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# Infrastructure Finance in the Developing World

**Involving the Private Sector and Public-Private Partnerships in  
Financing Investments: Public Opportunities and Challenges**

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The *Infrastructure Finance in the Developing World Working Paper Series* is a joint research effort by GGGI and the G-24 that explores the challenges and opportunities for scaling up infrastructure finance in emerging markets and developing countries. Each paper addresses a unique piece of the infrastructure finance puzzle and provides critical analysis that will give impetus to international discourse and play a catalytic role in the creation and success of new development finance institutions. The papers have been authored by top experts in their respective fields, and the process has been carefully guided by the leadership of both organizations. This work has important implications in the post-2015 environment, given the essential role infrastructure must play in achieving sustainable development. To this end, GGGI and the G-24 look forward to further development and operationalization of the contents of these papers.





# Involving the Private Sector and Public–Private Partnerships in Financing Investments: Public Opportunities and Challenges

Ehtisham Ahmad<sup>1</sup> Amar Bhattacharya<sup>2</sup> Annalisa Vinella<sup>3</sup> and Kezhou Xiao<sup>4</sup>

Given that public investment requirements far exceed available resources in most developing countries, channeling public resources wisely as well as leveraging the opportunities to utilize both national and international sources of private or institutional finance is necessary. A range of instruments is possible, involving combinations of public and private management and financing arrangements (see the companion paper, Ahmad 2014).

Some investments are likely to be predominantly public, especially, when externalities exist in the provision of a balanced and inclusive basis for sustainable growth (e.g., education, regional infrastructure, and operations and maintenance). These are also needed to facilitate involvement by domestic private investors and foreign direct investment (FDI). There is a global growing trend toward the private sector's involvement in infrastructure financing and the provision of public services.

Private sector involvement takes diverse organizational forms and arrangements. These range from privatization to deregulation, outsourcing, and government downsizing (see Armstrong and Sappington 2006). An increasingly popular mechanism through which the private and public interests combine is associated with public-private partnerships (PPPs) to finance and manage infrastructure projects across Europe, the US, Canada, and in several developing countries. In this paper, we focus on both the form of investment, e.g., PPPs, as well as the sources of financing.

A fundamental issue is risk sharing in the presence of information asymmetries. Private investors face high risks during the development and construction phases. This relates not only to the costs involved and the subsequent pricing that may be constrained by the state, but also to future revenue streams in relation to uncertain usage and

demand. Once the project is completed and operational, it becomes somewhat easier to securitize the potential revenue streams and involve the private sector in managing the undertaking. However, in spite of evidence that a project's success or failure is more sensitive to construction risks than operational risks,<sup>5</sup> a fully general classification cannot be made, as the exact types of risks are likely to be highly sector- and project-specific.

In this paper, we stress that the issue of accurate information on the generation of subnational liabilities is important not only to generate adequate signals for investment but also for macroeconomic management. This is especially the case in a multilevel country, and is typically ignored at some peril, as occurred, for example, when the Mexican crisis was exacerbated by the debts for highway projects that had been contracted without federal government guarantees. We also discuss the specific case of subnational liabilities that have appeared in China, and indicate measures required to ensure that these do not degenerate into macroeconomic difficulties while simultaneously ensuring that they remain a sustainable mechanism for financing sustainable investments.

In some cases, macro problems arise due to the failure of PPP contracts and the ample room available for gameplay, which, on the one hand, leads to inefficient investments and, on the other hand, to a buildup of liabilities that go unheeded until a crisis emerges. Following the recent economic crisis, the International Public Sector Accounting Standards (IPSAS) tightened its accounting rules for PPPs to ensure a better recognition of liabilities. Key issues relate to the ownership of the asset and beneficiary interests at the end of the contract. The sectoral dimensions are important, as are the public finance implications—including the recognition of liabilities, provisioning, and generating public finances to cover

the public component. Special issues arise in multilevel countries, regarding both the aggregate buildup of liabilities and their sustainability, as well as the credibility of contracts and incentives to renege.

Section 1 describes some general trends in involving the private sector in public projects. Section 2 focuses on PPPs and asymmetric information. Section 3 draws some policy conclusions.

