INTERGOVERNMENTAL GROUP OF TWENTY FOUR
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Global Green Growth Institute

WORKING PAPER SERIES

# Infrastructure Finance in the Developing World

## Private Finance for Infrastructure Investments: Analysis and Implications for New Multilateral Development Banks

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## 1. Introduction to Private Capital Use in Infrastructure Projects

Infrastructure is a typical public good and should be financed on the public balance sheet in most cases. However, in recent decades, inefficiencies in public spending, misallocation of resources, and political interference have resulted in suboptimal capital spending. From 1980 to 2005, the average ratio of fixed investments to GDP declined from above 4% to approximately 3%, with a prevailing trend toward more public–private partnerships (PPPs) (OECD 2013). Considering current public budget constraints in many countries due to global economic pressures, filling the infrastructure gap will require a shift toward greater private capital fundraising.

In response, the private sector has begun to play a substitution role in infrastructure spending. Banks and other institutional investors have contributed to close the infrastructure gap in ways that can be mapped according to the instrument used (debt, equity, or hybrid financial instruments) and status as a listed or unlisted asset class (Figure 1).

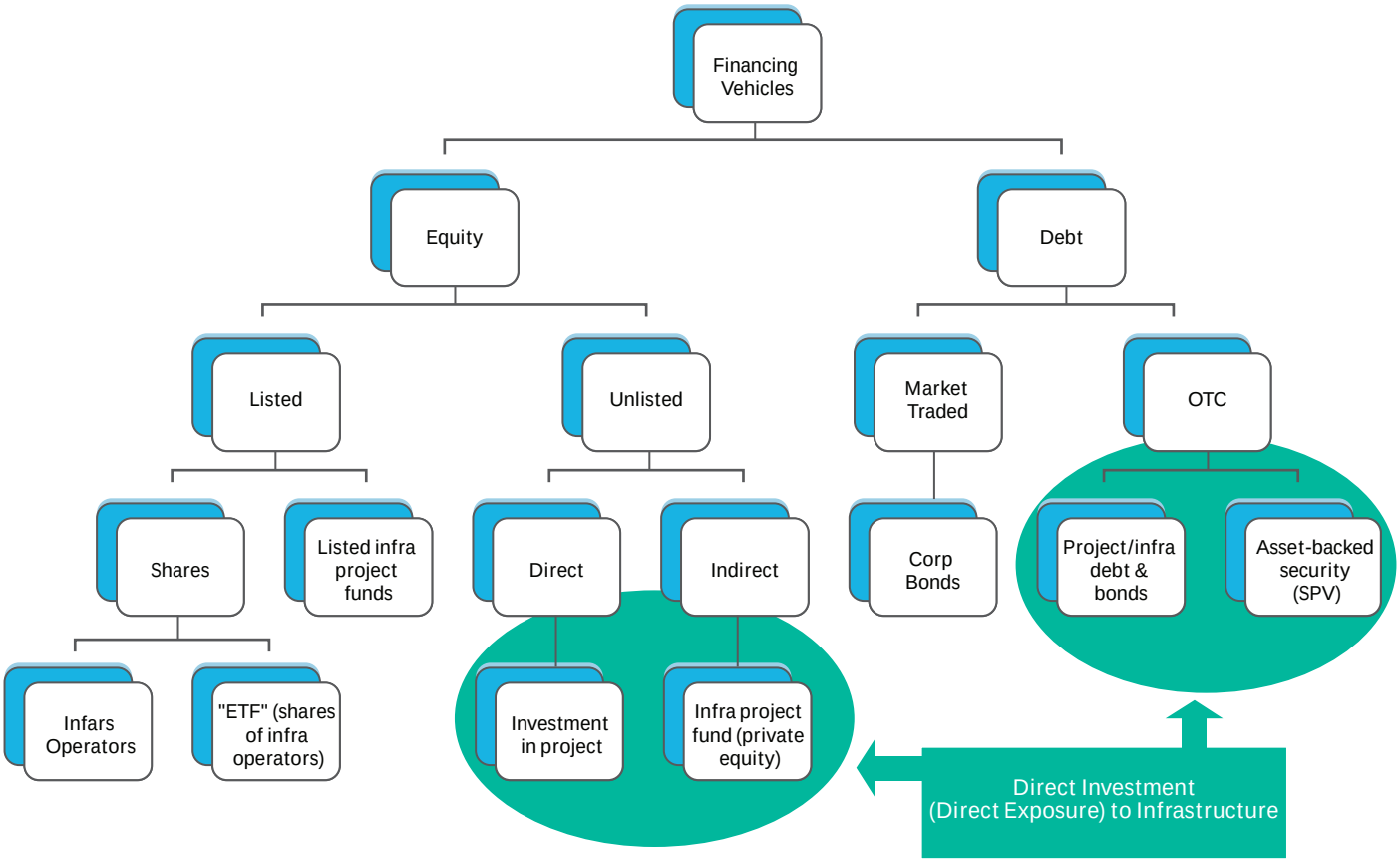
This paper examines investments—in the form of equity or debt—in direct investments to infrastructure. The reason for focusing on direct investment is twofold. First, the overall analysis of debt and equity capital markets for infrastructure exceeds the scope of this study and involves instruments that trade on regulated stock and bond markets. Second, the analysis of direct investments by private investors in listed infrastructure enables us to focus more on the risk analysis process that these investors typically perform when approaching an investment.[1]

Over the past few years, industrial developers, equity investors (often known as *project originators* or *project sponsors*), and banks have increasingly used project finance to apply private money to infrastructure. In project finance, banks and other lenders determine whether a special purpose vehicle (SPV)[2] can cover operating costs and service debt from cash flow generated by the infrastructure. The SPV's assets become part of the collateral for the loans, playing a secondary role to project cash flows. Furthermore, the rights and obligations associated with the investment project are related only to the SPV, and there is no recourse financing.

The private sector has utilized project finance for infrastructure development because it can offer certain advantages over normal corporate financing. These include

- Financing on a non-recourse or limited recourse basis eliminates the effects of project failure for sponsors. This is the key factor for deciding to adopt the project

**Figure 1. Different Approaches to Infrastructure Investments by the Private Sector**




*Source:* OECD (2014)

finance approach. Under project finance, each sponsor's liability is limited to the equity they provide to the SPV.

- As elaborated in Section 3, project finance is based on an in-depth analysis of risks and their allocation among participants. If risk coverage is optimal, the deal can be financed with a very high debt-to-equity ratio—a method that would be difficult to use if it were financed on balance sheet.
- If an enterprise finances a project on balance sheet, banks can get collateral protection on all the enterprise's assets, not just project assets. In project finance, the only guarantees provided concern the project assets, and a sponsor's assets remain unaffected.

Separate incorporation and intense risk management are the two more evident advantages of using project finance because spreads on loans can be reduced to create more leverage (Corielli et al. 2010).

On the other hand, sponsors bear some costs despite lower spreads, and the project finance instrument is not without its disadvantages, some of which include

- Project finance contracting is time consuming and is more expensive than a standard corporate finance loan agreement. Esty (2004) indicates a closing interval of 6 to 18 months.
- Transaction costs due to initial contracting, legal costs, and advisory fees are an important item of capital budgeting. Esty (2004) estimates transaction costs between 5% and 10% of the total project cost. High startup costs also explain the reason for project finance having minimum size constraints and being impractical for smaller deals.
- Risk management does not come for free. Every contractual agreement aimed at limiting the risk of the SPV must be paid by project sponsors. For example, Blanc-Brude et al. (2006) quantify a 25% higher construction cost for projects financed via PPPs compared to traditional public procurement. Grout (2008) reports that the advantages of intense risk management are offset by higher construction costs in several cases. This indicates that higher construction costs are the price the sponsoring public administration pays to shift construction risks to the private partner.
- Project finance is more difficult to implement in countries with macroeconomic instability, as well as in those with weak institutional quality, high corruption, ineffective rule of law, and a limited track record of PPP experiences (Hammami et al. 2006). This is because the quality of institutions is essential in a financial

**Figure 2. Evolution of Syndicated and Project Finance Loans Worldwide, 2006–2012**


*Source:* Thomson One Banker

formula strongly dependent on a robust network of contracts and on the possibility of enforcing them when necessary (Tung et al. 2008).

Project finance has been used in the US since the early 1930s in oilfield development and later in Europe since the beginning of the 1980s. It has been systematically used since then in numerous sectors in association with large-scale infrastructure projects. The market has grown significantly in recent years. According to Thomson One Banker, the global project finance loan market reached a record peak of US$247 billion in 2008 but then declined sharply after the onset of the financial crisis before rebounding toUS$197.5 billion at the end of 2012. Project finance constituted approximately 6% of all syndicated loans worldwide in 2012, after the 9% peak of 2008. (Figure 2)

Today, project finance is widely used in both developing and industrialized countries. Data indicate a concentration of project finance loans in four geographic areas—Western Europe, North America, Africa and Middle East, and South Asia—which respectively constitute approximately 28%, 12%, 13.5%, and 13.5% of the total global value of project finance loans. This has been relatively stable over time (see Table 1).

Data indicate that the relative volume of project finance loans as a percentage of total syndicated loan volume is not lower in developing countries than in developed ones. In developing countries, the approach is still mainly adopted for basic infrastructure (energy and power, mining and natural resources, oil, and gas), whereas it is used for the more advanced stages of economic development in industrialized countries, including social infrastructure. At a global level, Thomson One Banker data indicate that the power, oil and gas (63%), transportation (20%), and telecommunications (2%) sectors used project finance the most at end of 2012 (see Table 2).

The rest of the paper is organized as follows. Sections 2 and 3 analyze infrastructure projects as a nexus of contracts and pool of risks. These sections provide a taxonomy of risks and analyze their possible impacts on private investors. Section 4 highlights the most important variables that investors look at when deciding to invest money in infrastructure projects. Section 5 draws conclusions from the previous sections and identifies some possible implications for the design of the business model of a newly created multilateral bank for Brazil, Russia, India, China, and South Africa (BRICS) countries.

## 2. Infrastructure Projects: A Nexus of Contracts

Project finance is an arrangement whereby lenders are incentivized to finance a project because there is sufficient cash flow available to cover operating costs and to service debt during the life of the project. In other words, the project has strong potential to generate cash. From a legal perspective, project finance arrangements are a smart alternative to traditional investment options as they completely separate the venture and all associated financing from the businesses of the sponsoring shareholders by creating an alternative legal entity in the SPV.

