

Strategic Investment Funds

Opportunities and Challenges

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Abstract

Over the past 15 years, the number of government-sponsored strategic investment funds has grown rapidly in countries at all income levels. This paper identifies some of the challenges that these funds face in their endeavor to achieve economic policy objectives while also securing commercial financial returns—the so-called double bottom line. Through a review of the objectives, investment strategies, and operations of a sample of strategic investment funds,

this paper outlines ways in which these challenges have been addressed. The paper suggests that properly structured and managed strategic investment funds can be effective vehicles for crowding in private investors to priority investments, thus magnifying the impact of public capital. However, their success rests on the funds' ability to balance policy and commercial objectives, source investment opportunities, and secure the right fund management capacity.

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Acronyms and Abbreviations

ADB	Asian Development Bank
AREF	Africa Renewable Energy Fund
EFSI	European Fund for Strategic Investments
EIB	European Investment Bank
EMDEs	emerging markets and developing economies
ERR	economic rate of return
EU	European Union
FONSIS	Fonds Souverain d'Investissements Stratégiques
GEEREF	Global Energy Efficiency and Renewable Energy Fund
IFIs	international financial institutions
IRR	internal rate of return
ISIF	Ireland Strategic Investment Fund
OECD	Organisation for Economic Co-operation and Development
PE	private equity
PINAI	Philippine Investment Alliance for Infrastructure
PPP	public-private partnership
SIF	strategic investment fund
SMEs	small and medium enterprises
SOEs	state-owned enterprises
SWF	sovereign wealth fund
VC	venture capital

1. Introduction

The past 15 years have seen the rapid proliferation of strategic, government-sponsored investment funds that, in addition to generating returns for their investors, are tasked with catalyzing capital flows to priority sectors of national and regional economies. Their role goes far beyond the provision of public capital. Well-managed strategic investment funds (SIFs) can create opportunities for attracting private investment, deepening domestic capital markets, and building the capacity of governments to act as professional long-term investors. At their best, SIFs bring highly specialized and sector-specific expertise to the structuring and financing of investment projects. Their presence as co-investors provides some degree of implicit political and regulatory risk insurance for private investors, particularly for infrastructure projects, which are generally more exposed to sovereign risk.

However, a review of the existing literature suggests that the establishment and operation of SIFs is not without challenges. Efficient operation of these funds requires a high level of fund management capacity, independence, and transparency. To be successful, SIFs need to balance policy and commercial objectives, source investment opportunities well, and secure the right staff. Although SIFs have been around for a few decades, they have not until now been the object of analysis in the literature.

Section 2 proposes a definition and classification of SIFs based on their investment strategy. Section 3 identifies factors that may explain their recent proliferation, while sections 4 to 7 focus on their structure, strategy, role, and operations. Section 8 identifies common challenges and proposes possible solutions based on the experience of a wide range of existing SIFs. Section 9 concludes.

2. What Is a Strategic Investment Fund?

This paper defines SIFs as special purpose investment funds that exhibit all of the following six characteristics. These funds:

- Are sponsored and/or fully or partly capitalized by a government, by several governments, or by government-owned global or regional finance institutions;
- Invest to achieve financial as well as economic returns, in accordance with a double bottom line;
- Aim to crowd in private capital by co-investing at the fund and/or project level;
- Operate as expert investors on behalf of their sponsors;
- Provide long-term patient capital, primarily as equity, and may also invest in quasi-equity or debt; and

- Are established as investment funds or investment corporations.²

Appendix A contains a non-exhaustive list of SIFs categorized according to their geographical scope.

SIFs come in different flavors. Their investments tend to focus on infrastructure projects and/or funds, but may also include investments in private equity (PE) and venture capital (VC) funds for small and medium enterprises (SMEs). A useful categorization of SIFs can be derived from research carried out by Clark and Monk (2015) on sovereign development funds, which the authors define as publicly sponsored commercial investment funds that combine financial performance objectives with development objectives. The authors suggest four operational and not mutually exclusive strategies for sovereign development funds: (i) *reinforcing*, by reorganizing, professionalizing, and innovating state holdings (companies, infrastructure, or other real assets) so as to drive commercialization and higher returns; (ii) *crowding in* private capital, by acting as a cornerstone investor in key sectors or projects; (iii) *catalyzing*, by seeding new industries, thereby diversifying the economy away from industries that are no longer profitable or sustainable over the long term; and (iv) *financializing*, by deepening local financial markets, thereby underwriting the development process through the growth of the capital market and the emergence of new financial intermediaries and investors focused on opportunities in the region. Each of these strategies is situated along a double spectrum, from strategic to commercial in terms of investment objectives, and in tight or loose alignment with national endowments and advantages (figure 1).

Figure 1. Categorization of Strategic Development Funds

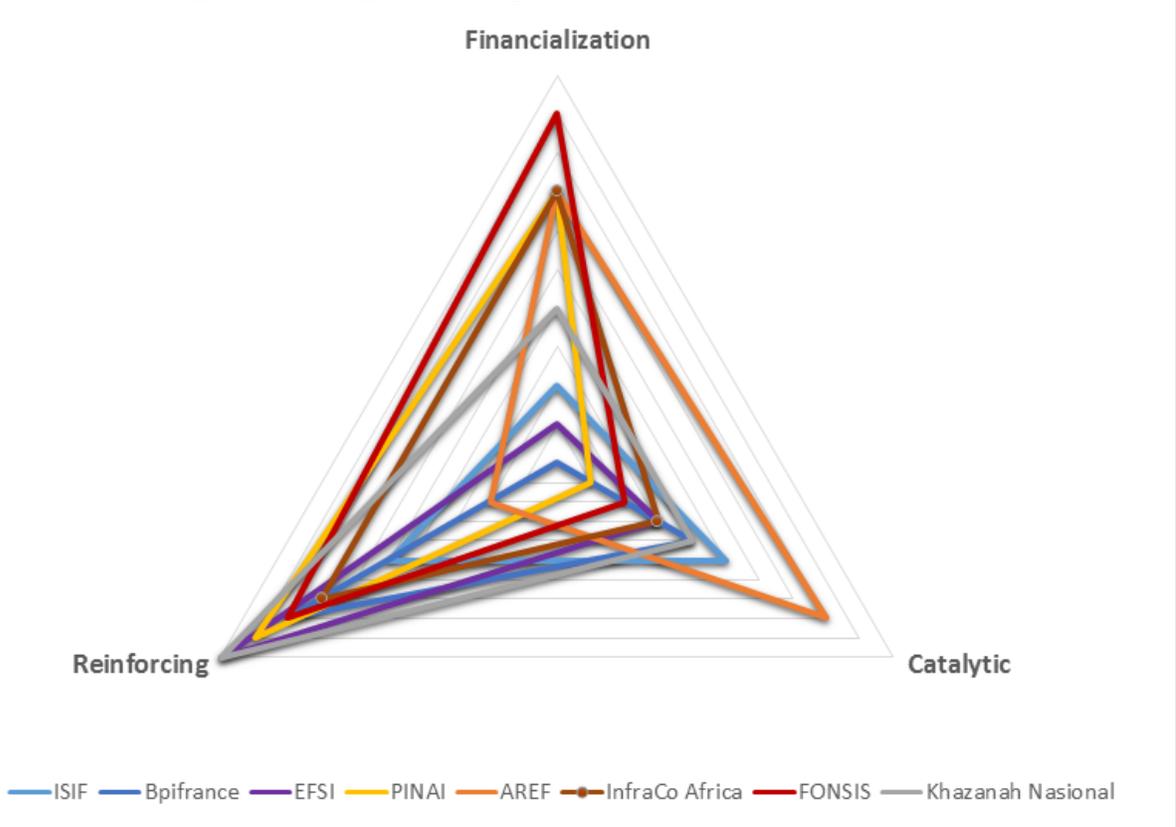


Source: Clark and Monk 2015.

² SIFs have yet to be analyzed in existing literature on investment funds. This paper is an attempt to define what SIFs are and how they operate.

Because SIFs are first and foremost commercially oriented investors focused on leveraging public investment by crowding in new sources of funding from the private sector (either domestic or foreign), by definition they populate the upper-right quadrant in figure 1. Within this operating environment, SIFs could be categorized on the basis of their policy objectives as mainly catalytic, or reinforcing, or financializing. Figure 2 applies the proposed taxonomy to a subset of SIFs. The graph helps to visualize SIFs’ strategic positioning, and suggests that financializing and reinforcing are the most common strategies for the SIFs observed in this paper, particularly in emerging markets and developing economies (EMDEs). On the other hand, SIFs that focus on climate financing appear to play a catalytic role independent of the country of operation. Examples include the Africa Renewable Energy Fund (AREF), the Renewable Energy Asia Fund (REAF), and the Global Energy Efficiency and Renewable Energy Fund (GEEREF).

Figure 2. The Strategic Positioning of Sovereign Investment Funds



Source: Authors’ assessment based on funds’ mission statements and objectives.
Note: ISIF = Ireland Strategic Investment Fund; EFSI = European Fund for Strategic Investments; PINAI = Philippine Investment Alliance for Infrastructure; AREF = Africa Renewable Energy Fund; FONSIS = Fonds Souverain d’Investissements Stratégiques.

As with sovereign wealth funds (SWFs), SIFs’ sources of funding may include balance-of-payment surpluses, official foreign currency operations, the proceeds of privatization, pension reserve funds, fiscal surpluses, government (or government guaranteed) borrowing, and/or receipts resulting from commodity

exports (IFSWF 2009). However, monetary authorities' foreign reserves held for balance-of-payment purposes, government employees' pension funds, traditional public enterprise operations, and assets managed for the benefit of individuals are not sources of funding for SWFs and SIFs (IMF 2014).

International, bilateral or multilateral financial institutions, domestic development banks, and some commercially focused development and climate finance institutions are not SIFs. Although these institutions may fulfill the four criteria proposed above, they differ from SIFs in their governance structure, and/or investment policy, deal sourcing, and staffing. In all these respects, they are more akin to government institutions than to SIFs, which—as discussed further in this paper—are nimbler structures that derive much of their modus operandi from the PE model. For example, South Africa's Public Investment Corporation is a state-owned asset manager that invests on behalf of the Government Employees Pension Fund (89 percent), Unemployment Insurance Fund (6 percent), and other public funds. Its main investment objective is to achieve strong long-term capital returns above the clients' benchmark while contributing to the broader social and economic development of South Africa and the rest of the African continent. The Public Investment Corporation lacks a formal double bottom line and, being a pension fund manager, is not an SWF, as defined by the International Monetary Fund (IMF) and the International Forum of Sovereign Wealth Funds (IFSWF). By the same line of reasoning, pension funds are not SIFs even when they align with responsible investment principles (consider, for example, the California Public Employees' Retirement System, CalPERS, which is the largest pension fund in the United States).

Public pension funds derive at least part of their resources from contributions made by employees, and their fiduciary responsibility is toward their contributors. Specifically, for a defined contribution scheme, the fiduciary obligation is to maximize the replacement value of pensions provided to members upon their retirement. For this reason, pension funds' investments are entirely commercial and cannot be subject to a double bottom line—though they can and do invest in SIFs on commercial terms (for example, the South African Government Employee Pension Fund has invested in the Pan-African Infrastructure Development Fund). Unlike public pension funds, pension *reserve* funds are generally capitalized by budget transfers. Their objective is to hold precautionary savings for future government expenditures, which may include public pensions without having any contractual obligations to future pensioners (IMF 2008). Pension reserve funds function very much like other long-term government savings funds (Shields 2013). Some pension reserve funds, such as Australia's Future Fund and the Ireland Strategic Investment Fund (ISIF), have combined commercial and developmental objectives. These particular reserve funds are SIFs. Others, such as the New Zealand Superannuation Fund, invest on purely commercial terms and are not SIFs.

