a total aggregate value of nearly US$160 billion with three sectors – finance, infrastructure, and real estate – attracting the most capital.

In terms total deal value, CIC from China, dwarfed other sovereign investors in the aggregate value of deals in which it participated – over US$40 billion in 2016. Over half of this aggregate value was in very large infrastructure transactions in three consortia deals – two in Australia: Asciano, the port and rail transport leader, and the Port of Melbourne; and one in Brazil, the acquisition of the natural gas pipelines unit of Petrobras. All these three deals are valued above US$5 billion.

BOX 1. DATA ON SOVEREIGN WEALTH FUNDS TRANSACTIONS: AN IMPORTANT METHODOLOGICAL CAVEAT.

Respected and mature data providers such as Bloomberg or Thomson Reuters face true difficulties to track the investment activities of SWFs. One of the main issues refers, precisely, to the definition of SWFs. With blurred lines separating sovereign funds, central banks, foreign exchange managers, pension funds or state-owned enterprises, there is a lot of data missing. Other main issue refers to the fact that SWFs is a developing countries theme. And data providers fail to provide accurate data on countries beyond the OECD frontiers. Reporting requirements in developing exchanges are weaker than in developed economies. And the fact that many SWFs investments are made in developing regions (the so-called South-South deals) amplifies the inaccuracy of databases. Nonetheless, the geographic aspect is not the only one to consider.

As this section will show, many SWFs investment are conducted in company of other investment peers. Data providers are not able to distinguish the amount invested by the SWF from the amounts invested by co-investment peers (many times without blame due to the lack of reporting requirements in private markets deals). Probably the investment rounds in venture capital deals are the best example of how inaccurate the data providers can be. Yet, these round sizes are normally below the US$ 100-200 million. However, when consortium investments are made in sectors such as real estate or infrastructure, the lack of precise details of the weight of each investor may produce distortions in data of billions of dollars.

SWFs specialists and researchers know that the lack of consistent databases is one of the main barriers to conduct good panel data analysis. Last but not least, there is a lot of SWFs investments that cannot be traced because they are invested through third-party asset managers. All the investment positions of SWFs acting as limited partners in private equity, infrastructure or venture capital funds, remain unobserved unless the SWF details such positions, which is unusually the case. So, to summarize, the lack of consistent databases on SWFs transactions is due to three main reasons: fewer reporting requirements in developing countries, consortia deals that difficult to isolate the weight of SWFs in each transactions, and the lack of information about the SWFs limited partner positions in third-party funds.

The surge of private markets: Real estate and Infrastructure.
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Alternative asset classes are dominating SWFs strategies. Indeed, in 2016, SWFs spent 62% of all foreign direct investments on real estate and infrastructure — the average only four years earlier stood below 30%.

Given the uncertainty in the listed equity markets, low fixed-income yields and sustained real asset valuations, SWFs have found real assets as an alternative investment choice. These asset classes are attractive to long-term and large institutional investors given its low volatility, and inflation-adjusted steady income streams.

Indeed, all SWFs with assets above US$100 billion invest in real estate, reinforcing the idea that real estate is needed to diversify large portfolios. That was the conclusion that NBIM made in 2013, when it decided to open its portfolio to real estate. Since then, NBIM has become one of the most important players of the real estate sector. With near to US$1 trillion in assets under management, it planned to invest 3% of its asset base in real estate, meaning it would inject US$30 billion in global real estate markets. The same may apply to other SWFs: once they decide to enter into a new asset class, the distortion effects globally may be large.

Figure 4. Sovereign wealth funds asset allocation (2002-2015)

Source: Sovereign Wealth Lab (2016) with data from SWLab and Sovereign Wealth Center.

Yet, according to an analysis run by Preqin, a research company, there is still way to go. Many SWFs have not yet reached the targets of their real estate asset allocation and are still parking capital into other more liquid asset classes such as cash and fixed income.
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Once the market conditions allow them to reallocate, more capital will be deployed in private markets. Indeed, among the largest transactions by SWFs every year since the financial crisis there is always real estate transactions. For instance, in 2015, of the top 10 deals, 5 were in real estate involving new real estate developments, hotels, offices and residential niches.

As particular theme, SWFs are investing heavily in logistics and industrial assets. SWFs from China, Norway and Singapore have all invested in logistics companies in Europe and the United States. Indeed, the sub-sector was the number one in 2016, with 26.5% of all real estate investments. In 2016, GIC acquired P3, a European warehouse owner and developer, for US$2.5 billion, the single biggest deal on real estate that year, above luxury hotels and expensive office buildings. In the first six months of 2017, the size of the logistics share of total real estate has grown exponentially to 76% of due to the CIC’s massive deal on Logicor. CIC acquired Logicor to Blackstone for US$13 billion, defeating a competitor bid lead by Temasek.

Interestingly, the reason for making such a huge shift relates to the SWFs long-term investment strategies. Indeed, the expected growth of retail and ecommerce sales has propelled the investments in logistics. To deliver efficiently, ecommerce giants such as Amazon, Alibaba or Flipkart do need proper warehouse and logistics networks. SWFs have identified such need and are positioning themselves to reap the upside of a market that seems to continue growing in the coming decades. Indeed, the fact that SWFs are able to identify long-term consumer behaviour changes reflect the ability of SWFs to anticipate secular trends. This places sophisticated SWFs in a very strong position for investing in the green economy and to adopt a leadership position in the coming years on sustainable investing.

On its part, infrastructure has grown in importance for SWFs as an asset class. Investments in infrastructure are also framed by the same trend of increasing exposure to private markets given the current low interest rate environment and the long-term and stable financial returns it produces. According to Preqin, 63% of SWFs invest in infrastructure. With clear exceptions at the top, NBIM being the most paradigmatic large fund without infrastructure exposure, the sector has attracted the attention of SWFs. Yet, the bulk of investments remain controlled by few sophisticated large investors: China, Qatar, Abu Dhabi, Singapore and Kuwait accounted for 98% of all SWF infrastructure dollars spent from 2014 through 2016 (IE -Sovereign Wealth Lab, 2017).

The largest deals of 2015 and 2016 included infrastructure deals. And the preferred destination to allocate SWFs dollars was Australia. The country is running an A$100 billion privatisation programme to finance new infrastructure developments. For instance, the privatisation of Australian TransGrid, a public electricity transmission company, attracted both ADIA and Wren House Infrastructure (a wholly-owned subsidiary of KIA), as they teamed up with local partners to acquire the 99-year lease. In 2016, Also, the bid for the 50-year lease of Melbourne port, the busiest cargo port in the country, has attracted the interest of SWFs, which competed against another short-listed investor consortium backed by two public pension funds. Finally, the consortium backed by Future Fund (Australia) and CIC (China) received the green-light for a minor margin over its competitors to acquire the port for US$7.3 billion. In mid-May 2017, Endeavour Energy, one of Australia’s largest power-grid utilities, was partially acquired by a group joined by QIA, for US$5.6 billion. This huge privatisation program will continue attracting SWFs’ participation.10

10 Which in turn shows a paradoxical situation of countries privatizing companies that end up being acquired by foreign government-owned funds.
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Beyond Australia, European infrastructure has received attention in the last years: In February 2016, Wren House Infrastructure, the specialized unit of KIA, joined a consortium of investors and bought the London City Airport for US$2.8 billion. In 2017, CIC and QIA invested about $1 billion each to buy a controlling stake in the UK gas distribution of National Grid. The total cash deal was US$4.55 billion, excluding debt.

Beyond mature markets, whose regulated utility markets have attracted SWFs capital, CIC has participated in deals in Latin America and Central Asia. In 2016, CIC acquired in consortium with Brookfield, the Canadian asset manager, the natural gas pipelines unit of Petrobras for a reported US$5.2 billion. ADIA acquired a 20% minority stake in the Chilean business of Abertis, the Spanish motorways developer and operator, for US$554 million.

The presence of regulatory and foreign exchange risks still prevents SWFs to play a larger role in the infrastructure space in Latin America. The lack of risk-adjusted opportunities in Sub-Saharan Africa derails SWFs from investing in the region too. The innovative solutions to overcome these risks and fears in infrastructure would also facilitate investments in green related infrastructure. Indeed, the traditional challenges that institutional investors face when investing in emerging markets infrastructure apply to many green investments. Among them regulatory uncertainty (critical in the case of power purchase agreements or transport), the development risk (in developed markets most SWFs or institutional investors acquire existing infrastructure assets while emerging markets need more greenfield projects, it adds challenging construction risks to the models); due diligence of the deal and the partner can be more complicated than in developed markets due to lack of information, and increases due diligence and partner risks; size of equity deals in emerging markets tend to be smaller and that is the reason for investing in platforms, like the IFC vehicles. Also a weak rule of law, currency risks and political uncertainty should be considered. Opportunities in developing economies may provide attractive yields, portfolio diversification and impact. Yet, they require the adoption of a very different risk profile.

SWFs and start-ups: Elephants and unicorns.

Technology is attracting SWFs in recent years. Unicorns, tech-based companies backed by venture capital funds valued US$1 billion, are attracting the world's largest investors, the elephants among institutional investors, the SWFs. Indeed, the so-called “sovereign venture funds” take large positions in technology, digital and innovation sectors. The logic behind these movements relate well with sustainable investments. Only those who bet on the next leaders will obtain long-term rewards. For SWFs to invest in incumbents may be riskier for a long-term expected return. To invest in sectors that can be rapidly disrupted is a risk that any long-term investor should consider.

That is the reason more SWFs are betting on innovation and technology. From health to software, fintech to artificial intelligence, semiconductors to ecommerce. No SWF wants to be left behind by the leaders and economic sectors of the future. In order to do so, multiple SWFs have opened offices where innovation flourishes. Indeed, Malaysia’s Khazanah, Singapore’s GIC and Temasek, Qatar Investment Authority, and China Investment Corporation, the last to join the group in 2017, have all opened offices in Palo Alto, California. Moreover, It shows that among the top 10 most valued start-ups (Figure 5), SWFs have invested in 7 of them, with Temasek and GIC leading the pack, accompanied by QIA and CIC. Others will follow.
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*Figure 5. Top 10 start-ups and participation of SWFs*

Source: Author’s elaboration based on crunchbase.com and websites of SWFs.

For many SWFs, to invest in start-ups and high-tech companies was an impossible mission only a few years ago. For others, it is the bread and butter of daily activities. Again, the different degrees of sophistication and in-house capabilities reveals how heterogeneous the SWFs industry is. The same can be said on green investments. For many SWFs, to consider investing in green assets is a new frontier. Yet, the coming sections, especially Chapters 4 and 5 will introduce the current trends in green investing and how and why SWFs are well-equipped to enter into these many times unexplored opportunities.

Regularly, SWFs compete against each other on specific deals, while the same pair of SWFs may cooperate on other deals. It happens in large-scale real estate and infrastructure deals, yet is particularly salient in the venture capital space. There is a famous case of SWFs supporting rivals in the growing niche of ride-hailing platforms. Uber, the California-based world’s most valued start-up, has been supported by the Public Investment Fund (PIF) of Saudi Arabia and QIA from Qatar, whereas Didi Chuxing, Uber’s rival in China, is supported by Temasek and CIC. The Chinese cab-hailing app won the battle and Uber sold its operations in China to Didi Chuxing in exchange of shares. In Singapore, the Uber’s regional rival Grab is supported by CIC and Vertex (fully-owned by Temasek) too. In India, Ola is backed by GIC and PIF, which supports both Uber and the Indian startup.

**Geographic allocation of SWFs investments.**

The geographic allocation of SWFs reveals that since the global financial crisis, the majority of SWFs investments have targeted developed economies. The United States and Europe are traditional destinations of SWFs equity investments. The geopolitical concerns in the United States and the United Kingdom seem to have no strong effect on SWFs investment choices. The mega deal announced by China to invest in Logicor, the logistics company whose largest warehouse portfolio is based in the United Kingdom, or the acquisitions of New York real estate and technology companies confirm the fearlessness of SWFs to these particular risks, and the longer view that SWFs are taking on these geopolitical issues.
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Indeed, SWFs concentrated their 2016 investments in six countries: United States, India, Singapore, China, Australia, and – most significantly - the UK. Developed markets remained key destinations for SWF investment.

Another interesting trend from geographic allocation is the share of domestic deals: 40 deals were home country transactions in 2016, largely dominated by the Irish ISIF, Temasek, and the Russian RDIF. When investing at home, SWFs prefer to invest in finance, technology and infrastructure sectors.

In fact, as previously commented, among foreign acquisitions only, transactions in the technology and real estate sectors represented nearly half of total transactions; and show how important is this shift towards alternative assets.
The new low for longer scenario (dual low oil prices and low interest rates) has determined the investment strategies of SWFs since the global financial crisis and especially since the collapse of oil prices. On the one side, the low interest rates maintained by the Federal Reserve, European Central Bank, and the Bank of Japan, have influenced strongly the strategic asset allocation of SWFs. Also, it is behind the shift towards private markets observed in Figure 4 with larger exposures to infrastructure, real estate, and other alternative private choices, such as venture capital, and potentially green investments. On the other hand, the low oil prices have an impact too, more importantly on the hydrocarbon-based SWFs as oil or natural gas is the main source of funds.

With these two key scenarios, lower interest rates and low oil prices, the question is, how are these two mid-run scenarios affecting the way SWFs invest?

First, the SWFs move towards private markets is the answer to low fixed income returns. As pointed out in Figure 4, SWFs are investing today more in private markets than in cash related instruments and fixed income. Low interest yields have forced SWFs to enter and explore new investment frontiers. The development of stronger in-house capabilities is a key consequence of entering private complex markets, and has potential impacts on green investment strategies, too.

Persistent low oil prices have an impact on hydrocarbon-based SWFs. However, it has not been an apocalypse for SWFs and the data about the redemptions supposedly made by SWFs on asset managers is far from clear and consistent. It is true that many oil-based economies have suffered the effects of continued low oil prices marking record fiscal deficits. It is also true, that weaker inflows are making more difficult to rebalance SWFs portfolios. But, media has overreacted based on particular cases and their conclusions on the overall industry are exaggerated.

In the case of Middle East countries, for instance, they have realized substantial shortfalls in their public finances. In 2016, Saudi Arabia raised US$17.5 billion marking new record of an emerging-market sovereign bond sale. Year (2017) to date data shows that the same trend continues at record-high levels with Saudi Arabia leading again debt issuance with US$9 billion (new record in sukuk, Islamic bonds), along with Kuwait (US$8 billion). However, the reason most Middle East countries have issued debt last year is due to low debt absolute and relative levels (to GDP), and also given accessing the international markets was at a moderate cost. The analysis of the trade-off between selling assets, including divesting SWFs portfolios, and to tap international markets, was favourable for the latter (See Box 4 for details about the sovereign asset-liability rule). Thus, the capital of SWFs from the Middle East have not been touched.

Yet, it is true that the impact of oil prices has forced other countries to draw heavily on their stabilization funds (the case of Russia, Kazakhstan or Algeria) due to the higher costs of accessing debt international markets and the modest returns of their sovereign vehicles. So, the reported stories about a massive sale of SWFs assets affecting asset managers and global prices has not yet happened. In fact, the cases of Russia, Kazakhstan and Algeria, were positive in the sense that the stabilization SWFs were precisely established to counteract in cases of strong oil price declines affecting national fiscal balances. The responses of each government are of course different, but overall, the SWFs are fulfilling their duties of rainy-day funds.
Implications and Green investment lessons.

Thus, the low for longer scenario described in Box 2 has direct implications and provides a better framework for SWFs to invest in green assets such as clean energy, transport and to promote funds on green infrastructure. The main four implications are:

1. SWFs move towards private markets is the answer to weak fixed income returns and the need of diversifying larger portfolios. The changes on the asset allocation strategy are not exclusive of SWFs but the institutional investor industry as a whole (mainly pension funds). Owning real assets, such as offices, airports or toll roads, allows to access potential to return premium of illiquid assets; second, it allows to protect against inflation; and third, allows to diversify portfolios.