## Table 1. Global Project Finance by Geographic Area (US$ mil), 2011–2012

| | 2011 | | | 2012 | | |
|---|---|---|---|---|---|---|
| | Amount | Number | % of total amount | Amount | Number | % of total amount |
| Central America | 1,879.20 | 9 | 0.9% | 7,890.00 | 20 | 4.0% |
| South America | 11,680.60 | 27 | 5.4% | 9,379.80 | 27 | 4.7% |
| Carribean | 1,156.00 | 3 | 0.5% | 25.00 | 1 | 0.0% |
| North America | 23,589.40 | 78 | 11.0% | 22,102.70 | 80 | 11.2% |
| Total Americas | 38,305.20 | 117 | 17.9% | 39,397.50 | 128 | 19.9% |
| Africa and Middle East | 16,870.50 | 29 | 7.9% | 20,717.50 | 42 | 10.5% |
| North Africa | – | 0 | 0.0% | 4,488.80 | 3 | 2.3% |
| Sub Saharian Africa | 5,786.00 | 15 | 2.7% | 9,403.60 | 25 | 4.8% |
| Middle East | 11,084.50 | 14 | 5.2% | 6,825.10 | 14 | 3.5% |
| Europe | 67,443.80 | 211 | 31.4% | 46,298.40 | 176 | 23.4% |
| Eastern Europe | 15,302.00 | 21 | 7.1% | 9,030.50 | 21 | 4.6% |
| Western Europe | 52,141.80 | 190 | 24.3% | 37,267.90 | 155 | 18.9% |
| Central Asia | 570.00 | 2 | 0.3% | 2,914.00 | 2 | 1.5% |
| Total EMEA | 84,884.30 | 242 | 39.6% | 69,929.90 | 220 | 35.4% |
| Australasia | 23,382.00 | 52 | 10.9% | 42566.5 | 34 | 21.5% |
| Southeast Asia | 14,035.90 | 41 | 6.5% | 13530.3 | 31 | 6.8% |
| North Asia | 6,449.60 | 21 | 3.0% | 8093.3 | 34 | 4.1% |
| South Asia | 45,925.70 | 124 | 21.4% | 21643.6 | 83 | 11.0% |
| Japan | 1,524.10 | 16 | 0.7% | 2365.5 | 11 | 1.2% |
| Total Asia-Pacifc | 91,317.30 | 254 | 42.6% | 88,199.20 | 193 | 44.7% |
| Total Global Project Finance | 214,506.80 | 613 | 100.0% | 197,526.60 | 541 | 100.0% |

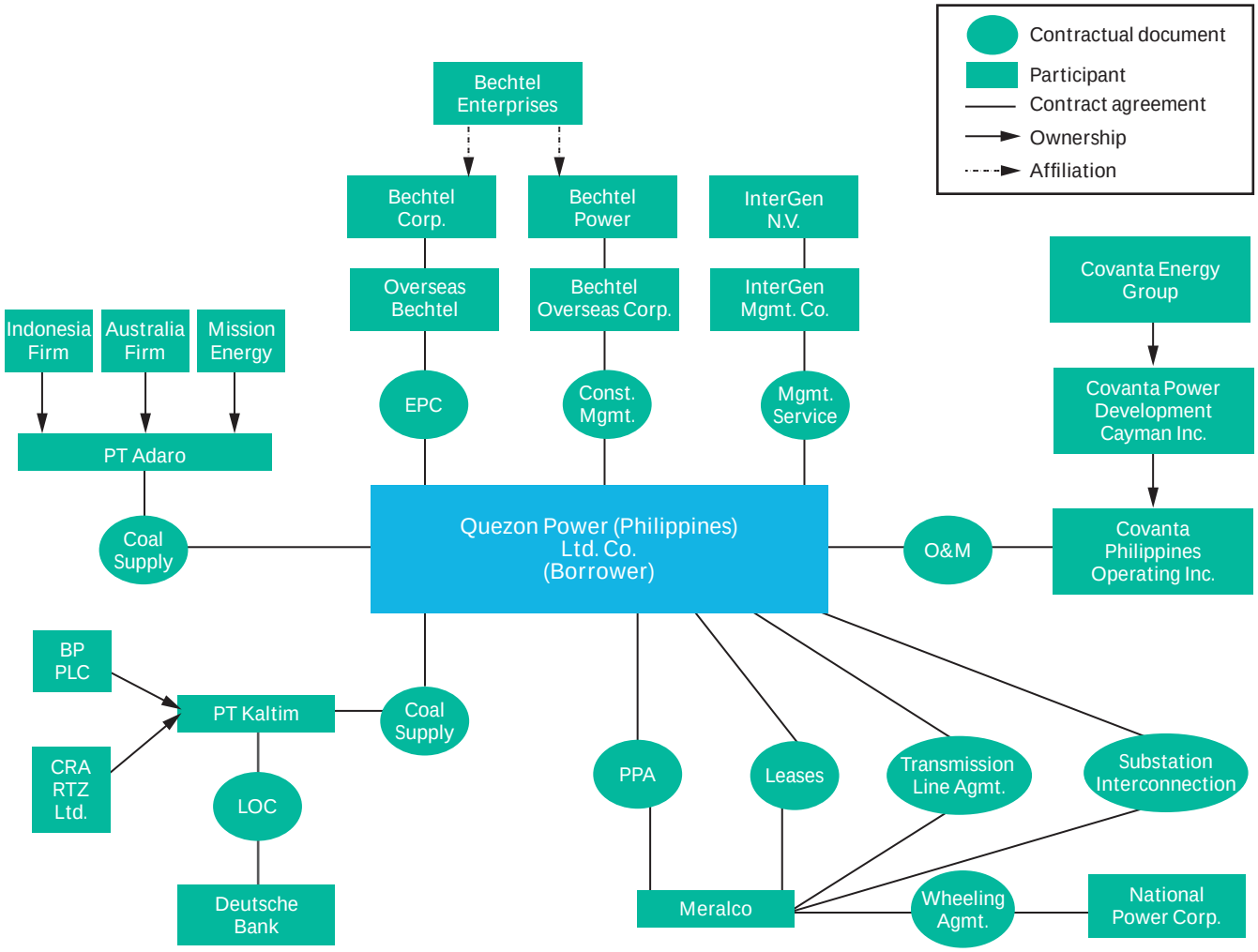
*Source:* Thomson One Banker

## Table 2. Global Project Finance by Sector (in US$ mil) 2011–2012

| | 2011 | | | 2012 | | |
|---|---|---|---|---|---|---|
| | Amount | Number | % of total amount | Amount | Number | % of total amount |
| Power | 81,534.20 | 299 | 38.0% | 64,014.60 | 283 | 32.4% |
| Transportation | 44,724.00 | 110 | 20.8% | 40,202.40 | 94 | 20.4% |
| Oil and Gas | 39,391.70 | 63 | 18.4% | 60,681.00 | 56 | 30.7% |
| Petrochemicals | 4,364.80 | 11 | 2.0% | 4,311.10 | 11 | 2.2% |
| Leisure, real estate, property | 14,494.00 | 57 | 6.8% | 10,413.90 | 47 | 5.3% |
| Industry | 12,154.90 | 17 | 5.7% | 7,605.40 | 12 | 3.9% |
| Water and sewerage | 997.20 | 8 | 0.5% | 3,285.20 | 12 | 1.7% |
| Mining | 10,328.60 | 27 | 4.8% | 4,513.60 | 15 | 2.3% |
| Telecommunications | 5,314.00 | 10 | 2.5% | 1,529.10 | 4 | 0.8% |
| Waste and recycling | 724.10 | 8 | 0.3% | 842.30 | 6 | 0.4% |
| Agriculture and Forestry | 479.00 | 3 | 0.2% | 128.00 | | 0.1% |
| Total Global Project Finance | 214,506.50 | 613 | 100.0% | 197,526.60 | 540 | 100.0% |

*Source:* Thomson One Banker

**Figure 3. Example of a Project Finance Network of Contracts**




*Source:* Bonetti et al. (2010)

*Notes:* EPC - Engineering, procurement, and construction; O&M - Operations and maintenance; LOC - Letter of credit; PPA - Power purchase agreement

Figure 3 provides a typical structure for a project finance arrangement. While this case refers to the power sector, contracts are similar in other sectors. Project finance is a network of contracts that revolves around the SPV, which is useful to understand a "shell company." The SPV's only purpose is to create an entity vested with all the rights and obligations detailed in the network of contracts. The SPV cannot directly construct or operate the infrastructure because it is not a construction or management company. However, it is a fully outsourced entrepreneur with a series of contracts.

The SPV stipulates a series of financial and nonfinancial contracts to execute and manage the project, ensuring that it produces cash flows to cover costs, repay debt and interests, and pay dividends to its sponsors. The four key contracts (*purchase agreements, selling agreements, construction contract*, and *operations & maintenance (O&M) contracts*) are essential at different stages of the infrastructure's life. The project finance arrangement is considered a success when all parties involved have their interests satisfied simultaneously. In the process of administering a project's key functions, the key contracts often require subcontracts with third parties and related provisions for collateral—a complex system that exists entirely to manage risk.

Contract preparation is extremely important to effectively manage project risk. Contracts are jointly negotiated by the sponsors' and banks' legal counsels, who are the first consultants to become involved in the deal, given the importance of legal aspects.

While the existence of an SPV is neither a necessary nor a sufficient condition to qualify an arrangement as project finance per se, it is preferable from both the lenders' and legal perspectives to establish a vehicle legally separate from the sponsors for two reasons. First, it facilitates investment evaluation by enabling lenders to assess only a single project as opposed to all the sponsors' assets. Second, the legal separation of the SPV from the sponsors means that sponsors' pre-existing creditors cannot request payment of sponsors' debts from the project's cash flows or assets.

Some parties perform multiple roles in their relation to the SPV, as depicted in Figure 3 where Covanta Energy Group acts as an O&M agent and at the same time as a project sponsor. A brief description of each role follows.

## 2.1. Project Sponsors

Sponsors are corporations, private equity infrastructure funds, or public entities[3] that setup the project finance arrangement by establishing the SPV and providing it with equity capital. The sponsors in Figure 3 are Intergen NV and Covanta Energy Group. Private sponsors typically participate in project finance because the initiative is linked upstream or downstream to their core business. Therefore, sponsors frequently become a contractual counterpart of the SPV.[4]

Public sponsors aim at financing public utilities and provide efficient services with limited use of public money. This is one of the various PPP models used to involve private capital in public infrastructure. The public body assigns construction and operation duties of an infrastructure project to a private party in the form of a concession on a build–operate–transfer (BOT) basis. Examples of such PPPs are found in the waste-to-energy and water treatment sectors and in construction of transport infrastructures such as highways, bridges, and tunnels. Public entities in many industrialized countries have increasingly used project finance to create public works that require substantial public grants to supplement project operating revenue, such as in the case of social infrastructure (i.e., hospitals, prisons, student accommodation, or social housing).

Financial sponsors typically invest money in SPVs without bringing industrial knowhow and expertise. Their interest is to invest in a long-term project in regulated sectors with high entry barriers, low demand elasticity, and stable cash flows.