Government-owned investment funds that are fully capitalized by the government or a subnational entity to serve a politically defined purpose, and that do not seek private capital participation at the fund or project

level, are also not SIFs. These funds represent pools of public capital destined for public investment, often in infrastructure, that could in principle be implemented through the normal budget process. They are *fiscal funds*: essentially, quasi-fiscal tools for governments. Like SIFs, fiscal funds provide increased functionality to public investment, since managerial and professional capacity is centralized in a specialized body. Their singular focus on policy objectives makes the attainment of these objectives more straightforward than for SIFs. But it also may cut them off from sources of private capital since profitability is a critical factor in attracting private investors. A notable example is the State Oil Fund of the Republic of Azerbaijan, which lists among its objectives “financing major national scale projects to support socio-economic progress” (SOFAZ, 2016).

SWFs may exhibit some of the characteristics of SIFs, particularly if their domestic investment strategy involves a double bottom line (for example, Malaysia’s Kazanah Nasional Berhad, and the Nigeria Infrastructure Fund owned by the Nigeria Sovereign Investment Authority). However, unlike SIFs, SWFs’ international investments are usually guided by commercial principles only. That said, an SWF with an exclusively domestic investment mandate may be considered an SIF if it exhibits the six characteristics listed in section 2 of this paper.

SIFs support the development of local economies through direct investment that aims to generate a high level of private sector participation. To achieve their objectives, SIFs use different approaches: some domestically focused SIFs are owned by both the public and the private sector, while others are wholly owned by a government; some SIFs operate at a global or regional scale, and may be funded by several governments. For example, the Philippine Investment Alliance for Infrastructure (PINAI) is a 10-year closed SIF, managed by a specialized private investment manager—Macquarie Infrastructure Management (Asia) Pty Limited—that invests exclusively domestically in a broad range of infrastructure projects. The PINAI was created in 2012 by the Government of the Philippines with assistance from the Asian Development Bank (ADB), and has a domestic and a foreign pension fund as the two largest shareholders. Senegal’s Fonds Souverain d’Investissements Stratégiques (FONSIS) also invests only domestically. It was established in 2013 to catalyze external investment supporting the development of a strong local economy and the creation of jobs. However, its capital structure is much simpler than the PINAI: it is wholly owned by the Government of Senegal, and operates as a private equity firm on the government’s behalf. As a result, its investment strategy is closely guided by the government’s national development plan. The European Fund for Strategic Investments (EFSI) is a regional SIF. It was established in 2015 and is funded through a €16 billion first-loss guarantee facility provided by the European Commission (EC) and by €5 billion capital provided by the European Investment Bank (EIB)—the European Union’s long-term public lending institution (NEU 2015). The fund is managed by the EIB and aims to generate additional investment

of €60 billion by the EIB and by the European Investment Fund (EIF) and to unlock at least €315 billion in private sector investment over a three-year period.³ Box 1 outlines PINAI, FONSI, and EFSI in more detail.

Box 1. Examples of Strategic Investment Fund Strategies: PINAI, FONSI, and EFSI

The **Philippine Investment Alliance for Infrastructure (PINAI)** is a \$625 million 10-year closed-end private-equity-type fund. The fund is managed by an external, private sector manager, Macquarie Infrastructure and Real Assets, and its policy objectives include (i) attracting top-tier international partners to infrastructure investments in the Philippines, (ii) fostering competition in domestic infrastructure finance, and (iii) establishing a secondary market for well-performing infrastructure assets.

The Philippine government asked the Asian Development Bank (ADB) to develop financing solutions to help meet its infrastructure gap. ADB's support for PINAI was built on previous legislative and fiscal reforms (for example, public-private partnership reforms, institutions, and feed-in tariffs).

PINAI is an alliance of a small number of parties that combine domestic knowledge and international experience:

- The Philippines' Government Service Insurance System Fund (GSIS) is a large domestic social security fund intending to invest in domestic infrastructure, but with little or no experience in infrastructure investment. GSIS holds 64 percent of PINAI's assets.
- The Netherlands' Algemene Pensioen Groep is Europe's largest pension fund, and has significant experience in direct and indirect infrastructure investment. It holds 24 percent of PINAI's assets.
- The ADB provides guidance on the concept, design, and implementation of the new fund vehicle and holds 4 percent of PINAI's assets.
- Macquarie Infrastructure and Real Assets is an experienced international fund manager holding 8 percent of PINAI's assets. It manages PINAI and is responsible for all major investment, divestment, and management decisions within the fund's overall mandate.

PINAI aims to provide equity and quasi-equity (mezzanine debt) financing in core infrastructure assets exclusively in the Philippines. It seeks to invest in a portfolio of greenfield and brownfield projects across a broad range of infrastructure sectors (including power, transport, and telecommunications), and has a cap on greenfield exposure (Lewis 2013). Information on PINAI's financial performance is not publicly available. However, GSIS was reported to have expressed an interest in doubling its investment in infrastructure projects in the Philippines to \$800 million, on account of the very good returns and risk diversification offered by PINAI (interview with GSIS president Robert Vergara, *The Philippine Star*, February 7, 2016). PINAI's financial performance will need to be judged at the end of the 10-year term of the closed-end fund.

Senegal's **Fonds Souverain d'Investissements Stratégiques (FONSI)** is a strategic investment fund focused on attracting private investment to Senegal by operating as a private equity investor on behalf of the government. Established in 2013, it aims to invest in projects that stimulate economic growth and job creation in the framework of the national development plan—Plan Sénégal Emergent—while creating wealth for current and future generations. Its stated policy objectives include the support of strategic economic sectors, sustainable jobs, and small and medium enterprises, as well as the optimization and management of state-owned assets.

FONSI acts as a financial intermediary, which brings credibility; access to a network of international investors; and capacity to structure, negotiate, and transact deals. The fund has a minimum rate of return on its investments (hurdle rate) of 12 percent and a target multiplier of 1:12.⁴ Its investment criteria have been extensively

³ http://www.eif.org/what_we_do/efsi/.

⁴ Multipliers are discussed in section 6.

disseminated in the national press, to build legitimacy and mitigate pressure to undertake projects that do not fit these criteria. FONSI may—if necessary to attract external capital to high-priority projects—use a return margin that exceeds the hurdle rate to enhance returns or mitigate risk for external investors. Also, exceptionally and subject to board approval, it may cross-subsidize one project (whose expected returns are below the hurdle rate but which has significant positive externalities) from a project with higher returns, so that the joint expected returns remain above the hurdle rate.

The **European Fund for Strategic Investments (EFSI)** started operation in 2015. The fund aims to help overcome the financing gap in Europe by mobilizing private finance for strategic investments, and acts as one of the three main pillars of the Investment Plan for Europe. With EFSI support, the European Investment Bank (EIB) group provides funding for economically viable projects where it adds value, including projects with a higher risk profile than ordinary EIB activities. Further, EFSI aims to strengthen the European regulatory environment and support the investment environment throughout Europe.

EFSI priorities include:

- Strategic infrastructure, including in the information technology, transport, and energy sectors
- Education, research, development, and innovation
- Expansion of renewable energy and resource efficiency
- Support for small and medium enterprises

Given its objectives, EFSI's main measure of success is the amount of external investment unlocked by its guarantees for investment in the fund's defined priority sectors. EFSI aims for a 1:15 multiplier on its investments for the aggregate investments generated. As of April 2016, EFSI approved 249 transactions in 26 of the 28 EU countries.

Sources: Adapted from Inderst (2016a); Focis Consultora (2016); funds' websites.

SIFs may also act as VC funds. The first state-sponsored VC fund programs were created by the U.S. and U.K. governments to improve financing for fast-growing young firms and foment post-World War II productivity. In the 1960s these funds represented the bulk of VC raised in the United States (Lerner, Leamon, and Hardyman 2012). Some of these programs are still functioning. For example, the Small Business Investment Company (SBIC) program, established in 1958, consists of federally guaranteed risk capital pools. State-sponsored VC programs are now seen in a growing number of EMDEs (EY 2015). In Senegal, Teranga Capital is an equity impact investment fund launched in 2016. The fund targets promising domestic SMEs, with financing needs between €75,000 and €300,000. In addition to long-term finance in the form of minority equity participation, Teranga Capital provides management coaching to support the growth and consolidation of the SMEs in its portfolio (sales and marketing; accounting; and environmental, social, and governance benchmarking). FONSI invested in Teranga Capital as a limited partner alongside Investisseurs and Partenaires (the general partner and fund manager), Sonatel, Askia Assurances, and two private professional investors. Another SIF, the African Agricultural Capital Fund (AACF), provides growth financing to Africa's undercapitalized agriculture sector through SME investments in East Africa. The AACF was created in 2011 by the United States Agency for International Development (USAID) and another six investors. Managed by Pearl Capital Partners, the AACF aims to invest \$25 million through

equity investments to smallholder farmers with a target of around 15 percent annual compounded return. Successful VC industries have also been seeded by the governments of Israel and Brazil (box 2).

Box 2. Venture Capital Funds in Israel and Brazil

Israel's **Yozma** program, established in 1993 with \$100 million capital, initially sought to attract experienced international venture investors, who had to come up with \$12 million of their own capital and work in partnership with an Israeli firm. Yozma would provide such investors \$8 million in matching investments, with a capped upside to further attract private investors. Factors contributing to the program's success include that (i) its capital was spread across many small funds, (ii) it fostered relationships between local and international venture capitalists, and (iii) business incubators and tax incentives were established to complement the program (Yozma 2016; OECD 2003; Druid 2009). In the two decades after Yozma was established, Israel went from having no venture capital (VC) sector at all to having the highest VC penetration in the world as a share of gross domestic product (GDP), reaching 0.36 percent in 2012.⁵

Brazil's **Inovar** program combines the role of VC co-investor with the provision of extensive capacity building. Inovar was launched in 2000 to teach entrepreneurs how to raise funds and to work with equity-holding partners. Limited partners learn how to evaluate funds, and general partners how to select companies, manage funds, assess investment opportunities, and manage portfolio companies. A special organizational framework and tax incentives have been put in place. In the beginning, Inovar's sponsored VC funds needed to raise only 20 percent from private investors as market validation, with the rest provided by the government as loans with a capped return. The Inovar model has since been exported to other Latin American countries. In 2014, the program managed a \$197 million VC portfolio (EMPEA 2016; Leamon and Lerner 2012).

Source: Authors' compilation, based on various sources.

SIFs may also be thematic investors. Particularly in clean-energy finance, several SIFs have been established with the objective of attracting private investment in wind, solar, and thermal energy infrastructure; and energy efficiency. Some climate-focused SIFs are funded by multilateral financial institutions, including Asia Climate Partners (established by the ADB) and the GEEREF (a hybrid fund with both private and public shareholding established by the EIB and several European governments) (box 3). Green SIFs are emerging at the national level, too. For example, Norway recently announced its intention to establish a domestically focused renewable energy investment fund, Fornybar AS, and the Government of China is considering the establishment of a national green investment fund.

Box 3. Examples of Green Strategic Investment Funds

The **Asia Climate Partners** (ACP) is a \$400 million joint initiative of the Asian Development Bank (ADB), the financial services group ORIX, and the asset manager Robeco. ACP makes private equity investments in the environmental industries, resource efficiency, and renewable energy sectors in Asia. Besides private equity, ACP

⁵ OECDiLibrary (2013); Ernst & Young puts it at 0.65 percent (EY 2015).

provides additional forms of capital such as debt and credit enhancement from the ADB, climate finance facilities, and commercial debt from partner organizations.

