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Infrastructure Development

Reducing the Infrastructure Gap through Pension Fund Investments

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Abstract

This paper deals with the question of how the PIDG could incentivize pension funds to invest in infrastructure projects in developing countries and therefore contribute to close the infrastructure gap. First of all, the importance of infrastructure will be highlighted. In a second step, the characteristics of infrastructure investments, pension funds and PIDG are elaborated. In a third step, two best practices examples of Sweden and Nigeria are analyzed. This exhaustive analysis demonstrates that on one hand pension funds are rather risk-averse and on the other hand some opportunities for infrastructure investment would exist. Therefore, the challenge is to match and convince pension funds of the relevance of infrastructure investments in developing countries. These insights lead to three recommendations for the PIDG. So, first, PIDG could use different communication channels, as an investor brochure, second, it could establish a fund with the concept of blended finance and third, it could provide various de-risking mechanisms.

Keywords: Pension Fund, PIDG, Investment, Infrastructure, SECO

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Note: At the wish of different interviewees, interviews have been anonymized and the names of the firms and pension funds removed.

List of Abbreviations

DevCo	-	Infrastructure Development Collaboration Partnership
DFI	-	Development Finance Institution
DFID	-	UK Department for International Development
ECA	-	Export Credit Agencies
FDI	-	Foreign Direct Investment
FMO	-	Dutch Development Finance Company
GDP	-	Gross Domestic Product
GuarantCo	-	GuarantCo Limited
HNWIs	-	High Net Worth Individuals
IEA	-	International Energy Agency
IFC	-	International Finance Cooperation
ILX	-	Impact Loan eXchange
InfraCo	-	InfraCo Limited
MDB	-	Multilateral Development Banks
MDGs	-	Millennium Development Goals

NIIMP	-	Nigeria Integrated Infrastructure Master Plan
OECD	-	Organisation for Economic Cooperation and Development
PIDG	-	Private Infrastructure Development Group
SDGs	-	Sustainable Development Goals
SECO	-	Swiss State Secretary for Economic Affairs
SIDA	-	Swedish International Development Cooperation Agency
TAF	-	Technical Assistance Facility
UN	-	United Nations
UNCTAD	-	United Nations Conference on Trade and Development

1 Introduction

1.1 Problem-Setting and Research Question

A country's infrastructure is being considered as a key factor of growth and development. Therefore, fostering the industry, innovation and infrastructure of very country has been defined by the United Nations as one of the priorities within the Sustainable Development Goals. Especially in developing countries, those goals are of great importance for the future development of those countries. Traditionally, public investors have executed infrastructure investments, which was mostly the state. However, states often time face pressure on budgets and tax-raising capacity, which means that governments lack the means to finance publicly owned and operated infrastructures. In contrast, private investors face a low interest rate environment and are thus in need for low risk investment opportunities (Weber, Staub-Bisang et al., 2016, p. 1). Within such private investors, pension funds are especially attractive, as they manage worldwide around 11'000 Billion US Dollars. In countries such as Canada and Australia, pension fund investments have risen in the last years (Inderst & Della Croce, 2013). However, such a process has not been seen in developing countries. This outstanding pension fund investments is what the Private Infrastructure Development Group (PIDG) aims to change, under its mission to incentivize private sector participation in developing countries. Therefore the question states the following:

How can the PIDG incentivize pension funds to invest in infrastructure projects in developing countries?

With regard to the research question, it is especially interesting whether domestic or foreign pension funds are keener to invest in infrastructure in developing countries.

1.2 Research Design and Structure of the Paper

In order to answer the research question, primary and secondary research has been conducted. In addition to that, two best practice cases have been analyzed. Secondary research has been done by generating base knowledge of pension fund investments and infrastructure projects. The primary research in the form of expert interviews extended the base knowledge through professional opinions. The analysis of the best practice cases provided practical inputs. Ultimately, the knowledge gained from the research has been gathered in order to derive recommendations for the PIDG and thus to answer the research question.

In accordance to the research design, the paper structures as follows. In the second section the concept of infrastructure development will be presented to the reader. In the third section pension funds as potential investors will be analyzed. In the fourth section the PIDG will be presented in order to gain an overview on what the goals of the group are and how it operates. In the fifth section, the two best practice cases from Sweden and Nigeria will be presented. In the sixth section, the recommendations for the PIDG will be outlined. In the seventh section a conclusion will be drawn.

1.3 Definitions

This sub-section will provide the reader with definitions on terms, which will be used throughout the paper. Therefore, it makes sense to define the following terms.

1.3.1 Developing Countries

The UN has no established convention for what countries are defined as developed and developing. Nevertheless, the UN classifies all countries either as developed economies, economies in transition or developing economies. However, this designa-

tion is only intended for statistical purposes. Hence, no judgment about the state reached by a country in the development process is being made (United Nations Statistic Division, 2018). The classification takes place according to the basic economic condition of a country. Even though some countries prevail characteristics of different classifications, the grouping has been made mutually exclusive. The geographical region in which developing countries lies are Africa, East Asia, South Asia, Western Asia, and Latin America and the Caribbean (United Nations, 2018, p. 139). Consequentially, when speaking of developing countries, the term encompasses countries with a low economic condition and which are not yet in transition.

For the purpose of this country, developing countries are defined as all the countries, which are not considered by the UN classification as economies in transition or developed economies (United Nations, pp. 89 – 130).

1.3.2 Infrastructure

Infrastructure is a term, which can have a broad meaning. The OECD (2002) for example defines infrastructure as "the system of public works in a country, state or region, including roads, utility lines and public buildings". Weber et al. (2006, p. 13) apply a broader definition. They distinguish between economic infrastructure and social infrastructure. Economic infrastructure further gets divided into transport, energy, water, waste and communication. On the other side, social infrastructure is comprised of the health, education, sport, public administration and security category.

For the purpose of this paper, the broader definition by Weber et al. (2006, p. 13) will be applied in order to emphasize the importance of infrastructure in various sectors and not only in public works as defined by the OECD.

1.3.3 Infrastructure Investing

When speaking of infrastructure investing, one has to be aware that there exist different approaches to invest in infrastructure. Generally, a distinction can be made between listed and unlisted investment opportunities, due to their distinct investment profiles.

Weber et al. (2006, p. 69) divide listed infrastructure investment opportunities into direct investments in listed infrastructure with equity and debt and listed infrastructure investment funds. This distinction and further sub-distinctions can be seen in figure 1. A similar division is made with regard to unlisted infrastructure investments. In this context, a division is done between direct infrastructure investments and infrastructure investment funds. This distinction and further sub-distinctions can be seen in figure 2.

Direct investments in listed infrastructure securities (equity and dept)	Listed infrastructure investment funds
• Shares of companies that own and/or operate infrastructure assets (e.g. utilities or toll road operators) or that are otherwise active in the infrastructure sector	• Open-or closed-ended funds/indices that invest in individual listed infrastructure project companies (this is relatively rare in ist purest form) and/or in "infrastructure operating or service companies"
• Bonds of the same companies	• Funds that invest in unlisted infrastructure assets/and/or "infrastructure companies" or "infrastructure debt (bonds or loans)"
	• Hybrid funds that invest in listed and unlisted infrastructure assets, "infrastructure companies" or infrastructure dept (bonds and loans)

Figure 1. Direct investments in listed infrastructure securities and listed infrastructure investments funds

Direct infrastructure investments	Infrastructure investment funds
• Direct investments in individual unlisted infrastructure assets/projects or "infrastructure companies" via equity or dept	• Open-ended (evergreen, periodically opened for investors) and close-ended investment structures or funds that invest in individual unlisted infrastructure projects, operating or service companies via equity or dept • Hybrid funds that invest in individual listed and unlisted "infrastructure projects, operating or service companies" via equity or dept • Infrastructure funds of funds, which invest in closed-ended (and in some cases also open-ended) infrastructure funds (equity only)

Figure 2. Direct infrastructure investments and Infrastructure investment funds

2 Infrastructure Development

This section will give the reader an overview on infrastructure development with a focus on developing countries. Therefore, in a first step, the infrastructure gap and corresponding infrastructure investment gap will be explained. In a second step, infrastructure as an asset class for investors will be outlined. Finally, in a third step, the various possibilities on how to finance an infrastructure project will be discussed.

The international community acknowledges that efficient, reliable and affordable infrastructure is crucial for economic growth, social well-being and sustainable development of the world (Kirkpatrick et al., 2006, p. 144). A study of Limao et al. (2001) confirms the importance of infrastructure on transportation costs, and therefore also for economic growth. Thus, the level of a country's economic development depends amongst other factors also on its infrastructure. The Sustainable Development Goals also take into account the importance of infrastructure, with an emphasis in SDG number nine, which calls for "*resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*" (Casier, 2015).

Developing countries have a huge lack in infrastructure, mainly in the sector of transportation, water, sanitation and waste management (Interview B, 17.04.2018). This shows that the demand for primary infrastructure is increasing more quickly in developing countries (Global Development Finance, 2004, p. 150). On the one hand, infrastructure projects are important in urban areas, especially as most of the mega-cities are in developing countries. On the other hand, infrastructure projects in developing countries are also crucial in rural areas in order to enable farmers to find a way out of the subsistence agriculture (Interview B, 17.04.2018). Furthermore, infrastructure is essential to attract foreign direct investment (FDI), to expand international trade and to achieve long-term investments (Global Development Finance, 2004, p. 145). In addition, besides long-term benefits of infrastructure projects, in the short-term jobs are being created (McKinsey & Company, 2016, p. 12). Hence, the socioeconomic rate of return of infrastructure projects is estimated to be around 20% (McKinsey & Company, 2016, p. 12). Taking into account that Africa's infrastructure is one of the least developed in the world, it is no surprise that the lack of infrastructure clearly hinders the economic development of the continent (Shendy et al., 2011, p. 11). Generally speaking, in many countries, there is a lack of sufficient infrastructure in order to tackle poverty or to foster economic growth (Kirkpatrick et al., 2006, p. 144). Hence, the world faces a huge infrastructure gap, which is especially prevalent in developing countries. Consequently, there is an infrastructure gap around the world, which is important to overcome with regard to global economic development.

2.1 Infrastructure Gap and Infrastructure Investment Gap

As mentioned above, it is crucial to overcome the infrastructure gap. Otherwise, economic growth will slow down and international competitiveness will decrease (Della Croce et al., 2011, p. 15). This is notably important in regard to developing countries

because their infrastructure is largely underfinanced, which constrains their economic growth and makes them more vulnerable (Norges Bank, 2015, p. 6).

Nowadays, about 2.5 trillion US dollars are being invested in infrastructure projects, such as transportation, water, power or telecom systems. According to a report by McKinsey and Company (2016, p. 8) However, this amount is not sufficient (McKinsey & Company, 2016, p. 8). McKinsey & Company (2016, p. 15) estimates that from 2016 to 2030 3.3 trillion US dollars per year must be invested in infrastructure in order to keep pace with the projected economic growth. Thus, there is not only an infrastructure gap in terms of missing infrastructure worldwide, but also an infrastructure investment gap of more than 800 billion USD per year (Casier, 2015). The largest part of these investments will be made in emerging economies, such as China. In addition, investments will also be necessary to mitigate the effects of climate change (McKinsey & Company, 2016, p. 17). The International Energy Agency (IEA) estimates that by 2050, about 45 trillion USD will be needed for climate change mitigation (Della Croce et al., 2011, p. 15). 10 to 15 percent of the required infrastructure investments can be used to make the infrastructure more sustainable, through lower emissions, higher efficiency and resilience to climate change (Norges Bank, 2015, p. 5). In addition, according to UNCTAD, to achieve the SDGs, principally in regard to developing countries, a further 1.1 trillion USD must be invested annually. Hence, the amount of the infrastructure investment gap triples (McKinsey & Company, 2016, p. 8, p. 17). This leads to an infrastructure investment gap of 1.9 trillion USD per year. However, PIDG management (19.04.2018), points out that "*the issue at the moment is the lack of projects, not the lack of capital.*" This means that at the moment, not only the necessary investments, but also well-structured, investable projects are missing. This two-fold problem of missing investment and missing projects in the pipeline is important to consider when aiming to overcome the infrastructure gap.

2.2 Infrastructure as an Asset Class

The previous has section has shown the importance of infrastructure because it offers relevant services to the public. Nevertheless, those services come at its price, as infrastructure projects are capital intensive and need concrete assets, which have to be maintained over a long period. Moreover, the environment of infrastructure assets is marked by natural monopolies, government regulations and concessions (Della Croce et al., 2011, p. 15). This sub-section will touch upon those specialties of infrastructure as an investment opportunity. Therefore, it is divided into two parts. The first part will give on overview on the special characteristics that infrastructure assets prevail. The second part will ultimately present the different sources of infrastructure funding amongst which pension funds are a part of.

2.2.1 Characteristics of Infrastructure Assets

In the context of infrastructure investments, a primary distinction is being made with regard to the risk level of a particular infrastructure investment at a particular development stage. A project with is in its development stage is labeled as a "greenfield" investment, or primary project. A project, which is in its operational phase is being labeled a "brownfield" investment or secondary project. Investors tend to assume the risk of a greenfield investment to be much higher than the one of a brownfield investment (ZURICH, 2017; Weber et al., 2016, p. 21). In developing countries, where these is a high demand for investments in primary care and utilities, funding for such infrastructure investments is scarce. This is due to their status as high-risk greenfield investments (Norges Bank, 2015, p. 10; Weber et al., p. 2). Apart from this primary distinction between greenfield and brownfield investments, there exist other characteristics of infrastructure as an asset class, which can present challenges to infrastructure financing. Those characteristics will be presented as follows (OECD, 2015, p. 8; Weber et al. pp. 11–12):

Key public service

Infrastructure assets meet key public requirements, which are of need in everyday life. Examples of such requirements are the provision of water, energy, mobility, communications etc. Therefore, owing to their key functions, demand for most infrastructure assets is inelastic and independent of industry cycles or economic performance.

Capital intensity and longevity

Infrastructure assets require a high amount of capital, especially in the early phase of a project. In addition to the high up-front costs, the assets prevail a lack of liquidity and a long asset life. The lack of liquidity demonstrates itself especially in the early phases when no positive cash flows are being generated, due to the high initial costs. Nevertheless, once in the operational phase, regular and stable cash flows can be generated. However, depending on the infrastructure class, some don't generate cash flows at all.

Economies of scale and externalities

Infrastructure classes such as highways or water supply exhibit increasing return to scale and comprise oftentimes natural monopolies. Such a situation of a monopoly leads to very high barriers for market entry. Thus, the competitiveness for those markets is low. Furthermore, infrastructure can generate social benefits for the economy as a whole. However, the cost for the usage of the infrastructure cannot always be covered by the owner and thus creates positive externalities.