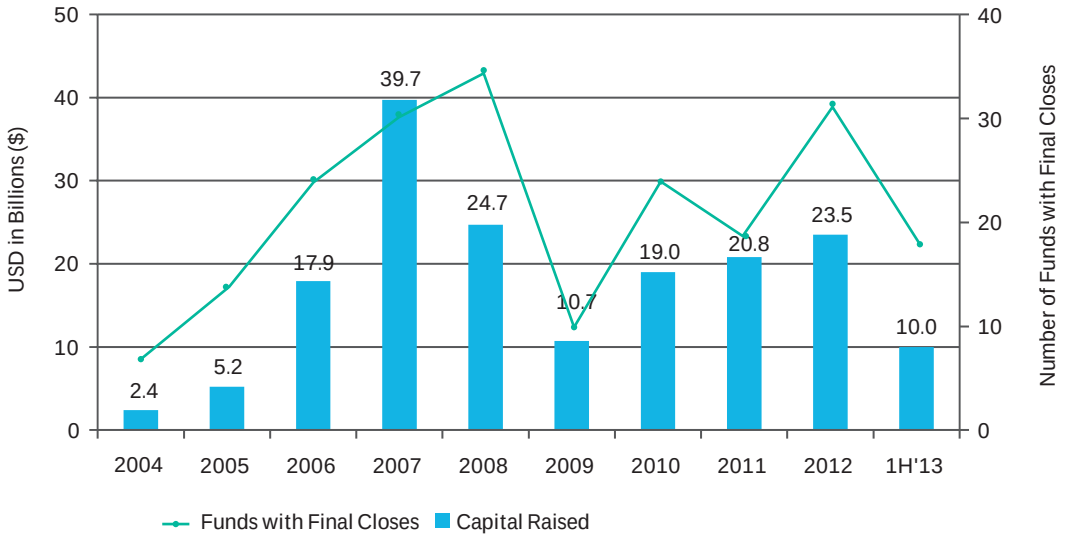
Since the mid-2000s, the financing of project finance transactions—essentially a mix of equity provided by industrial sponsors or public bodies and privately held bank debt—has radically changed on both the debt and equity sides. The main reasons can be traced to the intrinsic characteristics of infrastructure investments accompanied by extraordinarily low interest rates, particularly in the US and Western Europe.

The search for yields and the relatively stable cash flow performance of infrastructure has attracted a higher interest from long-term investors such as insurance companies, pension funds, and foundations/nonprofits. Infrastructure equity funds and the development of the new segment of project bonds backed by monoline insurers created a favorable environment to attract private capital to infrastructure outside the restricted circle of industrial sponsors and banks.

The abrupt breakthrough caused by the default of Lehman Brothers in September 2008 and the subsequent downgrade of many monoline insurers has slowed this search for yield. However, data presented in Figures 4 and 5 indicate that the equity and project bond segments are recovering quite rapidly.

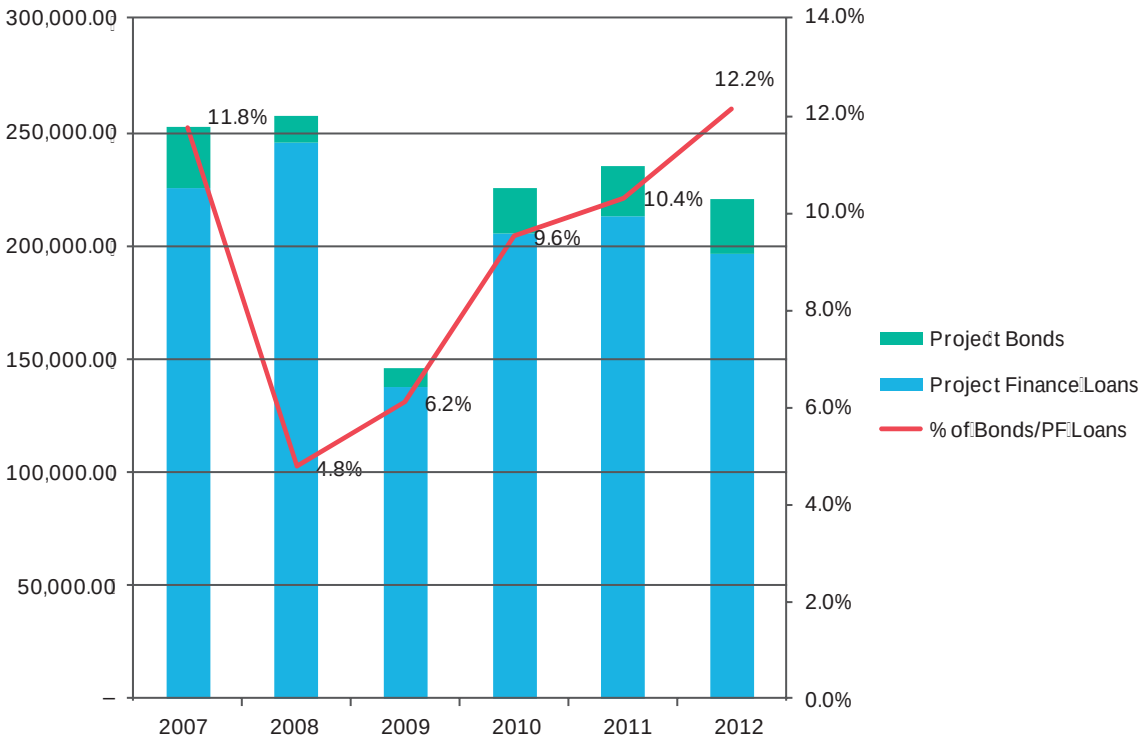
Geographically, global allocations or allocations to US and European projects still represent a large proportion (Figures 6 and 7) of total investment. However, Asia, Latin America, and other emerging countries constituted approximately 30% of the funds raised in 2012. In terms of the investment types, brownfield (i.e., investments in infrastructure projects that have already completed their construction phase) and mixed brownfield/greenfield represent more than 60% of the raised capital, indicating that financial investors still prefer to concentrate their investments on less risky projects than on greenfield (i.e., projects fully exposed to construction risk).

**Figure 4. Global Infrastructure Fundraising**



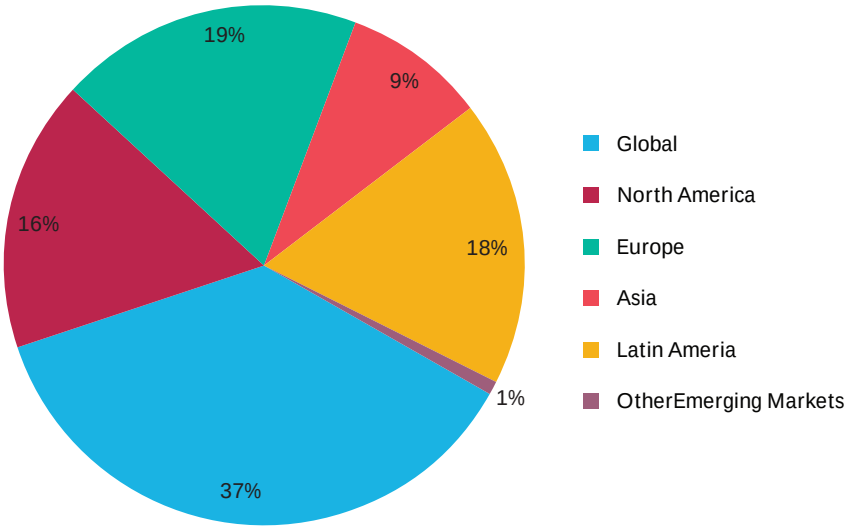

*Source:* Probitas Partners (2013)

**Figure 5. Amount of Project Finance Loans and Project Bonds (2007–2012)**




*Source:* Gatti (2014)

**Figure 6. Infrastructure Fundraising in 2012 by Region (Capital Raised)**




*Source:* Probitas Partners (2013)

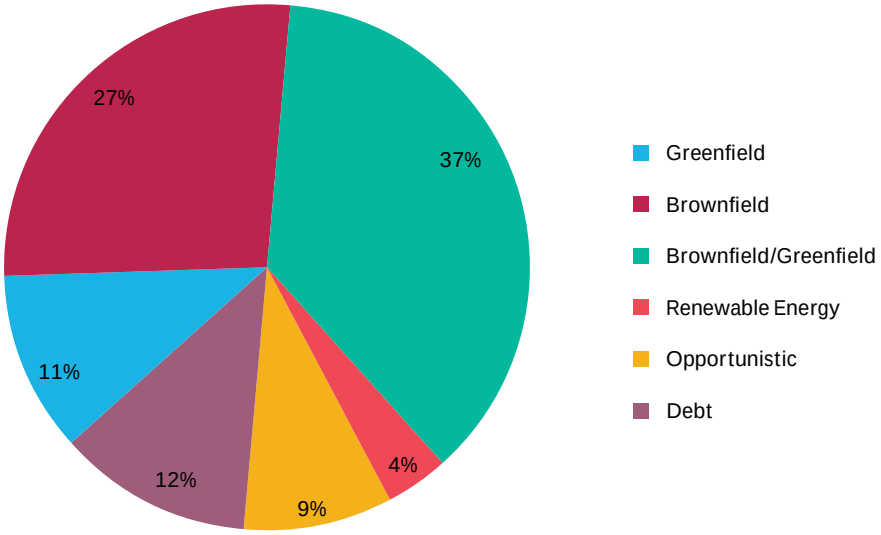
*Note:* Does not include infrastructure funds-of-funds.

Figure 8 indicates the factors that investors consider when deciding to invest in infrastructure located in emerging markets. The annual survey prepared by Probit as Partners indicates that approximately half of the respondents in 2012 are less interested in the sector due to political, economic, or currency risk factors, although they consider the asset class very promising in the long run.