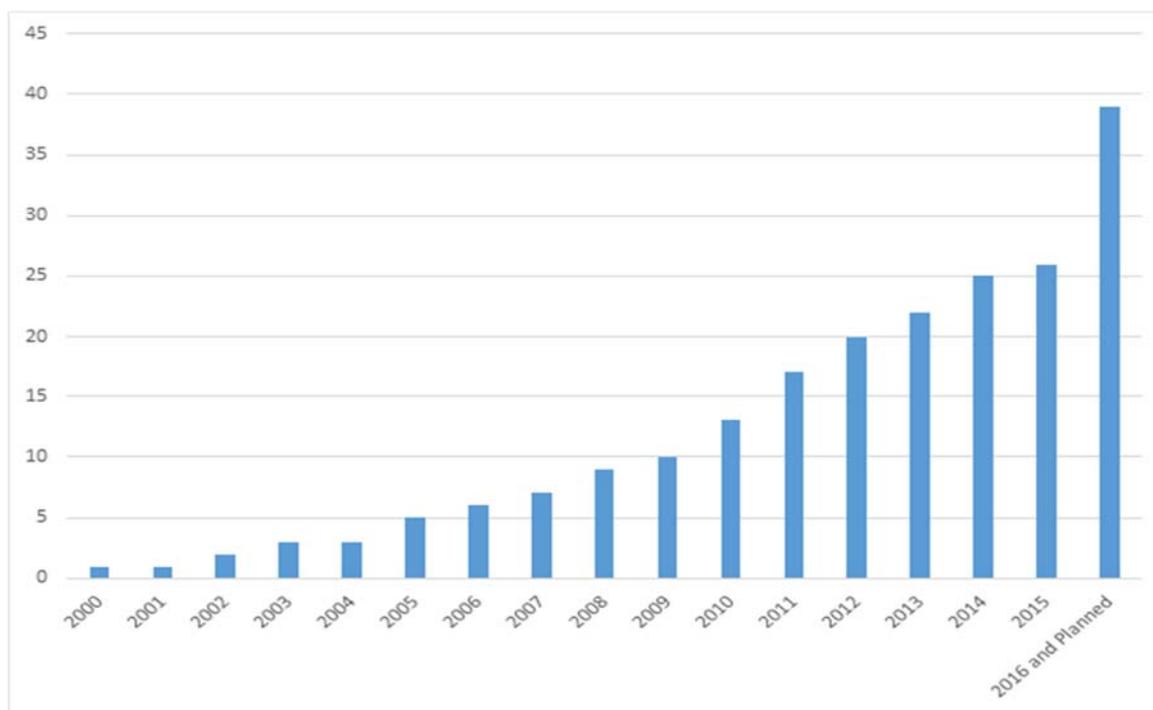
The **Global Energy Efficiency and Renewable Energy Fund (GEEREF)** is an international fund-of-funds, domiciled in Luxembourg, which deploys public sector funds to catalyze private sector investment in clean energy projects. GEEREF started in 2008 with €112 million from the European Union, Germany, and Norway, and has since been further capitalized with an additional €110 million from private investors. GEEREF’s investments aim to achieve a “triple bottom line”: provide access to sustainable energy, combat climate change, and deliver compelling financial returns. Its target is to catalyze investments sufficient to generate 1 gigawatt of clean energy capacity, thereby avoiding 2 million tons of carbon dioxide emissions and potentially supporting the energy needs of 3 million people.

Source: GEEREF 2015.

3. The Emergence and Growth of Strategic Investment Funds

Over the past 15 years, at least 26 SIFs have been established, and another 13 are planned (figure 3).⁶ Examples of existing SIFs include Bahrain’s Mumtalakat (2006), Italy’s Strategic Investment Fund (2011), Kazakhstan’s Baiterek (2013), the GEEREF (2008), InfraCo Asia (2010), and the AREF (2014).

Figure 3. Growth in the Number of Strategic Investment Funds, 2000 onward



Source: Authors’ compilation.

⁶ These numbers may be conservative. The lack of publicly available data on investment funds and their operations makes it difficult to assess which funds exhibit the SIF characteristics identified in section 2.

While there are undoubtedly many factors affecting the establishment of an SIF, the widening of the financing gap for long-term investment that followed the 2008 financial crisis is likely one of them. Indeed, 17 of the 26 SIFs presented in appendix A were established after 2008. SIFs like InfraCo Africa and the Indonesia Infrastructure Guarantee Fund were set up to crowd in private sector financing to infrastructure. Others, such as the Macquarie Mexico Infrastructure Fund and PINAI, funded by a combination of public and private capital, aim to improve government capacity to efficiently invest in public-private partnerships (PPPs). PPPs have historically been used to engage private capital in infrastructure projects that are too complex or too expensive to be financed by public capital alone. Global PPP investment in infrastructure reached \$1.2 trillion in 2015 (PPI database). Although SIFs may be responsible for a significant portion of this investment, the lack of publicly available information on investment deals makes it difficult to estimate their contribution.

Governments have also established SIFs to support the domestic capital market. Particularly in EMDEs, local financial markets may lack the range of financial products or intermediaries required to sustain economic development, or the density of financial intermediaries may be too low to ensure effective competition between providers. As a government-sponsored financial intermediary, an SIF may offer financial services and products that are not yet being commercially provided, either for the economy as a whole or for certain sectors. The Indonesia Infrastructure Guarantee Fund is an example of this type of SIF.

In advanced economies and EMDEs alike, governments are increasingly preoccupied with enhancing the competitiveness of the local private sector, by nurturing the creation and growth of innovative SMEs. According to a recent Organisation for Economic Co-operation and Development (OECD) study, young SMEs are globally the primary source of net job creation. The disproportionate contribution of young firms to employment creation holds across all economies, sectors, and years considered (Crisciolo, Gal, and Menon 2014). In countries with underdeveloped capital markets, SMEs frequently lack access to financing. Nonetheless, promising results such as those obtained in Israel and Brazil (box 2) could provide useful information for SIFs that invest as minority limited partners in hybrid PE and VC funds.

Finally, the increasing number of SIFs may be indicative of their sponsors' growing confidence in the capacity of these funds to address market failures and economic externalities.⁷ SIFs' dual financial and economic objectives allow investments to be guided by market imperatives (measured in terms of internal rate of return) as well as higher-order policy imperatives (measured in terms of the economic rate of return, ERR, or other parameters) (see section 5). Externalities can cause the ERR to be higher or lower than the

⁷ An externality is a consequence of an economic activity that is experienced by unrelated third parties. An externality can be either positive or negative. Externalities associated with an investment project refer to the wider impact of such a project on the economy and society.

financial rate of return. For example, an infrastructure project might have positive economic externalities that are not fully captured by its financial return (Gelb, Tordo, and Halland 2014). A power plant, while paying for itself, can also improve access to electricity for local industry, and therefore strengthen domestic productivity. If the power plant is a wind farm, carbon emissions associated with a given level of energy production will be lower, generating a benefit (positive externality) that goes beyond the investment project itself. Over the past few years, SIFs such as GEEREF, Asia Climate Partners, and EFSI have emerged to address urgent investment needs in climate finance. SIFs' ability to crowd in private sector financing is of particular interest to climate finance, given the large estimates of the financing gap, and the limited resources available to the public sector.

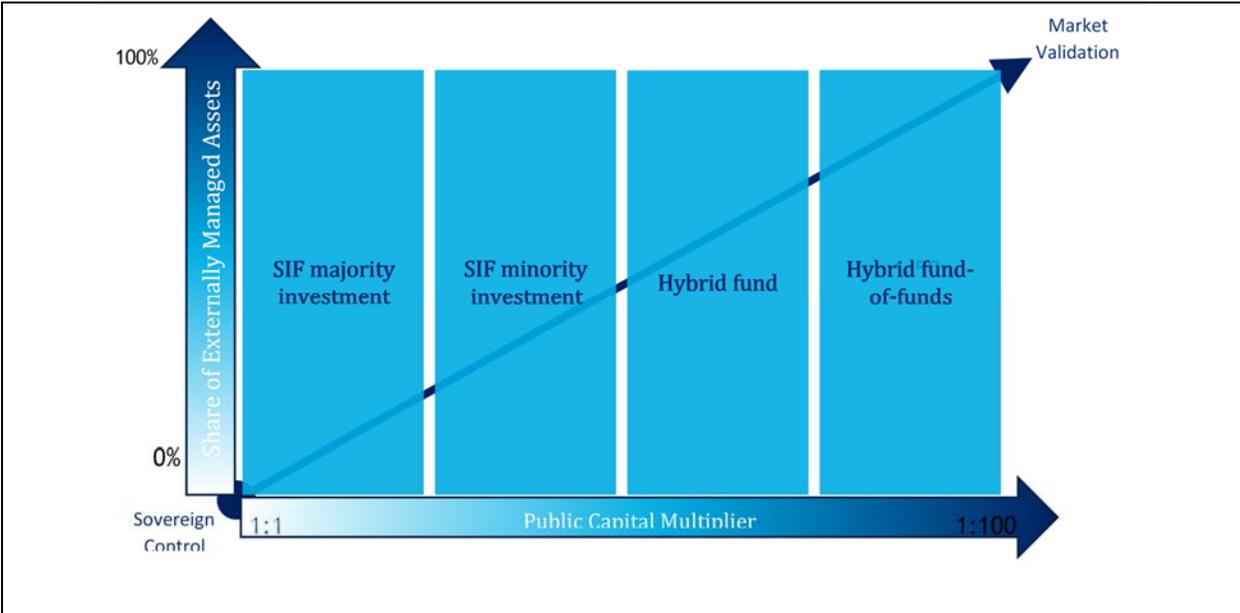
4. Structure and Market Validation

The structure of SIFs vary along a broad spectrum, from the private management of public capital, via hybrid funds, to fully state-owned direct investment funds. In general terms, the choice of structure depends on the relative importance of market validation versus the policy objectives of the SIF. Private management of public capital occurs when the government invests in a private fund, on terms that reflect policy priorities, or when a public entity shares risk as a limited partner in a hybrid fund. In this model, investment decisions are made independently by the private sector general partner that manages the fund or by an independent investment committee that may include government representatives, while the overall investment policy is set by the fund's board, which is usually controlled by limited partners. The fund manager and general partner may be required to put up some share of the total capital. The PINAI is an example of this approach.

In funds that are fully government owned and/or operated, market validation may come from constraints on the ownership share in each investment, limiting the SIFs' investments to minority participation of a certain size. Except for hybrid funds, fund management is frequently provided by a government-owned fund management entity operating at arm's length from the government (see appendix A).

In general terms, the extent to which private capital participates in the fund's structure increases the market validation of investments (figure 4).

Figure 4. Strategic Investment Fund Structure, Market Validation, and Public Capital Multiplier



Source: Authors’ compilation.
 Note: SIF = strategic investment fund.

Although attaining a high level of private funding is a priority for SIFs, it is worth mentioning that a higher multiplier may translate into less control of policy objectives. In the fund-of-funds model, the public sponsor’s control over an investee fund’s investments may be limited to supervision of environmental, social, and governance reporting, while direct investment funds such as FONSIS can be expected to have a higher degree of control over policy objectives.

The Alberta Heritage Savings Trust Fund (AHSTF), while not an SIF, illustrates the importance of ensuring the market validation of investment projects (box 4). The AHSTF had a complex set of objectives, and a complex structure to go with it. The emphasis on public investment and the significant political influence over the fund’s governance and investment decisions contributed to its poor results, and the funding of uneconomic projects resulted in many loans being written off (Morton and McDonald 2015).

Box 4. The Alberta Heritage Savings Trust Fund (AHSTF)

The AHSTF was established in 1976 by the province of Alberta, Canada, to (i) save for the future, (ii) strengthen and diversify the economy, and (iii) improve the quality of life of Albertans. During the early 1980s, the fund made loans to other provincial governments in Canada. Later, the fund’s money was used for capital infrastructure projects. Investments included low-interest financing to state firms, financing to Alberta corporations to encourage diversification away from the oil sector, social investments such as parks and hospitals, and investment in the Canadian stock market.