2. The impact of low oil prices has forced some countries to draw on their stabilization funds (the salient cases of Russia, Kazakhstan or Algeria). The very nature of stabilization funds is to accumulate wealth, normally from natural resources such as oil and natural gas, and to use these funds in periods of low resource prices to fund national budgets.

3. However, it has not been an apocalypse for SWFs. For instance, the annual investment income of Norway’s SWF is higher than the total amount withdrew by the Norwegian government. Moreover, despite of the significant fiscal imbalance in Kuwait, the sovereign fund received the proceeds of oil, as planned by the fiscal rule. So, the oil may have impacted long-term strategies but have not eaten sovereign funds capital.

4. Middle East countries, despite facing growing fiscal imbalances have been able to issue sovereign bonds, given low debt burden and low costs of accessing international debt markets. For the first time in years, Middle East countries have issued debt. And this have made possible not to draw money out of SWFs capital.

The SWFs’ move towards private markets is explained by the need to diversify larger portfolios, and the weak returns provided by fixed income securities. Also, private markets and the access to real assets such as infrastructure and real estate is in line with long-term investment strategies typical of SWFs. The consequence of this movement to private markets is the strengthening and sophistication of SWFs workforces. And this sophistication might have a direct effect on the capacity of SWFs to establish specific and focused investment teams around green investments or to develop comprehensive green criteria when contracting external asset managers. SWFs may build green investment teams following their experience on real estate (Norway, ADIA), infrastructure (KIA, CIC, PIF), or venture capital (Temasek and GIC). This process, which has enhanced investment capabilities, may be expanded to green assets teams for those SWFs with large and expert asset-class investment managers. At least, the enhanced capabilities would help to include environment related investments more easily or to integrate climate-related criteria when operating on infrastructure, real estate or venture capital.

2.3. Direct, consortium, platforms. What is the most common investment model?

- SWFs is increasingly co-investing more than investing alone.
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- Consortia deals have increased mainly due to investments in the venture capital space: more frequent and smaller deals.
- Asset-based and geographic-based co-investment platforms have proliferated in the last years. These platforms may ease some of the issues of SWFs when investing in green assets in developing markets.

Traditionally, sovereign wealth funds invested alone for the most part. Only in the last two years, there has been more capital deployed in co-investment or consortia deals than as solo investors. SWFs are joining forces on several fronts and building up different kinds of co-investment platforms.

The trend again is in line with the transformation of SWFs themselves but also as a reaction to the market conditions. Back in 2008, when SWFs injected large sums of capital in some of the most important financial institutions in the US and Europe, the average deal value was above US$600 million and SWFs were investing alone (Figure 6), only 27% of total value deals was made in co-investment with other partners (sovereign and private). But the figures since the global financial crisis have changed. SWFs have lost its appetite for the financials and now the largest transactions are on infrastructure and real estate. Also, given the need to obtain higher risk-adjusted returns, SWFs have partnered among themselves or with sector and geographic specialists to enter into niche markets.

Figure 6 displays a negative correlation, showing that the share of co-investment deals to total deals run in the opposite direction to average deal size. The influence of investments in venture capital have two effect that may explain partially the correlation. First, venture capital deals reduced average deal size values given investments in VC range, on average, between US$5-40 million in comparison to large deals in real estate or infrastructure (worth hundreds of millions or billions of dollars). Thus, the average deal size have declined given the growing number of deals in the venture capital space. Second, the vast majority of venture capital rounds are made in consortia with other investors, making the co-investment deal share go up. So, the effect of SWFs entering into the VC may have this dual effect: lowering average deal value and increase the share of co-investment deals. Lastly, it is relevant to notice that the venture capital exposure of SWFs has been highly driven by the two Singaporean SWFs—Temasek and GIC—despite other SWFs from Malaysia, Kuwait or China are also joining this trend.

Beyond venture capital, SWFs are competing for large deals in infrastructure with other institutional investors such as public pension funds and experienced infrastructure and real estate asset managers. To join consortia for bidding for public infrastructure auctions is more common today, and given SWFs’ investment horizons match with infrastructure deals, an increase in such deals has been witnessed in recent years. As it was said, there is still room for more deals in this space. First, more SWFs may start doing infrastructure deals. Here, the potential role of Norway entering this asset class can be a game-changer. Second, there is a continuous call from multilateral organizations to mobilize capital towards infrastructure, especially in developing countries. Third, the growing number of strategic development SWFs which invest at home and have a mission of economic development, typically involve the creation of investment units focused on infrastructure. Fourth, the establishment of institutional investment platforms will also intensify collaboration and co-investment deals. These four reasons may help SWFs to increase the exposure to infrastructure, and this would

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11 Investments in private equity funds may have similar effects, although quantities are larger in PE than VC. Yet, the lack of data on PE commitments impedes to include it in the analysis.
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imply more co-investment and consortia deals in the future. This expertise will help SWFs to enter into green infrastructure deals via direct investments or committing to green aligned funds on energy, agriculture, transport, etc. Data on the exposure to these green assets is presented in Section II.

Figure 6. Average deal value (US$ million) and co-investment deals (%).

Source: Author’s elaboration based on data from Sovereign Investment Lab (2016).

There is a growing number of institutional investors joining investment platforms. There are two main types of such platforms: geographic- and asset-based platforms. The former refer to those platforms established by a country or regional specialist to invest at domestic companies. In the SWFs sphere, it can be classified as Foreign Direct Investment – SWFs. These FDI-SWFs mission is to attract foreign capital to invest into domestic companies. This is the case of the SWFs established in Italy, France, and to some extent Ireland, too. Russia Direct Investment Fund (RDIF) is a very good example of an FDI-SWF which has established agreements with 25 other institutional investors for co-investment projects. For investors, many times other SWFs, it is attractive to invest in such platforms to get exposure to specific markets and reduce multiple risks associated with developing markets investments such as regulatory and country risks (the FDI-SWF tends to be well connected to the government and use to have access to critical information) or deal size (the platforms allow to pool deals and are open to larger equity commitments). Thus, the capital from foreign large institutional investors, paired with the country expertise of the domestic FDI-SWF helps to unlock otherwise blocked deals.

The asset-based investment platforms refer to globally-oriented platforms led by an asset-class experienced investor. Asset-based platforms focus on specific asset classes such as clean energy, green infrastructure, power projects, farmlands, or even start-ups and high-tech companies. Some examples of these asset-based investment platforms include Aligned Intermediary (AI), an advisory platform for long-term investors (SWFs, pension funds, endowments, family offices, foundations) which helps identify and accelerate the flow of private capital into climate infrastructure projects. It also drives investments towards organizations in the areas of clean energy, water infrastructure, and waste-to-value. To date, nine long-term investors have joined the platform. So far, its members have committed to invest US$1.4 billion into low-carbon infrastructure projects identified by AI. The members list
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includes New Zealand Superannuation Fund (SWF), the Regents of the University of California (university endowment), TIAA Global Asset Management (financial services group), Ontario Public Service Employees Union Trust (OPTrust) (pension fund), Wafra Investment Advisory Group (services group linked to Kuwait national security funds), or the Leonardo DiCaprio Foundation. The AI shows how different investors, sharing a long-term and sustainable view, can join to obtain long-term benefits in terms of returns and environment and social impact.

Another example, the Green Growth Infrastructure Facility for Africa (GGIF Africa) led by Ithmar Capital (the SWF from Morocco) and supported by the World Bank, is a combination of the two types of platforms: it has an African angle and looks for foreign capital (geographic platform), and it is focused on green infrastructure (asset platform). The GGIF Africa shows how these platforms play both roles simultaneously. The platform, plans to close a US$1-2 billion first fund attracting other global infrastructure investors and other SWFs. More details in Section 5.2.

Another interesting project, funded by SWFs in this case, is the Innovation Alliance. Established in 2012, the platform comprises two SWFs (NZSF and ADIA) and a pension fund manager (Alberta Investment Management Corporation). The focus of the investment is on late-stage start-ups. The idea is to provide expansion capital to innovative companies once VC rounds are completed (to work as early-stage private equity providers before IPOs are in sight).

12 Ithmar Capital is still in the fundraising stage for its GGIF Africa. No investment has been made yet.
3. Principles and strategic governance of Sovereign Wealth Funds

3.1. The Santiago Principles and the International Forum of Sovereign Wealth Funds.

- The Santiago Principles (SP) launched by the IFSWF in 2008 are a guideline to foster good governance and accountability among SWFs.
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- The main goal of the SP was to ease the fears of recipient countries to SWF investments. There was a big emphasis on assuring recipient countries that SWFs investments were made on a commercial basis and were not politically influenced.
- Today the IFSWF focuses in three “Cs”: compare, collaborate, co-invest.
- More transparent and accountable SWFs would be more open to incorporate sustainable investment policies.

The Generally Accepted Principles and Practices (GAPP), known as the Santiago Principles is a set of 24 voluntary principles designed to promote “good governance, accountability, transparency and prudent investment practices” among SWFs. The Santiago Principles were presented in October 2008 by the predecessor of the International Forum of Sovereign Wealth Funds (IFSWF). The IFSWF is the voluntary organisation of global sovereign wealth funds behind the Santiago Principles. Currently, there are 32 members which approximately represent 70% of all assets under management by SWFs. The IFSWF is the largest and most important association of SWFs globally.

The Santiago Principles are a “code of good conduct” which serves to establish a space for dialogue and deeper understanding of SWF activities. The four main objectives of the Santiago Principles are:

1. To help maintain a stable global financial system and free flow of capital and investment;
2. To comply with all applicable regulatory and disclosure requirements in the countries in which SWFs invest;
3. To ensure that SWFs invest on the basis of economic and financial risk and return-related considerations; and
4. To ensure that SWFs have in place a transparent and sound governance structure that provides adequate operational controls, risk management, and accountability.

The main “requisite” to join the IFSWF is to voluntarily endorse the Principles. The Santiago Principles have helped SWFs to increase transparency and disclosure.

However, the pace of transformation towards more transparent and consistent governance schemes is slow and challenging. Indeed, one of the main drawbacks in the short history of the IFSWF was the departure of one of its most influential members: The Government Pension Fund Global of Norway. For Adrian Orr (Chair of the IFSWF), the IFSWF members were not making sufficient progress, or at least the pace “on this front [transparency, accountability, good governance] has not been fast enough, and IFSWF’s relevance as a Forum of sovereign peers is threatened” (IFSWF, 2016).13

The IFSWF have encouraged a renewed effort to their members to improve transparency, reporting and governance general quality. In 2017, 29 of the 32 members of IFSWF disclosed self-assessments on the endorsement of SP. For the IFSWF, the purpose is clear: compare investment practices, collaborate, for example in establishing long-term risk and performance metrics, and to foster co-investments. The impact of technology or the growing acceptance of

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13 This might explain why GPFG left the group, yet the reasons are not publicly disclosed.
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responsible investment (active ownership and sustainable investment), represent new challenges for SWFs in governance aspects.

Yet, this effort on transparency which has earned important improvements, seems a bit exhausted. That may explain why the IFSWF while continue betting on transparency and accountability, reinforces new messages such as compare, collaborate, and co-invest. On the one hand, the largest dealmakers do not seem to need further transparency given they have already achieved certain reputation among other institutional investors peers. That would be the case of QIA, KIA, GIC or ADIA, which rank in the lower half of the transparency ratings (Behrendt, 2016). On the other hand, the renewed interest of IFSWF members of serving as development SWFs would complicate issues related to accountability and transparency, as domestic investments increase the odds of political interference (Bauer, 2017). This political interference in investment decisions was the main reason that triggered the establishment of the Santiago Principles, as its mantra is to ensure that SWFs invest on the basis of economic and financial risk and return-related considerations.

Transparency and accountability, thus, remain as one of the most controversial issues related to SWFs. Yet, the implications for sustainable investments remain unclear. It is clear that only well governed SWFs are able to endure on complex macroeconomic conditions, domestic economic stress periods and political interference. Yet, SWFs may establish strong accountable processes towards their sole shareholders–governments—and remain quite opaque in terms of transparency indexes. Well-functioning is not necessarily a synonym of public disclosure. The fact that very important investors in green assets such as SAFE or ADIA are ranked low on disclosure pose some doubts about the best strategies for increasing allocation of SWFs resources on sustainable assets.

In principle, to be transparent would facilitate imitative processes among other institutional investors both at home and abroad. Also, transparency facilitates the development of responsible investment strategies developed in the Section II: engagement with management and boards, and active ownership in portfolio companies. Indeed, along with transparency and accountability measures, there is a growing interest on the monitoring role played by SWFs. From a passive and low profile tone, SWFs are adopting more active shareholders’ strategies. SWFs from different regions and backgrounds have already blocked board decisions in companies in which they own an influential stake and are voting in favour of climate related policies.

Thus, membership to IFSWF may imply a reinforced message on responsible investment strategies. Peer-pressure within the group of SWFs, collaboration and comparison, may align SWFs toward greener initiatives. In fact, the IFSWF proposed climate change as the main theme for its 2016 Annual Meeting. At the annual meeting the IFSWF agreed to explore the investment implications of the global commitment to curb greenhouse gas emissions SWFs. Sharing best practices among its members and observers would facilitate the implementation of green criteria in the investment process, educate and develop internal and external managers on climate related topics and help to identify low-carbon investment opportunities.

Moreover, among the 1,800 signatories of the Principles of Responsible Investment (PRI) there are just 5 SWFs. All of them, excluding Norway, a former member, are members of the IFSWF. To bring more SWFs to transparency, reporting and good governance should benefit the

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14 The efforts by the IFSWF face “the risk that the implementation of the Santiago Principles remains unfinished business. A substantial number of SWFs still have not reached satisfactory levels of disclosure” (Behrendt, 2016).
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participation of more SWFs in initiatives promoting transparency on carbon footprint among institutional investors or investing in low-carbon initiatives and platforms.

On its part, governance link towards sustainable investments is more clear: well-governed SWFs are able to diversify their investment teams, hire national and international talent, and to successfully enter into complex asset classes (infrastructure, agriculture). This professionalization would influence the ability to support low carbon initiatives both at home and abroad.

3.2. The effects of in-house capabilities for SWFs governance and sustainability.

- Higher in-house capabilities reduce management fees and agency issues.
- The insourcing should be done carefully: It may imply worse deal sourcing and higher costs in the mid- and long-term.
- Insourcing allows to develop long-term strategies and thus eases access to sustainable investment strategies.
- Ireland provides a very valid example of a SWF focused on domestic economic development. The performance is evaluated on two factors: financial and economic returns, which may serve as a blueprint for other SWFs.

The fact that SWFs are relying more on in-house capabilities have positive consequences and it also increases risks in several areas. Some of the changes explained below have direct effect on the development of sustainable investment strategies.

SWFs are both hiring external talent and developing their own pool of national talent. The agreements signed by SWFs in Abu Dhabi, Kuwait or China with international education partners imply a will of professionalization and people development. SWFs would rely more on their own workforces and less on external managers. What are the implications of this shift? This shift may yield three main consequences for SWFs governance.

First, direct investments reduce the costs of intermediation and implies potential increase in the net-of-fees returns. Rather than paying fees to external managers, SWFs directly invest by themselves and save those fees. Thus, the net-of-fees returns improve. Second, to invest directly implies less agent costs and stronger bargaining power when negotiating with third-party managers. Developing stronger internal investment teams helps to establish internal benchmarks and to set peer-to-peer comparable settings. These lead to stronger bargaining power of SWFs when negotiating the terms of the fees payed to external managers. Third, developing stronger internal teams facilitates direct investments in more complex or niche sectors. That is, for example, the case of venture capital investments. Both Temasek and GIC have established strong in-house capabilities and develop organizational changes (establishing specialized teams or subsidiaries) to access venture capital. It is not surprising how active these funds are in the VC sphere in comparison to other SWFs which have not developed such capabilities.