## 2.2. Contractor

The engineering, procurement, and construction (EPC) contractor (Bechtel Corp. in Figure 3) is responsible for the entire construction phase. The contractor is always a consortium of enterprises headed by a general contractor who then subcontracts a certain part of the overall work to other enterprises. The general contractor is responsible for contractual commitments made to the SPV and for

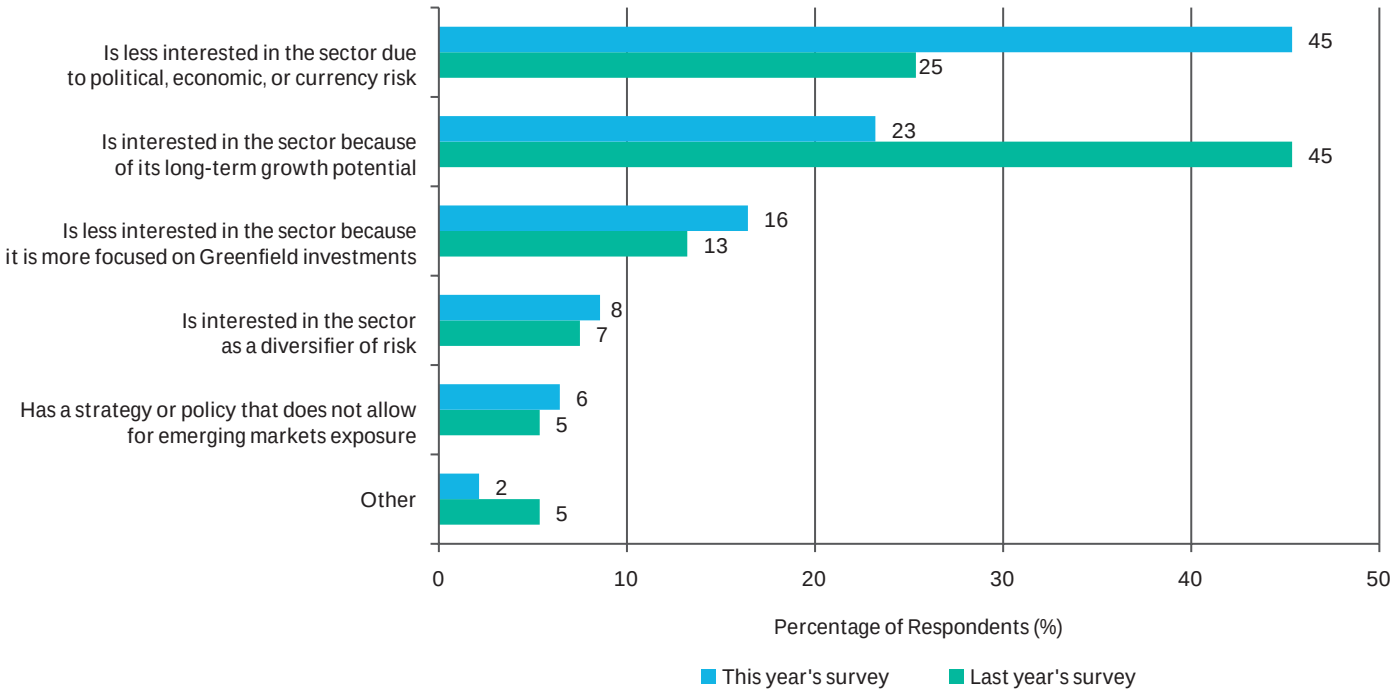
**Figure 7. Type of Investment in 2012 (Capital Raised)**




*Source:* Probitas Partners (2013)

*Note:* Does not include infrastructure funds-of-funds.

**Figure 8. Key Factors Affecting Allocation of Resources to Infrastructure in Emerging Markets**




*Source:* Probitas Partners (2013)

completion of the work as prescribed, either directly or by its subcontractors. In some projects, the general contractor can also conduct O&M of the infrastructure after completing construction. The contractor is also frequently a sponsor of the SPV.

## 2.3. O&M Agent

This party secures the facility from the contractor on completion of the construction phase at the commercial operations date (COD) and operates it while handling maintenance, guaranteeing the SPV a predetermined level of performance standards. In Figure 3, the O&M agent is Covanta Philippines Operating Inc. There may be more than one O&M agent such as in the highway sector, where one agent manages cash collections at tollbooths while another is responsible for road maintenance. The agent receives either a periodic fee, a fixed amount, or compensation on a pass-through basis (an amount comprising costs incurred plus a percentage agreed to by the SPV). As in the previous case, it is quite common for the O&M agent to also be one of the SPV's sponsors.

## 2.4. Buyers

These are the counterparties of the SPV sales agreements. Sales can either be to a retail or end users market (for example, in the case of supplying drinking water, hotel

services, leisure parks or toll-road facilities) or to a single wholesale purchaser (the offtaker) who purchases the SPV's entire production. The SPV's sponsors can also be purchasers of the product, such as in the oil and gas, mining, or power sectors. In Figure 3, the offtaker of the Quezon Power Ltd production was Meralco, the Philippine Islands Electricity Public Utility.

### 2.5. Suppliers

Suppliers sell raw materials required for the project to the SPV. In many cases, there are very few suppliers: the optimal situation occurs when a single supplier is able to cover the SPV's entire input needs. In such cases, however, the sponsors' advisors will always try to identify an alternative source of supply if the single supplier is unable to fulfill its obligations. Moreover, it is common for the supplier to be a sponsor of the SPV. In Figure 3, PT Kaltim and PT Adaro are the coal suppliers for the Quezon Power plant.

### 2.6. Public Administration

This party has two roles in project finance deals. On one side, it participates in a BOT concession to the SPV, delegating the planning, financing, realization, and operation of the infrastructure concerned. This is the approach used in most PPP projects. On the other side, the public administration can provide equity for the SPV during the construction or operations phase or by providing guarantees to lenders in case of project underperformance to attract more private capital. More generally, the public administration can condition project finance initiatives given that (1) it issues authorizations, licenses, and permits (delays which can negatively impact the financial conditions of the project) and (2) political pressures can result in lengthy contract (re)negotiations with private parties (with negative effects on profitability and sustainability).

## 3. Infrastructure Projects as "Bulks of Risks"

Identification of parties involved in a project finance deal is a fundamental activity jointly performed by sponsors and lenders to analyze an initiative's risks. Knowledge of the parties involved and the project's risks form the basis of a sound and bankable business plan and financial model. In principle, private creditors evaluate the project only on the basis of the SPV's ability (not of its sponsors) to generate cash flows with the infrastructure. In reality, banks, lenders, and rating agencies carefully examine the track record and reputation of the sponsoring firms. As project finance is a network of contracts and the SPV is an empty shell company, its success is strongly linked to the ability of the different contractual counterparties to guarantee ex-ante commitments with the SPV. Private creditors favorably examine the project finance deal only if sponsors and contractual parties can demonstrate a track record of experience, reputation, and sound financials. Newly created sponsoring firms without a positive track record rarely approach private lenders for project finance because the risk is unsustainable for creditors.

The risk management process is crucial for the deal's success. Equitable balancing of interests for each party involved in the deal is based on identifying risks associated with the venture, assessing their impact on cash flow generation and defining the most adequate methods to allocate them.

In this sense, project finance can be considered a technique for distributing risks to those participants best suited to manage them appropriately. Ring fencing is based on the quality and strength of contracts between the SPV and key parties and is even more important than collateral on project assets.

Creditors, in agreement with sponsors, aim at ring fencing the SPV and thus hedge against events that could negatively affect future cash flows, exposing the SPV to only low-impact risks. Appropriate risk allocation therefore means project cash flows are less volatile. Given that the SPV's project will produce less risky cash flows, lenders should appreciate the effects of ring fencing and accordingly reduce the cost of funding to the SPV, enabling the sponsors to use a higher debt-to-equity ratio. Corielli et al. (2010) indicate that the lack of relevant nonfinancial contracts increases loan spreads by 19 basis points and causes the debt-to-equity ratio to decline by 1.1×.

### 3.1. Risk Mapping and Allocation

In project finance, risk is an idiosyncratic component of each transaction, and each venture generates its own specific risks. However, approaching risk analysis and mapping in infrastructure projects is possible using broad risk categories that can be generalized to a large number of initiatives.

The simplest method for risk mapping is to use an intuitive chronological approach. This method is also useful from the perspective of the valuation of the cash flow performance, project profitability, and sustainability (see Section 4).

The chronological approach is based on the two main phases of the project life: the construction or pre-completion phase and the operating or post-completion phase. Each phase is exposed to different risks that could affect the venture's overall outcome. This classification is conveniently used to categorize equity investors in infrastructure, splitting them into either greenfield or brownfield investors. Greenfield investors participate in the project development from the beginning of the construction phase, whereas brownfield investors participate from the beginning of the operational phase. According to this approach, the sequence of risks to be allocated and hedged includes

- Risks in the pre-completion phase;
- Risks in the post-completion phase;
- Risks in both the pre- and post-completion phases.

## 3.2. Risks in the Pre-completion Phase

The construction phase is crucial for the future performance of the infrastructure. Materialized risks will significantly impact the venture's success because they occur when the project is unable to generate positive cash flows. During construction, the risk is mainly borne by lenders; if the project were to fail during this phase, the majority of funds at risk would be the loans granted by creditors. A study conducted by Moody's (2010) on a sample of 2,689 project finance loans in 1983–2008 indicates that the 10-year cumulative default rate of 11.5% is lower than the default rate for corporate issuers of low investment grade/high speculative grade (21.13%). However, the same study indicates that infrastructure projects still under construction experience defaults earlier and emerge later from bankruptcy than projects still in operation. The average recovery rate is lower for projects experiencing a default during pre-construction and construction phases, and construction risks are a key factor in determining the future success of the infrastructure investment.

### 3.2.1. Engineering and planning risk

Engineering and planning risks can compromise the project at an early stage of development. Engineering risk is the possibility that the technological design or license may not result in a functioning plant. Technological risk, similar to the aforementioned risk, occurs because of using an untested or little known technology. Planning risk considers the timing of activities required to construct the plant and their possible inefficient coordination.

Hedging such risks is difficult. In general, project finance is rarely used to finance a deal in which the project is entirely based on innovative technology. Parties would be unwilling to undertake the risk of failure when the technology underlying the deal is untested. Excluding full recourse financing to sponsors during the construction phase (which would turn the deal into more traditional, full recourse corporate financing), such deals are financed on a corporate and not on a project basis.

The valuation of engineering and planning risks is attributed to independent technical advisors who must (1) assess the effectiveness of the technology, whether the assumptions underlying the plan for executing the project are reasonable, and (2) perform due diligence regarding the industrial aspects of construction. These activities require highly specialized engineering skills and are based on applying project management grid analysis techniques. The technical consultant analyzes the contractor's construction projects for the structure and verifies that the forecast sequence and timing of activities is sustainable. If sustainability is confirmed, the contractor will be held responsible for delivering the project according to the schedule indicated in the construction contract.[5]

Available solutions for technological risk mitigation include

- Provision for payment of liquidated damages by the party providing the patent or license based on the value of the patent. This solution only slightly mitigates the lenders' risk because the value of the patent represents only a small percentage of the total value of the investment.
- Wraparound responsibility of the contractor—asking the contractor to provide a guarantee concerning functionality of the technology as part of the construction contract. From the lenders' perspective, this guarantee is much more effective even though it triggers relatively higher construction costs for the SPV.[6]

### 3.2.2. Construction risk

Possible construction risks include

- Delivery delay of the functioning structure compared to the pre-established schedule;
- Overrun cost compared to the budget;
- Performance at test below pre-agreed minimum performance standards (MPS);
- Interruption of work due to "acts of God" or damage to property or persons;
- Bankruptcy of the contractor or one or more of the subcontractors.[7]

Construction risk can be hedged most effectively by stipulating a turnkey agreement or turnkey construction contract (TKCC) with the main contractor at a fixed cost and guaranteed by letters of credit (bid bonds during the tender stage and thereafter performance and retention bonds if the public sector provides grants to the project). Under the TKCC, the contractor must give the SPV a definitive EPC project, which is why a TKCC is often referred to as an EPC contract.[8]

Under an EPC contract, any cost increase over budget will be borne by the contractor and not by the SPV. The contractor will only be able to recover cost overruns in the event of acts of God or when changes in regulations are introduced, requiring the project restructuring to comply with change in law that modifies the project's financial performance.