Heterogeneity, complexity and the presence of a large number of parties

A characteristic, which seems especially interesting, is the heterogeneity of the infrastructure assets. Every infrastructure project is unique, not at least due to the complex legal arrangements, which are involved with infrastructure investing. What makes those arrangements a complex undertaking is the large number of parties in-

volved. Those two factors – the heterogeneity and the complexity of infrastructure projects make such investments less liquid and thus less likely to sell them.

Opaqueness

Infrastructure assets are considered opaque investments, due to their diverse structures. Again, this has something to do with the previous mentioned characteristic of the complexity of those projects. Oftentimes, investors are reluctant to invest in infrastructure project due to the fact that the market lacks information necessary to assess the risks or that the market is too scattered, which creates uncertainty. Incalculable risks and uncertainty are market conditions, which are not attractive for investors.

2.2.2 Sources of Infrastructure Funding

This sub-section provides an overview on different sources of infrastructure funding next to external and domestic pension funds (see section 3). Therefore, sources of infrastructure funding will be presented along the three categories "public sector financing", "domestic financing" and "external financing".

Public Sector Financing

Traditionally speaking, the public sector has been the main source of the funding for infrastructure projects (International Development Finance Club, 2014, p. 8). However, already during the 1980s and early 1990s, it was difficult to maintain the existing infrastructure and to build new infrastructure due to constraints on public finance cumulated with an increasing demand for social expenditure (Della Croce et al., 2011, p. 16). Hence, an increase in infrastructure investment will require cuts to other important programs or to increase the tax rate, which would cause long-term macroeconomic disturbances. Therefore, attracting sources of funding like external and/or private sectors to complement government investment efforts is essential (International Development Finance Club, 2014, p. 8). A concept, which has gained im-

portance within infrastructure funding, has been Public-Private-Partnerships, which is a collaboration of the public with the private sector. Within those types of partnerships, the private partner helps to finance, build, and/or operate publicly owned assets (Leruth, 2009, pp. 223–224) (see section 2.3.1 for further information PPPs).

Apart from government investments in infrastructure, *national development banks* present also an option of credit source. Development banks are public entities, which finance projects that the private sector is not able to undertake, due to the possible risk or the amount of investment needed. This function of development banks also applies to infrastructure projects. Advantages of development bank investments are that they offer country risk mitigation, below-market interest rates and longer terms and repayment schedules. In addition development banks often pair their investments with technical assistance to ensure long-term success of the project (International Development Finance Club, 2014, p. 8).

A mechanism, which development banks often use is the pooling of their investments with investments from other development banks. Those "syndicated loans" offer the advantage of risk-sharing among the investors (International Development Finance Club, 2014, p. 8). Even though development banks seems to be a final solution for the lack of public investment, one has to bear in mind that those types of banks should not compete with commercial banks as they could create distortions into the financial markets. Therefore, development banks should only provide investment if the private sector has been failed to attract (International Development Finance Club, 2014, p. 8).

Another source, which plays a greater role within infrastructure funding nowadays are so called Export Credit Agencies (ECAs). Export Credit Agencies aim to support domestic business by providing a cover either through an insurance to the exporters or bankers or through a direct guarantee of payment to the bank covering a loan to a borrower from overseas in order to finance the supply of goods and services in case of a default in payment by the buyer or the borrower under a loan agreement (Drummond, 2008). For FDI (see external financing below), for example, ECAs offer

insurance in order to give the investor confidence and to facilitate investment in high impact areas like infrastructure development (International Development Finance Club, 2014, p. 9). Hence, the use of ECA seems helpful to exporters in markets where the political situation is riskier. In such markets, the ECAs have the ability provide a cover when commercial borrowers are not willing to take political risks (Drummond, 2008).

Domestic Financing

The investment capacity of the sources of infrastructure funding depends on the general economy of a country and on its bank penetration. In developing countries, financing infrastructure projects through domestic financing poses a great challenge, due to the low bank penetration in most of those countries. This issue becomes apparent when considering that in comparison to the 89 percent of adults who have a bank account in developed countries, only 41 percent have one in developing countries (Demirguc-Kunt and Klapper, 2012, p. 2).

Commercial banks, apart from development banks, insurance companies and pension funds are considered as important sources for the acquisition of capital. The role of a commercial bank does not end with the provision of capital. It can also include consultation and support for a project or risk analysis etc. (Weber et al., 2016, pp. 306–307). Nevertheless, Della Croce et al. (2011, p. 15) point out that the sources of capital by commercial banks have limited credit growth and may further be constrained by new regulation, such as Basel III, in the future. In developing countries the limits of the commercial bank sector is even more visible, as mentioned above.

Another source for infrastructure funding can also be private capital provided by *high net worth individuals* (HNWIs). It is estimated that the assets of the HNWIs value around 42.7 trillion USD, which equals to 68 percent of the world GDP (Merrill Lynch Wealth Management and Capgemini, 2011, p. 4). Only a small percentage share of this private capital would have great effects for infrastructure development.

External Financing

The category external financing encompasses all foreign capital. Especially after the global financial crisis after 2008 the amount of foreign capital decreased drastically. This reduction in assets has especially affected the developing countries. Therefore, and for future foreign investment, ensuring political and macroeconomic stability, putting in place transparent institutions and an effective legal and regulatory framework is of importance (International Development Finance Club, 2014, p. 10). Especially *foreign direct investment* (FDI) shows great potential in developing countries, as their domestic financial markets are underdeveloped and their access to international debt market is limited. However, the use of FDI as a source of infrastructure finance is a new development in emerging economies (International Development Finance Club, 2014, p. 11).

Another source of external finance are the *Multilateral Development Banks*. They operate similarly to the national development banks (see public financing above), with the difference that they prevail a transnational ownership structure with a pan-regional perspective, which provides a bridge across a variety of market players (International Development Finance Club, 2014, p. 11).

2.3 Financing of Infrastructure Projects

When considering the optimal financing instrument for an infrastructure project, one has to be aware that different phases of an infrastructure project involve different risk and return characteristics. Therefore a closer look on how infrastructure projects can be divided into different project phases is necessary. Accordingly, this section provides the reader with an overview on the different phases of an infrastructure project and the corresponding financial instruments, which are needed in each phase.

With regard to the phases of an infrastructure project, scholars provide different classifications (see Ehlers, 2014, pp. 5 – 20; Weber et al., pp. 312–325) Due to the limited

scope of this paper a broader classification in three phases has been chosen. Hence, an infrastructure project can be divided into the planning phase, the construction phase and the operational phase.

2.3.1 Planning Phase

The planning phase is important in order to attract investments. Due to the fact that infrastructure bases on project finance, two contractual arrangements must be set into place in this phase. First, a self-contained entity (SPV) against which all legal contracts are written must be established. Second, contracts arranging the distribution among the parties included in the project (Ehlers, 2014, p. 6). The environment in which the SPV is incorporated and its complexities are illustrated in figure 3.

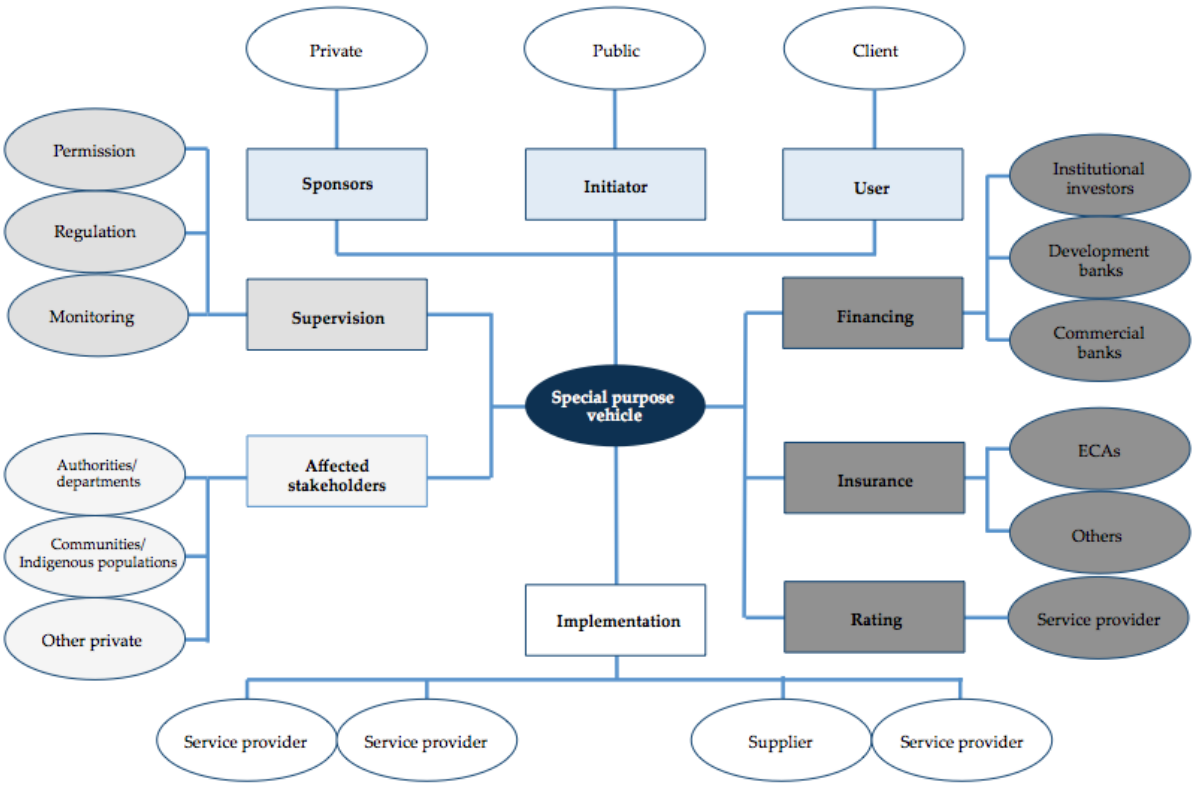

Figure 3. Environment of SPV

Through the creation of such a SPV, private forms of finance get more easily attracted due to the contractual pledging of cash flows to creditors and the distribution of risks among the parties involved in the project (Ehlers, 2014, p. 6).

The degree to which private investors are involved can vary along the continuum of simple management duties to complete private ownership. An efficient mechanism for the distribution of risk and returns are PPPs. How such a possible risk sharing can look like is illustrated in figure 4 (Leruth, 2009, p. 232).

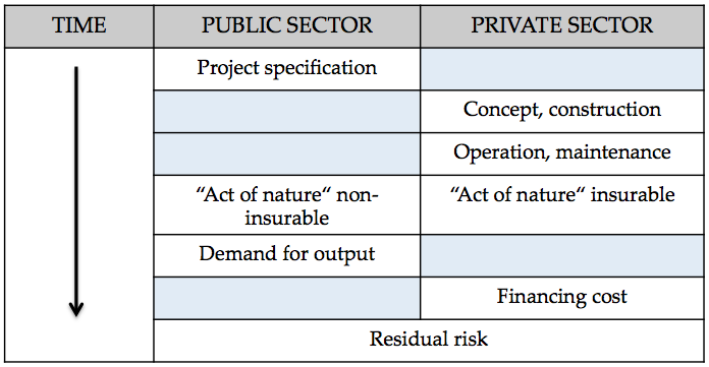

Figure 4. Possible risk sharing of PPPs

The two decisive advantages of such partnership are the efficiency gains as well as additional sources of capital. Efficiency gains are being reached in contrast to purely public procurement, which in most parts of the world is characterized through bureaucracy and thus inefficiency (Ehlers, 2014, p. 6). Nevertheless, PPPs also prevail disadvantages. Leruth (2009, pp. 231–235) discusses principle-agent problematic, which can happen within the PPP mechanism. This is due to the reason that the public sector as the initiator of the project and as the one who has more decision-making power has less information as the public partner who is more actively involved with the specifics of a project.

With regard to the financing instrument needed in the planning phase it is of great importance to find *equity* investors. Due to the fact that such investors need a lot of expertise, they are often construction companies or governments. However, equity investments are sometimes also done through infrastructure funds or direct investment by pension funds. Using *debt* as a financing instrument, investors consist mostly of banks. Banks, be that development or commercial banks, use oftentimes syndi-

cated loans in order to minimize the risk in the capital-intensive planning phase (Ehlers, 2014, p. 5). Other important players in this phase are the rating agencies and ECAs, whose ratings resp. insurance are important for the decision-making process of debt investors and ECAs (Ehlers, 2014, p. 5).

2.3.2 Construction Phase

In the construction phase the risks are quite high due to the complexities involved in infrastructure projects, the possibility of mismanagement and an occurring optimism bias. The optimism bias is the effect that when one looks at the budget of the beginning of a project and the budget actually needed in the construction phase, the distribution is oftentimes extremely skewed. The budget figures at the beginning and the budgets actually needed, then the distribution is extremely skewed. There exists large number of projects that have become many times more expensive than the original plan (Interview B, 17.04.2018). Therefore highly specialized and technical expertise and monitoring capabilities are crucial in this phase. The problem is that most investors do not possess such expertise or monitoring skills or simply don't want to invest money on building up such skills. Consequently, enabling equity or loan financing becomes difficult as it is hard to find investors or lenders for this phase (especially in developing countries) (Ehlers, 2014, pp. 10–17). Nevertheless, in recent years new equity investors have emerged, such as insurance companies and pension funds. However, due to the high risk in this phase, pension funds are not willing and due to regulatory restrictions not able to undergo risky direct equity investments.

At this stage of an infrastructure project, as already mentioned in the previous subsection, commercial bank loans and development bank loans are necessary generate the capital needed. Ehlers (2014, pp. 12–13) sees bank loans as a key source in the initial phase, as they are able take on risks with their loans. However, over the long lifecycle of a project, the risks are lowering. A positive side-effect of the banks taking risks providing a loan is that they themselves ensure that the project is being con-

stantly monitored. This act improves the structure of a project and can attract potential new investors, which have less monitoring possibilities (Ehlers, 2014, p. 13).
Development banks take on a similar role as in the previous phase. The syndicated loans, which have been mentioned in the previous section, are used as an extension of bank loans, due to the fact that they present a major share of bank loans financing in terms of volume. It is important to mention at this point that syndicated loans have a success in developing countries and have even surpassed the level of advanced economies (Ehlers, 2014, p. 14). Nevertheless, it has to be mentioned that the loans which development banks can provide are naturally limited and therefore most of the time they cannot or are not supposed to be the main financer (Ehlers, 2014, p. 16).