## 1. Involving the Private Sector—Some Trends

### 1.1. What Do the Data Reveal?

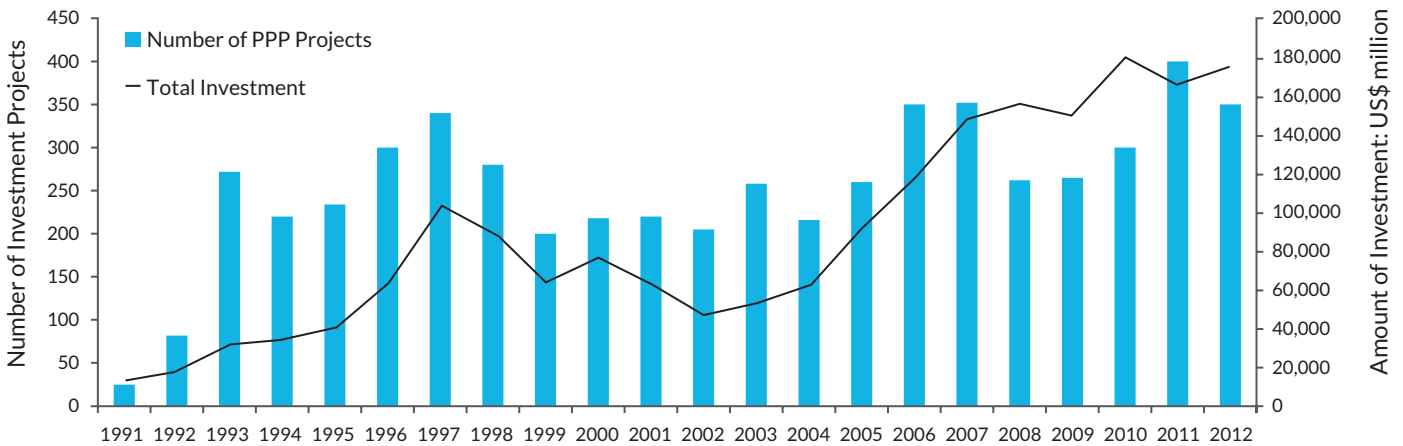
Global trends for PPPs—relating to both the total amount of investment and the number of projects (Figure 1)—come from the Private Participation in Infrastructure (PPI) Project Database jointly produced by the Infrastructure Policy Unit of the World Bank’s Sustainable Development Network and the Public–Private Infrastructure Advisory

Facility (PPIAF).<sup>6</sup> The figures present aggregate values from both sectoral and regional data. From 1991 to 2012, the overall trend for investment in PPP projects was increasing, despite a temporary downturn in 1997–2002. There was a 5.8% increase in the total nominal amount of investment commitments in 2012 compared with that in 2011.<sup>7</sup> The number of PPP projects, on the other hand, has oscillated between 200 and 400 projects per year since 1993. In 2012, there was a 13% decline in the number of PPP projects worldwide. Overall, this means that the average size of investment commitments increased in 2012. Brazil and India constituted approximately 55% of all PPP commitments across the developing countries in 2012.<sup>8</sup>