If construction is completed after the agreed upon commercial operating date due to the contractor's negligent execution, the contractor is deemed responsible and pays liquidated damages. On the other hand, if the plant is completed ahead of time and passes the initial acceptance tests or guarantees more efficient output conditions (for example, a lower input consumption), the contractor is rewarded with a bonus proportionate to the benefit enjoyed by the SPV.

When construction is completed, the contractor must pay a penalty proportionate to the lost revenue due to the shortfall in performance if the plant is substandard compared to contractual performance levels. In this manner, risk management guarantees a perfect *risk pass-through* from the SPV to the contractor, all to the advantage of creditors.

Acts of God, environmental damage, and third-party liability for damage to persons and property in both the pre-completion and operating phases can be covered by all risk insurance contracts stipulated by the SPV. However, only limited coverage is available for environmental risks, which are best managed by requiring the O&M agent to setup management protocols compliant with regulatory standards during the operational phase.

## 3.3. Risks in the Operating Phase

The main risks in the operating phase refer to raw materials procurement, plant performance compared to the agreed MPS, and market/demand risk.

### 3.3.1. Procurement risk

Procurement risk arises when the SPV is unable to obtain the necessary inputs for operation, when prices are higher than planned or when supplies are unsuitable for operations in terms of quantity or quality.

If an input is unavailable or not of suitable quality, the plant will be unable to function or will do so in a less than optimal way. Consequently, revenue will be lower and costs could increase due to the need to find alternative supply sources.

Input risks are hedged by stipulating an unconditional put-or-pay (POP) or a through-put agreement with the supplier. These agreements are unconditional obligations for the supplier to sell the SPV pre-established volumes of inputs at fixed prices. In the event of failure to deliver, normally the supplier must reimburse the cost increase incurred by the SPV due to having to find an alternative input supplier. In the case of the Quezon Power Project shown in Figure 3, the SPV entered into a long-term agreement signed by two Indonesian companies, PT Adaro and PT Kaltim, to supply the coal needed to run the plant (Bonetti et al. 2010).

### 3.3.2. Performance risk

This risk occurs when, after the issuance of the final acceptance certificate (FAC) by the technical advisor, the plant performs below the pre-agreed minimum standards, atmospheric emission standards are exceeded, or input consumption is higher than the budgeted level. The effect of performance risk is the reduction of plant efficiency (with a lower ratio between input employed and output generated) and earnings before interest, taxes, depreciation, and amortization (EBITDA) margins.

Performance risk is hedged in different ways depending on whether it arises prior to acceptance tests or during the operating phase. Cost overruns incurred to modify a plant found to be inefficient during acceptance testing are normally borne by the contractor, and payment of these penalties is covered by the EPC contract. Those occurring during the post-acceptance phase are paid by the plant operator if the underlying cause is poor plant management or maintenance. Again, in this case, the situation is assessed by the independent technical advisor who, on the one hand, reviews periodic maintenance reports prepared by the operator and, on the other, participates during periodic testing of the plant's performance.

Under more troubled circumstances and severe underperformance, lenders enforce a supplementary guarantee removing the original operator and replacing it with a trusted new operator (the "step-in right" clause).

An example is provided by the Brazilian Odebrecht Drilling Norbe VIII/IX Ltd. bond refinancing deal in August 2010. The Project was based on the cash flows related to two charter agreements signed by Petroleo Brasileiro S.A. (Petrobras) for using the dynamically positioned drill ships. The drill ships were serviced and operated by Odebrecht Oleo e Gas S.A. (OOG), the primary sponsor of the transaction and leading operator in ultra-deepwater drilling. OOG was responsible for operating/servicing the vessels. Its obligations were related to the navigational needs of the vessel and the provision of a trained crew, adequate equipment, vessel maintenance, and supplies, among other obligations, for Petrobras to conduct drilling activities.

### 3.3.3. Market risk

Market risk (also called "demand risk") occurs when the SPV generates lower revenues than forecasted in the business plan. The negative gap can result from

- Lower product or service sales;
- Lower sales prices than forecast;
- A combination of lower sales volumes and prices.

Checking the soundness of assumptions concerning volumes and prices is part of initial due diligence activities performed by the independent technical advisor.

Hedging demand risk—pre-establishing revenue levels affecting project earnings and cash flows—is desirable, although not always possible. Reduction or elimination of market risks is easier when there is only one or a limited number of offtakers of the product or service, for example, in the power, oil and gas, and mining sectors. In this case, an unconditional take-or-pay agreement (TOP) can be stipulated requiring purchases of pre-established volumes of product or service at pre-defined prices. The offtaker pays the agreed upon amount although the SPV output is not needed. This payment is treated as a down payment for future deliveries.[9]

Demand risk cannot be fully hedged when the project sells products or services to end users. In the case of a toll road or a leisure park, for example, it is impossible to forecast traffic flows, visitors or tourists, or the elasticity of demand for that service. However, some examples of risk mitigation in PPP projects exist. For example, university students' accommodation facilities, where University of Sheffield (UoS) guarantees part of the project income through a minimum rental payment to the SPV, which receives revenues from UoS, exposing it only to the credit risk of the University (Standard and Poor's 2013). Similar contractual agreements are frequent in highway development projects, where the public sector can provide the private counterparties with guarantees on traffic levels (called traffic floors or traffic collars). With this support, the SPV can claim a payment from the government if the traffic volume does not meet the agreed minimum threshold. On the other side, the SPV must pay the government an amount if the traffic is above a pre-specified limit. Minimum traffic guarantees have been adopted for the concession of the South Access to Concepción in Chile, for the Buga-Tuluà highway in Colombia, or Incheon Airport highway in South Korea.

## 3.4. Risks in both the Pre-and Post-completion Phases

Some risks exist throughout the entire life of the deal and cannot be rigidly defined. Some are merely potential risks, such as country risk for international projects or exchange rate risk when certain cash flows are in currencies other than the SPV's base currency. These risks also differ in nature, as some are financial while others are nonfinancial (for example, political risk or administrative risk).

### 3.4.1. Inflation risk

Inflation risk occurs when trends for industrial and financial costs escalate without proportionate increases in revenue.[10] As a result, profitability and operating cash flows to service loans will be lower.

Consumer price index (CPI) swap contracts can be setup to hedge inflation risk (Gatti 2012a). In these contracts, an inflation rate is fixed and the protection seller is committed to make a settlement in favor of the SPV for any difference between the pre-established and actual inflation rates. However, in certain projects, cash flows are automatically protected when inflation affects revenue and operating and financial costs in a similar manner. A financial model is used to test the sensitivity of cash flows to changes in inflation.[11]

### 3.4.2. Currency risk

Currency risk arises in project finance deals when at least one of the cash flows is expressed in a currency other than the SPV's accounting currency. This risk can only be classified as common to both phases in the life of a project if cash flows in another currency are found in both the construction and operating phases. For instance, an unhedged loan in foreign currency will represent a permanent currency risk, whereas this will limit the currency risk only to the construction phase if a construction contract is stipulated with the contractor in a foreign currency.

Normally, banks require sponsors to hedge any currency risk as a condition precedent to the drawdown of loans. Whenever possible, sponsors will attempt to negotiate all contracts in their own currency; in cases wherein this is not possible, they will adopt hedging instruments such as forward exchange contracts, currency swaps, options, and futures.

### 3.4.3. Interest rate risk

The risk of interest rate changes is present in almost all projects because deals are long term and lenders are generally unwilling to finance an SPV at a fixed interest rate. The only case in which loans are granted at a fixed rate for a prolonged period is project bonds, but these represent a minor fraction of debt capital markets instruments issued for infrastructure financing.

Sometimes, banks insist that the SPV hedge interest rate risk during the construction phase. An important part of the initial investment cost comprises interest capitalized during the construction phase (see Section 4.2). Failure to transform the floating interest rate into a fixed rate would cause the overall project cost after the construction phase to be much higher than the forecasted cost in the budget if interest rates rise. Therefore, hedging interest rate risk is another condition precedent that lenders require to enable the SPV to drawdown funds.

Solutions adopted to hedge interest rate risk are derivatives such as interest rate swaps or interest rate caps or collars.

### 3.4.4. Administrative risk

Administrative risk occurs because of delays in the granting of permits or authorizations for licenses to launch the project. These delays can occur because of inefficiencies in public administration. If the cause is a deliberate decision to block the deal, then this can be considered a political risk.

Administrative risk is a classic ownership risk and is therefore borne by the SPV (and therefore by its sponsors). In certain cases, contractors can be asked to undertake the risk of obtaining building permits.

### 3.4.5. Political risk

Political risk occurs when the authorities adopt an unfavorable fiscal or industrial policy affecting the project, or deliberately delay granting permits, signatures, or approval for contracts. A further example of political risk is the possibility that after a project startup, a referendum is held that blocks activities due to a change in law.

Political risk, similar to administrative risk, is considered an ownership risk and is therefore borne by the SPV.

### 3.4.6. Country risk

Country risk refers to situations where, for macroeconomic reasons (for example, to protect the balance of payments or the level of exchange rates), a country's authorities limit an SPV's freedom of action by adopting protectionist measures. These could include limiting free convertibility of currency, supplies of foreign raw materials or resources, sales to foreign countries, or transfer of dividends by the SPV to its sponsors resident in other countries. More serious forms of country risk include war, civil unrest, and any consequent confiscation of assets without compensation, including nationalization.

Country risks are hedged by specific insurance contracts. Almost all industrialized countries have agencies that insure against commercial and political risks (called export credit agencies or ECAs) to which operators can apply to hedge such negative events at competitive rates. The World Bank's Multilateral Investment Guarantee Agency also offers political risk insurance for cross-border investments in developing countries.

### 3.4.7. Credit risk (or Counterparty risk)

Credit or counterparty risk occurs when a counterparty of the SPV is unable to fulfill its contractual obligations or declares bankruptcy. Although the sustainability of a project finance arrangement depends on the SPV's ability to generate sufficient cash flows, the contractual network that links the SPV to the different entities (called counterparties)further demonstrates that counterparty risk is a serious concern at every stage of the project life.

The SPV can protect itself against bankruptcy risk with credit default swaps if they are written against any single counterparty of the vehicle, though this solution is rarely used. The key strategy for success in project finance is to involve only well-reputed companies with a strong track record and excellent financials.