2.3.3 Operational Phase

This last phase of an infrastructure project is different from the previous two phases. At this stage, a project start to generate positive cash flows, which has not been the case in the other phases, due to project complexities and the accompanied risks. At this stage, bond financing is the most suitable financing instrument due to income securities. Furthermore, bonds provide an appropriate instrument at that stage when countries the need for a local bond market seems necessary in order to allow bond financing to flourish at this phase of a project and to allow a greater liquidity of infrastructure investments.

3 Pension Funds as Investors

This section focuses on pension funds as institutional investors for infrastructures. Pension funds are an interesting source of investment, as they manage a huge amount of assets. At the end of 2016, assets worth 38 trillion US dollars were managed by funded and private pension funds in the OECD area (OECD, 2017, p. 5, 16). That was the highest level ever. The amount of pension assets which are prevalent in a country depend on whether participation in a pension plan is mandatory or voluntary (OECD, 2017, p. 8). The first sub-section outlines aspects for pension funds, which define whether they are able or willing to execute investments. The second sub-section looks at risks, which pension funds face when deciding to invest in a developing country. The third sub-section in contrast looks at the opportunities for pension funds when investing their assets. In order to attain more insight knowledge on Swiss pension funds and their investment decisions, two interviews have been conducted with two different Swiss pension funds (Interviews F & I).

3.1 Determinants for Pension Fund Investments

This sub-section outlines factors, which determine investment actions by pension funds. As previously already argued in another context, sources apply various differentiation criteria (Amadou, 2017, p. 17 – 32; Alonso et al., 2015, pp. 9–10). Therefore, the following determinants are just one way of distinction among many.

3.1.1 Pension system's environment, design and performance

The amount of money a pension fund has available for investments depend on three factors, namely the environment in which the pension fund is incorporated, the design of the pension fund and its performance. The environment within a country

plays a great role for the pension systems. In this context, Sub-Saharan Africa has a favorable environment, as the old-age dependency ratio (proportion of elderly over working population) is low. Hence, the continent has scope to develop their pension system. However, a huge problem in Sub-Saharan Africa is the informal sector, which workers do not contribute to the pension system (Amadou, 2017, p. 19).

The design of a pension fund can affect the level of assets available for investment. The World Bank (2008, pp. 2–3) defines three groups of pension systems:

- A non-contributory "zero pillar" (e.g. in the form of a democrat, social pension, or general social assistance typically financed by the local, regional or national government), fiscal conditions permitting, to deal explicitly with the poverty alleviation objective in order to provide all of the elderly with a minimal level of protection. This ensures that people with low lifetime incomes are provided with basic protection in old age, including those who only participate marginally in the formal economy.

- A mandatory "first pillar" with contributions linked to varying degrees to earnings with the objective of replacing some portion of lifetime pre-retirement income. First pillars address, among others, the risks of individual myopia, low earnings, and inappropriate planning horizons due to the uncertainty of life expectancies, and the lack or risks of financial markets.

- A mandatory "second pillar" that is typically an individual savings account (i.e. defined contribution plan) with a wide set of design options including active or passive investment management, choice parameters for selecting investments and investment managers, and options for the withdrawal phase.

Finally the performance of a pension fund works as an indicator of the ability to finance infrastructure. The better the performance of the fund, the greater the financing abilities and the greater the sustainability of pension funds.

3.1.2 Governance, regulation, and supervision of pension funds

The governance, regulation and supervision of pension funds are internal limitations, which are being put in place due to the fiduciary duty of pension trustees and the objective of the pension fund to deliver the pensions. In the both of the interviews F & I, interviewers emphasize their duty to generate profits in order to pay back the pensions (Interview E, 20.04.2018; Interview I, 09.04.2018). It has to be acknowledged that different types of pension funds have different objectives, motivations, investment requirements and guidelines. Those guidelines can be defined internally acknowledging state regulation.

3.1.3 Policy framework for investment in infrastructure

State regulation, which set a limit to pension fund investment to infrastructure varies across countries. For example, a third of the countries analyzed in the OECD (2014) annual survey of investment regulations of pension funds do not allow pension funds investment in private investment funds or direct loans. On the other hand, although the majority of the countries that allow investment in private bonds that could be infrastructure bonds, the limit is eventually almost always lower than for holdings of government bonds. In terms of investment in shares, the majority of countries do not allow investment in unlisted instruments and have limits for quoted assets (Alonso et al., 2015, p. 12). In regions where there are looser regulations investing is greater. This holds true especially for Latin America, where 2.6 percent of the total pension fund portfolio is in infrastructure (OECD, 2014 p. 5).

The examples above show that national regulations or policy frameworks greatly determine the investment of pension funds in infrastructure.

3.2 Risks for Pension Fund Investments

Investments always carry potential returns, but also risks with them. Any investor, be it the public, private or the institutional sector, has to assess those risks when outlining an investment. Acknowledging the risks involved, the investor can ultimately use risk mitigation in order not to undergo incalculable threats to investment.

In general, infrastructure projects in developing countries are more complex and considered to be riskier. However, the risks vary depending on the country, sector and project (Norges Bank, 2015, p. 7; 21, p. 24) and can be separated into different categories according to the source (OECD & World Bank, 2015, pp. 14–18; World Economic Forum, 2015). For the three following categories: economic risks, political and regulatory risks and technical risks.

3.2.1 Economic risks

First of all, infrastructure investments are sensitive to economic risks. The economic environment can change due to macroeconomic or business variations, as inflation, real interest rates, exchange rate fluctuations, shifts in demand or debt maturity (OECD & World Bank, 2015, p. 15). Moreover, local currency fluctuation through tariffs and user fees also occur (Norges Bank, 2015, p. 2). Furthermore, in order to attract foreign investment, a significant level of capital market development is necessary. However, in most of the cases, domestic capital markets in developing countries are not as developed and the investor base is rather small (Norges Bank, 2015, p. 2).

3.2.2 Political and regulatory risks

Second, there are also political and regulatory risks. For example, if a government decides to change its policies or regulations, infrastructure projects will be impacted (OECD & World Bank, 2015, p. 15; Interview C, 17.04.2018). According to Interview A (17.04.2018), a precondition would be to invest only in countries with a democratic regime, as a regime change is less likely to occur in democracies and the regulations are more reliable. Moreover, the infrastructure project must be supported by the ex-

isting legal framework of the country (Interview A, 17.04.2018). Ineffective rule of law and a high level of corruption lead to a risky environment for investors (Norges Bank, 2015, p. 7) because there could be a lack of political commitment in the long term (Della Croce et al., 2011, p. 24). Another risk are weak regulatory standards on infrastructure assets, which are not a favorable condition for the investment environment (Norges Bank, 2015, p. 2; McKinsey & Company, 2016, p. 8). So, regulatory issues and breach of contracts are relevant concerns for investors (Norges Bank, 2015, p. 7). Therefore, poor governance and expropriation risks constitute a challenge to attract investors (Norges Bank, 2015, p. 8). The political risks are difficult to account in infrastructure finance because they are very subjective and hard to quantify (OECD & World Bank, 2015, p. 15).

3.2.3 Technical risks

Last but not least, there remain some technical risk, mainly in regard to the project itself. Most of the projects in developing countries are greenfield projects and therefore face different risks than brownfield projects (Norges Bank, 2015, p. 13). Mismanagement and an optimism-bias, which means that in almost all cases the project is more expensive in the end than initially expected or planned, play a crucial role (Interview B, 17.04.2018). Especially in developing countries, there is also the possibility that a project will never be finished or that the contract will be cancelled (Interview B, 17.04.2018; Interview D, 19.04.2018). In addition, other technical risks concern the project complexity, skills of the manager, construction and technology (OECD & World Bank, 2015, p. 15). Also, the market could be fragmented over various level of governments, which in turn would lead to an ambiguity on investment opportunities. Moreover, there remains the possibility that the investor doesn't have the expertise in the infrastructure sector and only has a short-term view. Last but not least, there are risks of a lack of transparency in the infrastructure sector, a negative perception of the infrastructure value in general, not enough studies on the performance

of infrastructure projects and missing social acceptance (Della Croce et al., 2011, p. 24; Interview C, 17.04.2018).

For all these reasons, infrastructure investment opportunities seem to be quite risky. Therefore, investors with little experience in this kind of markets often choose an indirect investment route, as for example through multilateral development banks (Norges Bank, 2015, p. 2). Because of the risks mentioned, Swiss pension funds, seem to not be so eager to invest in infrastructure projects in developing countries as they have quite a conservative attitude (Interview E, 20.04.2018).

3.3 Opportunities for Pension Fund Investments

Institutional investors, amongst with are pension funds, manage 38 trillion USD. Public pensions and superannuation plans, for instance, manage 11 trillion USD assets (McKinsey & Company, 2016, p. 33). The challenge is to connect these investors seeking investment opportunities with the infrastructure projects needing capital (McKinsey & Company, 2016, p. 27). Thus, pensions funds could play a more active role in reducing the infrastructure gap by providing capital, financing long-term, productive activities, supporting sustainable growth through green energy and infrastructure projects (Della Croce et al, 2011, p. 15). However, current estimates demonstrate that only one percent of pension funds worldwide are invested in infrastructure projects (Della Croce et al., p. 16). Nevertheless, the institutional investor sector is growing in importance, particularly in emerging economies (Della Croce et al., p. 17). Rothballer and Kaserer (2012, p. 95) even argue that there is a demand for infrastructure investing and that has been driven by the investors appetite for low-risk returns (in the operational phase) with little market correlation as well as the desire to match long-term liabilities and to protect against inflation.

Alonso et al. (2015, p. 4) also claim that literature cited different reasons for a greater future investment in infrastructure. Those reasons are: i) a fit between the long-term time horizon for infrastructure projects to mature and the pension fund portfolio; ii) infrastructure tends to operate like a natural, regulated monopoly, and there is no competition which might cause its asset value to fluctuate wildly; iii) there is a low correlation between the assets in infrastructure projects and all the other financial asset classes which normally track the vicissitudes of the economic cycle; (iv) it provides protection against inflation (as argued by Rothballer and Kaserer); (v) there is a good risk-return trade-off; and (vi) infrastructure asset has greater cash-flow stability when the project has matured.

In Switzerland, another factor, which is important to consider is that the interest rates are very low, hence pension funds have to look for other returns (ZURICH, 2017). Due to the fact that Swiss pension funds have a balance surplus and capital must be exported. For the next ten years – until the "baby-boomers" will retire – it makes sense to export capital from an economic perspective (Interview B, 17.04.2018). Until now, more than 3.7 billion CHF have been invested in infrastructure projects. Thus, infrastructure investments in developing countries are an interesting alternative for pension funds to export their capital (ZURICH, 2017). Moreover, investors investing in infrastructure projects in developing countries face higher risks, so they can expect higher returns than with investments in developed countries (Norges Bank, 2015, p. 2; Interview B, 17.04.2018). Furthermore, infrastructure investments in developing countries is an attractive possibility for long-term investments because they match the long duration of pension liabilities. In addition, investments in infrastructure projects are an opportunity to diversify the portfolio of pension funds (Norges Bank, 2015, p. 2; Della Croce et al., 2011, p.16; Interview B, 17.04.2018). For example, Canadian pension funds are looking at Spanish and Italian assets at the moment (Interview D, 10.04.2018). Moreover, according to the ILX infrastructure, assets in developing countries perform as well as other assets that pension funds would invest in (In-

terview E, 17.04.2018; Interview H, 11.05.2018). Actually, quite often the risk perception is much higher than the real risk (Interview H, 11.05.2018). As mentioned above, the construction phase is quite risky. For this reason, pension funds probably don't want to be involved during this phase. However, pension funds could get involved in the operational phase and gain returns from the steady flow of cash from these assets (Interview E, 17.04.2018). Recently, the demand for "Socially Responsible Investing" has been increasing, this could foster "green infrastructure" projects, as renewable energy, and attract pension funds to invest in infrastructure projects in developing countries (Della Croce et al., 2011, p. 18; Interview E, 17.04.2018; Interview G, 9.05.2018).

4 The Private Infrastructure Development Group

4.1 The Organisation: Origin and Mission

The Private Infrastructure Development Group (PIDG) is a public-private partnership organization that was established in 2002 at the initiative of different donor organisations, amongst which are the UK Department for International Development (DFID) and the SECO. Its main goal is to mobilise private sector investments for infrastructure projects in developing countries, by mitigating risks and overcoming obstacles (Hodges, 2009, p. 1). Moreover, they contribute importantly to reduce the infrastructure gap and to meet the SDGs (PIDG, 2017, p. 1). PIDG works mainly in low-income countries and fragile, conflict-affected states, in Sub-Saharan Africa, which makes 70 % of their business, and South and South-East Asia, which makes about 30 % of their work (Interview D, 19.04.2018).

PIDG was developed as a donor-financed group. Its members are the following: the UK Department for International Development, the Australian Government Department of Foreign Affairs and Trade, the Swiss Federal Department of Economic Affairs, Education and Research (SECO), the German KfW, the Netherlands Ministry of Foreign Affairs, the Norwegian Ministry of Foreign Affairs, the Swedish International Development Cooperation Agency, the Dutch FMO (Finance for Development), the International Finance Organization of the World Bank (PIDG, 2018, p. 1). Donor members, i.e. PIDG members, set their country, sector, investment policy preferences (Hodges, 2009, p. 2). PIDG members are part of the board and monitor the work, the operation framework and procedures and the strategy of PIDG, to make sure PIDG and its firms comply with their development goals (Hodges, 2009, p.1). Indeed, PIDG is accountable to its donor members' governments for what it does with their taxpayers' money, but also to the developing countries in which it is working. PIDG allows bilateral donors with smaller aid budgets to enhance their efficiency (Hodges, 2009, p. 1). Moreover, PIDG provides with a single and efficient interface their beneficiary countries and the private investors (Hodges, 2009, p. 3).

4.2 Operational Structure

By investing in small- to big-scale projects, between 3 to 800 million USD (Interview D, 19.04.2018), PIDG operates through six companies, that intervene at the different steps of the project process providing expert guarantees, as well as strategic, financial and practical support. These six companies can be divided in three buckets as figure 5 demonstrates (Interview D, 19.04.2018):

1) **Upstream technical assistance:** The *Technical Assistance Fund* provides assistance to the other PIDG companies through the identification of potential investment opportunities and through capacity building. *DevCo*, led by the World Bank Group's International Finance Corporation, is key to support financially the transactions formalization. Thus, it facilitates the private sector participation in infrastructure projects in developing countries (PIDG, 2016, p.1).
2) **Early-stage project development**: *InfraCo Africa* and *InfraCo Asia* both aim at facilitating the early-stage project development of infrastructure projects through private investments, respectively in Africa and in South and South-East Asia (PIDG, 2016, p.1).
3) **Credit facilities providing guarantees and debts instruments**: *GuarantCo* provides guarantees to lenders, banks and bond investors to finance infrastructure projects and to support local currency finance and thus, the development of local capital markets. The *Emerging Africa Infrastructure Fund (EAIF)* is a public private partnership to finance long-term debt for the construction and development of private infrastructure projects (PIDG, 2016, p.1).