However, insourcing comes with its own drawbacks. First, to invest directly implies an increase in costs either in salaries in larger workforces or training, or both. These costs can be unaffordable especially for smaller SWFs. Also, to invest directly implies to substitute the deal sourcing abilities of global experienced asset managers, and if not well executed may result in worse deal identification for SWFs, especially relevant in non-regulated private markets. And to invest in niche markets, while maybe attractive in terms of potential returns, also increases
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risks for those funds without previous experience. Thus it is key to understand the maturity level of SWFs for not forcing inexpert SWFs to enter into complex endeavours by themselves.

A proper design of the insourcing is critical for sustainable investments. Only SWFs with strong in-house teams are able to implement climate change investment strategies due to its complexity and the need to evaluate and include climate risks into the risk matrix. Stronger in-house capabilities would also help in the case of SWFs which have already designed their own internal benchmarks. These SWFs are better equipped to incorporate climate issues to the investment process. Also, SWFs with established low-carbon strategies which also invest directly save the potential misalignment between external portfolio managers and SWFs’ green goals. Section II will detail how misalignment between asset owners and asset managers explain partially why there are no more resources allocated to low-carbon investments. Through direct investing and established internal teams, more SWFs would be able to demand such investment strategies to asset managers or will design such strategies in-house. For smaller SWFs, without internal scale, to acquire climate expertise would be necessary in order to require climate-oriented mandates to external asset managers.

Insourcing is also related to sustainable investments from a different angle. One of the most important governance practice to be developed by an institutional long-term investor refers to the accuracy of its mission. The cases of Brazil or Venezuela, show how the inconsistencies between the mission and the actual operations represent a hard hurdle that may damage the whole project. On the contrary, if the SWFs’ mission is well established and reflects on the importance of long-term goals, then the push towards insourcing and sustainable growth strategies is stronger.

Insourcing eases the conflicts that arise from co-investing or delegating to third-parties which have no long-term missions. Also, insourcing and developing internal capabilities help to introduce investment criteria and benchmarks that are framed to the particular nature of SWFs. By nature, SWFs look to consider long-term trends and thus the inclusion of sustainable development goals seems desirable. As such, those SWFs which are already investing in long-term assets would make the transition towards green investments more easily. These SWFs have insourced many of these operations and are investing by themselves or partnering with other institutional investors. On the contrary, funds with weaker long-term background may face difficulties to enter into green asset classes, where duration tends to be longer and asset complexities higher. The case of the transformation of the Ireland Strategic Investment Fund (ISIF) exemplifies well how clear mission and beliefs, aligned governance and operations, joint with internal capabilities helps to set up sustainable methodologies to measure returns not only on financial grounds but also on economic development impact (See Box 4 for more details).

The main takeaway of Box 4 is clear: Ireland has developed a particular model which fits as a desirable conceptual model for the group of development sovereign funds (SWFs with economic development missions). This model would have a huge impact in terms of sustainable development of domestic economies. Only time will confirm the validity of this model in Ireland and how to implement it in other settings. The model has a strong potential impact on sustainable policies and economic and social development. Other development SWFs may work on a similar effort: to be able to measure returns on investments using economic impact criteria. Yet, the risks of using loose definitions of “economic development” which may hide inefficient or politically-driven investments at home is high. This is riskier in countries with fewer talented individuals, weaker regulations and accountability, and poorer investment opportunities. One way to overcome this is to establish FDI-SWFs to attract other
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SWFs and institutional investors (pension funds, IFC, financial development institutions) which would counterweight potential deviations from economic and sustainable development.
In 2014, the National Pension Reserve Fund (NPRF) of Ireland changed its mission and investment scope. NPRF’s former mission was to obtain financial returns from an international portfolio to help reduce the bill of future pensions, alike Australia or NZSF. After the global financial crisis, NPRF was transformed into a sovereign development fund. The new Ireland Strategic Investment Fund (ISIF), commenced from a legislative process started with the National Treasury Management Agency Act in 2014. The year later, the investment strategy of ISIF was published, a new investment committee was set up and a team of 35 professionals started working in the new objectives of the new ISIF. To date, it has committed €2.2 billion and has impacted €5.4 billion via co-investments. That is, per every euro that ISIF has been investing in Irish projects, it has attracted more than 1.5 euros, thus north doubling the impact of its investments.

The main transformation of the Irish SWFs is the change in its mission, beyond the organizational changes and financial details. It now has a unique and challenging mandate with a double bottom line: to “invest on a commercial basis to support economic activity and employment in Ireland”. The first part sounds familiar to IFSWF members, as they are encouraged to invest “to maximize risk-adjusted financial returns”. The second part, the “economic impact” responds to a new narrative within SWFs, now renamed as development SWFs, and it has required the introduction of renewed economic conceptual frameworks. To ensure that ISIF is investing in high economic impact investments, the SWFs investment decision is subject to:

**Additionality** refers to the additional economic benefits to Gross Value Added /Gross Domestic Product which are likely to arise as a result of the investment under consideration, over and above what would have taken place anyway.

**Displacement** refers to instances whereby the additionality created from an investment is reduced or made smaller at the overall economy level due a reduction in such benefits elsewhere in the economy.

**Deadweight** refers to instances whereby the economic benefits created from an investment would have been achieved in any event in the absence of intervention.– Generally, ISIF looks for supporting the economic activity of Ireland and employment, while generating commercial returns. It looks for additionality avoiding or limiting the displacement and deadweight. What is exactly the economic impact? The economic additionality refers to increased: output (turnover), profits (operating surplus), employment, net exports and capital expenditure.

Indeed, ISIF evaluates each deal using the double bottom-line: on the one hand, commercial returns include the characteristics of the company managers, the co-investment partners and the sector particularities; on the other hand, economic impact refers to capital expenditure, job creation, research and development, international expansion, etc. As a long-term investor, ISIF looks for sustainable additionality. It will have “a more prolonged effect on economic activity and will result in a greater impact than once off, short-term gains”.

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SECTION II. SWFs AND SUSTAINABLE DEVELOPMENT GOALS.

4. Institutional investors on climate change: where do we stand today?

- To bend emissions curve by 2020 would require at least US$800 billion private resources in climate action each year.
- Main challenges to enter climate change assets are: lack of transparency, risk measurement, and fears of missing returns if investing with a responsible investment focus.
- Disclosure efforts by companies and investors should help to achieve standardization.

Today, according to the last report of the Principles for Responsible Investment and Novethic (PRI-Novethic, 2017), which analyzed findings from a review of 1,200 investors, including asset owners and asset managers, are moving forward on climate action. Yet, there is a need for including climate change within investment strategies to have a consistent impact in the coming years.

The PRI-Novethic finds that in 2017, 74% of asset owners who responded to survey are taking action on climate change and see low-carbon investment as one of the most important long-term investment trends, ahead of technology developments and demographic changes. This includes any kind of action towards climate change. The figure remained stable from previous year.

Also, the PRI-Novethic reports that 60% of asset owners worldwide look to exert an influence in their portfolio companies on climate change issues. Asset owners are establishing different engagement strategies with portfolio companies to increase transparency and reporting and also to reduce the carbon impact of its operations. How to do this in a consistent and efficient manner is not yet clear. Norway, below, would provide an example of engaging. The first step being an active owner, voting shareholder’s rights and aligning voting to green attitudes directly or via proxy advisors.

Looking forward, bending the emissions curve by 2020 is the only way to limit global warming by 2030. This requires investment of at least US$800 billion from private sources and US$200 billion from public finances in climate action each year on areas such as energy, infrastructure, transport, land use, heavy industries and finance (PRI-Novethic, 2017). And this mobilization of resources remains a huge challenge. Despite asset owners and managers are targeting low carbon or climate resilient investments or using emissions data to inform investment decision making, only 17% of asset owners have established a climate change sensitive or climate change integrated asset allocation.

Some challenges institutional investors\(^\text{15}\), and specifically SWFs, face to increase the allocation of climate smart investments can be grouped in three categories:

- Lack of transparency and the difficulty on risk measurement and management.

\(^{15}\) Section III focuses specifically on the challenges of SWFs on green investments.
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- Fears that environment, social and governance (ESG) focus would hurt overall performance in terms of financial returns?
- Lack of clear national roadmaps and social demand on climate actions.

First, the lack of information and proper risk management tools is one of the main hurdles for institutional investors. With respect to risk management and measurement, institutional investors face the difficulty of accessing to green opportunities directly. To invest through funds can be costly and to develop and implement green criteria in-house is costly too. Yet, despite new tools such as Sustainalytics or MSCI are available, institutional investors tend to think that green investment opportunities are scarce and difficult to integrate in the asset allocation strategy. Other factors which limit investors to use climate information is the lack of appropriate quantitative environmental information, the lack of comparability across firms, or the lack of sufficient material information. Also, the cost of data gathering and analysis may be too high (CFA Institute, 2017).

Second, many institutional investors still think that green investments provide lower returns than traditional benchmarks or that climate risk pose no material differences and to focus on green investments adds no value. There is still noise in the markets and conclusions beyond academia are not that consistent yet. Bloomberg (BNEF, 2017), in its last New Energy Finance Report, analyzed clean energy index funds with a focus on companies active in renewable and low-carbon energy, and which stand to benefit from responses to climate change and energy security concerns. The performance is slightly worse than general Nasdaq and S&P 500 indexes in 14, 5 and 3-year horizons. The same conclusion is obtained from the MSCI World ESG Leaders index, when compared to its parent MSCI World. On the contrary, BlackRock, the world’s largest asset manager, provides evidence that the low carbon version performs slightly better than its parent, the most global passive index-fund. These mixing results are still present in the decision making process of many asset owners.

And these fears led to substantial inaction: at least 20 per cent of institutional investors both in North America and Asia do not allocate to sustainable investments, according to the Schroders survey of 400 major institutional investors. This number drops to 10 per cent in Europe, suggesting that the awareness efforts should focus on asset owners from North America and Asia.

The last issue relates to the lack of enough climate change social debate. SWFs have the mission of preserving and grow wealth for future generations. They are responsible for the wealth of the national citizens and their main focus is on financial returns. Thus, SWFs normally are exposed to domestic public opinion. Countries where climate change is not a political or social priority tend to have lower inclination to implement climate related strategies. The key issue, as observed in the case of New Zealand below, is that many SWFs still see climate risk as a non-financial risk. Many SWFs still see climate change policies as costly and unnecessary to fulfill their long-term mission. On the contrary, if SWFs leading such changes even in adverse public opinion settings, SWFs would have a large impact, influence other national institutional investors and potentially frame government policies.

Yet, the future looks brighter: Another recent survey by BNP Paribas, the French bank, found that asset managers and asset owners plan to double their investment in ESG strategies over the next two years (PRI-MSCI-UNEP Enquiry, 2016). While lagging behind, the demand in the United States for ESG related investments is growing three times as fast as in Europe. According to the survey by Schroders, more than two-thirds of big investors believe sustainable investing will grow in significance by 2022. California has recently signed into law
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legislation that forces CalPERS and CalSTRS, two of the world’s biggest pension funds\(^1\)\(^6\), to divest their coal assets (Scott, 2015).

These awareness and visibility efforts activities by groups such as PRI or the Global Sustainable Investment Alliance (GSIA) have a common goal: help make the crucial link between sustainable development, government policies and the finance industry. The sustainable investment community is building momentum. Two years after the COP21 and the launch of the SDGs, the world have witnessed important milestones in terms of regulation and reporting through recent national policy updates, including France’s Energy Transition Law and China’s Guidelines on establishing the Green Financial System, involving political will and institutional investment support. Indeed, sustainable investing is a growing segment among institutional investors, which almost doubled in size from US$14 trillion in 2012 to US$22 trillion in 2016 (Institutional Investor, 2017)\(^1\)\(^7\).

To facilitate the consolidation of these positive trends, there are two critical areas for improvement: to incorporate climate change considerations into manager contracts and into asset allocation.

Indeed, there is a consistent gap between asset owners and financial advisers. Asset owners tend to care more about climate change issues than their financial advisers. Particularly, only 19% of advisers would consider pulling out money of companies whose activities are damaging the environment, in comparison to the 38% of asset owners who would take money out of those companies (Schroders, 2016). This relates with the agency issues and asymmetric information that comes with externally managed funds. More internal capabilities, along with clear investment policy rules, would ease the risks of conflicting goals and facilitate more effective climate-related divestment and engagement strategies (see Section 3.2 above).

According to a recent survey among the members of the CFA Institute, a global association of investment professionals, the client demand is the main driver in ESG investments (CFA Institute, 2017). Overall, 73% of survey respondents take ESG consideration into account in their investment analysis and decisions. Specifically, 54% of investors take into account environmental issues. By investor type, institutional investors are more likely than private investors to take climate change issues into consideration. Interestingly, there are also geographical and generational differences linked to environmental issues. Thus, 66% European investors take into account environmental factors in comparison to Asia-Pacific (58%) and Americas (49%). By generations, younger professionals are more likely to consider climate issues: millennials (78%), Gen-X (74%) versus baby-boomers (68%). This implies that the younger the workforce of investment professionals of a given institutional investor, the larger the inclination to adopt climate investment criteria. Moreover, there are also large gender differences. Despite data does not disaggregate between environment, social and governance when describing gender differences, the data is relevant. Women systematically consider ESG issues in their investment analysis (62%) much more frequently than men (49%). In the same trend, only 18% of women say ESG issues are immaterial or add no value to investment analysis or decisions, compared to the 46% of men.

\(^1\)\(^6\) The state of New York is planning to follow.

\(^1\)\(^7\) Very recent initiatives such as Climate Action 100+, supported at the highest level, are now building upon solid initiatives launched more than five years ago, like PRI or the Global Investor Coalition on Climate Change.
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In conclusion, it seems that younger workforces, with more women, are more likely to adopt climate change investment criteria. To educate older generations and men, or to incorporate younger and more women seems to increase the likelihood that institutional investors adopt climate change criteria. American and Asian institutional investors are today less inclined to move in this direction in comparison to European investors.

Another set of steps and actions are claimed from different groups and experts such as the need to focus on the following to-do lists:

- Aligning policy and regulation with the SDGs, bringing the global investor voice to policymakers, including promotion of green finance, disclosure and carbon pricing, as well as collaboration and policymaker capacity-building.
- Advocating reporting reforms and standardizing global corporate disclosures that are comparable among regions and stock markets. By enabling collaborative investor engagement with companies to adopt the Financial Stability Board Task Force on Climate-related Financial Disclosures' (TCFD) recommendations, manage transition risk and use scenario analysis.
- Directing patient capital towards infrastructure development, promoting the creation of long-term pools of risk capital. Advancing investment practices in assessment and management of climate-related risks and opportunities including sharing of good practice.
- Supporting investor disclosure by aligning the PRI Reporting Framework with the TCFD guidance for asset owners and managers.

5. SWFs investing in green assets and supporting SDGs

There is no agreement on the definition of “green investment”. Countries adopt very different definitions to the term and may include investments in renewable energy sources such as hydropower, sunlight, wind, tides or geothermal heat. Others refer to the investments in clean energy solutions, waste management, forestry, pollution control, environmental protection, etc. The term is quite loose. All these make the analysis of green investments supported by SWFs more difficult. This study considers six types of green actions analysed in Table 4 below:

- Green debt funds & platforms: Describes commitments to green-certified platforms such as the IFC’s Managed Co-Lending Portfolio Program (MCPP).
- Renewable energy: Direct investments in renewable energy companies and projects.
- Green infrastructure: Commitments and limited partnerships on green infrastructure investment funds or companies.
- Green startups: Investments on fundraising rounds in privately-held innovative green companies.

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18 The list is the result of the merge of the challenges detected by the Business & Sustainable Development Commission (BSDC, 2017), a pressure group from top financial public and private leaders, and the conclusions of the PRI Report (PRI-Novethic, 2017).
19 The web site details actions of the Task Force and its mission of developing voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders. It is chaired by Michael Bloomberg. See more details at: https://www.fsb-tcfd.org/
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This study considers a broad definition of green investments. Green investing in this report includes investments in companies and securities that are considered to be positive for the environment, such as companies and technologies offering alternative sources of energy or those that have demonstrated a track record of reducing their environmental impact. Also, green investing includes allocations on green-labelled funds in various asset classes, normally infrastructure and agriculture. It also includes commitments to such funds, not necessarily realized yet. The study considers portfolio decarbonization strategies, yet they are not included in the total investment sum because they are mainly divestments. The term “sustainable investments” refer, in this report, exclusively to the environmental aspect of sustainability, otherwise is indicated when it refers to governance or social issues.