### 3.4.8. Legal risk

Legal risk results from weak creditors' rights protections for lenders enforcing a contract in the event of a dispute. A country's adherence to either civil law or common law principles has implications for legal risk. Civil law effectively protects the borrower, whereas common law is more favorable to lenders. Clearly, legal risk goes beyond the control of any of the SPV's entities and essentially depends upon the legal institutional quality and robust rule of law. Lending agreements are registered under UK or the State of New York Law whenever possible as they give comfort and protection to lenders to address legal risk. Thus, project finance and PPPs are less common in countries with poor quality legal institutions (Hammami et al. 2006).

## 3.5. The Security Package

Together with a well-designed set of binding contracts, private creditors typically ask for further security from the SPV beyond individual risk-related contracts. These guarantees are intended to further delineate the SPV's responsibilities and often impose limitations to managerial discretion, both of which are aimed at improving lenders' ability to monitor the borrower's behavior.

The requested guarantees are indicated in detail in the credit agreement, and their execution and verification constitute the necessary conditions for disbursement of the loan.

In general, these guarantees (collateral) typically include

- A mortgage on the plant and all other fixed assets linked to project management and operations;
- A pledge on the project company's shares, the SPV bank's current proceed accounts, and assignment of both present and future SPV credits to the banks;
- Covenants—any additional obligation for the borrower regarding the basic obligation to pay interest and principal to lenders.

The request for collateral is made as a defensive measure rather than to obtain a right of recourse for certain property if the venture fails. Creditors seek a security package that enables them to control the rights on the SPV if the project's performance casts doubt on the SPV's ability to repay its debt. The same holds true for the pledge of shares; legislation in many countries enables banks to exercise voting rights to takeover the SPV's shares in the event of sub-optimal operation.

Finally, creditors are the beneficiaries of all possible future income items due to the SPV, including insurance compensation, concession rights, contracts stipulated with buyers and sellers, and cash flows from letters of credit granted to the SPV.

The credit agreement includes a detailed set of positive, negative, or financial covenants. Positive covenants are obligations to do something, whereas negative covenants impose upon the SPV obligations to refrain from doing a particular activity. Table 3 presents the examples of positive and negative covenants.

Financial covenants impose certain financial obligations on the SPV. Some of these might stipulate a maximum debt/equity level, standby equity agreements (an obligation to put up additional share capital), or—the most significant example of financial covenants—cover ratios (See Section 4.2).

## 3.6. Summing up: the Project Risk Matrix

A risk matrix table indicates the map of project risks and summarizes the solutions that sponsors and lenders have adopted to allocate them (see Annex 1). The aim is to avoid any entry into cells in the first line, which indicates that the SPV is still exposed to risk. If SPV risks exist, they must be properly "sold" to creditors and priced accordingly. This

**Table 3. Examples of Positive and Negative Covenants**

| Positive covenants | Negative covenants |
|---|---|
| Obligations relating to building and operating the plant and the project according to sound industrial and business criteria. | Obligations of the borrower not to dispose of its assets except in specific circumstances, as in, for example, obsolete assets. |
| Obligations to use the funds made available through the credit agreement solely for the purposes set out in that document. | Obligations not to incur, create, or permit to subsist any other financial indebtedness unless contemplated in the project contracts. |
| Obligations to keep the insurance policies required for the project in force. | Negative pledge: obligation that prohibits the creation of other security in favor of third parties. |
| Obligations to implement the interest rate risk coverage policy (and, when applicable, exchange rate risk) as agreed to with lenders. | Obligations not to undertake any other activity except for building and operating the project. |
| Obligations to obtain the administrative authorizations listed in the relative annex(es) to the credit agreement. | Obligations not to buy assets or sign contracts that are not included in the list of project contracts, or approved by lenders. |
| Obligations to comply with laws and regulations applicable to the project and the activity of the project company in general. | Obligations not to undertake any merger, de-merger, or other corporate restructuring deal. |
| Obligations to duly and accurately keep the project company's accounting documents. | Obligations not to decrease the equity capital, and not to issue shares that are not pledged in favor of the lenders. |
| Obligations to open and maintain the project bank accounts specified in the credit agreement or in a separate, specific contract. | |

*Source:* Gatti (2012a)

"sale" will only be possible if the sponsors make certain concessions, making the project bankable.

The risk matrix in Annex 1 exemplifies the optimal risk level for a private investor as they will only consider participation in the project if the row labeled SPV is empty, indicating that all risks potentially borne by the project have been identified and allocated to third parties.

Numerous tools are available to shift the risk from the SPV to any of the involved counterparties, enabling the SPV to be ring fenced and converted into a synthetic risk-free asset. This is called a "sound project rationale."

There are some clear risk bottlenecks that can potentially make infrastructure project financing more difficult or even impossible, and these bottlenecks often fall outside the private sector's control. Investors perceive the uncertainty related to political, economic, and currency risk as the most dramatic deterrent for the provision of financing. Such uncertainty can be limited using ECAs insurance policies, which typically provide coverage against investment and political risk. Currency risk can be easily managed using derivative instruments. However, a grey area remains in addressing idiosyncratic risk related to concessions and regulation that can only be managed by governments.

In addition, governments can play a pivotal role in attracting private capital for improving the quality of the legal system and the enforceability of contracts. Clearly, the private market has no voice in this matter, but it is fundamental to guarantee that the key contracts can be enforced for the benefit of the project's shareholders and creditors once the project has received funds. Hammami et al (2006) clearly indicate that countries with macroeconomic stability, political stability, high quality institutions, a strong rule of law, and low corruption rank high in terms of their use of project finance and PPPs.

## 4. Private Investors' Criteria for Providing Capital to Infrastructure

The previous sections have highlighted that private investors—using either debt or equity—approach an infrastructure project as a bundle of contracts and a bulk of risks. The project must be strong and able to withstand negative events throughout its life to generate a sufficiently stable and predictable cash flow stream.

Therefore, shareholders and lenders seriously consider any variable that could restrict a project's cash flow generation. If a project is not sufficiently strong, the cost of funding or the equity required to finance the transaction would be high such that no private investor will be interested in providing capital.

Three basic conditions must be met to attract a robust flow of private capital to infrastructure:

- Sound project rationale;
- Sound cash flow performance;
- Clear "quality of rules and regulations" and sound country institutional variables.

### 4.1. Sound Project Rationale

An infrastructure project shows sound project rationale when an alignment of interests exists between the

different parties involved in the transaction. Private investors in the capital markets carefully examine the sponsoring parties to understand if sufficient industrial knowhow is available in the project and if sufficient contribution is made by each to incentivize project sponsors to act optimally. In this sense, the involvement of industrial sponsors is more crucial than that of pure financial equity investors.

An example provided by Gatti and Borgonovo (2013) in the power cogeneration of biomasses is considered to illustrate a case of infrastructure with a solid project rationale. In this case, one sponsor decided to provide equity to a project for the construction and management of a power plant due to its access to its byproducts for use as a base feedstock for the power plant. The waste byproducts were to be sold to the biomass plant by the sponsor/supplier under a long-term raw material supply agreement. In addition, the ashes derived from the combusted biomasses could be used as fertilizers in the company's plantations, minimizing waste and further reducing costs. The project rationale is clear: the sponsor is also a supplier and has all the right incentives to provide raw material (thereby reducing procurement risk) throughout the project life with benefits for the lenders in terms of cash flow stabilization.

The existence of a solid project rationale has become even more important since the rise of a new group of pure financial investors such as pension funds, insurance companies, and SWFs, which have no industrial interest in the project. In contrast to industrial sponsors, these investors only seek dividends and carefully examine the business model and underlying incentive schemes of their industrial counterparties. Available data (Probitas Partners 2013) indicate an acceleration of private equity for global infrastructure starting fromUS$2.4bn in 2004 to a peak of US$3.9bn in 2007, representing 15% of the total project finance loans that year. Funds collected for private equity investments significantly declined after 2008; at the end of 2012, they constituted only slightly above 10.5% of available total project finance loans.

## 4.2. Sound Cash Flow Performance

From a private investor's perspective, infrastructure represents an interesting alternative asset class, as long as risks and effective risk mitigation measures have been carefully assessed (Table 4). Strong and stable cash flow performance is the critical variable to assess project viability and the potential interest of private investors. This section details the criteria used by private investors to assess project profitability and sustainability

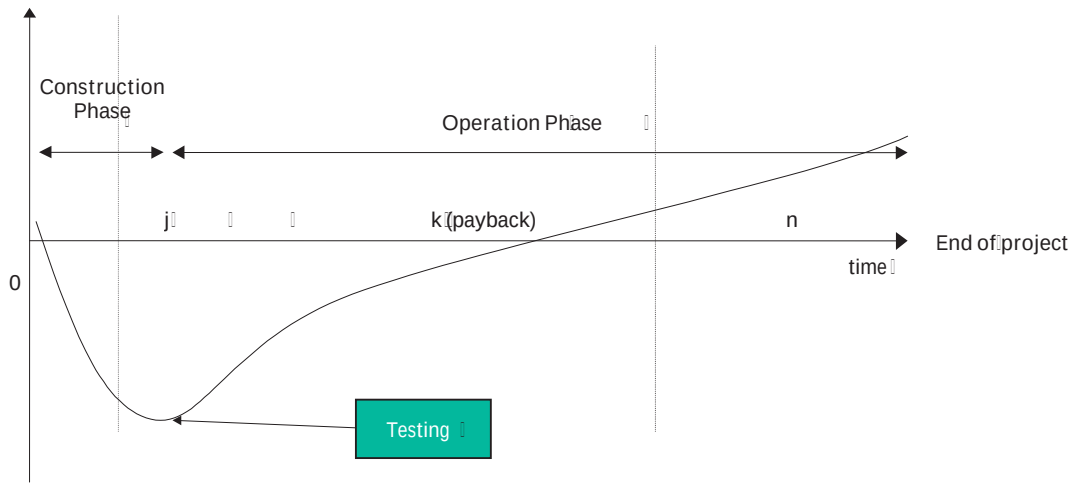
To better understand infrastructure project cash flows, consider a typical case (Figure 9). The Xaxis indicates time, and the Yaxis is the cumulative value of operating cash flows up to a certain year. The first part of the deal

**Table 4. Typical Characteristics of Infrastructure Investments**

| |
|---|
| Long-term assets with a long economic life |
| Low technological risk |
| Provision of key public services |
| Strongly non-elastic demand |
| Natural monopoly or quasi-monopoly market contexts |
| High entry barriers |
| Regulated assets |
| Frequent natural hedge against in fation |
| Stable, predictable operating cash fows |
| Low correlation with traditional asset class and overall macroeconomic performance |