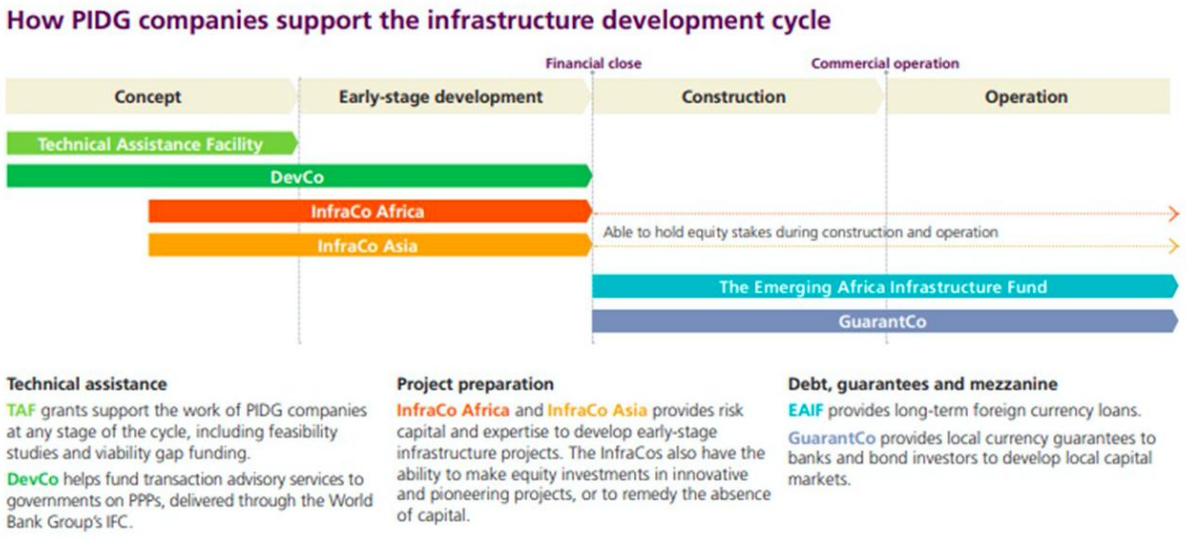

Figure 5. How PIDG support the infrastructure development cycle

Thanks to their solid expertise and experience, PIDG's companies overcome investment barriers, such as project development costs, long-term debt shortage, a lack of structured infrastructure projects for commercial investment or unstable local currency (Interview E, 18.04.2018). PIDG creates a climate of trust for private investors: Through the support of donors' financial contribution, it makes it safe and viable for private investors to invest in infrastructure projects in developing countries. For every 1 USD a PIDG member contributed, 17 USD of the private sector are mobilised for infrastructure projects (PIDG, 2016, p.1). Between 2002 and 2016, PIDG has mobilized 2.4 billion USD from donor organisations and 21.3 billion USD from private sector investors. This helped to complete 154 infrastructure projects, from which 222 million people benefited, and thanks to which 230,153 long-term jobs were created (PIDG, 2016, p.1).

4.2.1 Financing projects through the Cascade approach

PIDG finances projects in a sustainable manner with the cascade approach: First, commercial financing is used. If it cannot be mobilized cost effectively, then upstream reforms and market reforms on specific policies, regulations and institutions are implemented to address market failures. If that is still not enough to foster infrastructure projects' financing, then risk instruments and credit enhancements are de-

veloped with public resources to mitigate the remaining risks. Finally, if needed, the last possible step is to resort to public and concessional financing for the infrastructure projects, either with public financing, DFIs or MDBs (IFC, 2017, p.6).

4.2.2 Three Level Monitoring

To assess its development impact, PIDG ensures monitoring at three levels: first at the PIDG level, second at the level of each of PIDG's company, third at the project level (see table 1). Every third to fourth year, an independent review is organised by PIDG to assess the development impact and the performance of each individual PIDG company. At the project level, a "log frame", i.e. logical framework, is provided by PIDG to assess projects on a systematic basis across all the PIDG companies before and after each project. The project key development indicators that get monitored include the following indicators as demonstrated in table 1 (PIDG, 2013, p.9):

INPUTS Use of goods, services and products in the pre-project phase	**OUTPUTS** Goods, services and products resulting from the project implementation	**OUTCOMES** Short and medium-term effects of the project
Finance - Investments of PIDG companies - Funding of Technical Assistance **Additional support** - Project design - Policies - Regulations **Alignment of investments with national development plans of beneficiary developing countries**	**Mobilization of Investment** - From commercial entities & DFIs via equity or debt **Viable infrastructure** - Projects reaching financial close (operational projects)	**Improved access to infrastructure** - Existing services' improvement - Additional people reached **Employment** - Number of jobs created **Poverty reduction** **Gender inequality reduction** **Climate change mitigation** **Supply chain** - Opportunities and value generated for local businesses **Wider economic impact** - Fees & taxes received by the government **Demonstration effect** - Mobilization of capital through greater private commitment

Table 1. Project key development indicators

4.3 Potential of PIDG for Pension Fund Investments

DFIs, such as PIDG, are specifically designed to deal with the constraints of infrastructure projects investments. They can support long-term finance, mitigate the project risks, leverage and provide finance in a counter-cyclical manner (Spratt and Collins, 2012). PIDG reduces the risks specifically through a solid structuration and a good design of the projects, as well as through a close collaboration with the project developers, investors, beneficiaries and governments (Interview D, 19.04.2018, Interview E, 19.04.2018). PIDG, and especially its companies intervening in the early project phase, have developed an expertise in structuring properly and adequately projects for more than 15 years (Interview D, 19.04.2018). Moreover, PIDG is able to assume the risks in the projects development phase, as it is supported by donor organisations, such as SECO. Thus, the investment risks will be lower for private investors (Interview D, 19.04.2018, Interview E, 19.04.2018).

In opposition to other donor organisations, PIDG favours a "hands-off" approach, which leaves a lot of flexibility to the donors and the private sector (PIDG, 2008, p.18). This approach offers many advantages to firms willing to work with PIDG's companies: economies of scales; efforts' harmonization; non-bureaucratic and efficient management and public-private sector interface (PIDG, 2008, p.26). In addition, board members of each PIDG company deliver a specific high-range expertise, which helps to combine the expectations and requirements of the public donor organizations and private investors (PIDG, 2008, p.26).

Thus, pension funds might get interested in investing in the PIDG projects, but under certain conditions. Half of the projects supported by PIDG are telecom and power-supply projects. Indeed, in these sectors, costs are more easily recovered from users and returns are also more sustainable (PIDG, 2008, p.45). This might meet some of the pension funds constraints. To attract pension funds in investing in infrastructure projects, different conditions are required: good-structured projects; geographical

and sectorial diversification; investment flexibility (Interview D, 19.04.2018). Considering the risk-aversion of pension funds, direct investments in infrastructure projects alongside PIDG's companies does not seem like a valid option. However, other solutions could be imagined and are developed in the last section (see section 6).

5 Best Practices

Worldwide there are the more and more pension funds investing in infrastructure projects in developing countries. In the following two best practice examples are examined. First, the case of Sweden with an international pension fund investing in an Emerging Market Loans Fund will be analyzed. And second, the case of Nigeria with local pension funds investing in Nigeria will be discussed.

5.1 The Case of Sweden

In 2017, Sweden's largest pension fund, Alecta, which manages assets over 90 billion USD, invested 100 million USD in the NN-FMO Emerging Markets Loans Fund. This fund is managed by the Dutch development bank FMO and NN Investment Partners, which are investment managers based in the Netherlands (ImpactAlpha, 2018). Institutional investors, as for example pension funds, can invest through the fund in loans in renewable energy projects, agribusiness and financial institutions in developing countries (ImpactAlpha, 2018). All these three areas include important infrastructure investments. The objectives of the fund are to receive attractive financial returns while investing with a meaningful impact. Environmental, social and corporate governance (ESG) aspects are fully integrated in the investment and portfolio management (FMO, 2018b). The development impact is mainly accounted by the newly created jobs and the avoided CO2 emissions (Rust, 2018). Moreover, besides the social and environmental impact of the fund and the financial returns, the fund has also a moderate risk profile (FMO, 2018). With this fund, pension funds have the opportunity to invest sustainably, while securing financial returns (FMO, 2018; Alecta, 2017). The fund is able to generate high and stable returns through the relative high illiquidity premium (FMO, 2018b). Moreover, the Emerging Markets Loans Fund provides protection against rate sensitivity because of variable interest rates on the LIBOR and bps loans (FMO, 2018b). The fund mirrors loan investments of the FMO, which has strong capabilities and track records in emerging markets. So, it is an op-

portunity for investors, as for the pension fund Alecta, to invest alongside the experienced FMO in the fund (FMO, 2018b).

5.2 The Case of Nigeria

In February 2016, Nigeria's minister of power, works and housing, Babatunde Raji Fashola declared that "*pension funds should be used for building federal highways, hospitals, railways, ports, and other important infrastructure"* (Pension Funds & Alternative Investments Africa, 2016). The main reason for this statement is that over the next 30 years, Nigeria needs infrastructure investments in the amount of 2.9 trillion USD (Onwuka & Nwafor, 2018, p. 73). And based on the Nigeria Integrated Infrastructure Master Plan (NIIMP) estimates, the country needs to invest 127 billion USD to develop sufficient infrastructure in various sectors over the next five years (The Guardian, p. 1). However, neither the Nigerian government can cover these costs with fiscal operations nor Nigerian commercial banks and international banks are able to do so, as they are subjects to exchange fluctuations. Hence, involving Nigerian pension funds in infrastructure project financing with their assets of 5.9 trillion NGN (about 20 billion USD) appears as an ideal solution to close the infrastructure gap (Onwuka & Nwafor, 2018, p. 74). For instance, in 2016, Nigeria's pension funds allocated 2802 million USD in infrastructure funds and bonds (National Bureau of Statistics, 2017). Thus, the growing Nigerian pension funds sector is a clear opportunity to overcome its infrastructure gap (Onwuka & Nwafor, 2018, p. 74). Moreover, some African pension funds are already leading on investments into Africa. For example, South African pension funds had invested 897 million USD into Nigeria's growing economy. In Nigeria a robust legal and regulatory framework for the investment of pension funds in infrastructure projects exists, which regulates infrastructure projects through the Pension Reform Act and the Regulation on Investment of Pension Fund Assets (Onwuka & Nwafor, 2018, p. 77). The Pension Act 2014 states that the main objective of pension fund's investments is the safety and maintenance of returns on the invested amount (Onwuka & Nwafor, 2018, p. 77). Even if the promise of important profits

from investments in infrastructure projects is obvious, pension funds are reluctant (Onwuka & Nwafor, 2018, p. 81). There is a bias in the allocation of pension fund assets. Even if the regulatory framework allows pension funds to invest in infrastructure, the allocation of pension funds' assets allowed for investment in infrastructure is biased, as according to the regulatory framework, pension funds are only allowed to invest in infrastructure to a maximum of 5 % (Onwuka & Nwafor, 2018, p. 78). So, Onwuka & Nwafor (2018, p. 80) point out that in order to attract pension fund's investments the regulatory and institutional framework of pension funds must be reviewed. Nigeria's pension assets for infrastructural development need a better coordination between the government and the National Pension Commission and the Pension Fund Administration (Onwuka & Nwafor, 2018, p. 82). Hence, there are several other measures the Nigerian government could undertake: creation of a fiscal structure with tax incentives for pension funds investing in infrastructure projects, establishment of bonds for infrastructure project that are backed with government guarantees and active engagement with all stakeholders involved in infrastructural development in Nigeria (Nwachukwu, 2016, p. 1).

Besides the regulatory issues, pension funds are also reluctant in regard to the risks. In 2017, GuarantCo founded in partnership with the Nigerian Sovereign Investment Authority (NSIA) and with the support of PIDG's Technical Assistance Facility that provided a returnable grant of 15 billion NGN (50 million USD), a new company in Nigeria: InfraCredit. The goal of InfraCredit is to encourage and attract Nigerian pension funds to invest in local infrastructure projects via bonds. These investments should foster projects in different sectors such as water, transport or energy. As mentioned above, the reluctance of Nigerian pension funds and insurance companies to invest in infrastructure is significant. For this reason, InfraCredit aims to raise the trust level by securing the risks and providing sufficient credit quality to reach more risk-averse investors, such as pension funds. In fact, InfraCredit acts as a credit guarantor through the issuance of credit enhancing infrastructure bonds. For example,

they provide local currency guarantees to increase the credit quality and thus the credit rating of local currency debt instrument, such as corporate and project bonds (GuarantCo, 2017, p.1). By derisking the bonds, InfraCredit allowed the private sector to trust in infrastructure projects and to invest in them. InfraCredit supported for instance an investment bond issued by the power-supply firm Viathan that was looking for funds to develop and modernize a natural gas plant. In addition, thanks to InfraCredit, long-term financing in local currency could be secured for the projects loans. Moreover, a capital markets training was provided to Nigerian pension funds, so that they could understand the structure and risks specific to infrastructure assets (Interview D, 19.04.2018). The State was also involved to ensure that proper regulations were in place to allow pension funds to invest in infrastructure (Interview D, 19.04.2018). Several rating agencies verified InfraCredit's solvability and the rating agencies Agusto & Co and GCR granted InfraCredit with an AAA rating (Guardian, 2017, p.1). With InfraCredit, GurantCo achieves its two main goals: First, it provides guarantees to lenders. Second, it develops local capital markets, which can be achieved through market vehicles (Interview D, 19.04.2018). So, InfraCredit is clearly contributing to an increase in investments in infrastructure projects by pensions funds, which lead to a multiplier effect and positively influence Nigeria's economic growth and development (Onwuka & Nwafor, 2018, p. 81). Today, 12 Nigerian pension funds, that had never invested in infrastructure projects before, have invested in InfraCredit (Interview D, 19.04.2018). Furthermore, if the federal government improves transparency and the legal framework, local and foreign investors would be attracted to invest in Nigeria. In addition, in the long-run the investments will generate high returns (Onwuka & Nwafor, 2018, p. 81). Moreover, the growth of pension funds of over 6 trillion NGN can balance the attended stagflation of the decreasing oil prices by diversifying the capital funding of Nigeria's economy (Onwuka & Nwafor, 2018, p. 81). And last but not least, otherwise Nigeria would need external loans which are always associated with the country and foreign exchange risk factor (Onwuka & Nwafor, 2018, p. 81). InfraCredit is such a success story that other Afri-

can countries, in which PIDG is operating, would strongly support PIDG in developing similar institutions as InfraCredit in their country (Interview D, 19.04.2018).