Four of the fund’s five investment divisions were particularly striking because they covered activities that are conventionally undertaken by the general budget. The checks and balances that were set up for these activities were less stringent than those normally applied to the general budget. Indeed, by transferring money to a fund

with loosely defined objectives, the executive (through the cabinet) determined spending priorities in a very autonomous fashion. Although there were ex post considerations of these decisions that could have prompted the legislature's refusal to approve further transfers into the fund, these were rather weak and could not easily reverse a spending decision once it had been made.

Since a baseline analysis was not undertaken, it is difficult to assess to what extent the fund was able to achieve its policy objectives. In 1995, the fund's mandate was put to a provincial referendum, and its domestic development role ceased in 1997. Since then, it has been a pure savings fund, operating as a commercial investor with the sole objective of maximizing financial returns for its shareholders, the citizens of Alberta.

Sources: Bacon and Tordo 2007; Warrack and Keddie undated; Smith 1991.

Other sovereign funds with a domestic investment mandate, such as Malaysia's Khazanah Nasional Berhad and Singapore's Temasek, appear better able to ensure market validation and generate financial returns while supporting their national economies. These funds' initial capital consisted of a portfolio of state-owned enterprises (SOEs) and other assets destined for full or partial privatization. As such, they acted as state-owned holding companies. Because these funds' role was to privatize state assets, their management and investment decision-making processes have, since the start, been exposed to and validated by market forces. The funds have since expanded into foreign assets while maintaining their public policy objectives. For example, Khazanah's foreign investments are to some extent driven by the purpose of strengthening sector and industry links that promise to benefit Malaysia's economy and Malaysian companies.

5. A Double Bottom Line

In principle, the policy objectives of an investment should be expressed in terms of its ERR estimated in accordance with one of several accepted methodologies (see appendix B). Although externalities can be hard to identify and objectively quantify, the ERR provides a single estimate of the social and economic impacts of an investment project. In practice, however, most SIFs use simpler, albeit less comprehensive measures. For example, the GEEREF measures its policy achievements in terms of the amount of clean power generated. The EFSI's main policy success benchmark is the amount of external investment unlocked by its guarantees for investment in the fund's defined priority sectors, with the aim to generate a 1:15 multiplier on its investments. The ISIF measures its policy objectives against the triple criteria of additionality, no displacement, and no deadweight, as illustrated in box 5.

Box 5. The Double Bottom Line of the Ireland Strategic Investment Fund

The Ireland Strategic Investment Fund (ISIF) started operations in December 2014 with €7.6 billion capital from the National Pensions Reserve Fund. The overarching purpose of ISIF is to invest on a commercial basis in a manner designed to support economic activity and employment in the State. The fund has a stated target of a 1:2.6 multiplier on its invested capital.

ISIF's act of establishment lists the following investment criteria:

- The investment performance goal is to exceed the average cost of government debt.
- No withdrawals shall be made from ISIF for budgetary purposes before 2025. Thereafter a dividend-type payment of up to 4 percent per annum may be paid to the exchequer.
- Investments shall not have a negative impact on the net borrowing of the general government of the state for any year.

ISIF measures the economic impact of its investment activity by applying the following three concepts:

- *Additionality*, that is, the additional economic benefits to the gross value added /gross domestic product that are likely to arise as a result of an investment over and above what would have taken place anyway.
- *Displacement*, or a reduction in the additionality generated by an investment when measured at the level of the overall economy, due to a reduction in such benefits elsewhere in the economy.
- *Deadweight*, as when the economic benefits generated by an investment would have been achieved without such investment being made.

The ISIF seeks to allocate the majority of its capital (80 percent of its portfolio over time) to priority sectors that are likely to have high potential economic and employment impact, while also ensuring that all investments satisfy the fund's commercial return objectives. The remaining capital is invested in assets that provide short-term gains, accelerate market activity, or address instances of market dysfunction. Some of the sectors with the lowest levels of deadweight and displacement and highest levels of additionality would be those involved in exports, manufacturing, and internationally traded services.

Investment opportunities that lead to economic additionality and have low levels of displacement and deadweight are likely to result in a high economic impact at the overall economy level over the long term. Economic additionality can come in many forms, including increased output (turnover), profits (operating surplus), employment, net exports, and capital expenditure. The supply of enabling infrastructure also creates additionality in the future, by facilitating future competitiveness of the economy. Similarly, innovation and investment in research and development have long-term additionality that may not be immediately evident but is necessary for long-term sustainable economic growth.

Sources: NTMA 2015a, 2015b.

6. Public Capital Multipliers

Publicly available data suggest that SIFs generate a wide range of public capital multipliers. Box 6 contains a brief description of the methodology used for calculating public capital multipliers and its application to a select number of SIFs for which data are publicly available. Although multipliers do not reflect the ability of SIFs to operate efficiently, or the wider social and economic impacts of their investments, they do provide a useful indication of a fund's ability to crowd in external capital. However, the following important caveats apply:

- *Definition.* Multipliers may refer to different dimensions (for example, different ratios, financing instruments, definitions of public and private capital, definitions of commitments or investment, and so on). For example, the external capital may come from other government institutions, or multilateral development institutions, instead of the private sector.

- *Additionality*. Private investment in a company or project may occur independent of public participation, particularly when the expected financial returns are attractive. In this case, estimated multipliers would be overstated.
- *Projections*. Multipliers may refer to expected rather than actual investment volumes.
- *Expectations*. Multipliers can generate mechanistic or otherwise unrealistic expectations.

Box 6. The Public Capital Multiplier

The concept of a public capital multiplier was first prominently used in the development of the Europe 2020 Project Bond Initiative (PBCE), adopted in 2012. It is defined as the ratio of total investment to public funds invested in a certain project. The multiplier can be calculated at the fund level and at the project investment level. The combination of the two levels results in the total or overall multiplier, as follows:

- Fund (or investment vehicle) multiplier = total size of fund or facility / public capital
- Investment multiplier = total invested in projects / fund size
- Total multiplier = total investment volume / public capital

Publicly available information on multipliers is very limited. Whereas the public capital multiplier is an explicit measure of success for and an integral part of the public disclosure of funds created by the European Union/European Investment Bank (EIB), other SIFs do not report their multipliers. The multipliers reported in the table below are therefore the result of estimates based on press releases and other publicly available data.

Capital Multipliers of Selected Funds: Preliminary Estimates

Fund	Year	Capitalization	Fund Multiplier	Investment Multiplier	Total Multiplier
EFSI	2015	€21 billion	1x	6.7x	6.7x
Marguerite	2010	€710 million	1x	11.8x	11.8x
GEEREF	2008	€112 million	2x	35.8x	~71x
ISIF	2014	€7.6 billion	1x	2.4x	~2.4
PAIDF	2007	\$625 million	4.2	4	16.7x
PINAI	2012	\$625 million	25x	<i>Unknown</i>	~25x
MMIF	2008	\$408 million	5x	10.3	51.7x
FONSIS ^a	2016	€28 million	1x	9.6x	9.6x
PBCE	2012	€230 million	3x	~6x	~19x

Source: Adapted from Inderst (2016b).

Note: Multipliers in this table are World Bank estimates based on publicly available information on actual invested amounts, often referring to specific projects since detailed information at the portfolio level is generally not available. Furthermore, information on the public versus private share of capital invested at the project level is also not publicly available. As a result, estimates shown in this table are indicative only. Funds that are wholly owned by a government have a fund level multiplier of 1.

EFSI = European Fund for Strategic Investments; FONSIS = Fonds Souverain d'Investissements Stratégiques; GEEREF = Global Energy Efficiency and Renewable Energy Fund; ISIF = Ireland Strategic Investment Fund; MMIF = Macquarie Mexico Infrastructure Fund; PAIDF = Pan-African Infrastructure Development Fund; PINAI = Philippine Investment Alliance for Infrastructure; PBCE = Europe 2020 Project Bond Initiative.

^aFONSIS provides an example of the multiplier effect through SIF investments. In February 2015, FONSIS completed the financing of a €43 million, 30 megawatt (MW) solar energy plant and its transmission line project in Santhiou Mékhé, 100 kilometers (km) from Dakar. The project is financed with 20% equity, distributed between FONSIS (32%), the French investment firm Meridiam (53%), and Senergy SUARL, where Meridiam is a majority shareholder (15%). Debt financing, 80% of the total investment, came from Proparco, the French Development Agency's private sector arm. The project received a €3.5 million guarantee from the government of Senegal, resulting in an investment multiplier of 9.6 (Foce Consultora, 2016; Sud Quotidien, 2016). Based on available information, the multiplier for FONSIS is calculated from

EUR 1 million of FONISIS capital invested in the project, while EUR 1.6 million of goodwill is assumed, plus the worth of the EUR 3.5 million guarantee.

All other things being equal, the size of the multiplier reflects the fund's structure. Intuitively, an SIF organized as a fund-of-funds should be able to achieve higher multipliers than an SIF that invests directly in specific projects alongside the private sector, although additionality is harder to establish at the fund-of-funds level. In a fund-of-funds structure, such as that of GEEREF, the effect of the multiplier takes place at three levels, those of (i) the fund, by co-investing with other investors as a limited partner in a hybrid fund-of-funds; (ii) the invested funds, through the fund-of-fund's minority stakes; and (iii) individual investments, through the invested funds' minority equity or debt positions in individual companies or projects. In direct investment funds such as FONISIS, the multiplier effect occurs at the level of individual investment, in some cases through special purpose vehicles. For example, InfraCo Africa, Ghana CenPower, and the Kpone IPP gas project created Cenpower Generation Ltd. and were able to mobilize \$903 million in financing from both African (70 percent) and other international (30 percent) investors.

SIFs' investment strategy also affects the size of their public capital multipliers. Intuitively, SIFs that operate like publicly sponsored VC funds would be expected to display lower multipliers than SIFs that operate as more traditional investors in both equity and debt. This is due to the higher risk of equity investment, and the financial leverage. However, by participating in PE investments—either by co-investing with the private sector or by investing in a private sector managed VC fund—SIFs can enhance their capacity to make complex and risky assessments of young companies with no credit or operating record, as well as reduce investment risk. Multipliers can also be estimated for credit enhancement and blended finance in general (Brown and Jacobs 2011).

7. Investment Strategy

When policy imperatives prevail over commercial considerations, an SIF may find it difficult to attract private capital. Mechanisms to reduce risk or enhance returns, financed by the public share of the SIF's capital, may help to overcome this challenge. For example, if public finance within the fund is used to increase the risk-adjusted rate of return for private investors, an SIF may leverage private funds that invest in relatively high-risk regions or projects, yet need finance with low-risk premiums. Typical instruments for this are first-loss equity and capped return. First-loss equity means that the public sector investors take equity stakes in an SIF with a first-loss position, thereby increasing the number of projects within the SIF that can fail before the private sector investors lose money. In a capped-return arrangement, the government's return on the capital investment is capped, allowing co-investors access to higher upsides on

their investments. The European Fund for Southeast Europe is an example of a first-loss arrangement (box 7).

Box 7. A Strategic Investment Fund with a First-Loss Arrangement

The European Fund for Southeast Europe (EFSE), based in Luxembourg, is a hybrid strategic investment fund (SIF) with €756 million (\$1.1 billion) in commitments from donor agencies, international financial institutions (IFIs), and private investors. The public-private partnership approach enables the EFSE to mobilize funding from private institutional investors to top up international public donor funding for development finance. In addition, it provides a platform for the coordination of donor activities in its regions. This pooling of resources multiplies the impact of public funding. The EFSE operates as a market enabler, facilitator, and risk taker as well as an innovator and incubator for new financial products. Donor or public capital constitutes the first-loss tranche—that is, the tranche to be used first in the event of losses. IFIs invest in the mezzanine tranche, private investors in the senior tranche. Because of its investment structure, the EFSE is able to provide access to long-term finance at market conditions to qualified investors. To undertake an investment, different sources of funds representing different risk-level tranches are pooled into a single source of financing for the EFSE. For the investment portfolio in each country, the proportion of the different risk tranches contributing to the total amount of pooled funds remains intact. Hence, donors and other investors hold a specific share of the pooled funds in the amount of their original nominal contribution to the EFSE.