5.1. Trends, drivers and strategies to support sustainable economic development.

- The value of SWFs’ green investments and strategies in the period 2015-2017 was US$11 billion. Plenty of room for improvement, given it represents just 0.15% of all SWFs assets under management.
- Green debt funds and platforms have received commitments from SWFs amounting to US$4.3 billion.
- Investments in renewable energy projects received equity funds estimated at US$3.5 billion. Investments in green infrastructure projects both directly or via green funds received US$2.2 billion from SWFs.

Total value of SWFs’ green investment reached US$11 billion between 2015-2017. SWFs have invested in renewable energy companies, have developed portfolio decarbonization strategies (divestments from heavy greenhouse emitters) or funded green infrastructure and agriculture funds. The room for improvement remains very high. Only few SWFs are participating in green investments. The addition of other large SWFs that may follow the leaders; or a larger exposure to green assets of those SWFs already investing may imply significant improvements. As in the case of venture capital and private markets, SWFs follow long-term trends, and SWFs may imitate the SWFs who are pioneering on green investments too. Demographic pressures (such as investment teams lead by millennials and women in a higher proportion), government policies (including regulation on energy or transparency requirements), and a changing perception of sustainability and climate risk as a financial risk, may help SWFs to expand their allocations to green assets.

So far, the total value of SWFs green investments and strategies represent a mere 0.19% of SWFs total assets under management. This figure is calculated from the analysis of deals and strategies described in Table 5 below. The estimated total value of SWFs’ green investments and strategies in the last three years is US$11 billion, representing 0.15% of total SWFs’ assets under management. The World Bank Group has estimated that between 2006 and 2016 green investments represented 0.7% of the value of all reported SWF deals. The share for 2016 may be higher, at 3.5 percent. However, this recent surge is driven by a small number of large
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deals, and it could be just temporary (Halland, 2017). In both studies the conclusion remains the same: SWFs’ involvement in green finance remains low in comparison to both total deal value and total assets under management.

In this section, the main sustainable initiatives led by SWFs are analysed. The criteria used to screen the major deals and strategies of SWFs on sustainable investment have been three-fold. First, news searches via Factiva/Google News on the 30 top SWFs by assets under management (representing 96% of the total industry). This search yielded a first group of SWFs currently investing in green assets. The second step was the in-depth analysis of the top 15 SWFs by assets under management: policies, annual reports, news releases have been studied to capture green investments, long-term sustainable strategies and advocacy efforts. Third, matching the results with two third-party information providers on responsible ownership (Bretton Woods II Leaders List and the Asset Owners Disclosure Project, AODP). This last stage implied the inclusion for analysis of smaller SWFs such as SOFAZ in Azerbaijan or Samruk-Kazyna of Kazakhstan, which have a minor exposition to green investments. The focus on transparency and disclosure of these initiatives is very relevant but differs from the focus of this study. The research presented here identifies green trends among both transparent and also opaque SWFs. In this sense, this report includes hidden but important deals in terms of sustainability impact of SAMA and the PIF in Saudi Arabia, or by SAFE and HKMA in China-Hong Kong.

According to the Asset Owners Disclosure Project, only eight SWFs disclose publicly their strategies on climate change. Among them, only three funds are based in developing countries: The United Arab Emirates (Mubadala and ADIA) and Azerbaijan. Thus, according to AODP, some of the world’s largest SWFs are ranked very low on their success at managing climate risk within their portfolios, based on direct disclosures and publicly available information (AODP, 2017).

The Bretton Woods II Responsible Asset Allocator Initiative classifies public pension funds and SWFs by their responsible and sustainable investment criteria and principles. The distribution of SWFs (Table 3) shows that the majority of SWFs (78%) are ranked in the medium, low or lowest quintiles. Only 12 SWFs, representing 21% of the total assets under management, belong to the group of asset owners with high levels of sustainable principles.

Table 3. Sovereign wealth funds as responsible investors.

<table>
<thead>
<tr>
<th>QUINTILE</th>
<th>AuM* (US$bn)</th>
<th>AuM* (%)</th>
<th># SWFs</th>
<th>% of SWFs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>1,257</td>
<td>18%</td>
<td>5</td>
<td>9%</td>
</tr>
<tr>
<td>High</td>
<td>217</td>
<td>3%</td>
<td>7</td>
<td>13%</td>
</tr>
<tr>
<td>Medium</td>
<td>3,779</td>
<td>54%</td>
<td>16</td>
<td>30%</td>
</tr>
<tr>
<td>Low</td>
<td>832</td>
<td>12%</td>
<td>18</td>
<td>33%</td>
</tr>
</tbody>
</table>

20 The World Bank research only considers three sectors: infrastructure, energy and utilities and spans over ten years (2006-2016). A comparable figure of the last three years of green investments (US$4.2 billion) versus total assets under management (US$7.5 trillion) yields a figure of 0.06%. In the present study the comparison is made between the value of last 3 years’ actions (covering all green sectors and both investments and commitments) and total SWFs assets under management.

21 The Heritage Stabilization Trust Fund is included in the AODP initiative but the analysis of its annual report yielded no information in terms of sustainability, and has not been analyzed separately.

22 It is an initiative backed by New America and lead by Scott Kalb, former Chief Investment Officer of the Korea Investment Corporation.
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**Table**

<table>
<thead>
<tr>
<th>Lowest</th>
<th>871</th>
<th>13%</th>
<th>8</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>6,956</td>
<td>100%</td>
<td>54</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration based on Bretton Woods II (2017). *Assets under management.

Yet, things may positively change in the near future. Climate change was the leading theme in the 2016 IFSWF annual meeting. Since then, a group of SWFs led by New Zealand, Ireland, Morocco and Australia, have been debating on the climate change and fossil fuel transition economy.

New Zealand Superannuation Fund is leading these changes within the IFSWF members. Out of the IFSWF group, Norway provides a very strong case in terms of divestment from fossil fuels and engagement with companies to support green investment strategies. The Future Fund of Australia has also developed an ESG policy that is applied when hiring and contracting external asset managers. There is a growing consensus and more funds are considering environmental criteria when hiring external managers. Also, SWFs may introduce changes on its performance benchmarks to acknowledge these new investment criteria. So far, only few SWFs (exception made of New Zealand and Norway) have integrated climate change in the performance benchmark or systematically control climate risks against a reference portfolio. Currently, only financial risks are considered, and climate change is still viewed as a nonfinancial risk by large majority of SWFs.

Recently, the world’s largest pension fund, the Japanese Government Pension Investment Fund (GPIF) allocated an initial 3% of its domestic equity portfolio, or US$8.9 billion, to three ESG-focused indexes, and promised to boost its passive exposure. It plans to begin applying ESG-related criteria to its active investments as well, in the future. GPIF partnered recently with the World Bank to research on the best ways to extend ESG criteria to fixed-income investments. Also, GPIF plans to draw resources from its partners in the “Global Asset Owners Forum”, a GPIF lead initiative which gathered 12 pension and sovereign funds in November 2016. The first meeting summary describes climate risk as “the most significant topic in the global market. It would benefit asset owners to continue to share experiences and known best practices on how to deal with latest trends in global ESG issues” (GPIF, 2017) It also plans to improve the relationship with external managers, the engagement with portfolio companies on ESG issue, including the role of passive investments and indexes, active ownership, and disclosure.

The analysis below provides a good benchmark to classify the policies and strategies developed by SWFs to deal with climate change. The action of SWFs on this field will be classified in three categories.

- Investments in green listed and private companies.
- Investment policies, country regulation and advocacy efforts.
- Portfolio decarbonization and engagement strategies.

The study explores the role of SWFs in each of these activities and tracks the deals and investment strategies developed in each case. As expressed in Box 1, it is difficult to track individual investments and to separate the amounts invested by SWFs in consortia deals.
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Moreover, there is no dataset available which is already tracking green investments of SWFs. The data track has focused on the last three years, 2015-2017.

Table 4 summarizes the main categories covering green investments. By value, the preferred destinations of SWFs’ green investments are commitments to green debt platforms which attracted US$4.3 billion in the period. Also, SWFs have supported directly solar, wind, geothermal projects up to US$3.5 billion over the last three years. SWFs are investing on green infrastructure projects and funds globally with total investment value gross US$2.2 billion. Beyond these large groupings, green technologies and green agriculture funds also attracted SWF attention at a smaller scale (US$641 million). Other investments include the allocation of US$300 million made by KIC, from South Korea, to an ESG fund.

### Table 4. Allocation of recent SWFs green investments.

<table>
<thead>
<tr>
<th>INVESTMENTS</th>
<th>VALUE (US$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green debt fund &amp; platform</td>
<td>4,300</td>
</tr>
<tr>
<td>Renewable energy</td>
<td>3,465</td>
</tr>
<tr>
<td>Green infrastructure</td>
<td>2,237</td>
</tr>
<tr>
<td>Green startups</td>
<td>375</td>
</tr>
<tr>
<td>Green agriculture fund</td>
<td>266</td>
</tr>
<tr>
<td>Others</td>
<td>460</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>11,103</strong></td>
</tr>
</tbody>
</table>

Source: SWFs’ web sites, news searches, third party information providers.

Table 5 details all green investments pursued by SWFs between 2015 and October 2017. Investments in renewable energy companies or projects, funding or commitments to green infrastructure or agricultural funds, are considered for the analysis. In total, 21 different SWFs have developed green strategies with total value of gross US$11 billion. By countries, China leads the pack of green investments in the period with US$4.6 billion (although roughly US$4 billion represent commitments to support green debt and investment platforms and not realized investments). Abu Dhabi comes second with estimated green investments of US$2.7 billion, lead by Mubadala, a sharp green SWF leader. Norway goes third, with an estimated value of its decarbonization strategy of US$2.1 billion and Singapore, with a total combined value of US$1.3 billion closes the top four greenest countries. In line with the dominion of developing countries in the SWF industry, developing-based SWFs, including economies in transition, accumulated 75% of investments in the period, compared to developed-based SWFs with 25%.

### Table 5. Selected Green investments by SWFs participation (2015-2017).

<table>
<thead>
<tr>
<th>DATE</th>
<th>SWF</th>
<th>DEAL</th>
<th>TARGET COUNTRY</th>
<th>SUB-INDUSTRY or TYPE</th>
<th>VALUE (US$M)</th>
</tr>
</thead>
</table>

23 Despite the data presented in this study relies on public sources, the figures presented in the study are the author’s best estimates, and it should not be taken as exhaustive coverage of all SWFs’ green transactions.
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<table>
<thead>
<tr>
<th>Year</th>
<th>Institution</th>
<th>Commitment</th>
<th>Markets</th>
<th>Asset Class</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-2019</td>
<td>State Administration of Foreign Exchange</td>
<td>Commitment to the IFC’s Managed Co-lending Portfolio Program (MCPP)</td>
<td>Emerging Markets</td>
<td>Green debt fund &amp; platform</td>
<td>3,000</td>
</tr>
<tr>
<td>2017-2019</td>
<td>Mubadala</td>
<td>Wind and solar plants with total energy output 810MW</td>
<td>Global</td>
<td>Renewable energy</td>
<td>1,300*</td>
</tr>
<tr>
<td>2015-2016</td>
<td>Hong Kong Monetary Authority–Exchange Fund</td>
<td>Commitment to the IFC’s Managed Co-lending Portfolio Program (MCPP)</td>
<td>Emerging Markets</td>
<td>Green debt fund &amp; platform</td>
<td>1,000</td>
</tr>
<tr>
<td>Oct-17</td>
<td>Abu Dhabi Investment Authority</td>
<td>Fundraising National Investment and Infrastructure Fund</td>
<td>India</td>
<td>Green infrastructure</td>
<td>1,000</td>
</tr>
<tr>
<td>Aug-17</td>
<td>GIC</td>
<td>Significant equity stake in EDC</td>
<td>Philippines</td>
<td>Renewable energy</td>
<td>650**</td>
</tr>
<tr>
<td>Oct-17</td>
<td>China Investment Corporation</td>
<td>Significant equity stake in Equis</td>
<td>Singapore</td>
<td>Renewables energy</td>
<td>550**</td>
</tr>
<tr>
<td>Dec-17</td>
<td>Ithmar Capital</td>
<td>Green Growth Infrastructure Facility with the IFC and others</td>
<td>Africa</td>
<td>Green infrastructure</td>
<td>500**</td>
</tr>
<tr>
<td>Jul-16</td>
<td>Future Fund</td>
<td>Fundraising in Powering Australian Renewables Fund (PARF)</td>
<td>Australia</td>
<td>Green infrastructure</td>
<td>400</td>
</tr>
<tr>
<td>Sep-17</td>
<td>Korea Investment Corporation</td>
<td>ESG Fund commitment</td>
<td>Global</td>
<td>Passive ESG portfolio</td>
<td>300</td>
</tr>
<tr>
<td>Dec-17</td>
<td>Several SWFs</td>
<td>Fundraising Amundi &amp; IFC “Green Cornerstone Bond Fund”</td>
<td>Emerging Markets</td>
<td>Green debt fund &amp; platform</td>
<td>300</td>
</tr>
<tr>
<td>Sep-17</td>
<td>Temasek</td>
<td>Gogoro</td>
<td>Global</td>
<td>Green startup</td>
<td>300*</td>
</tr>
<tr>
<td>2016-2017</td>
<td>Nigeria Strategic Investment Authority</td>
<td>Fundraising Green agriculture funds (FAFIN &amp; Old Mutual)</td>
<td>Nigeria</td>
<td>Agriculture fund</td>
<td>266*</td>
</tr>
<tr>
<td>Apr-15</td>
<td>Several SWFs</td>
<td>Fundraising Green Investment Bank UK offshore wind fund</td>
<td>United Kingdom</td>
<td>Green infrastructure</td>
<td>250</td>
</tr>
<tr>
<td>2016-2017</td>
<td>GIC</td>
<td>Fundraising in Greenko</td>
<td>India</td>
<td>Renewable energy</td>
<td>202</td>
</tr>
<tr>
<td>Oct-15</td>
<td>Abu Dhabi Investment Authority</td>
<td>Fundraising in ReNew Power</td>
<td>India</td>
<td>Renewable energy</td>
<td>200</td>
</tr>
<tr>
<td>Oct-17</td>
<td>Alaska Permanent Fund Corporation</td>
<td>Fundraising in Generate Capital</td>
<td>United States</td>
<td>Renewable energy</td>
<td>200*</td>
</tr>
<tr>
<td>2016-2017</td>
<td>Abu Dhabi Investment Authority</td>
<td>Fundraising in Greenko</td>
<td>India</td>
<td>Renewable energy</td>
<td>181</td>
</tr>
<tr>
<td>Jun-17</td>
<td>FONSIS</td>
<td>Solar farms, agribusiness, healthcare</td>
<td>Senegal</td>
<td>Several projects</td>
<td>160</td>
</tr>
<tr>
<td>Dec-16</td>
<td>Russian Direct Investment Fund</td>
<td>JV to build offshore wind plant with Sinomec</td>
<td>Russia</td>
<td>Renewable energy</td>
<td>142</td>
</tr>
<tr>
<td>Jul-17</td>
<td>Ireland Strategic Investment Fund</td>
<td>IPO of Greencoat Renewables</td>
<td>Ireland</td>
<td>Green infrastructure</td>
<td>87</td>
</tr>
<tr>
<td>Aug-17</td>
<td>Temasek</td>
<td>Impossible Foods</td>
<td>United States</td>
<td>Green startup</td>
<td>75*</td>
</tr>
</tbody>
</table>
5.2. SWFs' portfolio decarbonization and engagement strategies.