6 Recommendations for further PIDG Action

6.1 Enhanced Marketing via the Investor Brochure/ Investor education & Information

Interviews F (20.04.2018) & I (09.05.2018), with two different Swiss Pension Funds, clearly demonstrated that there is a lack of information as well as misperception amongst pension funds in regard to infrastructure investments in developing countries. As Interview H (11.05.2018) pointed out, the risk perception is often higher than the real risk of these kind of investments. Therefore, the first action PIDG could take, would be to reduce the pension fund's negative risk perception of investments in infrastructure projects through education and provision of persuasive information material. Accordingly, pension funds must be actively convinced of the potential of infrastructure investments. Thus, PIDG should pursue an enhanced communication strategy in order to inform pension funds about the opportunity of investing in infrastructure. First of all, the PIDG could take up the topic of pension funds investments in developing countries in its Investor Brochure (see figure 6). Second, PIDG could hold workshops with experts and representatives of pension funds. Third, PIDG could support financially or administratively conferences on the topic of infrastructure investments in developing countries. All these three possibilities must address the specific concerns of pension funds and highlight the opportunities for them of investing in infrastructure projects in developing countries.

The communication strategy should address local and international pension funds by detailing the risk mitigation options, as a blended finance fund, investments in the operational phase, provision of guarantees or the possibility to invest in US Dollar. Moreover, some best practice cases, such as InfraCredit in Nigeria or the example of the Swedish pension fund Alecta, should be highlighted. This demonstration effect of good examples is likely to subsequently increase projects supported by the private sector (Spratt and Collins, 2012, p.4).

In Switzerland, SECO could play an active role by sharing their successful stories of infrastructure projects in developing countries with Swiss pension funds (Interview H, 11.05.2018). Moreover, SECO could address Swiss pension funds more directly in order to explain the opportunities and risk mitigation possibilities of infrastructure investments (Interview H, 11.05.2018). Furthermore, SECO could also educate the pension funds on organizations such as the PIDG, which would act as an intermediary in order to enable infrastructure investments.

Ultimately, the PIDG in collaboration with state agencies such as the SECO could actively support platforms where professionally prepared projects can be presented to investors. Via such a face-to-face contact, question and insecurities on infrastructure investments in developing countries could be exchanged on through a professional platform such as a Conference devoted to pension fund investment strategies in developing countries.

6.2 Promotion of Investments with a blended finance fund

As demonstrated with the case study of Sweden, another possibility would be to create a fund in which pension funds could invest. PIDG could manage this fund and support it financially and with its expertise. The advantage for pensions funds is that they could indirectly invest in infrastructure projects as they often lack the specific country knowledge. So, pension funds would delegate some tasks to the managers of the fund, as for example to the PIDG, who are the real experts in regard to infrastructure projects in developing countries and know how to choose well-structured projects (Interview H, 11.05.2018). In sum, funds are better than single investments because they are more efficient (Interview H, 11.05.2018). An additional attractive opportunity for the fund would be to use the concept of blended finance (Interview H, 11.05.2018). On one hand, pension funds, a senior share class, would not bear the costs of failed projects. In this way, infrastructure investments would be de-risked for

pension funds. On the other hand, PIDG, a junior share class, could still get high returns out of these projects (Interview H, 11.05.2018). Moreover, with investments into a fund, investing in infrastructure projects in developing countries, pension funds could diversify their portfolio with numerous projects and uncorrelated assets in different countries, while generating high returns (Interview H, 11.05.2018; Interview E, 19.04.2018).

PIDG CASE STUDIES

Technical assistance | Early stage development | Debt and guarantees GuarantCo | Equity and mezza

Nigeria, InfraCredit

Facilitating infrastructure investments for pension funds

In 2017, GuarantCo, a PIDG company, founded in collaboration with the Nigerian Sovereign Authority (NSIA) and the support of TAF, a new company: InfraCredit. The goal of InfraCredit is to support local pension funds investing infrastructure projects in Nigeria via bonds. InfraCredit acts as a credit guarantor by providing sufficient credit quality and securing risks.

Accomplishments:

- Securitization of risks
- Long-term financing in local currency for project loans
- Capital market training for Nigerian pension funds
- Provision of adequate regulations by the State
- 12 pension funds have already invested in InfraCredit
- Several rating agencies rated InfraCredit with 'AAA'

Unlocking infrastructure investment opportunities | PIDG | 7

PIDG CASE STUDIES

Pension fund investing through PIDG

Pension funds Canada and Australia are the first movers in the field of pension fund investments in infrastructure. Slowly other countries follow this good example. PIDG encourages such investments, especially in developing countries, and supports investments through several mechanisms:

- Conferences & Workshops with experts on infrastructure investments in developing countries
- Creation of an Emerging Market Fund which works according to the concept of blended financing
- Selection of well structured projects in developing countries
- PIDG assumes the risks for pension funds investing in US Dollars
- PIDG provides guarantees for pension funds

Investments in infrastructure projects in developing countries offer several interesting opportunities for pension funds:

1) Pension funds can export their capital and gain high returns
2) Long-term infrastructure investments match the long duration of pension liabilities
3) Portfolio diversification
4) Infrastructure assets in developing countries have a similar performance than other assets
5) Investments in the operational phase guarantee high returns and less risks
6) Investments in green infrastructure project contribute to a meaningful impact

6 | PIDG | Unlocking infrastructure investment opportunities

Figure 6. Investor Brochure

6.3 De-risking mechanisms

As discussed in section 3.2 some important risks of infrastructure investments in de-

veloping countries persist and pension funds are traditionally rather conservative and risk-averse (Interview G, 9.05.2018; Interview I, 09.05.2018; Interview F, 20.04.2018). Therefore, an important contribution for the PIDG would be to mitigate the investments risks for pension funds (so called investment due diligence). First of all, in order to meet the low-risk requirements of pension funds, pension funds could only invest during the operational phase of infrastructure projects, as this is the less risky part of infrastructure projects. In addition, this would allow pension funds to gain durable and steady returns (Interview E, 19.04.2018). However, the inconvenient is that this measure would not bring more financing to the development and construction phase of the infrastructure projects (Interview H, 11.05.2018). Second, investing in infrastructure projects in local currencies might be risky. For example, a transfer restriction of funds outside of the host country, a local currency inconvertibility into other currencies or a fluctuating exchange rate to US Dollars could occur. These facts are particularly problematic for long-term investments, such as infrastructure projects in developing countries. For this reason, pension funds should be allowed to invest in US Dollar. However, in this case the risk would be transferred to a third party, for example to PIDG (Interview H, 11.05.2018). So, PIDG firms could continue to invest in local currencies and would thus reach their goal of developing local currency markets but private investors, such as pension funds, would invest in US Dollars through PIDG. Indeed, GuarantCo, one of PIDG firms, pursues this aim by enhancing credit access through the provision of guarantees for local currency debt issuance (PIDG, 2016, p.1). Last but not least, if pension funds were to invest in PIDG or in one of its companies alongside the whole cycle of the infrastructure projects, PIDG could somehow provide guarantees, for instance through a credit enhancement mechanism (Interview H, 11.05.2018; Interview D, 19.04.2018). All in all, transferring the risks to PIDG, and thus de-risking the projects for pension funds, would be a solution to attract pension funds to invest in infrastructure projects in less developed countries (Interview H, 11.05.2018).

6.4 Facilitate infrastructure project preparation and promotion

As mentioned throughout the paper, there is a lack of well-structured infrastructure projects. In order to face this challenge, the Technical Assistance Facility of the PIDG could play a further role in preparing infrastructure projects in developing countries. The aim would be that the PIDG strengthens the role of the expert on the ground and supports the project preparation phase with its know how through technical support and education.

7 Conclusion

7.1 Critical reflection

Infrastructure development is an important factor of growth for an economy and the world as a whole. However, the public sector is not able to individually finance the infrastructure development. Therefore private participation is needed. The Private Infrastructure Development Group aims to reach such participation for infrastructure projects. Nowadays, pension funds seem especially attractive, due to their immense value of assets they hold. The question was therefore on how the PIDG can incentivize pension funds to invest in infrastructure projects in developing countries. The present paper approached the question as followed. In the first part, the importance of infrastructure in regard to a country's economic growth and social well-being was highlighted. Especially, developing countries have a huge lack in infrastructure. Thus, it is crucial to close the infrastructure gap. However, in order to close the infrastructure gap, taking into account the accomplishment of the SDGs by 2030, 1.9 trillion USD a year are needed. Nonetheless, states are not able to finance the needed infrastructure by themselves, hence, private investors come into play. Actually, pension funds manage around 11'000 billion USD worldwide. That's the reason why this paper focuses on the question on how the PIDG could incentivize pension funds to invest in infrastructure projects in developing countries. Actually, PIDG is seen as an enabler for the task to attract and support pension funds for infrastructure investments. In a further chapter the risks, mainly economic, political, regulatory, and technical, for infrastructure investments were outlined. However, our analysis clearly demonstrates that opportunities for pension funds investing in infrastructure in developing countries are also present and probably outweigh the risks. For example, pension funds could diversify their portfolio, gain high returns, could export their capital, invest in long-term projects and pursue impact investing.

Thanks to the analysis of two best practices, the case study of Sweden and the case

study of Nigeria, some recommendation for further action could be presented to the PIDG. First of all and in particular through the interview with pension fund representatives, the conclusion must be drawn that pension funds are in general very risk-averse and lack the information about infrastructure investment opportunities in developing countries. Therefore, the first recommendation is to educate the investors by providing information. For example, an investor brochure could be created and workshops with experts could be organized. A second recommendation is that PIDG could establish a fund and support it financially and with its expertise. Preferably, the fund should be organized according to the concept of blended finance, which would attract investments of pension funds as they won't bear for the costs of failed projects. A third recommendation is that some risks could be transferred to PIDG and thus de-risk the investments of pension funds. For example, if pension funds are allowed to invest in US Dollar, if they only invest in the operational phase or if they provide guarantees, PIDG could assume the risks and pension funds would be more likely to invest in infrastructure projects in developing countries.

7.2 Scope and Limitations

The authors of this paper are fully aware that the conducted research presents limitations. Due to the limited scope of the paper, some issues couldn't be touched upon, such as how national regulations specifically restrict Swiss pension funds and whether they can be altered. Furthermore, the case study of Sweden couldn't be further elaborated because of a lack of information which was outstanding from the side of Alecta and the SIDA. Consequently, in further research, it would be interesting to analyse the mechanisms of the NN-FMO Emerging Market Loans Fund in regard to their risk mitigation strategy. And then, adapt the outcomes to the fund, which might be created by the PIDG.

Regardless of the limitations, in the first place, the aim of the paper was to provide PIDG some thought provoking impulses on how to attract investments of pensions

funds for infrastructure projects. The relevance of the paper is confirmed by the increasingly important role of pension fund investment in recent years. The authors strongly believe that a change in pension fund investment will happen in the future. Nevertheless, such a change will need time and PIDG has the ability to bring along this change in the next years.

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Appendix

Appendix A:

Interview A, with a Development Expert (on Skype on 17th of April 2018)

The aim of the Smart Cities project in India is first and foremost to build a structure that will then enable the emergence of smart cities. Cities must be network-based (see the video on the website). In order for a 2000 watts society to arise, in which little energy is consumed, certain rules must be accepted. In India, for example, the state manages access to water and energy. Every development needs infrastructure, for example smart cities.

The level of government is very central. For example, Herzog & De Meuron lost a project in Brazil as the government changed. The important question is: How can investors be given security? Therefore, in India, a top-down approach is pursued: first, the government president must be convinced of the project. This shows that the political risks are enormous, as a change of government can happen at any time and the laws could be changed. However, it is not so easy to change the laws. So the project has to be in line with the law, i.e. the regulatory framework has to be complied with. There is additional security in a way. The infrastructure project must therefore be secured by the state.

Keeping in mind that risk 0 does not exist, there are 6 different levels that must be followed in order for a project to be successful in a developing country. First, the country must be democratically governed. Second, as already mentioned, the project must comply with the legal situation. In a third step, public-private development partnerships (PPDP) can be set up. Rules should be defined between the different partners, for example, who receives how much of the return, and a partnership should be established, for example through a Special Purpose Vehicle (SPV). In India, for example, the state provides the law and land and the private investors the money and ideas. In a fourth step, rules must be established. The different shares must be regulated. Until recently, foreign investors in India detained a maximum of 49% and thus never had a majority of the votes. Meanwhile, this has been abolished but is still informally in place. The projects are therefore very dependent on the state and as a project initiator, you have to do a great deal, so that the state is convinced of the relevance of the

project and is willing to give a share of the profit. Fifth, the actual financing project can be divided into three steps. First, it takes quite a lot of work at the highest risk level until the state agrees to support the project. Most of the time, a Memorandum of Understanding is signed, which is not legally binding, but nevertheless represents a first step. Then the project must be defined concretely, rules must be drawn up and approved by both sides. The last step is about investment. You have to find an « angel investor » who is prepared to take a high risk. This is the most difficult stage and often this first major investment is made by SECO or DEZA. Then come the "Strategic Investors", who sense a lot of potential for the project and take a higher risk, as they also receive more interests. They want their money back and therefore invest in various projects. Only then, when the financial security is significantly higher than in the first steps, come the "commercial investors", such as the pension funds. Of course, infrastructure projects in developing countries have a higher risk-return potential. Since PIDG invests mostly in less stable countries, the return on investment must be very high, so that pension funds can take the risk. However, it could have some potential if the projects were in democracies. For pension funds, it could solve the current problem of negative interest rates in Switzerland. Sixth, the kind of infrastructure is important because every development needs the right infrastructure. Connectivity is currently a very important issue and it must be ensured that the infrastructure is modern and functional.

Appendix B

Interview B, with a Professor and Lecturer for Development Economics (on telephone on 17th of April 2018)

What are the ways to reduce the infrastructure gap?

That is also because infrastructure financing is very different from the financing needs of poor countries in general.

What do you think of public-private partnerships in this regard?

Here I can quote Mrs Deirdre McCloskey: Well, when it comes to private-public partnership, it always stinks of corruption. So I do not think anything of them.

So nothing, that the private firms would only be used ? Or what do you actually mean with corruption?