Sources: Wang et al. 2013; EFSE website, <http://www.efse.lu/about-the-fund/mission/>.

An SIF could also seek to attract impact investors or commercially oriented financial institutions that identify with the policy objectives of the fund and often require a lower financial return than traditional investors (box 8). For example, AREF received financing from Sustainable Energy for Africa, a fund administered by the African Development Bank, at a rate of return capped at 4 percent.

Box 8. Public Finance and Impact Investment

Emerging and frontier economies hold significant promise for private investors and corporations that seek to diversify their portfolios and enter new high-growth markets. Yet, the high level of risk (real or perceived) is often a barrier to investment. Public and philanthropic funders can use their resources to shift the risk-return profile of investee projects or companies to create favorable conditions for private sector engagement. Such blending of public, philanthropic, and private resources can in turn significantly scale up investment in areas that are critical for sustainable development, including infrastructure, climate change solutions, agriculture, health care, and financial services.

Impact investors have diverse financial return expectations. Some intentionally invest for concessional returns in order to maximize impact or to catalyze additional investment capital by accepting a riskier position in a deal. Others pursue market-competitive and market-beating returns, which are often linked to their fiduciary responsibility toward investors. According to a survey of impact investors carried out in 2015 by the Global Impact Investing Network—a nonprofit organization dedicated to increasing the scale and effectiveness of impact investing—25 percent of respondents were pursuing below-market returns at close to the market rate, and 16 percent below-market returns close to capital preservation.

Sources: Authors, based on OECD (2015) and a 2015 Global Impact Investing Network survey, results of which can be perused at <https://thegiin.org/impact-investing/need-to-know/#s5>.

As outlined in section 2, governments finance their SIFs in various ways, including through equity investment or lending. In particular, a fund's public sponsor may undertake on-lending to the fund at the interest rate that the sponsor is eligible for. Countries that have a strong credit rating or borrow from international financial institutions (IFIs) may be able to secure a margin between borrowing costs and expected risk-adjusted returns on their sovereign fund's investments. An SIF capitalized with government borrowing will have the option of using the spread between the expected risk-adjusted return of the fund's investments and the cost of borrowing, to provide favorably priced credit or return enhancement to attract private investors, thereby increasing the multiplier.⁸ Also, by carefully structuring the price and time profile of its on-lending, the government can de-couple its obligations to the original lender from the SIF's repayment schedule, allowing the SIF to manage its investment independent of the original debt repayment schedule. In accordance with the principles of good public finance management, equity investments and/or on-lending to the fund need to be channeled through the ministry of finance (representing the ownership of the fund), be included as liabilities in government accounts, and receive parliamentary approval.

Like other financial institutions with government involvement, SIFs may have a comparative advantage over traditional financial institutions thanks to their privileged access to PPP investment opportunities, and a relationship of trust with public and private local investors. Clark and Monk (2015) suggest that this type of advantage may explain the remarkably high financial returns achieved by several SWFs with a domestic investment mandate in spite of their social and economic objectives. Examples include Singapore's Temasek (18 percent total shareholder return over 40 years), Malaysia's Khazanah Nasional Berhad (10-year IRR of 13 percent), South Africa's Public Investment Corporation (10-year IRR of 16 percent), and the Palestine Investment Fund (10-year IRR of 10.3 percent). These funds, the authors observe, have taken on the role of *wealth creators* rather than *wealth appreciators*, acting like PE and VC investors by taking relatively large, direct stakes in projects and thereafter being actively involved in the operations of their investments. Furthermore, by being co-investors in PPP projects, SIFs allow governments to benefit if PPP projects turn out to be lucrative and provide comfort to the country's stakeholders that their interests are protected, thus reducing the likelihood of PPP contract renegotiation in the future.

⁸ A necessary assumption is that borrowing terms for the fund's public sponsor are fully or partly passed through to the fund.

8. Common Challenges

Although SIFs are designed to achieve a wide range of policy objectives, some of which may be specific to a certain country or context, they face common challenges. These are discussed below.

A. Attracting Private Sector Investment

Good governance. For an SIF to be an attractive investment target or co-investor for private investors, it needs to be first and foremost a credible investor. For many investors, corporate governance has become one of the key factors in the investment decision-making process. For example, 1Malaysia Development Berhad (1MDB), an SIF set up in 2009 to turn Kuala Lumpur into a financial hub, started to attract national attention in early 2015, when it missed payments of \$11 billion (£7.1 billion; €9.9 billion) that it owed to banks and bondholders. A series of probes and investigations exposed its weak corporate governance. These findings crippled the SIF's credibility and its ability to attract investors. From the perspective of an SIF, it is therefore very important to incorporate solid corporate governance mechanisms in legislation that establishes an SIF, as well as in the SIF's bylaws and other policy and procedural documents—and to make such documentation available to investors. Sound corporate governance arrangements define clear mandates and objectives, provide incentives for the SIF's board and management to pursue shareholders' objectives, and facilitate the monitoring of performance by shareholders and owners. This is particularly important for SIFs and other state-sponsored institutions where clear policies and mechanisms are required to deal with complex mandates combining financial and public policy objectives (Gelb and others 2014). Strong corporate governance—in particular, clear separation between the ownership role of the government or other sponsors, the oversight role of the fund's board, and the fund manager's independent role in decisions on investment and exit—help to ensure efficiency and accountability. Transparent and timely reporting of accounting information, and strong external audit systems, help increase the market credibility of an SIF, particularly when the fund engages in PPPs (Corbacho and Ter-Minassian 2013).⁹

SIF structure. Hybrid SIFs—that is, SIFs that are funded by both public and private capital—provide a high degree of market validation, and are likely to generate a high overall multiplier. Since private sector participation occurs at the fund level, hybrid SIFs are likely to exhibit competitive financial returns. The

⁹ The objectives and mandate of the fund, the organization of the ownership function of the state, and the institutional arrangements that govern an SIF's internal management bodies and processes are usually specified in a purpose-designed law, as well as in company law, financial sector regulations, and the fund statutes. The Santiago Principles for the Operations of SWFs (IWG 2008) and the existing literature on good corporate governance practice, including the OECD Principles of Corporate Governance (OECD 2004) and the OECD Guidelines on Corporate Governance of State-Owned Enterprises (OECD 2005), provide detailed frameworks for effective corporate governance (Gelb and others 2014).

PINAI, the AREF, and the REAF are examples of the hybrid model.¹⁰ However, an external manager may not have a natural incentive to pursue high multiplier effects at the project level, since this is likely to result in more complex and time-consuming transactions that will not necessarily correspond to a higher return to the SIF's own share of project capital. Linking the external manager's remuneration to the achievement of a multiplier benchmark may mitigate this risk. For fully state-owned and/or managed SIFs, limiting the SIFs' investment to minority participation can provide market validation of projects and enhance the integrity of investment decisions. In this way, due diligence by private sector co-investors can confirm the profitability of investee projects or companies (Gelb and others 2014).

Domiciliation. The jurisdiction in which the fund is domiciled may affect investors' perception or assessment of the integrity of a fund's activities, since such integrity is in part determined by regulatory quality, rule of law, and overall institutional quality in the country of domiciliation. Recognized international financial centers with strong legal, regulatory, and supervisory standards for fund operations may help to enhance investors' confidence. International SIFs, such as AREF, GEEREF, or Asia Climate Partners, tend to be domiciled in known jurisdictions with attractive and cost-efficient regulatory frameworks, such as Luxembourg, Mauritius, and Singapore. Tax optimization is another key factor deciding domiciliation.

SIFs that invest exclusively in the domestic market are normally domiciled in the country of operations, independent of their shareholding structure. This is likely related to these SIFs' need to attract domestic institutional investors as well as taxation, and the home governments' desire for a certain level of control over the funds. Where appropriate, dual registration could be considered, for example, to provide some degree of insulation against undue political interference in investment decisions—the biggest threat for any SOE—and in the resolution of investment disputes.

B. Sourcing Investable Projects

Project preparation. Many EMDEs lack the capacity to transform investible projects into actual transactions, which is a hindrance to PPP finance even where capital may otherwise be available. Empirical evidence in Asia and Africa shows that project preparation facilities are not effective in transforming investible projects into actual transactions (Adam Smith International 2014; ICA 2012). To accelerate the generation of project pipelines and the preparation and closure of PPP transactions, several EMDE governments are establishing infrastructure PPP project venture funds. For example, by identifying and working with financial and technical partners, Senegal's FONSI is able to develop and structure strategic

¹⁰ AREF and REAF report a net IRR of 20 percent; PINAI does not report its IRR. However, in a recent interview, the Government Service Insurance System (GSIS), one of its shareholders, indicated its support for a second infrastructure SIF (*The Manila Times* 2016).

projects from initial sourcing through transaction close. The underlying aim is for the fund to be responsible for managing all stages of the preparation of PPP transactions until financial close. A PPP project venture fund may, after originating and structuring a project, be entitled to take an equity and/or mezzanine stake in the project's special purpose vehicle, representing the government's participation. The PPP venture fund would then have a direct incentive to generate viable and profitable projects. Such a fund can be set up either as a fully state-owned SIF, as a public-private (or *hybrid*) SIF, or even as a subfund or fund compartment within an SIF. FONSIS is an example of a fully state-owned SIF that includes a PPP venture fund function. The inclusion of the venture-financing function in a single fund (as opposed to a separate compartment) enables the government to capitalize on project preparation costs that the SIF at financial close converts into equity stakes, or into a cost refund or a success fee.

Sourcing projects from national budgets. Since SIFs are partly or fully state owned, they have an opportunity to align their investment strategy with the identified economic development priorities of their country of operations, subject to project viability. The close relationship with the government makes it easier for SIFs to source their projects from national infrastructure master plans, line ministries of relevant sectors, PPP units, SOEs and public utilities, PPP studies performed by the government and development banks, other SIFs and SWFs, in addition to private developers (unsolicited proposals), commercial banks, and PE infrastructure venture funds. FONSIS is an example of this model. Sourcing projects from national development plans and other government-related project pipelines must not inhibit the ability of the SIF's manager to make fully independent viable investment decisions that will enable the SIF to attract private capital. An SIF established as an independent entity by an act of parliament may help to address this problem, as was the case for FONSIS. Legal independence of the SIF may also address an important challenge often faced by public investment units that are part of national treasuries. For these units, it may be difficult to offer staff benefit packages beyond those available through standard public sector salary regimes, as is necessary to attract and retain highly skilled investment managers from the private sector.

C. Balancing Policy and Commercial Objectives

Investment objectives. Successful achievement of an SIF's double bottom line requires that fund managers invest in projects that achieve competitive financial returns sufficient to attract investors across the risk spectrum, as well as economic policy objectives and associated economic returns. As discussed in section 6, when policy imperatives prevail over commercial considerations, SIFs may find it difficult to attract private capital even when they have good corporate governance. On the other hand, a fund that defines its policy objectives too loosely, focusing only on the maximization of returns, may end up making investments that would have taken place anyway, crowding out instead of crowding in private sector capital, resulting in a negative multiplier at the level of the overall economy.