- New Zealand, Norway, and France are leading the pack of SWFs decarbonizing portfolios.
- These strategies have focused on reducing coal reserves and emission of portfolios.
- So far, decarbonization have focused on listed companies.
- The dilemma between divest and signalling or stay and engaging with polluting companies to promote positive changes, remains open.
- There is recent evidence that NBIM has had positive impact on governance of its portfolio companies: Will it obtain similar results on environmental issues?

So far, three large SWFs\(^{24}\) have initiated strategies for reducing the exposure to fossil fuel reserves and carbon emissions. According to the UN Portfolio Decarbonization Coalition (PDC), portfolio decarbonization refers to systematic efforts by investors to align their investment portfolios with the goals of a low-carbon economy. It includes, but is not limited to, efforts to reduce the carbon footprint of investment portfolios, to increase investment in areas such as renewable energy, to withdraw capital from high energy consumption activities and to encourage companies and other entities to reduce their emissions and support the transition to a low carbon economy (PDC, 2017). The PDC is action-oriented, and promotes openness and transparency to support and catalyze the transition to a low-carbon economy by encouraging and mobilizing institutional investors to decarbonize their investment portfolios (PDC, 2017). Among SWFs, only France’s CDC have joined PDC.

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\(^{24}\) Norway, New Zealand, and France. Yet, the case of France is very particular and for some researchers CDC may not count as a SWF. CDC is a public financial group with multiple subsidiaries aligned to support state’s policies. One of its subsidiaries is the SWF itself, CDC International Capital. In this study, CDC group is considered as a public investor and included in the analysis.
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The data on decarbonization is dominated by the thermal coal divestments of NBIM and the low carbon portfolio strategy of NZSF. In total, both countries have divested companies with high emissions, valued US$2.8 billion. NBIM divested 52 thermal coal-based companies, including bonds issued by these companies or their subsidiaries. The total value is estimated at US$2.1 billion. NZSF, on its part, divested passive holdings in almost 300 companies, valued worth US$693 million. Other large SWFs may follow the suit such as the Future Fund of Australia, the Singaporean funds or some of the Chinese giants.

The divestments of these three SWFs amounted US$2.9 billion (See Table 6). Per SWFs, the portfolio decarbonization strategy of New Zealand affected 3.15% of its total assets and the thermal coal exclusions in Norway represented 0.21% of its total portfolio which amount to close to US$1 trillion.

Table 6. SWFs divestments for portfolio decarbonization.

<table>
<thead>
<tr>
<th>DATE</th>
<th>SWF</th>
<th>DEAL</th>
<th>DIVESTMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td>Government Pension Fund</td>
<td>Divesting thermal coal companies</td>
<td>2,100*</td>
</tr>
<tr>
<td>Aug-17</td>
<td>New Zealand Superannuation Fund</td>
<td>Carbon reduction strategy in passive portfolio</td>
<td>693</td>
</tr>
<tr>
<td>Nov-15</td>
<td>Caisse des Dépôts et Consignations</td>
<td>Divesting coal companies</td>
<td>108</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration. * Author’s estimate. Note: Figures in US$ million.

The Coalition is agnostic on both the methodology to measure the carbon footprint and the asset classes eligible to decarbonization. Members of the Coalition present their decarbonization outcomes using measurements such as the carbon intensity in comparison to the reference benchmark, CO2 equivalent emissions per unit invested, or changes in portfolio emissions year-on-year. This study uses these figures when describing each strategy per fund. Yet, the total value of the equities divested, the measurement used in this study, allows to understand the fraction of the portfolio affected by decarbonization strategies, and to show it is still very limited. Joining PDC or related initiatives, SWFs may find a way to increase their impact on SDGs too.

Sovereign wealth funds from New Zealand, Norway, and France, have implemented strategies to reduce the share of their portfolios exposed to companies with high carbon emissions. These strategies apply to both active and passive portfolios. In the case of New Zealand, France it applies to its passive portfolios, notwithstanding it could be extended to the whole portfolio. Norway applies this strategy to its active portfolio through defined ethical rules which exclude companies with higher exposition to carbon or those which represent clear risks to the environment.

One of the main reasons to divest is to draw the attention of government and policymakers to the urgency of enacting policies that decrease demand for fossil fuels (PDC, 2017). Divestment is also a way to reduce exposure to declining secular industries which increase portfolio risks in

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25 Active portfolio management focuses on outperforming the market compared to a specific benchmark, while passive portfolio management aims to mimic the investment holdings of a particular index.
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the mid and long-run. Yet, divestment is also about sending a political message and signaling climate change as a real menace to long-term returns of institutional investors. However, its effect remains unclear given cost of capital of polluters does not change in the short run: there is still plenty of low-cost, environmentally insensitive capital available for non-sustainable companies. Yet, the fact that the short-term results are hard to achieve has not derailed SWFs to start divestment strategies. In the end, the debate is still open on how to move between economic reasons to hedge climate change long-term risks of tomorrow and not missing financial returns today.

Beyond the immediate results of divestment strategies though, the question remains open on whether to exit and divest or to stay and engage with decarbonized companies to enhance positive changes. So far, SWFs are exercising both: divesting from heavy polluters and engaging with companies which have planned strong decarbonization strategies. According to the PDC both strategies provide strong impact: “when large institutional investors start to engage and/or re-allocate capital on the basis of companies’ Greenhouse gas (GHG) emissions it provides a strong incentive for those companies to re-channel their own investments from carbon-intensive to low-carbon activities, assets and technologies” (PDC, 2017).

New Zealand: A resilient portfolio against climate-related risks.

New Zealand Superannuation Fund is leading the pack of IFSWF members on climate change. In 2016, it designed a strong and comprehensive strategy to transition its passive portfolio to low carbon exposure. The climate change strategy announced in August 2017 focused on its passive portfolio, which represents 40% of the total portfolio. Prior to this date, the NZSF had sold passive holdings in almost 300 companies, valued worth US$693 million (representing 3.1% of the pre-decarbonization portfolio). NZSF retains holdings in companies in the top quartile of the MSCI ESG Research’s ‘Carbon Emissions’ score because these companies reflect less risk and better managed on climate issues than their peers. NZSF divested from companies in else quintiles. The immediate effects in terms of carbon footprint of the Fund is a reduction in carbon emissions intensity (19.6% lower than the pre-decarbonized portfolio) and the exposure to carbon reserves (21.5% lower).

The methodology will reapply on an annual basis with the hope that the refinement of carbon measurement tools and data reporting would help to fine-tune its divestment decisions. The climate change strategy (NZSF, 2017) has the goal of making the Fund more resilient to climate-related risk and it has four parts:

- **Reduce**: NZSF works on significantly reduce the Fund’s exposure to both fossil fuel reserves and carbon emissions. These reductions will be achieved through ongoing engagement with companies, building carbon measures into the investment model, targeted divestment of high-risk companies and reduction of other relevant portfolio exposures.
- **Analyze**: Climate change considerations will be incorporated into investment analysis and decisions, for example into valuation models, risk allocation and manager selection.
- **Engage**: The Fund will continue to manage climate risks by being an active owner, including prioritizing climate change engagements, developing its voting policy and directing investment managers to vote according to Fund’s instructions on climate change resolutions.
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- **Search:** The Fund is intensifying its efforts to actively seek new investment opportunities in the areas of alternative energy, energy efficiency and transformational infrastructure.

The NZSF carbon methodology would gradually apply to the whole portfolio. So far, the methodology has been also incorporated in the reference portfolio and will report against the guidelines launched by the TCFD. The most important lesson from NZSF is that climate change risks considered as nonfinancial risks for majority of investors and specially SWFs, are now included in the matrix of financial risks. Environmental (along with social and governance) factors are material to long term returns. As such, ESG matters are integrated in all investment decision processes and also as a relevant part of the active ownership activities (engagement with boards and executives of portfolio companies). The strategy also includes selection and monitoring of external asset managers and exercising voting rights during annual meetings.

**Norway: The responsible investor and the exclusion strategy.**

The NBIM has developed a responsible investor strategy since 2004 when it agreed on ethical guidelines and established its Council on Ethics. The ethical guidelines set the criteria for product and conduct-based violations. Specific new climate criteria have been incorporated to the guidelines. In 2015, the ethical guidelines explicitly included a new criterion which would exclude companies responsible for “acts or omissions that on an aggregate company level lead to unacceptable greenhouse gas emissions”. In 2016, the Norges Bank introduced a new carbon criterion: NBIM will not invest in coal power companies and mining companies, which themselves or through subsidiaries they control derive 30 percent or more for their income from thermal coal or base 30 percent or more of their operations on thermal coal. Interestingly, these exclusions should take into account not only the current share of income or activity derived from thermal coal, but to acknowledge any plans for increasing the share of renewable energy sources. The exclusion does not apply for green bonds issued by excluded companies.

Since April 2016, NBIM has divested from 69 coal power or mining companies. One third of companies is headquartered in the United States (21), reflecting the impact these decisions have had in a single economy. The second most impacted country was China and Hong Kong, with 14 divestments. India (7) and Japan (6) also have suffered a clear impact from this particular decision initiated on April 2016. Another 13 companies are still under observation because of the coal criterion. The estimated total value of the stakes divested from the excluded companies is US$2,100 million. It is the largest decarbonization strategy to date among SWFs.

The standard methodology measures the effects of a portfolio decarbonization strategy on the carbon footprint, (i.e. the reduction in the carbon intensity or carbon exposure). NBIM has published the carbon footprint of the equity portfolio since 2014. In 2015, the carbon footprint of NBIM’s listed equities portfolio had 12% less carbon footprint than its reference portfolio. In 2016, the figure grew to 16%, implying an improvement of 4% year on year. The bulk of the change was made in the carbon emissions of utilities and basic materials sectors, were most of the companies excluded by the thermal coal criteria were classified (NBIM, 2015, 2016).

Apart from product-based exclusions, NBIM has also divested from companies with conducts causing severe environmental damage. In 2016, NBIM divested four companies related to deforestation, and pulp and paper companies which produced out of the responsible standards. Since May 2006, 19 companies ranging from Rio Tinto, the UK-based mining giant,
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to Freeport (managing one of the world’s largest copper mine in New Guinea island), have been divested for severe environment damage.

This divestment strategy is one of best known channels used by NBIM to exert its responsible investment strategy. Historically, NBIM has divested 135 companies which do not comply with the ethical guidelines. Since January 2015, the divestments are decided by the Norges Bank directly, instead of the Ministry of Finance, which had been the ultimate responsible since 2005. Norges Bank is assessed by the Council’s recommendations but it can initiate its own recommendations, as it is the case for the thermal coal exclusions integrated in the guidelines effective February 2016. This new governance framework gives Norges Bank direct capacity to continue and advance its responsible investment strategies.

Beyond divestment strategies, NBIM displays a strong active ownership strategy. NBIM uses its voting rights to safeguard the fund’s assets. NBIM exercises its responsible ownership strategy via voting rights, interaction with companies and engaging with boards. In 2016 only, NBIM voted at 11,294 shareholder meetings and representatives of the fund had 3,790 meetings with company management. Moreover, NBIM releases research documents stating its “expectations” to companies in areas such as governance, children’s rights, climate change and water management. Preliminary results proved that this strategy is yielding positive results. NBIM is able to improve corporate governance provisions of its portfolio companies (Aguilera, Bermejo, Capapé, & Cuñat, 2017) Will NBIM be able to exert a similar positive effect on their portfolio companies in terms of sustainability? The potential impact of such influence is huge given the equity portfolio of NBIM is worth US$660 billion.

France, decarbonization and the new Energy Transition Law

- CDC, parent of the French SWF, is committed to portfolio decarbonization and to actively engage with portfolio companies on climate issues.
- CDC is also promoting standardization in the green bond market.
- France is leading on regulation: more transparency on carbon emissions for both corporates and investors.
- CDC applies three responsible investment layers: ESG integration, shareholder engagement and exclusion.

The Caisse et Dépots et consignations (CDC), the French public investment group which owns the CDC International Capital (the French co-investment SWF), plans to reduce the carbon footprint of its listed equity portfolio by 20% by 2020 (an aggregate of €55 billion). CDC is divesting from companies which obtain more than 20% of its revenue from coal. CDC has also committed €15 billion to finance green energy projects and is engaging with listed firms to support climate resolutions in annual shareholders’ meetings. Moreover, the carbon footprint of the portfolio of listed equities held directly by CDC fell from 0.450 tonne of CO2 equivalent per thousand euros invested at 31 December 2014 to 0.330 tonne of CO2 equivalent per thousand euros invested at 31 December 2016, representing a 27% decline in two years (CDC, 2017).

CDC International Capital might play a substantial role if it includes ESG criteria when co-investing with its foreign SWF partners. As a co-investment fund, CDC IC has signed agreements to co-invest with SWFs from Russia, China, Qatar, Abu Dhabi, Korea and Saudi Arabia. CDC IC may exert a positive influence by sharing expertise on how it incorporates
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sustainable issues to investment criteria. It would help its partners to foster their own decarbonization programs, especially in the case of Qatar, Russia and China, whose SWFs are not yet deploying big scale green strategies but would have an enormous potential when starting to do so. A similar “positive influence” would be exerted by other co-investment funds in Italy or Ireland.

France, on its part, has been at the heart of the regulatory push towards emissions reporting. In 2015, new regulation passed in France have reinforced the reporting requirements in terms of GHG emissions. The first dimension, directed to listed and large privately-held companies, requires that the boards report on the indirect emission occurring along the supply chain, which is normally not reported despite of the fact it represents three quarters of overall GHG emissions on average.

The second aspect of the law is that it targets institutional investors and makes France the first country to introduce mandatory carbon reporting by investors. All institutional investors, with assets above €500 million will be required to report climate change risks, capital expenditure for the development of fossil fuels, carbon footprint, etc. The impact of this measure, if expanded globally, can be huge in terms of transparency and disclosure.

In fact, according to the Portfolio Decarbonization Coalition (PDC, 2017), the fact that not only companies, recipients of capital, but now investors, as providers of capital, are required to disclose their own climate-related risks is a “game-changer” (PDC, 2017). Indeed, given investors will gradually be required to disclose their climate-related risks and opportunities, “they will be more determined to obtain climate-related data from the companies in their portfolios, in the format and to the quality that they require for their own disclosure. The resulting effect will be to improve and refine the practice of corporate climate-related disclosure, and the availability of corporate data” (PDC, 2017:4).

Yet, there is still an urgent need for standardize the reporting and disclosure processes. There are in place different methodologies to disclose environmental risk, developed by the Task Force on Climate-related Financial Disclosures (TCFD), the Low Carbon Investment Registry—a self-reporting database compiled by the Global Investor Coalition on Climate Change – or the efforts of the UN-backed PRI. The standardization would be key to ensure comparable data over regions and time, and to expand the universe of investable projects and companies based on their environmental impact.

The consolidation of standards would become a useful tool for SWFs in two dimensions. First, as investors SWFs would be able to efficiently design active and passive ESG portfolio strategies and to develop engagement tools on ESG issues. Second, as asset owners, standardization will facilitate self-assessment and thus to report their own carbon footprint and to identify comparable benchmarks and best cases. The dissemination effect that SWFs may have over the financial industry can be underestimated, given the total assets under management.

5.3. Investment strategies in listed and private green assets.

Abu Dhabi: The country of the green SWF and an infrastructure leader.

- Mubadala, “the green SWF”, is a pioneer of green and sustainable investments.
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- Mubadala supports large-scale green energy projects—solar and wind—in developing and developed markets through its fully-owned subsidiary Masdar.
- Masdar’s Special Projects develops small-scale green energy plants in Least Developed Countries, such as Pacific islands and Mauritania or Afghanistan.
- ADIA is the first foreign institutional investor supporting the National Investment and Infrastructure Fund of India, which is focused on developing infrastructure adhering to high standards of ESG criteria.

The group of green SWFs could not be complete without the inclusion of Mubadala. This government-owned investment company from Abu Dhabi, recently merged with International Petroleum Investment Company to form Mubadala Investment Company, is a pioneering global investor. As a strategic investment company, Mubadala invests in 13 sectors in 30 countries, worth US$127 billion. An analysis of Mubadala portfolio provides two main themes: economic diversification towards new sectors, and the focus on green investments. In both ways, Mubadala contributes to the sustainable development of the country.