So a private-public partnership generally provides private financing and investment opportunities that do not run according to normal conditions, but where the public partner provides a guarantee for the private investment, i.e. a minimum return or a guaranteed default. That is, this is basically a subsidy. If the investment was profitable enough for the private, then they would not need the public partnership. This means that investment projects are privately financed by the private sector because of the preferential conditions that the public sector offers. And it is known that the public sector can always finance itself more cheaply than the private one, because the guarantees of the future tax revenue serve as collateral for the loans. So a state cannot go bankrupt in principle. In other words, the state can afford to finance itself more cheaply than the private sector, apart from very, very few exceptional cases, where the state is completely uncreditworthy. And what does this mean? A transfer of state tax revenue or other state incomes into the hands of private firms or individuals. The only case where it would be conceivable that the state cannot finance itself more cheaply, would be if the state is completely uncreditworthy. But then no public-private partnership will work. So I'm not aware of any project where a public-private partnership would have been cheaper for the taxpayer than if the state had made it alone from the outset.

So not only in developing countries, but also in developed countries like Switzerland?

As a general rule.

Where do you see the risks associated with infrastructure projects in developing countries?

So with the risks, the return rates of the project may have been misjudged. There is the possibility of mismanagement and then there is generally the optimism bias, which exists even in developed countries. That is, large infrastructure projects, if you look at the budget figures at the beginning and the budgets actually needed, then the distribution is extremely skewed. That is, there are very, very few projects that have in the end become cheaper than originally budgeted, and a large number of projects that have become many times more expensive than the original plan. The whole thing, there is a great literature, that is, optimism bias. I can just remind you of the central airport in Berlin or the Elbphilharmonie in Hamburg or the decommissioning of nuclear power plants. So with such infrastructure projects, the risk that the costs are initially stated cheaper than they turn out, is enormous. Of course, in less developed countries, there is also the risk that the costs will not just be higher than originally planned, but that it will not be completed and that a lot of good money has been buried without ever having a return above zero. The whole thing is then negative.

How do you see the potential of such projects for the future, especially in developing countries?

Yes, there is a lot missing in developing countries. So there is a lack of sensible infrastructure in transport, health care, waste disposal. The big cities, the mega-cities, are all in developing countries. They suffocate in their traffic and in their garbage. So the need to invest in the infrastructure is virtually infinite. This certainly has a great immediate benefit for the many inhabitants of these giant cities. Of course, infrastructure projects are different in the countryside. But an agriculture that produces for the market must be accessible. And if the infrastructure is missing, the farmers are trapped in the subsistence economy.

So the potential for such projects is actually very high in the case?

Yes.

How can you reduce the risks you mentioned?

Yes, through reasonable project management. But you would rather need information from people who work in project management. So in general, when planning is considered from the outset, when the possibility of optimism bias is taken into account, when there are probabilistic assumptions made to analyze and when experts on the ground and donors to all parties catalog, quantify and monitor constantly as carefully as possible the risks and opportunities of the project. But of course these are the keywords in development cooperation. I can not really tell you anything new.

How can the private sector help to invest in such projects?

I have already given you the first answer. I do not think much of PPPs. That is not cheaper than if it is public. If you just start from the basic assumption of economics or macroeconomics, if there are profitable infrastructure projects, then the private sector does these ones. And if that does not exist, because there are externalities or other problems, or positive externalities, then it's best the public sector takes over. That's how I see it too. In order to get the private sector to invest in things, you have to make sure that the investments are attractive to private firms. Then they will invest. What makes this attractive? According to the economic theory, investment in poor countries should be more attractive than in rich countries, because of higher relative capital shortages, and thus of higher expected returns. On the other hand, there is political risk, there is corruption, there is the risk of expropriation, the investment climate is worse in poorer countries than in richer countries. But there is a great social, political and economic transformation needed to change the investment climate, so that private firms would invest more than they already do today. And that is not something, where one can once say: That must be changed, this must be changed. The keyword is Rule of Law.

Do you think that the financing of infrastructure projects by pension funds would be an option?

In general, Switzerland has a huge current account surplus. In other words, this current account surplus necessarily entails a capital export. And all sectors in Switzerland save, the private sector saves, the companies have net savings and the state as well. And this saving has to go abroad. You have to look now from Swiss point of view, what the pension funds do. The pension funds are relatively restricted in where they can invest. And Switzerland is facing the demographic transition. That means a lot of people will retire now, and by the

time things get balanced again, maybe two or three decades will go by. In other words, at the moment it is reasonable for Switzerland to have a current account surplus and to export capital, but of course it should be considered that this capital should someday be repatriated. And that should be repatriated if and only if this demographic mismatch in Switzerland becomes acute. That is, when the baby boomers retire. In other words, for the next ten years, from a macroeconomic point of view, it still makes sense for Switzerland to export capital. And the pension funds are a big supplier in managing Swiss savings. But on balance, that will have to change in two decades at the latest. Is it a good idea that the pension funds export capital? Yes, for the next one or two decades from the Swiss point of view. Generally from the perspective of recipient countries. The pension funds are not philanthropic associations. But pension funds are required to generate the highest possible return in the three-pillar system with tolerable risk. So, the question of whether the whole thing makes sense here and whether you should not rather switch to a tax- or a pay-as-you-go procedure, which I would very much favour, but it can certainly not be done within a generation or two. So the pension funds will be a very important player for several generations in the Swiss pension system. Well, as I said, the return opportunities are very high abroad. On the other hand, the risks are again high abroad. The pension funds work very long term and have a very long investment horizon. And if the whole thing is reasonably diversified, then there is some risk-absorbing capacity. In that sense, I think that given the way in which the pension funds are given the opportunity to invest the funds of their clients, that a well-balanced share of financing for large-scale infrastructure projects in poorer countries would certainly have a place. If it is then sufficiently diversified. One should not put all the eggs in a basket.

The same is probably true of local pension funds, which would now invest in local countries, not now a Swiss pension fund, but just one, for example, in Africa.

Correct. With pension funds, we always have the dilemma, as with all other investments, that they balance risk and return. And if they want to generate good returns for their clients, then there is also the risk that the whole thing can be negative or that the pensions are much lower. And, of course, this is a situation that is relatively precarious because clients, when they reach the retirement age, for instance 65 or over, and find that their pension is 20 percent lower than originally assumed, than it is a financial catastrophe. And that is not fantasized now. So hundreds of millions of people in the world have experienced this after 2008.

The pension funds always have the risk that they have to repay the clients, so to speak, their money, what they would do with a possible investment in these infrastructure projects.

Right, yes.

Still to the pension funds. Did you already have experience with this now theoretically or in practice?

So in practice, I pay money into the pension fund. That's a hands-on experience. And then I look at my bank statement and the benefits, since I pay into the pension fund in Switzerland, that's 20 years, which are always cut only. That is, the third contributor's promise is a fiction that may have been right in the great growth times of the 1970s and 1980s. Thus, I am a strong supporter of the pay-as-you-go pension scheme. And in the countries where the pension fund system is pay-as-you-go, people are getting messages year after year that their expected pension is going to be raised, unlike the countries where it is capitalized. But, as I said, there are path dependencies. These funded pay-as-you-go systems are there, and they will not be transformed into pay-as-you-go overnight. For a long time, the question arises as to which mix of risk and return the pension funds can offer. As I told you, because the personal consequences are too big, if the risk actually strikes, then the pension funds will have to invest relatively risk-aversely and give correspondingly low returns. And that's what you can see around the world in the expected projections of pensions, which are getting lower and lower because of the risk-absorbing capacity, because perception has changed and acceptable risky returns are quite low. Infrastructure investments are in principle no different investments than others. You just have to weigh the risks and returns. And as I said earlier, the returns are potentially very large, but the distribution of the risk is very wrong. So, you have a lot, lots of black swans, where the pension funds may lose hundreds of millions or billions in one fell swoop. In that sense, you have to diversify very carefully, but it does not mean that you should not do it.

So that actually leads me to my next question, if the risks are too high. But as long as they are calculable, you mean that investments are basically possible and also profitable if you diversify enough.

It depends on the portfolio of investments. So one investment can be profitable, the other might lose all the money. It depends on the right mix. But there I have theoretical knowledge, but not practical. You would need to talk to people who specialize in diversifying investment portfolios. What I can tell you is really very general.

What do you think now about the longevity of these infrastructure projects? Because they often last for decades. Because that might still be a risk, or a factor that prevents the pension funds from investing in such projects, the long-term nature of the projects.

The long-term nature of the projects is a good thing. A long-term project ensures long-term returns. Economic fluctuations or fashions or the like alike affect short-term projects. That's on the positive side. On the other hand, with long-term projects, of course, the payment uncertainty increases. There are upside and downside risks again. The longevity of these projects is a priori no reason to say: the pension funds should not do it.

So, is longevity more of an advantage if you can mitigate the risks?

No, I said, there are upside and downside risks, as in all investment projects. And the longevity on the positive side is that it is not dependent on the economic cycle and mood like short-term things. What in the individual case makes more sense in the assessment, that is a matter of individual case analysis.

Appendix C

Interview C with a Researcher and Project Manager in Development Economics (17th of April 2018)

Have you already dealt with financing infrastructure projects by pension funds?
Pension funds are a bit of a hot candidate at the moment. It's just about having a lot of investment money. And pension funds are a big part of that, along with the more speculative ones and they have to find ways to invest their money with a certain safety belt, so to speak. I come from the real estate, so housing but also infrastructure projects.

What do you think about pension fund investment in infrastructure projects in developing countries? How can you reduce the risks?
In infrastructure area, the government mostly gives guaranties. It is said that it is a bit better, as for example in real estate.

What are the specificities of infrastructure projects, especially in developing countries? How can you finance infrastructure projects?
Infrastructure projects can be very different: it starts with basic infrastructures (water pipes, sewage) to megaprojects, which are institutionally and financially completely different and accordingly also e.g. the guarantee of governments is going very differently. So for example for an infrastructure project, like a dam, there's mostly a consortium where the government ties some of it, then big developers and so on, actually big players, and then there are also different guarantees that the government opposes. With the smaller projects, water, sewage, road construction, such guarantees are given a little less. But there is - and this is more at government level - financial mechanisms, e.g. local government bonds. This has already been adopted in developing countries. These are simply guaranteed bonds that the local government can use. Because mostly, nowadays these infrastructure projects like water, sewage, road are local. For example, in Switzerland, the central government usually has nothing to say there and that's why there are problems with the financing. So a way in which a bit of independence can be provided to the local government is if it issues these bonds, they are then bought up, they get a certain fixed interest and they are relatively safe. They are even rated by rating agencies.

My focus is more on the level where it really concerns local governments and then really the basic infrastructures. All then what are the big infrastructure projects, where I suppose, as more and more of these international money flows come along. So bridge building, highways to the dam electricity, because they are just so big that they are secured by the government, and therefore I suppose - depending on the project - it must be institutionally possible that they get international cash flows. So the other way to do that is not project based, but then simply investing in quasi-listed companies, but I suppose the pension funds would not make that. You can invest through listed companies for instance. There are certainly specialized companies involved. I'm currently stationed in Brazil, which is only a prime example, because that's the problem in general. Of course, one major problem is that in this case, of course, in countries where accountability is not so developed, there is always the great danger of corruption being involved, sustainability being a small matter, and I suppose the Swiss pension funds have a certain work ethic, and so you have to think about how that is compatible.

Apart from the problems already mentioned, what are other risks of infrastructure projects?
So generally, when you're in developing countries, there are risks - so I'm talking very general. At least you have to think about it. Political continuity is often not given, which means that these infrastructure projects are also often politically depressed and of some prestige. That is, if there is a change of government, this project could suddenly fall back into the drawer. There are examples where real groundworks had already been done and then it was absolutely canceled. So that has happened in Latin America, where there is just this close relationship between government and the population, and also this quid pro quo, so that's also very much the case in Asia. We've already mentioned corruption. There is still the stability of the economy, also a big factor that you include. After all, everything from the Swiss perspective is very stable, everything works very well. But if, for example, the local economy suddenly breaks down, that could set completely new priorities. It also depends on the structure of the economy, e.g. Venezuela. Five years ago, Venezuela had a lot of infrastructure projects and suddenly, the global markets changed, and then that's mostly just a trigger, because it has given rise to profound problems and then, there is a spiral. Another risk: you could suddenly get rid of all the equipment again. Something similar was done in North Africa. So these are political stability problems, coupled with economic context. It's always a

big problem. Then, of course, it is also linked to the currency value, i.e. the exchange rates. Then there are problems within the country as well. Social acceptance can also be a problem: it is also very important in which projects you invest, that they are conflict-free, which is relatively difficult. There are resistances everywhere. During these big mega-events, many people are driven out, the compensation does not always work out, but also a lot of money is made. From that point of view probably the most unproblematic are the smaller projects. It is not particularly problematic for water and sewage. People need it and that is a public mission. That is, if you do that, then you do not have a big risk of big protests etc. or the press, but that's just smaller projects

The local government bonds are a way to move a bit to these international financial markets because the problem is that the accountability of local governments is relatively low. So there are regular examples that they are simply bankrupt and failing to pay their debts, simply because the government's financial backing is much lower. This is rare among national governments. It is usually avoided that a state is unable to pay, which is why national government bonds, which are also often used to finance projects, are better hedged.

In Brazil and in Asia, there is this system, through which local pension funds automatically finance different projects. All formally employed workers deposit their money. This goes into the pension funds and the government is set up to invest in the social sector. This includes affordable housing, basic infrastructure such as water, wastewater. If this system works, then the financing requirement is relatively low, I suppose. That was also the case in Brazil. As the economy has gone well, more people were hired, the pension funds then had more and more money and that was then invested. The question is nonetheless how these countries regulate this. There are quite a few states that have very social roots, almost communist roots, and you can still see that in the governments. So they are a bit more reserved. In certain measures, it also makes sense. There are quite a few countries where, for example, this financialisation, just that financial markets are getting more important, is not that strong and that's why they did not feel the global financial crisis that way. One must also be aware that hedge funds and pension funds are also price drivers. Now less obviously in infrastructure projects, so probably it's also interesting but e.g. in housing it is also very obvious, extra money that flows in. It drives up the prices and thus the affordability of housing. But that

might be for the infrastructure and e.g. the prices of materials, of workforce as well. So you have to look at how the regulation is. Pension funds would probably invest more as FFI (Foreign Institutional Investor). If it were direct investments in projects, that would be FDI, and that should be allowed. Depending on the country, there are certain regulations, conditions, etc. In Asia and Africa, it should be easier. But e.g. India is a bit difficult. That is also a fact that plays in it. Naturally, such projects also involve the regional development banks.