Performance metrics. The ERR is a comprehensive measure of the economic and social impacts of an investment project on society as a whole, and has been widely used by the public sector and the donor community as part of their economic analyses (World Bank 2013; World Bank 2014).¹¹ The tools used in the economic analysis of a project go beyond an ERR estimation, and can be used to answer broader questions about the impact of the project on the entity undertaking it, on society, and on various stakeholders. Economic analysis can also help to identify project risks and assess sustainability (Belli and others 2001). However, none of the SIFs referred to in this paper use the ERR to assess investment opportunities, and none applies an explicit trade-off between financial and economic objectives. In practice, SIFs use a simplified approach: they assess investment opportunities that satisfy a financial return benchmark, against an economic benchmark frequently expressed as a proxy measure of the project's economic and induced impacts, such as employment creation, the stimulation of new firms, the reduction of carbon emissions, and other proxy variables of their policy objectives. For example, ISIF measures the social and economic contribution of the investment it undertakes through a variety of proxy variables, including employment, value addition at the enterprise level, and underlying investee turnover (see box 5), and publishes data on its economic impact every six months.

SIFs often operate within a confined investment universe, that is, they invest only in certain sectors, themes, or asset classes predefined by their owners (for example, ISIF, AREF, GEEREF). A confined investment universe would, in principle, include the sectors and themes that are expected to contribute the most to the achievement of the SIF's policy objectives (that is, sectors that are expected to exhibit high ERRs). Beyond its simplicity, this approach has multiple advantages: it allows an SIF to tailor its organization (staffing and business processes) around a few, well-defined areas of expertise, and it facilitates the identification of meaningful and easy-to-understand proxy variables of economic impact.

The use of proxy variables as substitutes for the ERR, although a common practice among SIFs, provides only a partial assessment of a project's socioeconomic impacts, and may be more open to selection bias than a more comprehensive economic analysis. Using the single measure of the ERR, albeit not perfect, may also facilitate the assessment of the relative desirability of projects with the same IRR and cash profile. For example, of two projects with the same IRR and cash profile, it would be difficult to choose whether to invest in the one that generates more exports or the one that reduces greenhouse gas (GHG) emissions. By estimating the ERR when possible and appropriate, an SIF could more easily compare alternatives with

¹¹ Economic analysis is more complex than financial analysis in that it uses economic measures of input and output instead of market prices, and includes nonmarket impacts (externalities or indirect effects) that are not part of financial analyses. Economic values are not observable in the market, therefore their estimate requires the analyst to make a range of specific assumptions. There is ample literature on the comparison of economic and financial analyses, their uses, and respective limitations. See, for example, Kholi (1993) and EU (2014).

wide-ranging expected outcomes, and optimize the economic impact of its investment portfolio. This is particularly important when the number of investable projects is greater than the resources available to the SIF. Other indicators that capture unquantifiable impacts should also be considered.

Economic analysis is an integral part of the investment decision-making process in public sector organizations and for IFIs. The experiences of these organizations could offer useful guidance to SIFs in designing ways to measure their double bottom line while preserving their private sector vocation.

D. Securing the Right Staff

Human capital. The role of human capital as a key factor to explain firms' performance has been highlighted by researchers working on developing a resource-based theory of competitive advantage (Acedo, Barroso, and Galan 2006; Barney 1991; Barney, Wright, and Ketchen 2001; Coff 1999). The theory argues that the heterogeneous distribution of valuable resources among firms—such as human capital—explains performance differences. Researchers generally concur that the knowledge embedded in human capital is a firm's most universally valuable resource, and it is hard to imitate (Coff 1997; Grant 1991, 1996; Kogut and Zander 1992). High returns and risk diversifications have traditionally been the main focus of the PE, VC, and investment industry at large. A vast number of research papers have been published on the growing importance of human capital in the economic world, but very few are specific to the investment industry. While it is undeniable that an investment fund's performance is driven by many external factors—such as favorable markets, and a stable or growing economic environment—in an increasingly globalized economy the underlying internal driver of success is the quality of an organization's human capital.

Critical skills. The staff of the best investment companies, at all levels, share common characteristics: they have (i) knowledge and skills about generating value, and an ability to read and interpret trends within the target markets, that is, *financial awareness*; (ii) the ability to quickly implement the right investment approach, that is, *commercial awareness*; and (iii) access to extensive networks of contacts and the ability to interact with a wide array of people and interests, that is, *people skills* (Warner 2006).

For some EMDEs, the establishment and operation of SIFs have been greatly helped by the increasing availability of highly qualified investment professionals both domestically and among their diaspora. For example, Nigeria and Senegal have been able to staff their respective SIFs with diaspora members that have extensive international experience in the financial sector.

Cross-fertilization. Since SIFs are generally established to crowd in private investors, co-financing with the private sector is likely to enhance market validation and at the same time provide additional expertise to enhance the quality of investment decisions and fast-track their staff's learning curve. This model works best when there is a general alignment of interest among investment partners (Gelb and others, 2014). The

combination of private and public sources of funding in a hybrid SIF's capital structure helps to keep the limited and general partners' interest aligned, and may also be well suited to addressing issues related to limited partners' inadequate human capital. However, even as a limited partner, an SIF needs to acquire and retain sufficient capacity for project selection and assessment, and for the oversight of the general partner's activities.

Staff remuneration policy. An SIF's ability to offer staff benefits packages beyond those available through standard public sector salary regimes is also critical to attract and retain highly skilled investment managers. This may require special legislation. For example, FONSI benefits from legislation that sets it apart from other SOEs, and allows it to operate as an independent PE firm on behalf of the Senegalese government. The fund offers salaries and benefits that are relatively competitive to attract and retain highly specialized staff from the private financial sector. During recruitment, applicants' experience and education are screened by a professional recruitment firm, and candidates take financial aptitude tests as part of the selection process. In low- or middle-income countries, where high salaries for SIF professionals may be politically contentious, donor organizations could help remunerate specialist SIF staff via technical assistance facilities, as deemed adequate for the successful operation of the SIFs.

9. Conclusion

The number of government-sponsored SIFs has grown rapidly over the past 15 years, opening new opportunities to crowd in private capital to infrastructure PPP projects/funds and SME funds. SIFs are designed to achieve a wide range of policy objectives, some of which may be country and context specific. Some SIFs invest only domestically and are owned by both the public and the private sector, whereas others are wholly owned by a government. Some SIFs operate at the global or regional level, and may be funded by several governments.

Notwithstanding their diversity, all SIFs aim to crowd in private capital. This is achieved at the fund level by engaging as a limited partner in hybrid funds, by investing in other funds, or at the project level through co-investment and/or the use of various return-enhancing and de-risking instruments. Investing with the private sector allows the public sector to generate a multiplier effect, which can range from 1:12 for a typical SIF's direct investment to 1:70 for a hybrid fund-of-funds. The size of an SIF's capital multiplier does not reflect its ability to operate efficiently, or the wider social economic impacts of its investment. But it does provide a measure of market validation, which is a critical success factor.

SIFs' sources of funding may include balance-of-payment surpluses, official foreign currency operations, the proceeds of privatization, pension reserve funds, receipts resulting from commodity exports, and also contributions from IFIs and private sector actors. Partners that have a high credit rating or that borrow from

IFIs can on-lend to an SIF at low cost. In this case the SIF can, when necessary and justified by policy objectives, take advantage of the margin between low-cost loans and the expected risk-adjusted returns on its investments to enhance returns for private investors or de-risk their investments.

SIFs face common challenges. Whatever their country of operations or area of investment, they all need to reconcile (and appropriately measure) policy and commercial objectives by achieving attractive returns on their investments while delivering meaningful social and economic impacts. Based on publicly available information on the objectives, strategies, and operations of a sample of SIFs, this paper has identified some of the challenges that are implicit in the SIFs' dual objectives, and has outlined ways in which SIFs have addressed them.

When policy imperatives prevail over commercial considerations, SIFs may find it difficult to attract private capital even when they apply good corporate governance principles, and are domiciled in a country having good regulatory quality, rule of law, and overall institutional quality. Sourcing investable projects may also be difficult, particularly where lack of capacity and information asymmetry hinder the preparation of a well-documented pipeline of bankable projects. Sourcing projects from the national budget may provide the opportunity to align the SIF strategy to the development priorities of the country of operations. SIFs' close relationship with government makes it easier for these funds to source their projects from the national development plan, and other government-related project pipelines must not hinder the ability of the SIF to make fully independent viable investment decisions.

To be able to operate as expert investors, SIFs need to secure and retain professional staff with knowledge and skills on generating value, the ability to read and interpret market trends and quickly act on them, and access to an extensive network of contacts. Co-investing with experienced private sector investors can provide an SIF with both market validation and additional expertise, to enhance the quality of investment decisions and fast-track its staff's learning curve. An SIF's ability to offer staff benefit packages beyond those available through standard public sector salary regimes is also critical to attract and retain highly skilled investment managers.

Notwithstanding their growing number and relevance to policy making, SIFs have not yet been the subject of in-depth analysis in the literature. This paper has made a first attempt at recognizing their unique features, categorizing them on the basis of their investment strategies, and identifying common challenges to their success—as well as ways to address these challenges.

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Appendix A. Strategic Investment Funds and Sovereign Wealth Funds Investing Domestically with a Development Objective**Table A.1 National Strategic Investment Funds (SIFs)**

Country	Name	Year	Size (in billions)	Financing Source	Objective	Sectors	Domicile
Bahrain	Mumtalakat	2006	\$11.10	Oil revenues.	To create a thriving economy diversified from oil and gas, focused on securing sustainable returns and generating wealth for future generations. Key sectors include infrastructure, financial services, telecommunications, real estate, transportation, and aluminum production.	Financial services; telecommunication, technology, and media; general services; industrial manufacturing and services; logistics and transport; construction; private education; real estate and tourism; and consumer and health care.	Bahrain
France	Bpifrance	2013	€32.578 in 2015	Merger between Caisse des Depots, the former SWF, the SIF, and OSEO.	Bpifrance provides assistance and financial support to small and medium-sized enterprises, facilitating access to banks and equity capital investors, in particular during the high-risk phases: start-up, innovation, development, international, buy out.	Advanced materials, aeronautics, automotive components, biotechnology, contract research, oil and gas engineering, online video services, surgical equipment and cards.	France
Gabon	Gabonese Strategic Investment Fund (Fond Gabonais d'Investissements Stratégiques, FGIS)	2012	\$0.14	10% of oil revenue goes to fund, 50% from excess budget.	To support the growth of small- and medium-sized local enterprises through direct investment; increase the capture of revenue from the country's natural resources; diversify government revenues and mitigate risk; and broadly support the government's strategic economic policy objectives. Aims to develop industries capable of generating enough revenue to replace oil revenues and reduce Gabon's dependence on the hydrocarbon sector.	Insurance, wood, mines, services, materials, telecommunications, hydrocarbons, general trades, industry, transportation, property and hotel industry, automobile industry, banking. While no targets have been set to specific asset classes, 80–85 percent of ISIF's funds will be allocated to sectors with the highest economic impact, and 15–20 percent will be allocated to projects with short-term benefits such as employment projects or accelerating normalization of capital markets.	Gabon