Environmental sustainability is one of the pillars of the SDGs and to understand the need of transitioning towards low carbon economic models is a key step. Indeed, one of the distinguishing aspects of Mubadala is its early commitment to renewable energy. This peculiar SWF established from the richness of non-renewable resources has invested in cutting-edge technological green solutions and projects. Mubadala invests and co-develops wind and solar large-scale energy projects. Moreover, Mubadala set up Masdar, a renewable energy and sustainability company which also develops projects on urban sustainable development or carbon capture, utilization, and storage.

Mubadala has backed some of the largest wind and solar energy projects during the last decade. In total, Masdar has invested US$2.7 billion in renewable energy projects with a combined value of US$8.5 billion. Masdar has, at least, four large international projects under development with combined capacity of 790MW. Masdar keeps leading the investment landscape in renewable energy in the Middle East and North Africa region. The participation of Masdar in these four international energy projects (England, Scotland, Jordan and Serbia) and the development of Phase 3 of the Dubai Solar Park (800MW) at home, have an estimated combined value of US$1.3 billion.

Masdar has participated in some of the world’s largest renewable energy infrastructures of recent history. A major example is the London Array, by then it was the largest offshore wind farm project, consisting of 175 turbines with a combined capacity of 630MW serving directly the London grid. It has been backed by Masdar and a Canadian pension fund. Mubadala has financed Shams 1, one of the largest concentrated solar panels (CSP) plants in the World. It is owned, operated and developed by a joint venture between Masdar (80%) and Total (20%), the French energy giant. It produces energy for 20,000 UAE homes. Shams 1 was designed to displace 175,000 tons of CO2 every year, equivalent to planting 1.5 million trees or taking approximately 15,000 cars off the road. Another joint-venture in renewables is Torresol Energy. Jointly with Sener, a Spain’s engineering leader, it has built solar power plans in the Spanish “sunbelt”. So far, the three projects have operating capacity of 120MW. The first project, Gemasolar, diverts roughly 30,000 tons of CO2 emissions from the atmosphere each year (Torresol Energy, 2017).

Interestingly, Mubadala is investing in renewable energy sectors in developing countries. In 2015, it inaugurated a 117MW wind farm in Jordan. The project generates enough electricity.
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to power 83,000 homes and it was the first commercial utility-scale wind power project in the Middle East. Currently, Mubadala through Masdar Clean Energy is developing five projects with combined energy output of 840MW in solar and wind facilities. Projects outside mature markets such as Scotland and England, are located in Oman and Serbia. The importance of Mubadala investing in Jordan, Oman or Serbia is triple. First, the power capacity installed is relevant compared to the country total energy output. Second, Mubadala-backed projects represent the first large-scale green energy projects of these countries which lack the experience. Third, the combined projects displace 1.2 million tons of CO2 emissions each year (Masdar, 2017).

Beyond these large-scale international projects, Masdar deploys renewable energy and clean-technology solutions to remote, rural communities around the world. With completed and on development capacity of 70MW, Masdar’s Special Projects have installed solar and wind plants in Afghanistan, Mauritania, Seychelles, or Egypt. Through a partnership, Masdar has also developed green energy plants in 11 Pacific Islands.

Abu Dhabi Investment Authority, the largest SWF in the Middle East, based also Abu Dhabi, does play an important role as one of the oldest and most active SWFs. A leader in global infrastructure investments, ADIA has participated in large-scale green energy deals as a long-term minority shareholder. ADIA, in contrast to Mubadala, do not seek to control or operate the assets in which it invests.

So far, the green investment push of ADIA is still very small in comparison to its total assets under management. Indeed, only two deals in the Indian renewable energy market has been identified in the last three years. ADIA have funded Greenko Energy Holdings, the Indian leading clean energy company based in Hyderabad. ADIA controls 15% of this clean energy company. It has also invested (US$200 million) in ReNew Power, another Indian green energy developer. ReNew Power will use the funds as capital expenditure for its solar and wind projects. The potential role of ADIA to help develop large-scale renewable energy projects at home is undeniable.

Moreover, this reputed SWF, with prudent estimated assets around US$600 billion, can exert considerable support to the development of a sustainable energy strategies in India. ADIA has committed US$1 billion to the newly established National Investment and Investment Fund of India (NIIF). ADIA becomes the first foreign institutional investor to join this government-lead initiative. This agreement paves the way for creating significant economic impact through investment in commercially viable infrastructure development projects in the world’s second most populated country. NIIF is committed to invest only in projects with high adherence to ESG aspects. ESG diligence would be an integral part of the investment process (NIIF, 2017). Other SWFs may join this vehicle in the coming months.

Singapore: International deals, green technology and SDGs at home.

- Temasek is the leader of SWFs investing on green technologies.
- The impacts go beyond environment and targets specific social goals and community enhancement.
- GIC is supporting green energy companies in the region: Japan, Philippines, and most importantly India, a critical market for SDGs.
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The two SWFs of Singapore are among the world’s most sophisticated institutional investors. Temasek still owns a large domestic and regional portfolio (54% of assets are invested in Singapore and China). Temasek is a savvy venture capital investor and 23% of its portfolio is invested in telecoms, media and technology. GIC, on its part, is a reputed long-term investor which regularly partners with the most reputed asset managers on real estate, infrastructure and private equity. Their combined wealth, estimated at US$350 billion, would drive the region toward more sustainable investment approach. Still, there is a way to go. Temasek is included in the list of responsible owners. Yet, their role on climate change actions can be expanded forward in terms of decarbonization and advocacy. Recently GIC started a higher exposure towards renewable energy projects. Their combined role fostering the low carbon initiatives in India, can be of preeminent importance too.

GIC, has recently announced its strategic alliance with a Goldman Sachs subsidiary, Japan Renewables Energy, devoted to develop green energy. The announcement was made in October 2017 after a GIC investment in JRE, for an undisclosed amount. JRE develops and operates solar, wind, biomass and other clean-energy projects in Japan. It runs 34 power plants with a combined capacity of about 210 megawatts, and has 170 megawatts of new projects under construction. It is the first time GIC invests in Japan’s infrastructure and renewable energy sector. Another recent example, also involved GIC. In August 2017, GIC along with Macquarie Infrastructure and Real Assets (MIRA), acquired 31.7% of Energy Development Company (EDC) for US$1.3 billion. EDC is owned by the top clean energy provider in the Philippines and is a world leader in the geothermal industry. GIC plans to commit and grow the company into this “vibrant” energy sector.

GIC has partnered with ADIA, the investment fund from Abu Dhabi, to tap into the vast renewable markets of India. GIC and ADIA have funded Greenko Energy Holdings, the Indian leading clean energy company based in Hyderabad. Since 2013, both SWFs have invested more than US$500 million in three equity rounds of the green energy company. GIC is the majority shareholder of Greenko with a stake of 60-65%, while ADIA has around 15%. The rest is held by the two Indian founders. It took Greenko Group a decade to reach a gigawatt (GW) of capacity addition in the renewable energy space and then a mere 12 months to add its second GW. Listed at the London Stock Exchange’s Alternative Investment Market, this 10-year old green energy startup now has 2.7 GW of operating capacity and another 800 MW under construction from 60 projects (Tyagi, 2017). It expects to reach 3 GW of operating capacity by year end 2017.

Investments in green energy assets are not the only way to support sustainable development. In fact, investments in green technology and innovation may also generate a relevant impact in the transition towards low carbon economies. Temasek is a venture capital investor with big exposure to green innovative solutions.

A good example is the investment made by Temasek in August 2017 in Impossible Foods, a company that develops plant-based burger patties with the look, taste and texture of meat. Compared to animal sources, the production of burgers from plants requires less land and water, and emits less greenhouse gases. Temasek led the investment round of $75 million in the California-based company. It is not the first time Temasek invests in meat-free startups. Last year, the state fund invested in Modern Meadow, a New York-based developer of lab-grown bio fabricated leather. In September 2017, Temasek led a US$300 million round in

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26 It is included in the first quintile of the most responsible investors by the Bretton Woods II (2017) initiative.
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Gogoro, a technology leader building electric scooters and bridging sustainable energy and urban transportation.

Other Temasek subsidiaries have developed greener strategies to reduce greenhouse emissions (Singapore Airlines), invest in renewable businesses (Sembcorp Green Infra) or have been included in the yearbook of the world’s most sustainable companies published by RobecoSAM (CapitaLand) (Temasek, 2017). Temasek hosted global and regional conferences on “Business for a Better World” and has financed multiple projects looking for solutions for a clean and cool Earth. It has financed air cooling systems which use 80% less energy than conventional air conditioners. Also, it has developed face masks specifically for children, to protect them from severe air pollution and haze. Temasek invests 4% of its portfolio (US$8 billion) in three life sciences businesses.

Through six linked foundations, Temasek focuses on different aspects of building people, building communities, building capabilities and rebuilding lives. To date, these endowments have touched over 500,000 lives across Asia and in Singapore. Issues such as ageing populations, climate change, resource scarcity, and poverty are examples of challenges and opportunities which has received support of Temasek.

Saudi Arabian Monetary Authority (SAMA) and the Public Investment Fund.

- SAMA plays a central role for new regulation and supporting IFC sustainable debt and investment platforms.
- PIF is critical to catalyze the transition of the Kingdom towards low carbon economy.
- The alignment of goals between PIF and the government may have fruitful returns but it is exposed to higher political interference of investment decisions.

SAMA, the central bank of the Kingdom of Saudi Arabia is responsible for managing the Kingdom’s foreign exchange reserves. It is said that the unit responsible for the management of its foreign exchange reserves can be considered as a “quasi-SWF” (Alsweilem, 2015) and as such is included in this analysis27. Total reserves totaled US$500 billion of which 67% are invested in international securities (largely US sovereign debt securities and international listed equities) and 31% are held in foreign deposits and currency. One of the functions of SAMA is to promote the growth of the domestic financial system and ensuring its soundness. On this regard, SAMA has limited scope to invest in green private market assets, yet its leading role may help to establishing rigorous regulation and improving transparency of the financial sector. SAMA may also apply some of the recommendations of the Green Finance Task Force in China with regards to the banking and financial system. Moreover, we might see support to the IFC platform, as observed in the case of SAFE in China. Yet, the role of the refurbished Public Investment Fund (PIF) seems to be much more determinant (PIF, 2017).

Indeed, PIF redefined its strategic mission in 2015. PIF has fully aligned its vision, objectives and strategy with Saudi Vision 2030. Today, PIF is the investment arm of the Kingdom in charge of the economic transformation of the country. Saudi Vision envisages the reduction of

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27 SAMA is included in the lists of SWFs made by the Sovereign Wealth Lab by IE Business School, PwC – Sovereign Investors, and Thomson Reuters.
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the dependence on oil revenues through the development of new non-oil sectors. Among these sectors, renewable energy has a priority position in the future Saudi energy matrix.

The Vision plans a strong push to foster the domestic renewable energy industry. The government plans to generate 9.5 gigawatts (GW) of electricity from renewable sources a year by 2023 through wind and solar projects, involving up to US$50 billion worth of investments. The target, which will equate the renewable energy capacity of countries like Serbia or Malaysia, may be exceeded, given the energy needs of the country and the enormous available surface to develop new plants. So far, there is no solar plants in the kingdom. Indeed, the first solar plant of the kingdom is in the bidding process. It is a 300-megawatt solar photovoltaic project planned in the north of the kingdom. As of October 2017, the short-list of the lowest bidders includes Masdar, the fully-owned subsidiary of Mubadala, the UAE green SWF.

Yet the PIF would be a critical piece in the development of green infrastructure in the Kingdom. Indeed, in October 2017, the PIF announced it is participating in one of the largest photovoltaic solar energy projects ever witnessed. The SoftBank Vision Fund (SBVF) backed by PIF (which committed up to US$45 billion) and Mubadala (US$15 billion) announced a strategic partnership with Saudi Electric, the national utility majority owned by PIF. The memorandum of understanding plans to develop 3 GW of solar energy in 2018. If completed, it would meet one third of the 2023 National Renewable Energy Program’s target (Clover, 2017).

Recently, Dubai authorities awarded Saudi Arabia’s Acwa Power a 700 MW concentrated solar panel (CSP) project following a highly competitive tender launched earlier this year. Acwa Power is a regional and global leader in solar energy. Acwa Power is owned by a number of international and Saudi conglomerates, including PIF.

The combined roles of PIF and Acwa Power are central to the Kingdom’s efforts to depart from oil dependence. Indeed, Acwa Power is critical to the energy matrix transition of the kingdom given its expertise, experience in building and operating solar plants and the talent attraction it might generate towards the nascent Saudi solar industry. PIF, on its part, given its strong alignment with the government and its strong capital muscle, may facilitate the transition towards a low carbon economy by investing in new sustainable sectors.

However, as warned by previous academic work (Bauer, 2017; Bernstein, Lerner, and Schoar, 2013) domestic SWFs are more exposed to political interference. These funds are strongly encouraged to establish sound governance policies with clear investment mandates and objectives, abide to transparency and accountability rules (such as the Santiago Principles), to develop a consistent legal framework, and to ensure independence of investment decisions from government discretionary influence (Das et al., 2009).

Yet, the impact that well governed SWFs with a clear and transparent domestic mission on achieving environmental SDGs is clear. The model developed by Ireland for its dual mission of achieving financial returns and have an economic impact, could be adapted to multiple settings.

Azerbaijan. Old deals require a new green investment push.

The State Oil Fund of the Republic of Azerbaijan (SOFAZ) is a member of the IFSWF and the only Central Asian sovereign fund included in the list of “responsible owners” developed by the Asset Owners Disclosure Project. The main argument for such inclusion is the high levels of
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disclosure, the partnerships with green-backed initiatives and the support of foreign frontier markets development projects. SOFAZ publishes ethical guidelines too, but only aimed so far towards employees’ responsibilities, and not as a responsible investor. The annual report does not mention any green investment strategy (SOFAZ, 2016).

SOFAZ has supported climate change and sustainable development by joining the first group of investors of IFC Catalyst Fund in 2013, committing US$50 million. The Catalyst Fund was designed to stimulate the development of funds and projects focused on renewable energy and climate-friendly solutions in emerging markets. Years before, in 2010, SOFAZ made an investment in the amount of US$100 million to the IFC African, Latin American, and Caribbean Fund.

Korea Investment Corporation: The first Asian SWF allocating on ESG criteria.

Korea Investment Corporation announced in August 2017 the allocation of US$300 million to an ESG fund (Jeong, 2017). The resources will be gradually deployed after selecting a global specialized asset manager and evaluating initial performance. This amount represents 0.56% of its equity portfolio of US$53 billion, showing the ample room for expanding the investments based on ESG criteria.

During the same interview, the CEO of KIC also declared its intention to embrace stewardship responsibilities from January 2018 for responsible investing as a sovereign wealth fund. The responsible investment movement is gaining momentum in the Asian country following the introduction of the Stewardship Code. KIC is ready to join the global trend of institutional investors actively exercising shareholder rights to enhance the interests of clients and beneficiaries. Within this active shareholding strategy and integrating ESG investment and engagement criteria would have a wider effect on climate change and sustainable development goals.

Khazanah: The opportunity to play a leading green role in Malaysia and the region.

Another active SWF in sustainable development is Khazanah Nasional28. The sovereign wealth fund of Malaysia is a holding SWF which controls stakes in key national companies in telecom, airlines, electricity, etc. Khazanah is also a very transparent SWF which provides full disclosure of its sustainable development exposure. Investments in this particular sector align Khazanah with the country’s efforts to capitalize on opportunities arising from global environmental and climate change initiatives. Khazanah has invested in an integrated environmental waste management solutions provider, and in an investment company which develops and invests in clean energy projects, with particular focus on biogas, biomass and energy efficiency projects in Malaysia and Southeast Asia. It is also a shareholder of RedT Energy, a company listed on the Alternative Investment Market (AIM) of the London Stock Exchange, which develops and supplies energy storage systems.