#### 1.1.1. Sector trends

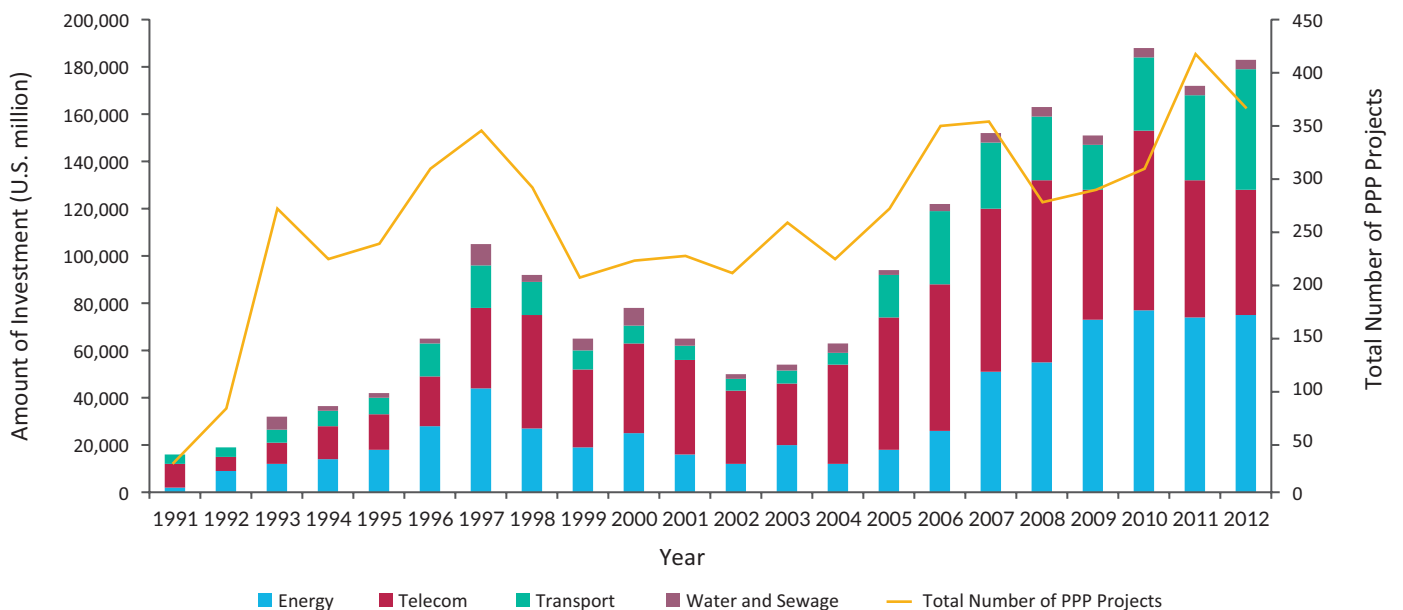
The energy sector attracted the largest amount of investments in 2012, with approximately US\$76.8 billion and 244 projects (Figure 2). From 1990 to 2012, there

Figure 1. Global Trends for PPP Projects from 1991 to 2012



Source: World Bank and PPIAF, PPI Project Database

Figure 2. Sectoral Composition of Investments



Source: World Bank and PPIAF, PPI Project Database

were 111 countries with energy PPPs and 2,653 projects reaching financial closure.<sup>9</sup> The most important segment was renewable energy, growing at an annual average of 21% since 2007 and doubling between 2007 and 2012.<sup>10</sup> The Latin America and the Caribbean (LAC) region had the largest investment share (36%). In terms of the format of private participation, greenfield projects constituted 68% of total investments and 75% of all projects. A total of 126 projects were cancelled or under stress, representing approximately 5% of total investments between 1990 and 2012.

The telecom sector was the second largest sector for PPPs in 2012, with investments totaling US\$52.4 billion (15% lower than the US\$60.2 billion in 2011). This is the lowest investment level since 2005. Only four PPP projects reached financial closure, the smallest number since the availability of the time series data. Of the different segments, 60% of investments went into stand-alone mobile operators.<sup>11</sup> Compared with the energy sector, the telecom sector used predominantly greenfield projects, which constituted 61% of investments and 75% of the total number of projects. LAC was the most active region with 37% of total investments in telecom PPPs. The number of projects cancelled or under stress was approximately 3% of the total investments, representing 60 cases between 1990 and 2012.

Investments in the transport sector have been increasing over recent years, with a total of US\$46.2 billion in 2012 spent on 83 projects, mainly in Brazil and India, which jointly constituted 78% of the investments made in 2012. Investment in this sector grew by approximately 25% between 2002 and 2012.<sup>12</sup> Unlike the telecom and energy sectors, concessions were the predominant form of partnership, constituting 59% of the investments and