Ireland	Ireland Strategic Investment Fund (ISIF)	2014	\$8.36	A share of assets of the National Pensions Reserve Fund (NPRF) became assets of the ISIF.	The dual mandate of the ISIF—investment return and Irish economic impact—represents a new “double bottom line” approach to investing, and will require all transactions to generate both risk-adjusted commercial returns and an economic impact in Ireland. Following recent restructuring, ISIF increased its exposure to corporate bonds, as well as downsized its allocation to alternative assets. However, all its investments target opportunities in Ireland to promote the Irish economy, create jobs, and attract foreign investments. Can invest directly into infrastructure and PE.	Equity: 13 percent (2.1 percent EM, 10.9 percent small and midcap); financial assets: 65.7 percent (cash 45.5 percent, bonds rest); infrastructure: 4.6 percent; PE: 5.9 percent; commodities: 3.3 percent. Infrastructure: transport, education, technology, development, wind, and so on. Natural resources: energy, agriculture, waste, and water.	Ireland
Italy	Cassa Depositi e Prestiti Group (CDP) Equity SPA	2011	€4.9	90 percent from government-owned CDP (bank owned by Ministry of Economy and Finance), 10 percent Fintecna.	CDP Equity invests in companies of major national interest, with the aim of creating value for its shareholders via growth in size, the improvement of operating efficiency, and the aggregation and enhancement of the competitive position on national and international markets of the companies invested in. CDP Equity is an institutional operator which acquires mainly minority holdings in companies of “significant national interest,” which are balanced economically, financially, and equity wise and which have adequate profitability and development prospects that are suitable for generating value for investors.	100 percent PE: research, innovation, and high-tech 14.45 percent, defense and security 2.89 percent, financial industry 6.94 percent, industrial/manufacturing/mechanics 30.64 percent, infrastructure 16.18 percent; made in Italy 29 percent (2013).	Italy
Kazakhstan	Baiterek	2013	\$12.7	Holding company.	Mission: to promote sustainable economic development of Kazakhstan through funding and support of priority sectors of the economy for implementation of public policy and state programs; finding solutions for socially oriented tasks and reaching goals set by Strategy 2050. Vision by 2023: the main financial agent of the Kazakh government that supports diversification, modernization, and sustainable development of the economy and provides solutions for socially oriented tasks of the state. Main goals/objectives: (i) provision of full range of financing instruments, (ii) support SMEs, (iii) support new modern economic sectors and innovation development of the economy, (iv) support export activities of national companies, and (v) support and promotion of affordable housing.	Infrastructure, transport, financial, energy, telecom, SME, and so on. Clear double bottom-line measurements, such as jobs created, enterprises created, subsidies, projects financed, and housing brought into operation.	Kazakhstan

Malaysia	Khazanah Nasional Bhd	1993	\$34.9	Government shares of privatized national agencies. Issues Islamic bonds.	To promote economic growth and make strategic investments on behalf of the government, contribute to nation-building, and nurture the development of selected strategic industries in Malaysia with the aim of pursuing the nation's long-term economic interests. Invests in PE via direct investments and fund commitments. Overall, it has a flexible mandate that allows it to have a wide range of strategies, including growth and early stage start-up vehicles.	Diverse sectors, but specifically targeting clean energy and technology. 22 percent in media and communications, 17 percent in health care, 15 percent in power, 14 percent in financial services, and 11 percent in property. Known to have 10.6 percent in real estate, 8.7 percent in infrastructure, and the remaining in equities and PE. 55 percent in domestic market, 12 percent Singapore, 7 percent China, 6 percent Indonesia, and 7 percent Turkey in 2015.	Malaysia
Mexico	El Fondo Nacional de Infraestructura (FONADIN)	2008	\$14.26	Government budget and existing infrastructure project returns.	FONADIN promotes the participation of public, private, and social infrastructure development by providing nonrefundable and refundable financial products. It is an instrument designed to assist in the fulfillment of infrastructure programs by creating the necessary conditions to promote national and international private sector investment in infrastructure in Mexico. Uses PPPs as main conduit of policy. Provides support, financing, and know-how for the planning, design, construction, and final transfer of projects developed by the private sector. Also invests into funds, and acts as a fund-of-funds.	Infrastructure; equity, debt, and mezzanine. Industries: aviation/aerospace, bridges, education facilities, energy, health care/medical facilities, railway, roads, sea ports, telecom, transportation, tunnels, utilities, waste management, water.	Mexico
Mexico	Macquarie Mexico Infrastructure Fund (MMIF)	2010	\$0.41	Fonadin—\$81 million, Macquarie—\$59 million, and seven pension funds—\$268 million.	Infrastructure assets located in Mexico in which the fund would have significant influence over management, operations, and strategic direction.	Infrastructure: roads and rail, airports and ports, water and wastewater, energy and utilities as well as social and communications infrastructure.	Mexico
Morocco	Moroccan Fund for Tourism Development, Fonds (Marocain de Développement Touristique, FMDT)	2011	\$1.80	2/3 government budget and 1/3 from Hassan II Fund (owned by state).	Mobilize national and international tourism investment. By attracting investors and partners, structuring and executing investment transactions, and supporting and managing investments within its portfolio, it will consolidate the financing of the Moroccan tourism sector.	Tourism.	Morocco
Nigeria	Nigeria Infrastructure Fund (NIF), one of the three funds of the Nigeria	2011	\$0.54	Excess earnings from crude oil exports.	To invest in projects that contribute to the development of essential infrastructure in Nigeria. The NIF is 40% of NSIA (40% * 1.35 billion). Selects projects/sectors through national priority and potential for nationwide economic	Infrastructure: power generation, distribution and transmission infrastructure, health care infrastructure, real estate, agriculture, transport infrastructure, water resources infrastructure, and so on.	Nigeria

	Sovereign Investment Authority (NSIA)				development impact, potential for attractive commercial and social returns, conducive regulatory environment, and ability to unlock private sector participation.		
West Bank and Gaza	Palestine Investment Fund PLC	2003	\$0.76	State budget.	To strengthen the local economy through strategic investments, while maximizing long-run returns for the fund's ultimate shareholder—the people of Palestine. Aims to do this by encouraging growth in the private sector of Palestine by investing in socially responsible projects in vital economic sectors in the West Bank and Gaza Strip. Specifically, it looks to promote job creation as a means to spur economic growth.	36.8% in public equities (75% domestic); 6.8% in fixed Income; 37.2% in PE (IT, microfinance, agriculture, tourism, health care, educational services, and small renewable energy); unknown percent of private debt, real estate, infrastructure, natural resources.	Palestine
Philippines	Philippine Investment Alliance for Infrastructure (PINAI)	2012	\$0.63	Macquarie \$50 million, Asian Development Bank (ADB) \$25 million, Algemene Pensioen Groep (APG) \$150 million, Government Service Insurance System (GSIS) \$400 million.	To mobilize private sector capital for infrastructure development. It seeks to invest in a portfolio of greenfield and brownfield projects across key sectors, including: PPPs, water and waste, road and rail, mass transit, ports and airports, power generation and transmission, renewable energy, gas distribution, and telecommunications.	Infrastructure: wind, gas, transportation, thermal, solar, water.	Philippines
Russian Federation	Russian Direct Investment Fund (RDIF)	2011	\$13.00	Oil revenues.	To make equity investments in strategic sectors within the Russian economy on a commercial basis by co-investing with large international investors in an effort to attract long-term direct investment capital. Every transaction is mandated to be co-invested with an international investor. Predominately investing into Russia, with up to 20% allowed to be deployed outside of Russia.	Infrastructure, retail, energy, logistics, airports, IT, telecom, textiles, railways, mining, agriculture, transport.	Russia
Senegal	Fonds Souverain d'Investissements Stratégiques (FONSIS)	2012	\$0.76	State budget.	To invest in projects to stimulate economic growth and job creation, primarily to boost investments; to act as a coinvestor in SMEs and flagship projects in strategic sectors and well-structured projects; to attract investors; to effectively manage state-owned assets; and to create wealth and sustainable jobs.	Agriculture, fish, infrastructure, logistics, industrial hubs, energy, social housing, mines, services (IT, health, education, tourism). 20% of assets to VC to fund SMEs.	Senegal
Vietnam	Vietnam State Capital Investment Corporation (SCIC)	2005	\$3.1	Government budget.	The SCIC is tasked with monitoring and investing its capital based on market mechanisms. In addition, the SCIC is responsible for promoting strategies to support market development, jobs, and economic growth in Vietnam. The SCIC was also created to reduce government ownership in domestic companies. It aims to facilitate corporate restructuring and promote SOE reforms.	Infrastructure, finance, transportation, and health care.	Vietnam

Source: Authors' compilation.

Note: IT = information technology; PE = private equity; PPP = public-private partnership; SIF = strategic investment fund; SME = small and medium enterprise; SOE = state-owned enterprise; SWF = sovereign wealth fund; VC = venture capital.

— Not available.

Table A.2 Multinational Strategic Investment Funds

Region	Name	Year	Size	Financing Source	Objective	Sectors	Domicile
Africa	The Emerging Africa Infrastructure Fund	2002	\$0.5977 billion	PIDG Trust \$388.1 million, KfW \$106.6 million, FMO \$53 million, SBSA \$25 million, Standard Chartered \$25 million.	Provides long-term loans to private sector infrastructure projects in Sub-Saharan Africa. Clearly measures impact in projects, amount invested, jobs created, construction jobs created, benefits reached.	Energy, infrastructure, and so on.	United Kingdom
Africa	Infraco Africa	2005	\$0.126 billion	Austria: ADA, Netherlands: DGIS, Switzerland: SECO, and United Kingdom: DFID—£5.9 million. Funneled through PIDG Trust.	InfraCo Africa seeks to alleviate poverty by mobilizing investment into Sub-Saharan infrastructure projects to catalyze economic development. Targeting initial stages of project development requires relatively little finance but higher risks can deter private sector investors, so InfraCo Africa bridges the concept, early-stage development, and advanced development gaps before construction begins. The company may invest in support of commercially viable infrastructure projects where, in the opinion of the Board, there exists demonstrable evidence of additionality to do so.	Infrastructure: energy, transport, water.	Mauritius
Africa	Pan-African Infrastructure Development Fund (PAIDF)	2007	\$0.63 billion	\$625 million total: South Africa Government Employees Pension Fund \$250 million; Barclays/ABSA \$125 million; Development Bank of Southern Africa \$100 million; Old Mutual \$50 million; AfDB \$50 million; Standard Bank \$15 million; Liberty Life \$15 million; Metropolitan Asset Managers \$10 million; Social Security and National Insurance Trust \$10 million.	Invest in infrastructure projects in the energy, transport, ICT, water, and sanitation sectors. The PAIDF will focus on very large-scale investments where it can make equity investments of \$25–\$120 million.	Infrastructure: energy, transport, ICT, water, and sanitation.	Mauritius

Global	Green Energy Efficiency and Renewable Energy Fund (GEEREF)	2008	€222 million	Private €110 million; EU, Germany, and Norway €112 million.	<p>GEEREF provides global risk capital through private investment for energy-efficiency and renewable-energy projects in emerging markets and developing countries. GEEREF focuses on Africa, Asia, and Latin America. It supports a broad mix of energy-efficiency and renewable-energy projects and technologies, such as small hydropower, biomass, wind, and solar power projects. GEEREF was structured to catalyze private sector investments into funds and underlying projects by leveraging the public sector seed contributions.</p> <p>EIF has assisted sponsors in setting up and launching GEEREF. EIF and EIB will select investment opportunities, monitor investments, and raise funding.</p>	Green infrastructure, renewable energy and clean power, and resource efficiency; SMEs.	Luxembourg
Asia	Renewable Energy Asia Fund (REAF)	2009	€86 million	GEEREF, BIO, Calvert, DEG, and FMO. OPIC and ADB also contributed.	REAF seeks to make equity investments of €5–€15 million into development stage renewable-energy projects and project developers deploying operationally and economically mature technologies, to consolidate these investments into operating portfolios, and to generate good returns through successful exits, primarily in India, Philippines, Sri Lanka, and Southeast Asia. Typically invests in economically mature technologies with proven and successful track records, namely small and medium-sized hydro, wind, solar photovoltaic, geothermal, and biomass.	Renewable energy: primarily wind, small hydro, biomass, solar, and methane recovery.	United Kingdom
Asia	Infraco Asia	2010	\$85 million	DFID \$60.8 million, DFAT \$14.3 million, and SECO \$10 million.	Infraco Asia creates viable infrastructure investment opportunities that balance the interests of host governments, local communities, and domestic and international private sector investors. To projects that satisfy the threefold criteria of being additional, commercially viable, and having a development impact, Infraco Asia directly contributes development capital and arranges project debt and equity capital from third parties, as well as other InfraCo affiliate programs.	Energy and power, water and waste management, transport, agriculture; storage and logistics, telecommunication, oil chain, upstream oil and gas, urban infrastructure.	United Kingdom