28 Khazanah is ranked in the first quintile of the Bretton Woods II initiative, which ranks government funds according to their responsible investment.
Khazanah has also invested in agrifood. Its investments help develop the building blocks for the industry. A key focus is to improve supply chain management from production to markets. The goal is to enhance productivity and quality under sustainable farm practices.

In total, agrifood and sustainable development sectors account for 1.7% of Khazanah investment portfolio, representing US$646 million. Khazanah has also invested in a desalination plant in Saudi Arabia, currently the world’s largest desalination plant. Khazanah co-invested through subsidiaries with the Public Investment Fund from Saudi Arabia (Shuaibah, 2013).

In December 2013, Khazanah incorporated a sister entity, Yayasan Hasanah (Hasanah), as an enhanced and more strategic approach to value distribution. This is in line with Khazanah’s capacity building agenda for the nation, and is also in support of the national transformation agenda. As part of this mission, Hasanah aims to strengthen Malaysia’s ability to move towards climate-resilience and low carbon emission pathways through building of environmental consciousness, conserving of natural heritage through innovative media and environmental education. Beyond environment, Hasanah supports community-led actions that strengthen social cohesion, inclusivity and equity through sustainable social and economic development. As part of this social mission, Hasanah addresses the socio-economic needs of the bottom 40%, addressing poverty from a multidimensional perspective considering multiple segments of communities such as vulnerable head of households, women, youths and children to build their resilience and livelihood capabilities by providing them the necessary skills, education, services and resources as enablers to break the cycle of poverty. It also enhances child rights and child protection.

Senegal, Nigeria and Morocco: African SWFs for sustainable development.

- Three SWFs are leading the group of green African investments.
- Ithmar Capital has launched an innovative green investment fund jointly with the World Bank to invest in the African continent.
- Senegal’s FONSIS is attracting foreign funds to invest in domestic green energy assets.
- Nigeria is supporting two green agriculture funds with food security and may play an important role in sustainable infrastructure through its focused infra fund.

The Moroccan SWF, renamed Ithmar Capital, announced in late 2016 that it has signed a Memorandum of Understanding with the World Bank to launch the Green Growth Infrastructure Facility for Africa (GGIF). It is the first green infrastructure fund dedicated to the African continent. This Memorandum of Understanding was signed during the meetings of COP 22 in Marrakech. GGIF for Africa, structured as a private equity fund, will aim to attract private investors in search of responsible and green investments. The main goal of the GGIF is to direct the flow of private capital to responsible infrastructure investments. Ithmar is seeking to raise $1 billion-$2 billion from infrastructure investment specialists and other sovereign funds. GGIF will focus on clean energy and water projects. GGIF has been endorsed by the IFSFW, and is expected that some SWFs may join as limited partners (Ithmar Capital, 2017).
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Recently, Ithmar Capital and the Ghana Infrastructure Investment Fund (GIIF) have signed a strategic partnership to explore co-investment opportunities in several African countries. As part of the agreement, GIIF will contribute to the GGIF for Africa. The deal validates the growing interest among institutional investors for green investment opportunities. Also, Morocco signed several public-private and private-private partnerships with Senegalese institutions, FONSIS included. They have joined forces to develop solar large scale projects and share expertise on renewable energy.

These multi-country co-investments on green investments are growing in West Africa and represent an opportunity to cover large infrastructure gaps, mainly energy shortages, that remain critical for economic sustainable development.

Senegal has made large offshore oil and gas discoveries since 2014. It is estimated that Senegalese discoveries may reach 1 billion barrels of recoverable hydrocarbons, starting to pump in 2021. So far, before the first barrel of oil is extracted, the Fonds souverain d'investissement stratégiques (FONSIS) looks more like a development-SWF than a saving-SWF. Today, the main objective of FONSIS is to source and facilitate deals which are considered “strategic” by the government of Senegal through capital investments, partnerships and designing vehicles reducing funding risks. FONSIS has already participated in eight investment projects. In three years, the Fund has closed 8 transactions worth over US$160 million by investing and attracting co-investments and debt, with a multiplier (leverage ratio) of 12 to 1.

There is a strong commitment with renewable energy. Senegal’s FONSIS partnered with French investors to build the largest solar farm of West Africa, a 30MW facility which was inaugurated in June 2017. FONSIS invested US$15 million in the US$47 million project. FONSIS is also backing another 20MW project in north Senegal, where it has invested US$1 million and has attracted other US$46 million in equity and bank debt, showing the capacity of FONSIS to develop and structure strategic and bankable greenfield and brownfield projects to attract foreign capital in sustainable business areas. Other green investments currently developed by FONSIS include a greenfield project to export organic products, a fund focused on agribusinesses and a healthcare infrastructure project in medical diagnosis.

Senegal, on its part, joined the International Finance Corporation’s Scaling Solar program in January 2016. Under this initiative, the IFC is organizing auctions for solar, as well as providing financing and guarantees for investors in order to reduce funding risks. FONSIS is acting as the financial arm of the government to collaborate on the Scaling Solar initiative. Currently, the country has tenders under preparation concerning three projects totaling 100MW.

Nigeria is supporting several initiatives with clear sustainable development impacts. The Nigeria Sovereign Investment Authority (NSIA) was established in 2011. NSIA has a triple mission: develop domestic infrastructure, stabilize government budgets and to save for future generations. The three funds are officially named the Nigeria Infrastructure Fund (NIF), the Stabilisation Fund (SF), and the Future Generations Fund (FGF). So far, all capital allocated to SF and FGF have been deployed, that is US$300 and US$600 million, respectively. Yet, only few investments have been made by NIF (capitalized with US$600 million). The first investment focused on a real estate financial institution to help unlock demand in the sector. The second realized investment is particularly interesting: the support of the Fund for Agricultural Finance in Nigeria (FAFIN). NSIA has backed the establishment of FAFIN, a 10-year fund with a final
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close of US$66 million. What is key at FAFIN is its commitment towards sustainability. The asset manager has elaborated its own ESG guidelines to provide a “robust framework”, which they use to assess operations of potential target companies prior to investing. This particular foreign-government-backed fund only invests in those Nigerian companies that meet (or can meet) the manager’s ESG guidelines (NSIA, 2017).

Also, NSIA partnered and formed a joint venture with Old Mutual to set up a US$200 million agriculture fund. Both parties provided seed capital (US$50 million each). The fund focus is on integrated commercial farming and agriculture food processing projects in Nigeria. Main investment objectives include food security and import substitution in addition to commercial returns. A good example of the fund is the take over and expansion of a 450 hectares’ farm to 2000h to grow maize and soya to be used as inputs for production of high quality chicken feed. Another big project being studied is the building of the second bridge over the Niger river, which would have a big impact connecting Southern and Western regions of Nigeria.
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BOX 5. SWFs in the energy sector: Lessons learnt and the dilemma of GHG emitters.

Sovereign wealth funds are heavily exposed to the energy sector. This is the case not only because hydrocarbon is the main source of wealth for SWFs. It is true because among the largest stakes of SWFs, traditional energy companies still play a big role.

In the period 2007-2015, eleven SWFs have invested in 23 energy companies, a total amount worth US$64 billion. Europe is the main destination market (US$46 billion), followed by Central Asia (US$6 billion) and North America (US$5 billion).

Another theme that arises from the analysis is that among these energy companies, there are some of the world’s largest greenhouse gas emitters (Lubin, Moorhead & Nixon, 2017). Indeed, companies such as Royal Dutch Shell ranked 9, Total (13), BP (16), or Engie (29), have received massive investments from SWFs. Concretely, CIC, SAFE, QIA, have invested US$12 billion in these four companies ranked in the top 30 world’s most emitters companies. Moreover, NBIM which makes huge efforts in combating climate change, holds US$5.3 billion in Royal Dutch Shell, US$2 billion both in BP and Total, and US$400 million in Engie (former GDF Suez). In total, Norway holds stakes worth US$9.3 billion in four companies included in the top 30 world’s largest GHG emitters.

This raises an interesting debate among institutional investors on whether is better to divest a polluting company or to stay and engage in order to reduce the emissions. Indeed, according to Thomson Reuters, companies such as Total or Iberdrola, are known for their vision of a new clean energy future and its progress on adapting a large, complex business for that future. Total’s emissions performance over the last three years shows reductions well ahead of Intergovernmental Panel on Climate Change (IPCC) guidance, with an approximately 20% aggregate decline in total GHG emissions across all scopes. On its part, Iberdrola, the Spanish utility company, which is the top renewable energy producer in Europe and the USA, has managed to reduce its emissions in Europe by 75% since 2000.
Yet, the amounts shown are much larger than all the green investment transactions tracked by all SWFs in the last decade. To engage with them and repeat successful decarbonising stories can be powerful but at the cost of not deriving these resources towards greener companies and projects.

The last trend that connects traditional energy investments with sustainable investments refers to capabilities development. As observed for infrastructure or venture capital, the concentration of the largest deal-makers shows how important it is to develop specialized skills to explore vertical sectors such as energy sub-industries. IPIC is an investment company just focused in global oil and gas industry leaders. CIC has developed a specialization in infrastructure and oil and gas companies, too. This specialization has allowed CIC to participate in multiple consortium deals with global industry leaders in developing and developed markets. The same can be observed of QIA, which via Qatar Holding, has been able to opt for large and complicate deals like the Rosneft and National Grid transactions. Kuwait Investment Authority, on its part, established a dedicated subsidiary for infrastructure (Wren House Infrastructure) which has successfully bid for large scale utility deals in partnership with global infrastructure managers and funds.

Lastly, it is interesting to notice that by sub-industries, water and wastewater service providers ranked third. Two large deals in the United Kingdom, the acquisition of Kelda Group (GIC was part of the consortium) and Kemble Water Holdings, the holding owners of Thames Water, with the participation of ADIA and CIC in the investor group, show the continued interest of SWFs based in developing countries on European regulated utilities.
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5.4. Green investment policies, country regulation and advocacy efforts.

In this section, the cases of Australia and China are discussed. Australia’s Future Fund and the usage of ESG criteria for contracting external managers is analyzed and shows the importance of integrating environmental criteria to the investment process. On its part, the Chinese cases are also discussed here. China, as the most polluting country by carbon dioxide emissions, has a particular importance in global environmental issues and for achieving SDGs. National new regulation may have strong impact to curb global emissions and the adoption of these new rules by Chinese SWFs can engine powerful imitative processes among other Chinese organizations. Also, Chinese funds, despite not having implemented specific green investment policies, have already participated in large-scale green deals.

Australia: The future steps of the Future Fund.

The Future Fund (FF) of Australia, has developed its own policies to integrate ESG criteria in their investment strategies. The starting point is their mandated objective to maximise returns earned on the investment portfolio while appropriately managing risk. FF combines this with the belief that the effective management of ESG factors, including climate change, can contribute to the long term risk adjusted returns of the portfolio.

The Future Fund integrates ESG factors into the process of selecting external investment managers responsible for individual investment decisions. The Fund assess investments for which climate change could pose a material risk to investment performance, and it incorporates these risks into the investment valuation process. This process ensures that risks and opportunities associated with climate change are evaluated in the same fashion as all other relevant risk considerations.

So far, the FF has excluded tobacco and weapons producers, and it has not excluded companies for environmental reasons yet (Future Fund, 2017). The FF considers climate risk and opportunities within an ampler set of risks, and do not displays a specific strategy for environment issues but integrated on the more general approach towards ESG criteria.

The Future Fund exercises the ownership rights associated with its investments according to defined corporate governance voting principles. The Future Fund also engages with key investee entities, either directly or in partnership with its investment managers, to promote enhanced ESG performance and to determine a climate of long term asset stewardship.

In the investment sphere, the Future Fund joined in July 2016 a partnership which develops, owns and manages large-scale renewable energy infrastructure assets and projects. The partnership, known as Powering Australian Renewables Fund, have already acquired two solar plants and two wind farms, one of which is the largest wind farm in Australia on completion. The equity commitment of the Future Fund was not disclosed, and it is estimated at around

\[29\] All SWFs described above in Section 5.2. have implemented green investment policies too, but their focus, has been on decarbonization strategies. We focus here on the ESG criteria used by the Australia’s Future Fund because it may be useful for other SWFs when relating with external investment managers.
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US$400 million. These investments will help meet Federal Government targets and spur investment and development in support of Australia’s transition to a low-carbon economy.

China, the critical role of the king of SWFs in the most polluting country.

- China has a leading role on sovereign wealth by assets under management and it is strongly affected by carbon emissions. To curb emissions in China would have critical implications for the achievement of SDGs.
- SAFE and HKMA are supporting IFC’s sustainable emerging markets investments.
- CIC is not yet participating in large-scale sustainable strategies but its potential impact is huge.

China is the global leader by sovereign wealth. The leading SWF in the country is China Investment Corporation, which is the second largest SWF. With estimated assets north US$850 billion, CIC represents the world’s largest non-commodity SWF. China, as a country is promoting several high-level initiatives in terms of policy and reporting standards on greenhouse gas emissions and to facilitate transition towards a low carbon economy. However, Chinese SWFs are not yet aligned with other big investors, such as the Japanese public pension fund or Norway’s NBIM, when it comes to climate change specific strategies. Chinese SWFs have not developed specific climate change strategies yet.

CIC has initiated several actions on poverty alleviation, education access, and sustainable development. Using innovative tools, such as the creative use of public private partnerships, CIC has supported sustainable development in several Chinese counties, providing infrastructure services or financing educational facilities (CIC, 2016).

The investment capacity for green investment strategies is huge. A recent large-scale investment may indicate a switch in the strategy. Indeed, in October 2017, CIC joined a group of private-equity investors to acquire a large portfolio of Asian wind and solar energy projects from Singapore-based Equis for US$3.7 billion. When finalized, this would be the largest renewable energy generation acquisition in history. CIC Capital, the private equity arm of China Investment Corporation, is participating on it and taking between 10 to 20 percent of the company, with estimated value of US$550 million.

Within China, it is remarkable the support that the State Administration of Foreign Exchange (SAFE), the reserve management unit of the People’s Bank of China, is giving to the IFC’s Managed Co-Lending Portfolio Program (MCPP). Established in 2016, the MCPP is a debt mobilization platform for emerging markets established by the IFC to finance emerging markets projects following sustainable criteria, with the eradication of poverty and sharing prosperity goals in mind. SAFE has committed US$3 billion to the platform to accompany investments made by the IFC and other private sector institutional investors in the platform. Other SWFs may join SAFE, as the platform offers access to attractive investment projects in infrastructure and mitigates fears of risk-averse institutional investors by absorbing the first losses at any project. Similar to other schemes developed by the European Bank of Reconstruction and Development, the MCPP Infrastructure initiative hopes to mobilize risk-sensitive institutional investors towards sustainable development projects in emerging
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markets, where the financing gap to achieve SDGs in developing countries remains at US$950 billion per year only in power, transportation, and telecommunications infrastructure.

The central bank of Hong Kong, the Hong Kong Monetary Authority manages its international reserves via the Exchange Fund. The assets of the EF stood at US$500 billion at the end of June 2017. In September 2017, HKMA announced a partnership with IFC to the innovative MCPP backed by China’s SAFE. HKMA, on its part, is committing US$1 billion to the platform and thus support IFC in financing projects across more than 100 countries, including in infrastructure, telecom, manufacturing, agribusiness and services, in a sustainable manner. This kind of platforms, sourcing investable deals with appropriate risk management, governance frameworks and looking for sustainable goals in a wide arrange of industries, facilitate the mobilization of long-term institutional investors capital.

In 2017, the climate business of the IFC, the largest global development institution focused exclusively on the private sector in developing countries, has reached US$4.8 billion in combined mobilization and investment, participating in 90 climate smart projects in 41 countries, reducing 6.7 million metric tons in annual greenhouse gas emissions.