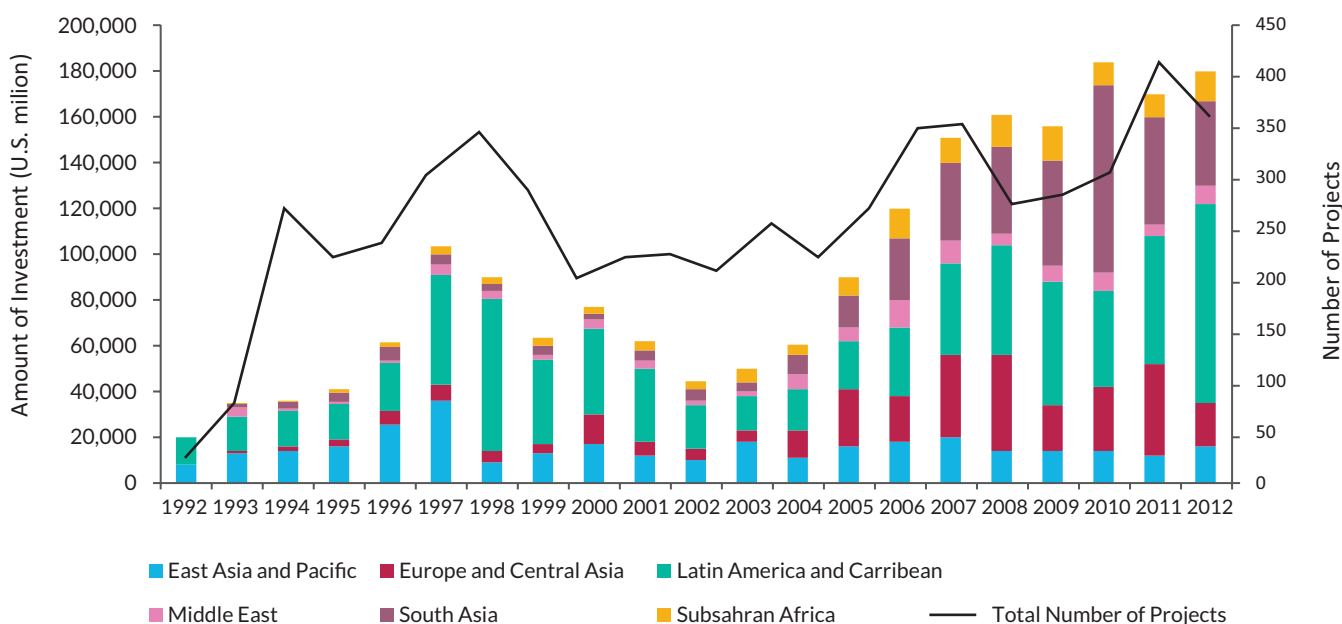
projects. LAC is the most active region, with 42% of total investments. The number of projects cancelled or under stress was approximately 6% of the total investments, representing 78 cases between 1990 and 2012.

The water and sewage sector received the smallest amount of investment, with US\$4 billion spent in 32 projects that reached financial closing in 2012. Despite the sector's small relative size, the total investments and number of projects rose noticeably over the past decade. In 2012, Brazil (11 projects) and China (14 projects) had the greatest number of water and sewerage projects.<sup>13</sup> The predominant form of partnership was concession, constituting 62% of total investments and 41% of the overall project. Projects in this sector were heavily concentrated in East Asia and the Pacific, with 44% of the total investments occurring in these areas. The number of projects cancelled or under stress was approximately 30% of the total investment, representing 63 cases between 1990 and 2012.

### 1.1.2. Regional trends

The investments in East Asia and Pacific region grew by 19% in 2011, reaching US\$17.2 billion in 2012 (Figure 3). In 2012, most investment in this region went to the energy sector (US\$8.9 billion), followed by the telecom sector (US\$4.3 billion), the transport sector (US\$3.5 billion), and the water and sewage sector (US\$355 million). China had the most projects (33 in total) in 2012 and Malaysia attracted the largest amount of investment (US\$5.1 billion). Greenfield projects constituted 68% of all projects and 66% of the total investment. The number of projects cancelled or under stress in this region was approximately 10% of the total investment, representing 86 cases from 1990 to 2012.<sup>14</sup>

Figure 3. Regional Composition of Investment



Source: World Bank and PPIAF, PPI Project Database

As a result of the economic crisis, PPP investment in Europe and Central Asia declined by approximately 48% in 2011 to US\$22.5 billion.<sup>15</sup> Despite this sharp decline, the region still constituted 12% of global PPP investment. In 2012, Ukraine was the most active country with 16 energy projects and commitments of US\$520 million. The most common partnership in this region was the greenfield project, comprising approximately 56% of the total investment and 45% of the total project. The telecom sector captured approximately 54% of the total investment made between 1990 and 2012; the number of projects cancelled or under stress in this region was approximately 2% of the total investment, representing 36 cases.