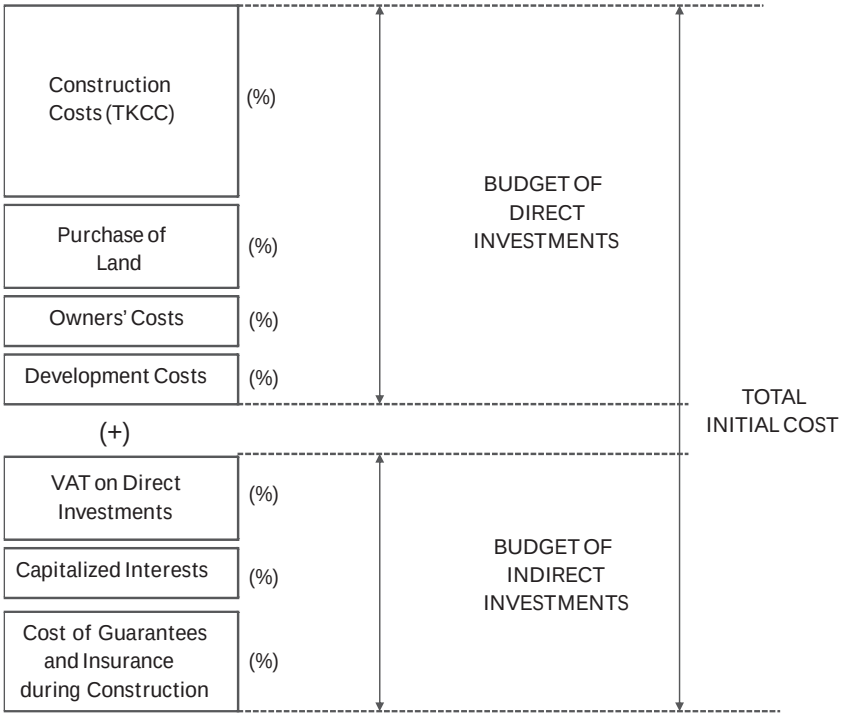
*Source:* Gatti (2012b)

**Figure 9. Cash Flow Behavior during the Infrastructure Lifecycle**




*Source:* Gatti (2012a)

**Figure 10. Construction Costs of an Infrastructure Project**




*Source:* Gatti (2012a)

covering time 0 to time j refers to the construction phase. The project will show a financial deficit in this phase, given that construction costs are not offset by revenues, which will only start to flow after completion of the construction phase.

In this phase, cash requirements are covered on a pro-rata basis. Debt and equity are utilized in the proportion defined by the debt/equity ratio every time a payment for work-in-progress (WIP) must be made during the construction phase.

The total project cost to be financed is not limited to construction costs (Figure 10). In addition, there are costs to purchase land, accessory costs (e.g., costs to create access roads to the plant), and development costs (e.g., initial consultant fees paid to lawyers, technical consultants, and the advisor). In addition, there are certain indirect costs, including valueadded tax (VAT) on direct investments when applicable, interest capitalized during the construction phase, and fees paid to advisors and banks.[12]

From time j in Figure 9, the project begins to produce revenues to cover operating costs, while the cumulative operating cash flow curve heads upwards as the plant begins to operate at full capacity. At time *k*, positive cash flows have entirely offset cumulative negative cash flows.

Operating cash flow is a crucial variable in each operating year as, in effect, it must be able to cover both debt servicing (principal repayment plus interest payments) and dividend payments to sponsors. These dividends must be sufficient to produce an adequate internal rate of return (IRR) given the degree of risk inherent in the deal. The sponsors' IRR can be defined as

$$\sum_{t=0}^{M} \frac{C_t}{(1+IRR_{equity})^t} = \sum_{t=M+1}^{n} \frac{D_t}{(1+IRR_{equity})^t} \quad (1)$$

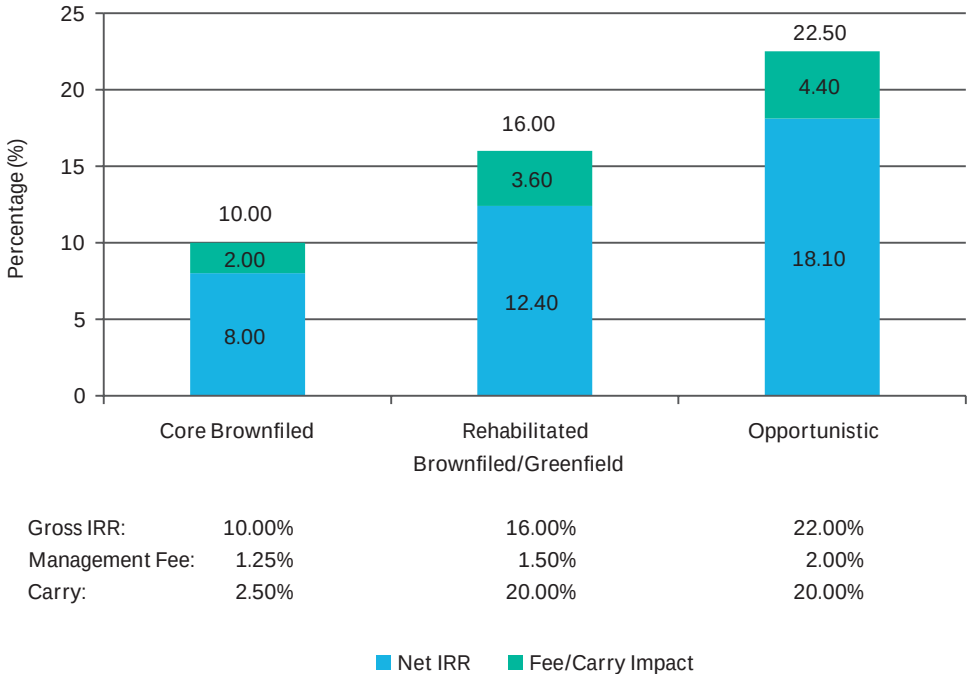
where the symbols denote the following:

$C_t$ = equity contribution in year $t$;
$M$ = last year of equity contribution by sponsors;
$D_t$ = dividends received by the sponsors in year $t$;
$IRR_{equity}$ = sponsors' internal rate of return.

The term on the left side of the equation is the discounted value of all equity contributions, which offsets the present value of all dividends collected by sponsors starting from year *M*, the term on the right side.

Sponsors' IRR is a function of the agreed debt/equity ratio as part of a project's finance deal. The SPV's shareholders always try to maximize their IRR by negotiating the highest possible debt and reducing equity required. Data on the profitability of project finance deals for sponsors are almost inexistent due to severe confidentiality issues regarding the business plans of these transactions. Project performance after financial close is also not well known. Interviews with top banks involved in the business indicate a wide dispersion of industrial sponsor profitability, ranging from 10% to 15% for power merchant plants (but with returns of only 7% to 10%–12% for plants with

**Figure 11. Fees and IRR for Equity Infrastructure Funds in 2012**




tolling agreements or for power coming from renewable resources) to 5%–7% for water and sewerage projects. In general, projects where the public administration is involved are less profitable given the social impact of the deal and the possible existence of price cap mechanisms. Transportation and hospitals' IRRs are between 6% and 10%. For pure private equity investors with no industrial role in the infrastructure projects, data provided by Probitas Partners (2012) are shown in Figure 11.

From the competing perspective of project creditors, based on assumptions made for interest rates, a higher debt/equity ratio increases financial costs and therefore debt service. Given operating cash flow levels, an increase in debt/equity ratio will only be possible on the condition given in the following ratio[13]:

$$DSCR = \frac{OCF_t}{DS_t} > 1 \qquad (2)$$

where the symbols denote the following:

$OCF_t$ = operating cash flow in the year;
$DS_t$ = debt service (interest and principal repayments) for the year.

This is known as the debt service cover ratio (DSCR), one of the financial covenants discussed in Section 3. The meaning of this index is straightforward: in each year of the operating phase, financial resources generated by the project (represented by the numerator) must be able to cover debt service due to the lenders (represented by denominator).

The minimum value for the ratio depends on the project's sector, degree of innovation, and inherent risk level. The higher the perceived risk, the higher the DSCR required by creditors. Although confidentiality issues do not allow us to have a statistically significant sample, evidence from market participants indicate a minimum required DSCR in the range 1.3×–1.5× for shipping and transportation projects, 1.4×–1.5× for telecoms, 1.3×–1.4× for power generation with offtakers, 2×–2.2× for power merchant plants, and 1.3×–1.4× for PPP projects.

The second important financial covenant included in loan agreements is the loan life cover ratio (LLCR). This is calculated by taking the sum of the present value for cash flows available between the time of calculation (s) and the last year of debt repayment (s+n) (numerator) and the outstanding debt (O) at the same time of valuation s (denominator), i.e.,

$$LLCR = \frac{\sum_{t=s}^{s+n} \frac{FCO_t}{(1+i)^t} + DSRA}{O_t} \qquad (3)$$

The numerator also includes DSRA, namely, any available cash debt reserve during valuation and any additional cash trapped into the SPV. The same considerations made for the DSCR also apply in the case of the LLCR: lenders always want a safety cushion and therefore a value greater than 1. Again in this case, the minimum value will depend on the sector concerned and levels of innovation/complexity inherent in the project.

## 4.3. Clear "Quality of Rules and Regulations" and Sound Country Institutional Variables

Most of the surveys targeting infrastructure investors indicate that public money in any form supplied to infrastructure is not the main concern. A survey conducted

by Allen & Overy (2009) shows that for investors approaching infrastructure investments, public financial support ranks on the bottom of the list. Rather, the key elements are robust rule of law and attractiveness of the regulatory environment together with a successful track record of other infrastructure projects closed in the country. These are the most cited elements that drive the choice of jurisdiction to invest in infrastructure. The latest Probitas Partners survey similarly found that for infrastructure investors in emerging markets, 45% of the respondents indicate a lower degree of interest in the sector due to political, economic, or currency risks. The Berwin, Leighton and Paisner (BLP)/Preqin analysis indicates that government or regulatory interference, i.e., political risk, is the biggest threat perceived by 60% of the respondents to a sustained flow of deals in 2014.

Available evidence indicates that governments aiming to attract private capital for infrastructure and PPP projects must sustain clear institutional and regulatory environments. Regulatory, administrative, and legal uncertainties fall outside the private sponsors' and investors' management capacity. Investors require a regulatory regime that survives over the life of a government or a political majority, particularly when financial constraints are stronger, and where governments are reconsidering public spending support to PPP projects, closely focusing on value for money and affordability methodologies.

## 5. Conclusions and Implication for a Future Multilateral Development Bank

Data provided by the Private Participation in Infrastructure (PPI) Project Database of the World Bank indicate a constant increase in the amount of private investment in infrastructure in low-and middle-income countries in 2010–2012. Despite this trend, a remarkable infrastructure gap remains to be filled (as described in the first paper in this series). This gap is even more important in low-to middle-income countries that do not have experience in involving private capital in infrastructure financing and that, in many cases, also show weaker institutions, lower political stability, unclear regulatory settings, and a poor track record of past experience in using PPP models.