In terms of regulation, CIC has an enormous potential role as diffusor and investor in supporting the activities developed by the Green Finance Task Force. This joint group, launched by the People’s Bank of China and the UNEP Inquiry, published in April 2015 its report “Establishing China’s green financial system”. The document outlines 14 recommendations to achieve this ambitious plan (Green Finance Task Force, 2015). Some recommendations fit well within the sustainable development approach of CIC. Central Huijin, one of the three CIC’s subsidiaries devoted to domestic financial sector, may have a pivotal role in building a green banking system, defining the environmental legal liabilities of banks and above all, by requiring environmental disclosures to listed companies and bond issuers. CIC, on its part, may support the development of green funds, and the networks of green investors. More importantly, CIC might play a role in improving the environment and social responsibility of overseas investments.
SECTION III. GUIDELINES AND CONSTRAINTS.

6. Guidelines for designing SWFs to support the SDGs.

6.1 Practical guidelines on designing SWFs to support delivery of the SDGs.

Beliefs.

- Agree on the beliefs at the highest decision levels.
- Reconcile long-term vision with long-term risks.
- Educate stakeholders.

SWFs tend to have a very long-term vision and missions. All of these missions and visions imply the need of developing very long-term investment approaches. Thus, SWFs portfolios should reflect such long-term investment by including long-term risks. However, only few SWFs have already included climate change into the long-term risk matrixes. Beliefs are the founding step for the development of a successful sustainable investment strategy. Only those SWFs who have reflected about their mission and have been able to integrate sustainability as one key long-term theme are able to deploy resilient sustainable investment strategies.

As institutions investing with very long-term horizons, SWFs may ensure their beliefs consider long-term risks such as climate change as a risk to be factored into their investment strategies and ownership practices.

The first step in the construction of their beliefs is to revise the long-term approach and acknowledge that climate change-related risks will affect long-term portfolio returns. Here, the recent revision made by New Zealand Superannuation Fund is a best practice (see Section 5.2). According to the NZSF, climate-related risks and opportunities come from physical and natural resources, regulatory actions, and technological innovations. For example, companies with higher carbon emission are exposed to stricter regulations that may affect business strategy. Companies in the fossil fuel sector may be affected by technological innovations. Climate change risks expand beyond energy to other sectors through revenues, operations, expenses, global value chains, etc. According to NZSF, the markets are not yet fully pricing the negative impact of climate change on asset valuations.

Yet, sovereign wealth funds have different beliefs around climate change and sustainable development, which can be placed into the following categories:

A. Core: SWFs integrate climate change or sustainability strategies as part of their long-term belief.

B. Opportunistic: SWFs look for green assets given their financial returns without considering long-term beliefs. Some SWFs may see green investments as a mere strategy to build reputation. These SWFs are open to change their beliefs.

C. Disconnected: SWFs which do not consider sustainability at any level and consider climate-risks as not material factors impacting financial returns.
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The transformation of beliefs should bring in critical stakeholders. Stemming from the board, the new belief should permeate to external stakeholders (government, regulators) and internal stakeholders (top management and investment teams). To educate stakeholders on the long-term mission of the SWF is a critical step toward understanding long-term risk such as climate change and to adopt it in a consistent way when building up sustainable investment strategies.

Governance.

- The clearer the fiscal rule governing flows in and out of the SWFs, the easier to design a consistent green strategy.
- Clear fiscal rules ensure sustainability of the SWF and their goals, including sustainable and green investment strategies.
- Transparency enhances accountability and increases stakeholders’ pressure for larger green investments.
- Stronger in-house capabilities help to understand and develop sustainable investment strategies.
- More responsible owners would more effectively demand sustainable strategies to portfolio companies via engagement and by exercising voting rights.

Fiscal rules require a precise description of the amounts the government may withdraw from the SWF every fiscal year. Also, an efficient fiscal rule requires a harmonized sovereign-asset liability management, so that governments consider withdrawing from SWFs only when it is cheaper than accessing global debt markets under reasonable macroeconomic conditions. Optimally, withdrawals should be made on the net investment income rather than eating into the capital, preserved for the future generations. In the end, the soundness of the fiscal rule will allow the fund to fulfil its mission with less political interference, longer returns and more consistent asset allocation strategies. This would facilitate the design of decarbonization strategies and the implementation of sustained long-term strategies for infrastructure, agriculture or renewable energy support.

Transparency enhances long-term investment strategies as it facilitates accountability. The more transparent is the fund, the bigger the effort to design long-term strategies and the higher the interest of the managers to show results aligned with the long-term mission of the SWF. Also, transparency, in areas such as portfolio asset allocation, risk management or performance, would hold SWFs accountable. This accountability of stakeholders (citizens, co-investors, media) would push SWFs towards greener strategies, and to exert responsible ownership in higher degrees. The fact that climate change risks and opportunities affect performance becomes even more clear when SWFs are more transparent and stakeholders are able to pressure the fund to go into specific directions. It is illustrative the case of Norway, which due to the transparency of both ethical guidelines and exclusion decisions, receives recommendations of exclusions on a daily basis from multiple stakeholders (industry associations, companies, individuals).

One of the big shifts of SWFs at the governance level is the transformation towards larger, and more professional workforces. Headcount has grown as the result of in-house investment approaches and the switch towards private markets, which required more sophisticated teams. The result of these trends have been the sophistication of SWFs and the surge of investments on private market transactions in infrastructure, real estate and private equity.
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More direct investments and the openness to wider asset classes support the selection of investment opportunities in the green economy. Funds such as Mubadala, ADIA or GIC are well equipped to invest in green companies from agriculture, technology to real estate or infrastructure.

Responsible ownership is a driving trend among large institutional investors. SWFs, with long-term mandates, are turning into more active ownership strategies acknowledging the importance of preserving value over the long-run. To understand that climate change brings in physical, regulatory and technology risks, as well as opportunities, means that SWFs would benefit from engaging with their portfolio companies directly or through their fund managers. Engaging with boards and managers of portfolio companies on sustainability is a critical task and a powerful tool to adapt company policies towards greener scenarios. Also, to ensure contracts with asset managers align with the broader SWF sustainable strategy may yield very deep changes for the SWF and generate imitative process in the industry as a whole.

Investment strategies and portfolio processes.

- Analyse thoroughly the exposure to carbon reserves and emissions.
- Set a credible objective of carbon reduction.
  - Introduce alternative measures for sustainable returns in areas such as agriculture, water management or infrastructure.
- Operationalize via internal or external managers.
  - For external asset managers redesign contracts to include ESG criteria.
- Start with passive portfolios and fixed income.
- Expand to actively managed portfolios.
  - Adapt information systems to aggregate, harmonize and share information across investment teams.
- Join other co-investors with similar sustainable goals and/or establish your own co-investment platforms for the domestic markets with sustainable criteria for deal sourcing.

SWFs follow normally four steps when integrating sustainability into the investment strategies.

1. A thorough analysis of the exposure of the portfolio towards climate related risks is the first step. The very recent experiences show that SWFs prefer to start with the decarbonization with the passively managed portfolios.

2. The second step is to set a credible objective: the percentage of fossil fuel reserves or carbon emissions which want to be reduced. Or to introduce an alternative returns measurement for wider sustainable development goals in other areas such as agriculture, water, or energy access.

3. The third step is to operationalize such changes via internal or external managers. When the bulk of the passive portfolios, invested in listed equities via indexes, is managed by external managers, the best way to go is to redefine the contracts to include climate conditions and criteria. For example, NZSF only held investments in companies in the top quintile in terms of carbon emissions, while the rest is divested.
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Here the critical point is data availability and the implementation of strong information systems that would be shared along the organization. Technologies to integrate ESG criteria provided by financial data companies and managers remain key at this stage.

4. The next steps would be to extend such criteria into other asset classes, such as fixed income (divesting in corporate bonds of heavy polluters while selecting new opportunities in the growing green bond markets), infrastructure or agriculture (ensuring the managers have a clear mandate to source and invest only in sustainable projects), renewable energy, technology, etc.

Co-investments: It is also a good experience to co-invest with proven investors and multilateral institutions which may help to source new deals aligned with the sustainable investment goals of the SWF. To join co-investment consortia with other responsible investors may facilitate access to deals, provide sector expertise, and also to expand the capital for the largest deals.

Also, to participate in investment platforms, developed by the IFC or established by specific SWFs, helps to grow the sustainable portfolio in non-listed equities, reduce the due diligence burden and sourcing costs, and may initiate interesting learning processes. For a local SWF, to develop such co-investment platforms implies the need to examine each deal carefully measuring its carbon impact, to source deals from well governed companies with a positive sustainable social impact. This effort to source sustainable aligned deals to the platform expands the flow of deals, provides new information and intelligence about market niches and eases the fears of large foreign institutional co-investors.

Sovereign development funds benefit from designing consistent measures for capturing sustainable investment returns, given this kind of sovereigns devote a majority of their portfolios to domestic, non-listed markets. It is key to ensure consistency between the global portfolio strategy and the domestic investments.

Beyond investing, all processes linked to active ownership apply as described in the previous sub-section on governance, that is voting rights directly or through proxy advisors and engagement with the boards and top management of portfolio companies.

6.2 Potential challenges and constraints.

- Transition costs of establishing sustainable portfolios.
- Lack of robust data investing in a sustainable way, especially in privately held companies or projects.
- Sovereign development funds, which typically invest in privately-held companies or projects in infrastructure, real estate or agriculture, face more difficulties than reserve SWFs or intergenerational SWFs which are largely exposed to listed equities.
- To align sustainable investment criteria for the global portfolio and for the domestic portfolio have been a real challenge due to transition costs.

One of the big challenges is the initial cost of transitioning towards a comprehensive sustainable strategy. From reducing carbon exposure, incorporating sustainable criteria to investment decisions, engaging and actively participating in annual shareholder meetings, and
searching for new investment opportunities brought about by climate change, imply new costs.30

These costs are offset by the benefits of hedging against climate risks by factoring in regulatory, physical and technological risks. Yet, costs are realized while profits remain latent in most cases, until carbon effects show up. The only quick return of hedging is reputational, which can be significant for SWFs from smaller economies.

The second largest issue relates to the lack of information and is one of the main sources of the increased costs of sustainable strategies. More stock exchanges are increasing their financial reporting demands. Efforts by the TCFD or the PRI may help to build international standards and reduce fragmented information. Yet, uncertainty remains high. Some securities such as bonds may qualify as green bonds under some regulatory frameworks and may not in others. Some companies issue bonds to finance green new business lines while still produce contaminating products. The same may apply for equities.

In the case of listed markets, asset managers are generating green indexes ensuring the components of the index comply with a certain degree of low or null carbon exposure and emissions. For the case of privately held companies, with less scrutiny and regulation, the costs of accessing valid information remain large.

Also, consistency between international and national regulation may be an issue for SWFs willing to develop a sustainable investment strategy. Especially for those SWFs with a mandate of development. Despite their potential role for supporting sustainable economic development in their domestic markets is high, harmonization between international and national portfolios is key. Consider the country regulators pass a new law limiting or banning the SWF from investing in fossil fuel based companies in their global portfolios. It may imply also to divest from SMEs which are actually servicing (from technology to strategy) fossil fuel companies in the home country, and that may have important implications in terms of jobs or regional development. The transition costs may derail certain SWFs from embarking into sustainable investment criteria.

7. Conclusion and 10 Key messages.

SWFs green investment strategies are still nascent and almost exceptional among SWFs. This study considers both investment and divestment activities of SWFs in relation with climate change. The total green investment value over the last three years totals US$11 billion. This represents a mere 0.15% of total SWFs assets under management. The study, the first of its kind, reviews the strategies and investments of SWFs in climate-related issues, with a focus on green investments and portfolio decarbonization strategies.

The study also explores the challenges SWFs face to integrate climate-related risks into the investment analysis. The main reason is the apparent conflict between financial returns and climate related investment strategies. SWFs do consider climate change as a nonfinancial factor and thus do not integrate it. Second, SWFs observe the lack of
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consensus in the industry about the performance of green funds, and as such are delaying the allocation to them. Third, SWFs may move faster towards greener investments if there is a stronger social demand for them. Also, the lack of enough national green policies may stop them from changing the strategy. Fourth, the analysis costs of the carbon footprint of portfolios or the costs of being active owners (exercising voting rights or engaging with companies) can be unaffordable for smaller SWFs.

The study also identifies some best practices of SWFs acting on green assets and how new steps can be taken to enhance SWFs participation in green and sustainable investments. First, the Santiago Principles, for instance, may work as the initial framework to help incorporate climate-related risks into the long-term investment design. The IFSWF may work as a diffusor of best practices among its members and other SWFs. Second, SWFs acting on climate change send strong signals to other investors both at home and abroad. SWFs may act as critical diffusors of government policies when adopting such regulations. Third, the SWFs co-investment activity is a growing trend and the trend may engine new partnerships with other green investors globally.

Lastly, there is an intriguing open debate among institutional investors, which affects green SWFs, on whether is better to divest a polluting company from the portfolio. Or whether is better to stay and engage with top management and boards, as an active shareholder, in order to reduce the emissions or to signal who is behaving better in a given industry.

10 Key Messages

1. Sovereign wealth funds represent a peculiar group of institutional investors which collectively manage assets worth US7.5 trillion. In recent years, SWFs have invested more and more in real assets (real estate and infrastructure), and have invested heavily in privately-held assets while reduced their holdings on fixed income. This expertise on alternative assets may help SWFs to increase exposure to green infrastructure, agriculture, and energy projects.

2. The SWF industry is highly concentrated at the top. The largest 20 funds control 90% of total assets. SWFs derive their wealth from natural resources (57%) and other non-commodity sources such as foreign exchange reserves and fiscal long-term rules (43%). The industry is dominated by developing countries which hold 80% of the assets of the industry. Clear leaders in sovereign wealth by the number and size of funds are China, United Arab Emirates, Norway. There are 6 SWFs based in LDCs.

3. SWFs green investment strategies are still nascent and almost exceptional among SWFs. This study considers investment and divestment activities of SWFs in relation with climate change. The total value of these actions in the
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last three years totals US$11 billion, this represents a mere 0.15% of total SWFs assets under management.

4. SWFs from developing economies such as the United Arab Emirates, Morocco, Singapore, China, or Saudi Arabia are also investing on green infrastructure assets directly or as limited partners on green infrastructure funds. Yet, there is a need to incorporate climate-specific strategies to the investment process.

5. Developed-based SWFs such as Norway, New Zealand, Ireland, Australia or France are implementing climate-related investment strategies. Only Norway and New Zealand have integrated climate-risks into the investment processes. So far, the main strategy followed by developed-based SWFs is portfolio decarbonization.

6. SWFs are exposed to green assets by committing to green debt platforms (US$4.3 billion), investing in renewable energy companies and projects (US$3.5 billion) or participating in green infrastructure funds (US$2.2 billion). The total value of the divestments made to decarbonize portfolios amounts to US$2.9 billion.

7. Yet, only few SWFs are investing based on green investment criteria. Their potential is huge given they have sophisticated their workforces in recent years, improved investment practices, and look for long-term returns where climate risk may play a larger role.

8. So far, SWFs do not integrate climate-related risks for several reasons:

   a. The apparent conflict between the fiduciary mandate of preserving and growing national wealth through financial returns and the consideration of climate change as a nonfinancial factor.
   b. The lack of consensus on performance of greener portfolios.
   c. The lack of enough national policies or the lack of a social demand for greener portfolios.
   d. The costs of analyzing the carbon footprint of portfolios or the costs of being active owners (exercising voting rights or engaging with companies).

9. Main lessons out of the best practices of SWFs acting on green assets:

   a. The Santiago Principles may work as the initial framework to help incorporate climate-related risks into the long-term investment design. The IFSWF may work as a diffusor of best practices among its members and other SWFs.
   b. SWFs acting on climate change send strong signals to other investors both at home and abroad. SWFs may act as critical diffusors of government policies when adopting such regulations.
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c. SWFs co-investment activity is growing and this helps to partner with other green investors globally.

10. There is an intriguing open debate among institutional investors on whether it is better to divest a polluting company or to stay and engage, with top management and board, in order to reduce the emissions.
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8. References


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9. Annexes