The LAC region saw a sharp increase in PPP investments, from US\$56.9 billion in 2011 to US\$87.0 billion in 2012, although the number of PPP projects declined from 95 in 2011 to 78 in 2012. In total, this region constituted 48% of global investment, the largest global share for a particular region in the past two decades. Between 1990 and 2012, the telecom sector attracted approximately 42% of the total investment. As in the previous two regions, greenfield projects were the most common type, receiving 41% of total investments and 52% of total projects. The number of projects cancelled or under stress in this region was approximately 7% of the total investment, representing 135 cases.<sup>16</sup>

In the Middle East and North African region, PPP investments rapidly increased from US\$3.9 billion to US\$6.7 billion, with a corresponding doubling of the number of project closures. However, investments in this region in 2012 comprised only 4% of the global investments, approximately 0.4% of regional GDP.<sup>17</sup> The telecom sector dominated the investment in the region, increasing by 64% from 1990 to 2012. The most common type of partnership is the greenfield, as in other parts of the world. The number of projects cancelled or under stress in this region was approximately 1% of the total investment, amounting to seven cases.<sup>18</sup>

South Asia experienced a 20% decline in PPP project investments in 2012, from US\$43.1 billion in 2011 to US\$35.1 billion. The number of the projects reaching financial closure remained stable, with 123 projects in 2011 to 128 in 2012. Despite the significant decline in total investments, South Asia was one of the most active regions in the world. India attracted the most regional investments (US\$31.2 billion) with 106 projects in 2012. In total, private investment comprised 1.5% of the regional investment. A majority of PPP projects in Bangladesh and Pakistan were backed by payment guarantees from the central government and credit support from Asian Development Bank.<sup>19</sup> Between 1990 and 2012, the number of projects cancelled or under stress in this region was approximately 2% of the total investment (12 cases).

In Sub-Saharan Africa, PPP investments grew by approximately 16% to US\$12.8 billion in 2012, reaching

7% of the global investment. Between 1990 and 2012, 471 projects reached financial closure. The telecom sector constituted 77% of these investments. As in other part of the world, greenfield projects are the most common form of contracts. The number of projects cancelled or under stress in this region between 1990 and 2012 was approximately 5% of the total investment (50 cases).<sup>20</sup>

### 1.1.3. Uneven recognition of liabilities within and across countries

Standardized information is likely to be a critical factor in generating the “building blocks” needed for informed decision making, especially when it comes to involving the private sector (both crossborder as well as domestic in origin) and removing the scope for game play between governments and private contractors, as well as between levels of government. Indeed, generating accountable governance is a complex problem, involving appropriate assignments as well as institutional arrangements that provide incentives to efficiently manage liabilities and not pass them on (see for example, Ahmad 2013).

The International Monetary Fund’s (IMF’s) revised standards in the Government Financial Statistics Manual (GFSM) provide a comprehensive measure for the coverage and reporting on public transactions, especially investments and recognition of liabilities. This is fully consistent with the System of National Accounts; hence, the linkages between financial flows and the real sector become clear. The full operation of the GFSM is difficult in many cases, involving a shift toward accruals and some complexity in both budget frameworks and the ability to track the flows through Government Financial Information Management Systems (GFMISs) and the concomitant management of cash flows either through a unique Treasury Single Account (TSA) or through nested TSAs (as might be needed in large multilevel countries such as China).

The absence of standardized information within and across countries, e.g., in the European Union (EU), makes it difficult for the private investors to judge the risks involved in particular countries. This leads to the possibility of their being able to “game the system”—especially if the downside risks are likely to be covered by higher levels of government—and may result in inefficient decisions such as overbuilding of tourist facilities as in Spain or Portugal.

In some federal countries, particularly Canada, subnational governments do not comply with the national standards of reporting, given the high degree of provincial autonomy.<sup>21</sup> This was also the case in Brazil, until the economic crisis in the 1990s required the use of common standards to implement the fiscal responsibility legislation. While a step in the right direction, the Brazilian standards do not comply with the GFSM standards on the recognition of liabilities. In Germany too, the Länder have disparate systems, and the 2010 debt break legislation hopes to persuade them to conform to common standards and balanced budgets within a 10-year period.