EUCA	Marguerite Fund (2020 European Fund for Energy, Climate Change, and Infrastructure)	2010	€0.71 billion	€710 million total: €100 million each from EIB, CDP France, CDP Italy, Instituto de Credito Oficial Spain, KfW Germany, and PKO Bank Poland; €80 million from the European Commission, and then a total of €30 million from Bank of Valletta in Malta and Caixa Geral de Depositos in Portugal.	Make capital-intensive infrastructure investments and target attractive long-term and stable risk-adjusted returns. Greenfield investments 65 percent; brownfield investments 35 percent.	Transport, energy, mature renewable energy projects.	Luxembourg
EAP	Asia Climate Partners (ACP)	2014	\$0.44 billion	ADB \$100 million, ORIX \$100 million, UK Government \$100 million, and Robeco \$100 million.	ACP is a fund managed by ADB, Robeco, and ORIX Corporation and supported by the U.K. Government, to make equity investments across a variety of environmentally supportive, low-carbon transactions throughout Asia and the Pacific. The fund's objective is to invest in privately held companies that are benefiting from the macroeconomic and environmental dynamics in emerging Asia, have a positive impact on the environment and society, and have the potential to generate a commercially attractive annual return to investors. Particular focus on China, India, and Southeast Asia.	Broad spectrum of investment opportunities across three sector groupings: (i) renewable energy, (ii) resource efficiency, and (iii) environmental industries. Focus countries are China and India.	Hong Kong SAR, China
Africa	Africa Renewable Energy Fund (AREF)	2014	\$0.2 billion	GEEREF, AfDB (\$25 million), SEFA (\$25.5 million), Global Environment Facility (\$10 million), SEFA Project Support Facility (\$4.5 million), West African Development bank, ECOWAS Bank for Investment and Development, the Netherland Development Finance Company, Calver Investments, CDC Group, BIO, OeEB, Wallace Global Fund, Sonen Capital, Berkeley Energy, EIB.	Renewable energy fund focused on Sub-Saharan Africa, with \$10-\$30 million size investments. Types of financing: equity project finance (30-50% of project with market rate returns after fees, carried interest, and taxes), technical assistance/grants through project support facility, debt mezzanine.	Grid-connected development-stage renewable-energy projects, including small hydro, wind, geothermal, solar, and biomass projects.	Kenya

EUCA	European Fund for Strategic Investments (EFSI)	2015	\$23.1 billion	€16 billion from EU, €5 billion from EIB: €21 billion EFSI.	Overcome current European investment gap by mobilizing private finance for strategic investments, as one of the three pillars of the Investment Plan for Europe. With EFSI support, the EIB Group will provide funding for economically viable projects where it adds value, including projects with a higher risk profile than ordinary EIB activities.	Diverse: strategic infrastructure, education and R&D, renewable energy and resource efficiency, and SME support. Sectors: energy 29 percent, RDI 23 percent, transport 13 percent, digital 13 percent, SME 9 percent, environment and resource efficiency 9 percent, social infrastructure 4 percent.	Luxembourg
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Source: Authors' compilation.

Note: ABSA = Amalgamated Banks of South Africa; ADA = Austrian Development Agency; ADB = Asian Development Bank; AfDB = African Development Bank; CDP = Cassa Depositi e Prestiti Group; DEG = German Investment and Development Corporation; DFAT = Department of Foreign Affairs and Trade; DFID = Department for International Development; DGIS = Directorate-General for International Cooperation; EAP = East Asia and Pacific; EIB = European Investment Bank; EIF = European Investment Fund; EU = European Union; EUCA = European Union and Central America; FMO = The Netherlands Development Finance Company; ICT = information and communication technology; OeEB = Development Bank of Austria; OPIC = Overseas Private Investment Corporation; PIDG = Private Infrastructure Development Group; PPP = public-private partnership; R&D = research and development; RDI = Research, Development, and Innovation; SBSA = Standard Bank of South Africa; SECO = State Secretariat for Economic Affairs; SEFA = Sustainable Energy Fund for Africa; SME = small and medium enterprise.

Table A.3 Planned Strategic Investment Funds

Country	Name	Year	Size (\$ billion)	Financing Source	Objective	Sectors
Bangladesh	Infrastructure Fund	<i>Planned</i>	\$1.50	Foreign exchange reserves	To develop infrastructure and boost economic growth.	Infrastructure
Cameroon	SIF	<i>Planned</i>	—	—	—	<i>Unknown</i>
Côte d'Ivoire	SIF	<i>Planned</i>	—	—	—	<i>Unknown</i>
Egypt, Arab Rep.	SIF	<i>Planned</i>	—	50 percent from Arab investment funds	Infrastructure fund.	Infrastructure
Ghana	Ghana Infrastructure Investment Fund (GIIF)	2016	\$0.25	Budget	90 percent of GIIF transactions must meet the GIIF hurdle rate and be fully commercially viable; 10 percent must be projects with high social impact and still have positive IRR. Hurdle rate not yet determined.	Infrastructure
India	India Infrastructure Fund	2016	\$3.00	Budget	To primarily invest equity for the long term in companies that derive value from development and operation of infrastructure assets/projects in India. The resulting portfolio is expected to comprise greenfield, brownfield, and operational assets/projects in core infrastructure subsectors.	Infrastructure
Nigeria	Nigeria Infrastructure Fund	2016	\$25.00	Local and international sources, including Nigeria's SWF and domestic pension funds	To invest in transport and energy sectors in Kenya.	Infrastructure
Norway	Fornybar AS	<i>Planned</i>	—	—	Clean Energy Fund.	Green finance
South Africa	Green Strategic Investment Fund	2016	—	Budget	To catalyze investments in clean technology and low-carbon infrastructure.	Green finance
Thailand	Thailand Future Fund	2016	\$3.00	Budget	To mobilize private sector/institutional funding to co-invest in Thailand's infrastructure. Pools investment in PPP projects as well as in government-funded infrastructure assets.	Infrastructure
Tunisia	Planned SIF	<i>Planned</i>	—	—	—	<i>Unknown</i>
Pakistan	Pakistan Infrastructure Fund	<i>Planned</i>	—	—	Meet infrastructure financing gap.	Infrastructure
Asia	Asia Climate Finance Facility (AClIFF)	<i>Planned</i>	\$0.60	\$100 from Asian Development Bank (ADB), \$500 from German private sector	To leverage public and private sector investment in climate change mitigation and adaptation in support of the goals of the COP21 Paris Agreement.	Climate mitigation and adaptation

Source: Authors' compilation.

Note: COP21 = 21st session of the UN Framework on Climate Change Conference of the Parties; HC = hydrocarbon; IRR = internal rate of return; PPP = public-private partnership; SIF = strategic investment fund; SWF = sovereign wealth fund.

— Not available.

Appendix B. Estimating the Economic Rate of Return and Policy Efficiency of Investments

A project's economic rate of return (ERR) may be estimated using cost-benefit analysis.¹² Project benefits are defined in terms of their wider economic impact on a given country. For example, positive impacts include the promotion of growth, eradication of poverty, reduction of income inequality, and abatement of carbon emissions. Project costs are defined relative to their opportunity cost, that is, the benefit foregone by not using the same resources for the best available alternative investment. Discounted project benefits and costs are valued using shadow prices, which are defined as the increase in welfare resulting from a marginal change in the availability of goods and services or factors of production.

A variety of approaches may be followed to estimate shadow prices in the economic analysis of projects, depending on the data available.

At the most advanced level, shadow prices may be estimated using a dynamic macroeconomic optimization model of the economy. For example, a dynamic computable general equilibrium (DCGE) model is based on earlier classes of dynamic input-output models and linear programming turnpike models. DCGE models maximize output over time, subject to input-output production and resource constraints. The dual solution of the model generates a set of shadow prices for each product and resource for every year over the simulation horizon.¹³

Alternatively, shadow prices may be estimated individually, using methodologies that adjust observed market prices to reflect economic opportunity costs. In most cases, the analysis is conducted in domestic currency at the domestic price level. To this end, the border prices of exports and imports in foreign currency are converted into their domestic currency equivalent, using a shadow exchange rate that reflects the opportunity cost of foreign exchange to the country. The shadow exchange rate may differ from the market exchange rate due to a fixed exchange rate regime, import tariffs, quantitative import restrictions, as well as export taxes and subsidies.

In turn, the shadow prices of outputs and inputs in domestic currency may differ from their market prices due to additional distortions generated by government and private sector market participants. These include distortionary domestic taxes and subsidies (such as sales taxes) or the presence of noncompetitive market structures (such as monopolies or oligopolies). They also include externalities that are not (or only partially) internalized by the market, such as greenhouse gas (GHG) emissions.

Estimating the shadow prices of nontradable goods and services can be challenging. The valuation of nontradable material inputs is a multistep process that includes assessing market distortions, estimating upper and lower bounds for the shadow price of goods, and estimating the opportunity cost of goods based on demand and supply elasticities. For example, in the absence of a price for a given piece of land, putting a value on the land's alternative use may require imputing a price based on the net present value of land rental prices. Also, amid widespread unemployment, the valuation of the shadow wage rate requires an

¹² The discussion here is based on the following sources: Dang and Mourougane (2014); Tan and others (2001); Gollier (2015); Hamilton and Stöver (2012); Squire and van der Tak (1975).

¹³ In optimization theory, the solution to the dual problem yields the marginal contribution of each resource constraint to the objective function of the model, which is the shadow price of the corresponding resource.

estimation of the reservation wage, and different shadow wages need to be estimated for different skills, times, and locations.

In preparation for the 21st session of the UN Framework on Climate Change (UNFCCC) Conference of the Parties in Paris in December 2015 (COP21), considerable attention was devoted to the economic rate of return (ERR) analysis of climate mitigation and adaptation projects. Since prices on existing partial carbon markets may equal the social cost of carbon only by coincidence, how one country chooses among various GHG-emitting projects may diverge from the maximization of world welfare. In particular, if the market price of carbon is lower than its shadow cost—but the switching price of carbon (that is, the price at which the country finds two alternative projects to be of equal value) lies between them—the country will choose the high-carbon project while the world would be better off if the country chose the low-carbon one, thus generating a financing gap. On the other hand, if the switching price does not lie between the market price and the shadow cost of carbon, then country preferences and world preferences coincide.

At the same time, considerable attention has been devoted to estimating the shadow discount rate under conditions of uncertainty, including environmental uncertainty. Under the assumption that the marginal net benefit of a project is smaller when the recipients of those benefits are richer, in a growing economy, future benefits are valued less than present benefits. This is because it is believed that recipients will be richer in the future, as development proceeds. Estimates of the elasticity of the marginal utility of consumption generally range between 1 and 2. As a result, estimates of the shadow discount rate generally range between 1 and twice the expected rate of growth of per capita consumption.

In theory, uncertainty about future consumption growth implies rising uncertainty about the future marginal utility of consumption. This in turn implies that the shadow discount rate should decline over time. The occurrence of shocks (such as natural disasters) has an ambiguous effect on the long-term, risk-adjusted discount rate because it reduces the risk-free rate, and potentially increases the risk premium. This may yield an increasing term structure of risk-adjusted discount rates if the asset's beta is larger than two times the relative risk aversion.¹⁴ Such a structure would prompt more investment in projects with benefits in the distant future, if the investment project opportunity set contains enough projects with a small beta. This in turn would favor investments in climate adaptation and, more generally, in projects that meet standards of resilience to natural disasters.

After the ERR for a project has been calculated, the policy efficiency of investment can be estimated as the ratio of ERR to total public capital invested.

¹⁴ The term “beta” is a measure of the volatility (or systematic risk) of a security in comparison with the market as a whole.