A bit more about Infrastructure Gap: What are the different ways to close it?

There are several reports, e.g. from McKinsey. You've written a larger report about what it'll take until 2030. I cannot remember the exact numbers, but it was about USD$ 3 trillion. You still have to be clear, so check it out. But for pension funds, investing in smaller projects is extremely difficult, except when you have a good network of intermediaries like PIDG.

What do you think of public-private partnerships, as a financing option for projects?

De facto the best examples are exactly mixed concepts. Public-private partnership is still a very wide term and it is important to see what it is exactly. Because, in fact, historically most of the projects were to a certain extent cooperation between public and private sectors, because very few countries could have completely public infrastructure projects (planning, financing, maintenance). Because that's not very efficient either. There are various modalities in these public-private partnerships such as build to operate, in which the private sector will build up and then immediately gets the concession for a certain time frame.

For example, if a highway is built, tolls may be required for 20-30 years. Then both the costs of implementation and maintenance are covered. It is then completely in government office, it is a way in which the government hardly needs own financial resources simply by giving additional rights. Of course it is also possible by other means.

It is also very much done with lend-based-financing. So the big problem in developing countries is the whole urban development. 98% is in the South, 15% in Sub-Saharan Africa and the rest mostly in Asia. The big problem is the fast growth and that the government does not comply to build infrastructure: electricity, but also roads, water, etc. There you have the known slums and you have to think about how to change this whole situation. That's a very

urban problem then. As you can see, the potential of rapid growth comes with a strong increase in property values. Cities that grow fast are in great demand. Big demand means higher prices and you can also take advantage of that, to say, how can I get this road construction or certain infrastructure or housing for free. The state says then to the private sector: "I give you this land, so you can make more profit, but you have to do that and that." These are these conditional development permits. It's just about finding the other funding streams. Again, everything that is pushed by the international organizations, so to speak, has nothing to do with the financial mechanisms of the pension funds. Of course they also want to have a certain independence. There, the local government will get financial access based on its own resources. Since they can get financing directly from the private sector.

That is also a problem: You want to help and promote development but also make profits. But we're talking about institutions that are likely to have very high standards of their own. So now I'm talking about these mechanisms in general. There is probably less to do in Switzerland, but there are pension funds in other countries as well, which will probably have different ethical standards.

KFPE (https://naturalsciences.ch/organisations/kfpe) is a Swiss organization that deals with the ethical references for working with developing countries. That could be interesting. Pension funds must be extremely careful in their investments.

Appendix D

Interview D, with a Manager at the PIDG (on Skype on 19th of April 2018)

How does PIDG function?

There are 6 companies operating under the PIDG, which can be divided under 3 buckets. The first one is the upstream technical assistance, the second one the early project preparation (mainly project development and bringing project to financial close), the last one is the credit facilities that provide guarantees and debts instruments. PIDG is thus able to intervene in the whole lifecycle of an infrastructure project. Operations take place in Sub Saharan Africa (70% of the business) and South-East Asia (30% of the business), mostly in poor countries and in post-conflict areas. About 50-55% of the PIDG business takes place in post-conflict frontier states. Which significantly higher than other international institutions.

How do you manage to mitigate risks?

Projects structuration is key to reduce risks. PIDG has had an experience of structuring properly and adequately projects for more than 15 years. For instance, PIDG's Emerging African Fund has been operating for 15 years and has known very few losses, even if it is operating in countries which have a risky reputation. However, their projects have low credit rates because of countries in which they are operating are quite poor. The key idea is to work with the investors and the borrowers. For a couple of years, the project might be impaired or go through losses. By working with the project beneficiaries, it helps to improve the project mechanics and to get the project through. PIDG's early projects corporation companies help to develop projects and mitigate the risks by taking them all upfront. Developing a project may cost between 5 to 15 million dollars. There are lots of private investors and developers in European countries for instance, but very few would be willing to engage such a sum of money, without knowing if the project will work or not. PIDG is able to do that, as the money needed in the early stages of the project development is provided by institutions like SECO, who are willing to develop infrastructures in developing countries. The money could get lost, but in principle, PIDG tries to achieve success by having the right teams selecting the right projects, that make sense. If you are doing a power project, you are ultimately going to look at the cost for the consumers, building something that is sustainable and not too expensive. Otherwise, there is the risk that the contract be renegotiated or cancelled, which in-

creases the risk of suffering a total loss. So, it is a mixture of things that make the projects' success possible.

Do you invest more in big-scale or small-scale projects?

Both. The projects' portfolio entails all types of projects. There is no minimum nor maximum size. PIDG's aim is to go where they can add value.

What kind of risks is PIDG facing?

PIDG does not necessarily work with governments, since the projects are privately driven and with private investors. But, depending on the sector, there will be interaction with the government, as for instance in a power project. Concerning corruption, it is omnipresent, but PIDG has a tolerance zero for it. It means that some projects might take longer to develop. It can be an issue in some countries. But it should not be generalized. Since Africa is a whole continent of 52 countries, it is sad it has a sole reputation of corruption, as it differs from country to country.

What kind of guarantees do you have?

It depends on the project. But actually, when you compare the default rates for project financed loans of rating agencies in Sub Saharan Africa and Europe, you see that the default rates for project financed loans in Sub Saharan Africa are quite low. Ten to fifteen years ago, it was possible to talk about an "African risk". Today, it is impossible because there are huge differences among the different African countries. PIDG has one company, GuarantCo, that provides guarantees to lenders, but it is not so much about protecting investors, but to attract local currency. One of PIDG's goal is indeed to develop local currency products. GuarantCo have two main goals: 1) Providing guarantees to lenders; 2) Local capital markets development, which can be achieved through vehicles like InfraCredit in Nigeria to attract Nigerian pension funds.

GuarantCo has developed an interesting project in Nigeria, called Infracredit (http://guarantco.com/portfolio/inputs-to-infrastructure/infracredit). This company, Infracredit, was set up together with Nigerian sovereign wealth funds one year ago and provides guarantees and credit enhancement with the issuance of local bonds for the financing of in-

frastructure assets. The credit enhancement is provided through a bond issuance to allow local pension funds or insurance companies to buy or fund those bonds. It attracted 12 Nigerian pension funds, that never invested in infrastructure projects before. Training was provided to these Nigerian pension funds, so they could understand the structure and the risks of an infrastructure asset. The State was also involved to ensure that the proper regulations were in place to allow pension funds to invest in infrastructures. A lot of other African countries have been asking PIDG to replicate the same scheme in their own countries. A similar project is being developed in Pakistan.

What about European pension funds?

There are actually very conservative. Unless there is an impact value for the money invested, which has been deployed under a social investment heading, it seems unlikely a Swiss pension fund would be willing to invest in Nigeria. Nevertheless, the market is slowly changing. Pension funds can invest in sovereign bonds, which do not give them much diversity, in European infrastructure assets. However, there are fewer and fewer opportunities. So, pension funds will also need to diversify Canadian pension funds for instance are looking at Spanish and Italian assets, which they would not have touched five years ago. When it comes to emerging markets, it is changing, because people are finally understanding what it takes to attract a pension fund. First of all, you need a critical size. You also need well-raped and well-structured projects. On top of that, you need sector and geography diversification. And you should be able to come in and out easily. Until now, it has been quite difficult to achieve. Domestic pension funds are a good option to mobilize capital and getting more domestic pension funds involved would be a great success. Pension funds might be ready to invest in vehicles (of a consistent size containing a pipeline of projects from several markets). So maybe, at some point, PIDG could manage to get some more adventurous pension funds involved. But actually the issue at the moment is the lack of projects, not the lack of capital. What is important, is not to have bigger projects, as it increases the risk, but to have a larger number of projects, to mitigate the risks.

One of the key to get European pension funds to invest in emerging markets is to find an efficient credit enhancement mechanism. One could envision for example, a guarantee provider, granting first or second loss mechanisms, to those pension funds. You would do it in a

way that the chances of the pension funds to have losses would be almost nonexistent. But for pension funds, who traditionally have had very strict internal rules on minimum credit-rating (A+ for instance), it might be difficult to start investing in assets that are rated B-. So do you credit enhance the asset, the rate? But Western pension funds might be more interested invested in vehicles, used to fund a number of projects in emerging markets. This allows to avoid the concentration risk.

Appendix E

Interview E, with a Consultant on Impact Investment and Sustainable Finance (on telephone on 19th of April 2018)

What about risks mitigation at the PIDG?

There are different types of investment companies at PIDG, which thus face different risks, as they concern different regions and different steps of the projects.

For some of them, risks are mitigated through a very close work with the developers and with the government to try to identify and reduce the specific risks of each project, such as technical risks, natural exposure risks, etc. Those risks are all part of the design of the project. Working through them more individually allows to mitigate and reduce the risks level. At the same time, PIDG does not mind taking risks. It is actually one of PIDG's aim to take over the risks in a project development that other private investors would not take. So PIDG tends to take over a higher share of the risks. We're trying to shield the investors from the risks they might otherwise be facing. PIDG manages to mitigate financial risks for investors, as they arrive early enough on a project design.

The other PIDG's company might invest alongside the private sector, knowing that they are able to take more risks than the private sector can. Either these companies might take over the more risky part of the package or they might guarantee the losses of the private sector companies willing to get involved in the project. PIDG is actually designed to take that risk. The guarantees are a way of providing insurance to the private sector companies and building up trust.

Could pension funds invest in infrastructure projects in developing countries?

It must be a good idea. Nevertheless, there are two different types of pension funds: Local pension funds and international pension funds. At the moment, there is a very limited amount of things that local pension funds would then invest in infrastructure projects. There might be some corporate funds and a limited number of stocks in that country. But if you have an infrastructure option for investment, that is a really good way to get long-term re-

turns, as well as getting something the country needs. It is fundamental to get local pension funds to invest in local pension assets.

For international pension funds to invest in developing countries, that is still not obvious. But that is about where the money is at the moment. So, these investors are needed to develop infrastructure in these countries. The trouble is that these countries are considered as risky and something is needed to give people confidence, so that they would feel comfortable putting their money in such countries and invest in such projects. Actually, according to ILX (http://www.cardanodevelopment.com/initiatives/ilx/), if you look at the performance of infrastructure assets in developing countries, they perform just as well as any other assets in which pension funds would be investing. For pension funds, it is also about having uncorrelated assets in different markets to mitigate the risks and to have a stable portfolio.

What could be the role of the SECO and of the PIDG for the investment of pension funds in infrastructure projects?

There might be different ways in which they come in:

1. Pension funds could actually invest in PIDG and its projects portfolio across Asia and Africa, across the various stages of a project's life.
2. Pension funds might invest in one of PIDG's company
3. Investing independently, but alongside PIDG or one of PIDG's company if the pension funds are thus trusting the infrastructure projects.

What is interesting for pension funds in infrastructure projects, are their operational returns. For instance, if an electricity company is functioning well, it will have a very steady stream of cash, there will be very few shocks. Pension funds might not want to be involved in the construction phase of the infrastructure project, as there are so many risks. However, they could get involved in InfraCredit, one of PIDG's company, as it was the case in Nigeria with the investment of local pension funds. But pension funds could get involved later, in the operational stage. PIDG makes the project possible and makes it happen, but does not get involved after that. We could imagine a portfolio of operational infrastructure assets, which would be able to spread out the risks across the world in different places. It is also in the operation phase that you get the steady flow of cash from the assets. That is a model which might be

interesting to the pension funds. An organisation like ACTIS (https://www.act.is/) is very interesting as they have a big portfolio of projects in emerging countries.

Would PIDG be able to provide sufficient guarantees to ensure trust for pension funds investment in infrastructure projects?

PIDG's work is to enable infrastructure to be built and not so much to be involved in that operationalisation stage. Pension funds could come alongside PIDG, but more in the operationalisation phase. PIDG would thus support the risks in the construction stage and pension funds could come in later. Companies running the projects would actually be the ones to get involved with pension funds later on.

So is PIDG interested in getting financing from pension funds?

It is in the InfraCredit example. InfraCredit is a vehicle created by PIDG's company, GuarantCo, in which pension funds can co-invest in projects. GuarantCo's money would be used alongside the pension funds' money in InfraCredit at the local level. But our mandate at PIDG is to take more risks than pension funds would be willing to take. We could however also derisk the projects by having a financial structure in which you would have long-term loans at a lower interest rate.

Isn't there also a cooperation between Allianz and the Emerging Africa Infrastructure Fund?

That's right. Allianz has come with $ 120 million to invest alongside this PIDG company. They are taking the risks, but actually, they are not only interested in the returns, but also in the impact. Pension funds would have to be also interested in the impact, and not only in the returns.

Appendix F

Interview F, with a Financial Risk Manager in a Swiss pension fund (on phone on 20th of April 2018)

Do you invest in infrastructure projects?

Well, I do not know, well, we invest in infrastructure assets, in infrastructure projects, but we do not invest in developing countries. Yes, I think for sure, that certainly gives parallels, but certainly also increased risks, which, in the developing world, are stronger or, yes, I say more pronounced than in the developed countries in this case. But I hope I can help you there anyway.

How does a pension fund work?

How does a pension fund work? So, when you enter the labour market soon... And if you have already reached 25 years, you will pay the pension fund a part of your salary every month, and you will receive a pension once you are retired. So you give the pension fund some money every month and the pension fund invests the money in the financial markets. As soon as you retire, you will receive a retirement pension from the pension fund every month, or you may withdraw the capital immediately. But most people actually take a monthly pension. Well, that's roughly what a pension fund does.

What are the goals of the pension fund? How do you do that, so the investments are safe or what are you paying attention to?

Well, that's certainly the one, the, top priority of a pension fund, that you can pay the benefits, so the pensions at any time. That's really the top priority. And in order to achieve this, there are certain aids. In an ability study, one actually analyses one's own obligations, that is, the annuity payments that are already incurred and the future annuity payments of the workers, which will then be incurred later. You make a risk profile, so how much liquidity do I need each month to mine to pay my pensions. On the basis of this risk profile of the obligation, one then structures the investments.

In the event that they could not pay now, you're probably insured, right?

Well, I do not think that will ever happen. Then you have something in advance, something

wrong calculated. Well, one is surrounded by many consultants, that is, by pension fund experts, who mainly cover the liability, the commitment side. There are also investment consultants, i.e. investment advisers who help you to structure your assets. Basically, you can get there on a common denominator, so that a payment should never be made. Otherwise you can still-, you have to sell certain assets at short notice, to be able to make the payment or you go to a bank and take up short term capital.

Where do you invest the profits from possible investments? So, are they reinvested or what do you do with them?