Improvements in information technology (IT) systems and GFMS technology now permit relatively easy and inexpensive web-based solutions that facilitate the creation of a central data repository with decentralized accounting and operating systems. This is clearly work in progress, including through a community of practice that involves a network of countries and international agencies, and could be supported by technical assistance from a new multilateral bank or existing agencies.

In Russia, the effort to introduce a new Treasury System, involving both GFMS and TSAs, facilitated the comprehensive introduction of GFMS standards. The shift from legacy systems is not simple, especially when it comes to assets and liabilities.

The Chinese case is also of interest. In the early 2000s, the government decided to move to the GFMS framework as well as to create TSAs in the provinces as well as in the center. However, Chinese provinces are larger than many countries worldwide, and the issues relating to the full implementation of the GFMS framework at the sub-provincial level still remain to be solved, preventing full implementation. This reform has to run parallel with the reform of the budget law that prohibits the provinces from borrowing directly from the private sector, but allows state-owned companies (Urban Development Investment Companies (UDICs)) to borrow for investments (see Ahmad and Wang, 2013). Given that PPPs were creating liabilities that proved hard to manage at the local level, PPPs were reigned in after an initial spurt (see Figure 4). Similarly, indirect borrowing by UDICs expanded considerably, but has been reigned in during the recent past. Thus, while China has made considerable progress toward enacting the GFMS framework, full implementation to cover all potential investment-based liabilities remains to be addressed, and this would be among the preconditions—along with clarity of responsibilities and local own-source revenues—to ensure orderly access to the credit needed for a more balanced development strategy. Indeed, adequately using the efficiencies generated by private management with PPPs could be better utilized in China, provided that the supporting framework to recognize and manage local liabilities is also strengthened. The new budget law enunciated in 2014 permits local governments to issue general purpose and special bonds, subject to oversight and overall limits to be coordinated by the central government (State Council Communiqué, September 26, 2014).

## 1.2. An Approach to Managing Risks while Encouraging Investments

Despite the promises and opportunities associated with PPPs, clearly some challenges remain. These difficulties arise because risk sharing can be complicated due to information asymmetries. The first set of issues relates to the private partner's ability to mask the project costs and the amount of effort extended. Thus, the private

party has incentive to renege on contracts, or at the minimum, to hide the effort and costs of its provision. Section 2 examines these issues, where we use a sectoral perspective to examine the potential to hide information and renege on commitments.

A second set of difficulties concerns the overall public finances at different levels of government—particularly, the government's ability to manage current and future liabilities. As the bulk of PPP investments are likely to involve subnational governments that tend to have limited own-sources of revenue, there is a tendency to “kick the can down the road” or pass it off to upper levels of government.