Weakness of the financial systems in these countries threatens the potential for filling the infrastructure gap. Even though the current level of domestic savings held by some countries may be sufficient to cover the infrastructure needs, their banking systems prevent the allocation of private sector savings to otherwise valid projects.

Given this landscape, the creation of a multilateral institution capable of playing a supplemental role to market mechanisms could bean effective strategy to close the infrastructure gap and attract higher amounts of private capital to infrastructure projects. Academic research has demonstrated that multilateral development banks act as "political umbrellas" for private lenders and that project finance increases despite political risk when such multilateral protections exist (Hainz and Kleimeier 2012).

With specific reference to project finance, multilateral institutions play an important role for developing countries in three ways. First, their institutional mandates allow them to make financial commitments even in countries with high political risk. Second, they can play a leading role in privatization, concession, and PPP policies. Finally, they promote private investment in the infrastructure sector by absorbing part of the upfront risk and finance key bottlenecks in the project pipeline.

The recent financial crisis has reshaped the functioning of financial markets and although investors have recently shown an increased risk appetite and willingness to invest in infrastructure (OECD 2013), it is clear that a newly created multilateral bank will have to cover a broader spectrum of activities if it wants to become a catalyst for private capital investment in infrastructure. This institution should aim at overcoming the risk bottlenecks described in this paper faced by project financers, in cooperation with governments.

The new institution should cover the following business areas:

- Advisory to governments (project assessment/ affordability/value for money);
- Debt financing (in association with the private sector);
- Equity financing (in co-investment with the private sector);
- Back up unfunded guarantees to fully privately financed projects.

### 5.1. Advisory to Governments

Most low-to middle-income countries lack the expertise to attract private investors to infrastructure financing. A new multilateral bank should act as an advisor to governments at different stages of infrastructure procurement, specifically advising on

- Definition of project priorities;
- Definition and design of bidding procedures;
- Valuation of the value for money of delegating project infrastructure design, construction and management to the private sector.[14]

The definition of a clear institutional framework for PPPs is an essential prerequisite to attract private capital, as described in Section 1. Although many governments have setup assessment units for the valuation of projects, a multilateral institution should cooperate with such entities

to develop a sufficiently clear and transparent set of rules that yield an investor-friendly environment.

Special attention must be given to the pre-bidding phase and project prioritization, to the bidding procedures, and to the valuation tools to perform a comparative analysis between the private solution (PPP) and traditional public procurement. When traditional public procurement is not a viable option due to lack of public money, a multilateral institution should help governments assess the affordability of the private solution and design contractual schemes to fairly split the risk of the project between the public and private sectors. This is fundamental to avoid moral hazard by the private sector when the project receives financial grants by the government at zero or limited cost. This also hedges against public opposition to "excessive" financial support to infrastructure projects.[15]

Furthermore, a multilateral institution could provide assistance in financial modeling and in the design of the most suitable financial structures for its infrastructure development, as outlined below.

## 5.2. Debt Financing (in Association with the Private Sector)

For loans and other debt instruments, a multilateral bank typically co-finances a project with private investors based on private market conditions and can also set a maximum percentage of participation. They can also act as lender of records in syndicated loans (for example, the B-loan program of the International Finance Corporation (IFC)), so that members of the pool assume the status of a privileged creditor.

The first option for a multilateral institution is to play a substitution role for debt capital markets, particularly when the robustness of financial projections requires loan tenors that are not compatible with the private bank market standards. In these cases, the bank syndicate could be composed by different debt tranches with shorter maturities covered by the private debt market and longer durations put on the books of the multilateral institution.

A second possible option, in line with the recent Project Bond Credit Enhancement (PBCE) scheme setup by the European Union (EU) and the European Development Bank, is for the multilateral institution to provide subordinated loans up to a given percentage of the senior debt. This mechanism creates a layer of protection for senior private lenders that can be calibrated to provide them with sufficient comfort against expected losses. The subordinated debt could absorb a certain level of cash shortfalls to immunize debt service payments to private lenders under adverse scenarios.

The third option on the debt side is to ask the multilateral institution to mobilize private capital coming from institutional investors. This option can take the form of a partnership—where the multilateral institution sets up syndicates of lenders offering participation—or the form of the debt or credit fund. The fund would be sponsored and promoted by the multilateral institution, which would act as a management company on investors' behalf. The institution would also be responsible for project selection and valuation, and could also provide a backup guarantee up to a certain percentage of expected losses to investors. With this model, institutional investors would be able to access a portfolio of projects in emerging economies with a predefined asset allocation and a given backstop to default risk. Participation in the credit fund could be open to target countries' governments, their national banks, or SWFs.

## 5.3. Equity Financing (in Co-investment with the Private Sector)

Most existing multilaterals intervene in infrastructure projects with equity contributions (usually between 5%–20%, up to a maximum of 35% in the IFC case). Equity could be provided directly or via equity infrastructure funds, where a multilateral could act as the fund's management company, with money coming from the private sector. An example is the Marguerite Equity Fund of the European Investment Bank (EIB), with participation from the national development banks of Italy, Germany, and France.

## 5.4. Backup Unfunded Guarantees to Fully Privately Financed Projects

The fourth business area where a new multilateral could function is in the provision of guarantees to the private lenders of an infrastructure facility. These guarantees could cover more traditional risks for multilaterals, such as political risk, but also could be setup as unconditional obligations to protect private senior lenders against possible borrower inability to service the debt due to an unexpected decline in revenues. Examples of similar arrangements include the UK Guarantee scheme and the unfunded back up credit enhancement guarantee under the 2020 Project Bond Initiative of the EU and EIB.

The UK Guarantee scheme envisages the UK Treasury as providing support for a wide range of UK infrastructure projects, including utilities, railway facilities, roads and transportation projects, health and educational facilities, courts and prisons, and social housing projects. Under the guarantee, the Treasury will unconditionally and irrevocably guarantee private lenders in terms of scheduled principal and interest payments and against a fee charged to the project at market rates reflecting the underlying riskiness of the project. Providing an unconditional and irrevocable guarantee, the project can receive a rating correspondent to the UK's creditworthiness. In this sense, the UK Guarantee scheme was designed to revive the wrapped bond market that was almost completely canceled by the downgrades of the monoline insurers following the default of Lehman Brothers in September 2008.

The unfunded backup credit enhancement guarantee under the EU's 2020 Project Bond Initiative is an alternative way to attract private capital to invest in infrastructure. Moreover, it is an alternative to the subordinated loan provision analyzed earlier. In this case, the multilateral institution commits to provide a backup liquidity facility under adverse scenarios up to a given percentage of the senior loan's value so that senior lenders can see their debt service guaranteed (i.e., their default risk is reduced). If the guarantee takes effect, the liquidity backup becomes a subordinated tranche that ranks junior and senior loans provided by the private sector.

## Endnotes

[1] The focus does not change if considering the indirect investment in unlisted infrastructure (i.e., private equity infrastructure funds or debt/credit funds). In fact, in these cases, a detailed risk analysis process is conducted by the asset management company/general partner on the investors' behalf. See Gatti (2014) and OECD (2014) for figures referring to the amount of various alternatives for infrastructure financing.

[2] Also called a special purpose company (SPC).

[3] This category can include national and multilateral development banks and sovereign wealth funds.

[4] The dual role of operator/sponsor creates a strong incentive for the sponsor to make the venture work properly and get funds from lenders. If the deal takes effect, then both parties will reap significant financial benefits.

[5] See Bacchiocchi (2012) for a description of such an arrangement related to the Paita Port in Piura, Peru.

[6] The contractor will only be willing to provide a wraparound guarantee if (1) it has already tested the technology in other situations, and (2) if this guarantee is compensated with a higher price for construction.

[7] Outcome 5 represents a remote but possible risk.

[8] See Bocchiocchi (2012) for a description of this type of arrangement related to the Paita port in Piura, Peru.

[9] See Moody's (2013) for a description of this type of risk mitigation related to the Ruwais Power Company in Abu Dhabi.

[10] Loans granted will be at a floating rate, given the long time horizon of project finance deals.

[11] For more on this issue, see section 4.2.

[12] These charges are in addition to construction costs, also because any VAT paid during the construction phase cannot be offset against VAT cashed on sales (which will only occur after the commercial operating date). The same goes for interest and fees to which the bank syndicate is entitled, which cannot be covered during the construction phase but only during the operating phase.

[13] The DSCR and LLCR are calculated ex ante using business plan data and ex-post for monitoring purposes during the operating phase to check conformity with these covenants included in the credit agreement.

[14] This aspect is becoming increasingly important also in countries that have traditionally used PPPs and project finance to procure infrastructure in response to more stringent budget constraints (Gatti et al. 2013).

[15] Two recent examples of uncertainty about institutional/regulatory variables are the two tender processes conducted in Brazil to tender the concession for the BR262 Motorway and the rights of exploitation of the Libra deep-water oilfield. The private intervention in such projects was far below the government's expectations. Apparently, the failure to assign the concession for the BR262 was due to the public opposition by local authorities for objecting to toll fees offered to the private investors.

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## Annex 1. Typical Risk Matrix for an Infrastructure Project

| | Risks found in both the pre- and post-completion phases | | | | | | | Pre-Completion Phase Risks | | Post-Completion Phase Risks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exchange Rate Risk | Interest Rate Risk | In fation Risk | Environmental Risk | Regulatory Risk | Political Risk | Country Risk | Technological, Planning, or Design Risk | Construction Risk | Operational Risk | Supply Risk | Demand Risk |
| **Special Purpose Vehicle** | Currency matching | | | | | | | Sponsors' guarantees to lenders | | | | |
| **Contractor** | | | | | | | | Included in the construction agreement | Fixed price turnkey agreement | Turnkey agreement (f rst test) | | |
| **Technology Supplier** | | | | | | | | Penalties to be paid | | | | |
| **Operator** | | | | | | | | | | Penalty payments and removal of operator (later tests) | | |
| **Buyers** | | | Establishing pre-agreed in fation adjustments | | | Included in the construction agreement | Fixed price turnkey agreement | Turnkey agreement (f rst test) | | | | Take or pay |
| **Suppliers** | | | Establishing pre-agreed in fation adjustments | | | | | | | | | Put or pay agreement or put through agreement |
| **Export Credit Agencies (ECAs)** | | | | | | Credit insurance programs | Credit insurance programs | | | | | |
| **Banks** | Derivative products and coverage instruments | Derivative products | | | | | | | | | Endorse-ment credit to back supplier's loans | Endorse-ment credit to back buyer's loans |
| **Insurance Companies** | | | | Insurance policies | | | Insurance policies | | Insurance policies | Insurance policies | | |
| **Independent Engineering Firms** | | | | | | | | Assessments on technological validity | | Certi fcation of later testing | | |

*Source:* Gatti (2012a)