So, we have defined a strategy. So what percentage of our assets do we invest in equities, how much do we want to invest in real estate and how much do we want to invest in funds. And typically every month or every six months coupons come from the bonds, there are dividends or sometimes a fund is repaid. And then you look at what is the current location and where do I deviate from my target strategy and then you invest again so that you come to his target structure. And periodically we also do some rebalancing, where we bring our location, the effective location back to our target structure.

In which category would an investment in infrastructure projects now fall?

So, if one is repaid, then we would probably invest that again in infrastructure projects. For infrastructure projects, it's a bit more complicated, because they are rather illiquid investments. So, in a rebalancing process, it's harder to do infrastructure projects there, to change allocation at short notice. You can not just invest 10 million more in infrastructure projects from day to day, as is the case with equities. Otherwise, you can not just sell a project from one day to the next. You can sell a project, but then you have to expect a certain discount. And you do not really want that either. Well, you have a few, a buy and hold strategy above all and, yes, it's harder to change the allocation there in the short term.

What is the profitability of such investments?

So, infrastructure projects involve certain risks. And one hopes that one will be compensated for these risks. So for example the liquidity, that is a risk, for which one is compensated. So, you typically compare it to public investments, and then you look at what is the higher return you get on an infrastructure investment and then you assume you have the same credit

risk, which is also an important risk factor. But you have a higher premium, then this is typically liquidity, you then also say complexity premium, which you get because the structuring of an infrastructure is very complex, you have to negotiate a lot and also it takes a long time, until you really get a deal has completed. And for this extra effort would like to be compensated.

Are they mainly in Switzerland or abroad?

No, in Switzerland we have no infrastructure projects. Switzerland is not quite as far as foreign countries. In Switzerland, infrastructure investments are typically still funded either by the state or by banks. Foreign countries are already a bit further. I think the pressure has also been a bit bigger abroad. But we have a global infrastructure strategy. Well, we invest in America, we invest in Europe, but not in all countries. And we are still investing in Australia. These are our three core locations. We are opened to infrastructure projects in Switzerland, should there be any. But even if you compare for example with England, England is much further. Well, the conditions are much better, the contracts are much further, they are more mature than they are in Switzerland. In Switzerland, too, you do not really have much experience with infrastructure projects that are financed by a variety of private investors. And even now, that is to say, such public-private partnerships, that is the kind of cooperation between the state and a private investor, Switzerland does not yet have much experience. Contrary in England or in the USA, yes there one has really already since several years, 20, 30 years approximately.

Do you think that pension funds are PPPs as Private Partners? This also in Switzerland?

I agree. For example, in other deals, this does not necessarily have to be structured as PPP and that is only the case when the state is involved. So, the state is more a regulatory framework.

Do you then invest in individual projects or are there groups of projects, so that the risk is lower somehow?

No, we finance individual projects. I am also not sure from when we could invest in a business, in several projects. You would probably have to go through a fund. But we do direct investments. So, that is, a finance or a transaction is a project. And we actually diversify by

having multiple transactions. Well, we now have about 40 transactions. So, that means we have some diversification in our portfolio.

You have now referred to countries where you invest. Where are the conditions for these projects or the investment locations that you are looking at a market at all?

Our investment philosophy is that when we enter a new market and infrastructure projects were now a new market, we entered it two years ago. Then we do so that we get into low-risk part. Well, they must have at least a credit rating of Triple B, typically of course also the industrialized countries and we also said that we only go to those countries that have political stability and that also have legal certainty. So, those that have a high degree of legal certainty. In case something goes wrong, it would certainly be legal. The political environment, as well as the regulatory environment, has to be really stable and you have to be able to rely on it. And that's why we are now only investing in industrialized countries. And also in industrialized countries, which already have several years of experience, in which the framework conditions are really tested and which have really good general conditions for an investor.

In that case, is the risk appetite of a pension fund probably not that high?

Well, I can only speak for us. But of course, we also have stocks, stocks have a relatively high risk. It's not that we now only have low-risk investments. We just tell ourselves that we only invest in things that we really understand. As I said, infrastructure is also a young market and the pension funds are slowly approaching it. And we believe that we can best build our understanding of infrastructure assets by first funding for lower-risk infrastructure projects, so that we can learn and then, if we see a need, go down in credit rating. But I do not know if the other pension funds do that either. I think there are certainly different ones. The risk appetite is certainly different. Other pension funds may also cover their riskier assets through infrastructure projects. You can achieve different return risk profiles if you want.

You mentioned earlier that you are actually doing direct transactions on infrastructure projects. Are there other ways to invest in such a project than a direct transaction?

Basically, one can distinguish between equity, i.e. infrastructure equity stocks, or debt infrastructure, i.e. debt. And we make infrastructure debt, so we do not buy equity from the pro-

jects, but we pass the debt, which is a first distinction. And then you can either invest indirectly or you can invest directly. Well, we do not buy funds. We do not give a fund or a manager money and then invest in various infrastructure projects, but we go directly into the investment and directly give the investment the money.

And now we are in developing countries. You probably do not invest in such countries because it's too risky or because you do not have much experience with it?

These are certainly two important factors. I also think that in developing countries in particular, political stability is certainly not as high as it is in the US or the UK, for example. Well, one does not know exactly that one has already seen in the past that suddenly an infrastructure facility was expropriated. Well, let's say, the political risk is much higher there and the imputed conditions are much less stable, the investor is much less protected.

With these infrastructure projects, this danger is due to political insecurity or corruption in general in the country. These are also factors that can not be directly influenced by the project manager. So national problems. Do you see a possibility how to insure that anyway or how you guarantee it, so that pension funds can invest in developing countries?

Well, I do not even know if this is wanted, because one takes a higher political risk, if one also gets a higher return, so if one then compares the return is perhaps, so in the investment project area maybe 150, 200, basis points higher. Well, I think you take a higher risk and you will be compensated for it. And I'm not sure if that would have been wanted by the investors, that would eliminate that risk. Otherwise you could invest in industrialized countries right away. Well, but it is clear that in developing countries the need for infrastructure is very high. But yes, I mean, if the risk appetite is there, then you can certainly invest in infrastructure projects in developing countries. That's certainly an attractive investment case.

So, probably also for larger pension funds, with a higher investment volume possible. Because with small ones, it may be harder to diversify your investments if you do not have that much money.

Yes, well, the denominations are certainly larger than public funds, definitely. Well, you have a much higher operational demand, so the information effort is much higher and the monitoring of your current portfolio is much higher. You really have to see what kind of in-

frastructure projects you are investing in here now. So, the surveillance activities are certainly much larger and small businesses and small pension funds often do not have the capacity to do so.

Yes, because you could not imagine that for these ethical or social reasons, a pension fund would invest in infrastructure projects in developing countries?

Well, I'm not sure if pension funds need to run economic policies. I think there are other associations that can or should provide development aid in quotes. I do not think that pension funds have to do that. Well, I would advise a pension fund not to invest for ideological reasons, because one is indeed financial intermediary, so, one manages the money of others.

So how do the funds, shares and real estate, as a percentage of the total, disperse?

Ah, our investment strategy. OK. Well, you can also find them on the internet. I think we have five - we certainly have a below average number of real estate, about four, five, six, seven percent. Well, we have 3 percent in cash, that is, liquid funds. Then we have 36 percent in funds, so bonds. We actually have two insurance plans. We have 58 percent bonds. Then we have 29 percent in stocks. Then we still have two percent commodities and we have eleven percent in real estate.

Appendix G

Interview G, with an Expert in Development Economy and Environment (on 9th of May 2018)

What do you think about the idea that pension funds should invest in infrastructure projects in developing countries?

Well, pension funds are in general quite conservative and there are a lot of regulations. I've recently talked with the CEO of Unilever and he told me that for example UNCTAD sometimes covers the additional risk of big investments, as for example of UBS. That's why, I would rather start with commercial institutions, as banks. In regard to pension funds, risks must be reduced, otherwise they won't invest in infrastructure projects in developing countries. In the UK, pension funds must demonstrate if they invest in social projects. Actually, impact investing is relatively secure nowadays and gets more and more importance. If the CO2 regulations get more restricted, fossil investments devalue. So, it would make sense to diversify the portfolio.

Appendix H

Interview H, with a Finance Expert (on 11th of May 2018)

Do you have experience in working with pension funds?

Yes, we are collaborating with pension funds but they're mainly investing in micro finance, private equity and women empowerment in emerging and frontier markets. We don't have any pension funds investing in infrastructure projects yet. We've recently undertaken a market sounding and came to the conclusion that the interest to invest in infrastructure projects is present but most of the pension funds are quite conservative in regard to the risks.

How could the risks for investments in infrastructure projects in developing countries be reduced?

Actually, the risks are not that high. I can't proof this empirically but in general – and also with my experience in microfinance – the risk perception is much higher than the real risk. Therefore, it is important to educate the investors about the real risks of investments in infrastructure projects in developing countries. Moreover, it is crucial to invest in the right structures.

Also, the concept of blended finance is very attractive. Blended finance projects are separated into two groups: Junior Share Class and Senior Share Class. Governments and development banks are part of the Junior Share Class, whereas private investors, as pension funds, are part of the Senior Share Class. They finance together various projects. For example, if they finance 20 projects of which 17 are successful and 3 fail, the Senior Share Class only finances the 17 successful projects and the Junior Share class assumes the losses of the 3 failed projects. So, private investors are more likely to invest because their "worst case" perception is different, as they are only responsible for the successful projects. This concept is actually successful for all actors. Even the stakeholders of the Junior Share Class have never lost. Moreover, development banks have another risk perception and get very high returns because they know the markets in developing countries quite well. So, on one hand, this concept is attractive for development banks because they get high returns. And on the other hand, through the mechanism of "derisking", investments in infrastructure projects get attractive for pension funds.

Reducing risks happens mainly through guarantees and so-called risk transfers. Risk mitigation is more difficult as the political environment of developing countries can actually be quite challenging. So, it is hard to minimize political risks. One possibility could be to really work with experts, as investment managers and development banks, because they have a country expertise. Another possibility would be to choose well-structured projects. And third possibility is that project developer also invests in the projects, which would make him more responsible.

Are there other mechanism to attract pension funds investments for infrastructure projects in developing countries?

Funds could be another way for pension funds to invest indirectly into infrastructure projects. Funds are better than single investments. First of all, an investor can diversify its portfolio. And second, funds are more efficient. PIDG could for example create a fund for pension funds.

How is the legal framework for pension funds in regard to their investments?

In Switzerland pension funds must have a reasonable risk-return profil. Until now, we never experienced problems with the legal framework (*Richtlinien*). Pension funds are legally binded by the "BVV Richtlinien 2". The "BVV Richtlinien 2" have different buckets and one of them is called alternative investments. Infrastructure projects are part of this bucket. Pension funds are relatively free where to invest their money. So, if the risks are not too high, as for example through guarantees or blended financing, pension funds could invest their money in infrastructure projects in developing countries.

What role could the SECO play?

First of all, the SECO could play a role in regard to education. Second, they could share their expertise of successful projects in order to demonstrate that infrastructure projects in developing countries can be successful. Third, they could be a partner for development banks or investment managers. For example, the SECO supports financially technical assistance for our projects. As mentioned before, it is crucial to develop good projects, so SECO could directly or indirectly support the pre-structural phase. For example, we hire experts in the re-

spective countries to ensure that the projects are well developed. So, the area of capacity building is very important.

Other projects?

The European Investment Bank finances energy projects: http://www.eib.org/?lang=de . And the Green Climate Fund of the UN also has several projects: https://www.greenclimate.fund/home

But I don't know any pension fund investing directly in infrastructure projects in developing countries.

How do you evaluate our recommendations?

I think the investor brochure is a good idea.

If pension funds only invest in the operational phase, important investments for the previous phase are missing. But of course, investing only in the operational phase is less risky.

The idea of funds is also a good idea. Maybe you could promote the option of blended finance.

The problem in regard to investments in US Dollars is that there remains an underlying currency risk. This means that someone has to be responsible for the hatching costs, so you would need some further guarantees, which is expensive.

In general, how do you evaluate the idea that pension funds should invest in infrastructure projects in developing countries?

From a developmental perspective it certainly makes sense, especially if you want to close the infrastructure gap. It makes also sense from an investment perspective as investors could get high returns and diversify their portfolio. Infrastructure investments in developed countries continuously increased in recent years. You just need the right investment vehicles for developing countries. So, it is a matter of time.

Appendix I

Interview I, with a Manager in a Swiss Pension Fund (on 9th of May 2018)

Wie would like to ask you whether you invest in infrastructure projects in developing countries and if yes, why and where?

No, we do not at all invest in infrastructure.

Is this decision based on regulatory framework?

No those decisions do not base on a regulatory framework. Our pension fund regularly checks its investment assets and looks for new investment assets. We have also looked at infrastructure investing as an option. However, we came to the decision that we don't want to invest in that asset class. We didn't find any viable projects.

Do you think this decision will change in the future? Because there is a trend, especially looking at Canada and Australia for investments in infrastructure.

I think that we would invest in infrastructure to a degree like Canada or Australia are doing it, I think will not happen. But I'm sure that infrastructure investments will establish itself in the future but I don't think those investments will make up a great amount of the balance sheets of pension funds.

What we think, is that there is no need for a great percentage of infrastructure investment. With the amount of capital that pension funds hold, only a small percentage into infrastructure investment would be needed in order to make a difference.

At this point we have to clarify if we understand the same when talking about infrastructure.

When talking about infrastructure, also with regard to pension funds, we can see that there is no infrastructure prevalent at all. Could you imagine that your pension fund would eventually invest in infrastructure in Africa?

No! I can't imagine that. When we talk of infrastructure, we talk of infrastructure only in developed countries and explicitly not of infrastructure in developing countries. The reason for that is simple. We have a mandate which is defined by law and this mandate includes

making money. We don't want to do development aid.

Sure! But it's interesting, because the projects in developing countries do make money. When we talk of infrastructure investing we don't mean doing development aid.

Yes but it is hard to find projects in those countries with which you can make money. Its the same when we talk of investing in African stocks. We could do that but the problem here is similar. There are not a lot of stocks, as there are not a lot of infrastructure projects in those countries. The costs for evaluating those options and to look for viable projects are just too great. Another important criteria with regard to infrastructure is politics.

What do you think if an organization such as the PIDG would present you with viable projects and if the group would guarantee you that the project would create returns, would you consider investing in such projects?

Of course! We just need to know that the money we invest that we get it back. If we find an intermediary, which can show us the way then we are open to such investions in infrastructure projects.

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- that we have written this work on our own without other people's help (copy-editing, translation, etc.) and without the use of any aids other than those indicated;
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