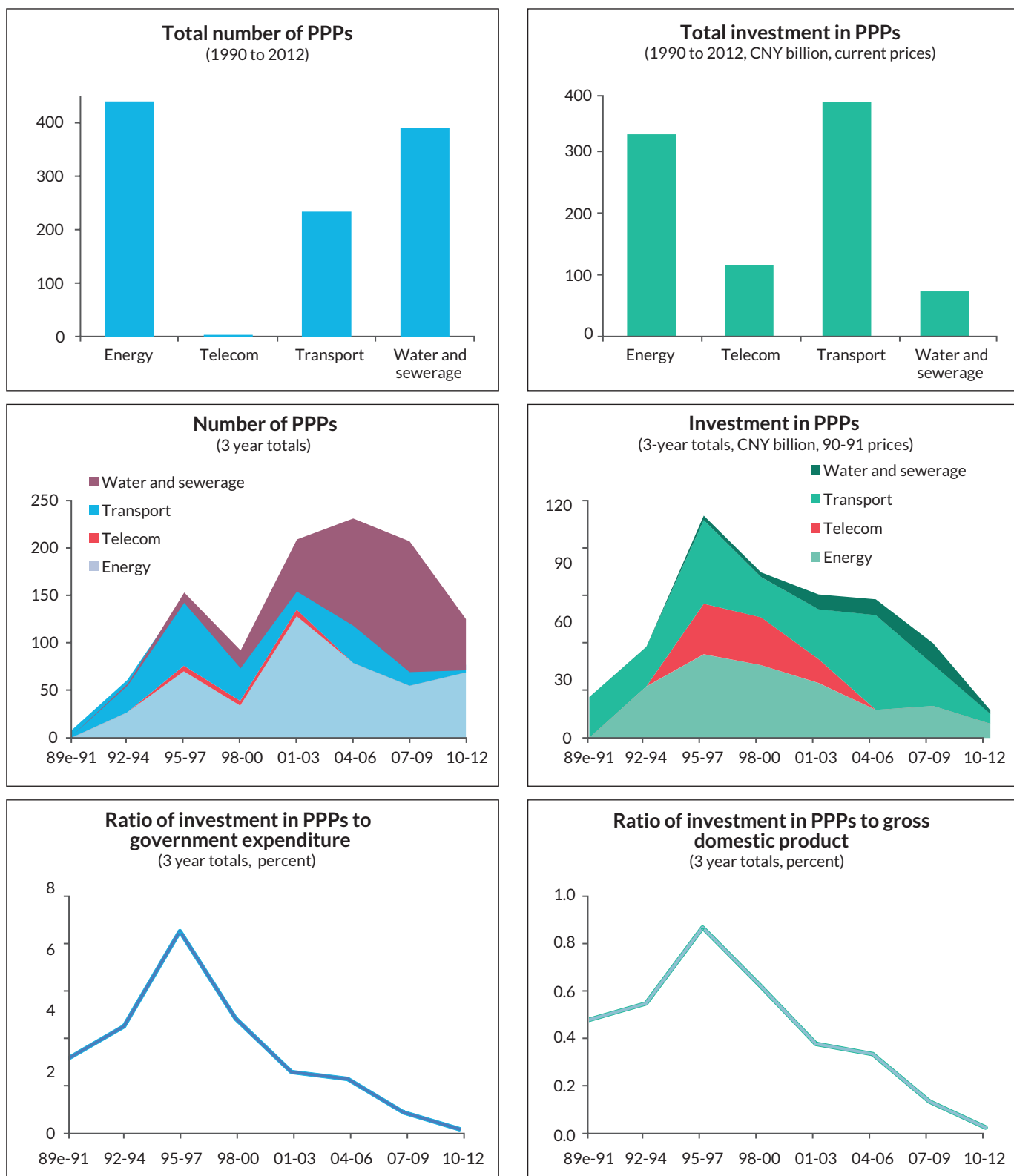
Clearly, from an investor's perspective, the credibility and sustainability of government finances are critical considerations when making sound investment decisions. Given that PPP investments are increasingly being undertaken at the subnational level, the generation of accurate and timely information on general government liabilities (including all levels of government and public enterprises) becomes a critical element in assessing investment sustainability, especially where cross-border investments might be involved. These issues are discussed in Section 3.

In general, the absence of standardized and timely information on the buildup of liabilities is likely to have two distinct effects. In boom periods, this is likely to lead to “irrational exuberance” and the generation of inadequate and unsustainable investments. Problems are likely to be magnified at the subnational level, especially in the absence of effective own-sources of revenue or incentives to ensure that the liabilities will not be passed on to the center, Brussels (in the case of the EU) or future generations.

The obverse is likely to be a greater problem in developing countries: investible capital fears to tread in areas where the enabling environment is problematic. Thus, even though standardized information on subnational operations is absent in Canada, the expectation is nevertheless that since they have own-source revenues and the federal government is not likely to intervene, the local governments will “behave well.” This would clearly not be the case if effective hard budget constraints were lacking, as may be the case at the subnational level in most developing countries, e.g., China.

Indeed, the risk management framework needs to be sufficiently flexible to accommodate excess private liabilities that are translated into public liabilities—e.g., as seen in the US subprime crisis, or the excess building in Ireland and Spain (both countries had been praised by the IMF for fiscal prudence prior to the 2008 economic crisis). In Europe, the presence of a supranational tier likely blinded markets to the risks involved in specific countries (especially in southern Europe, from Portugal and Spain

Figure 4. Snapshot of PRC's Infrastructure PPPs



e = estimate

Notes: The data indicate the number of PPP projects and the value of investment committed to by the project. Data for 1989 are estimated as the average of 1990 and 1991 values. Constant price estimates use the gross domestic product deflator. The data indicate that PPPs involving a private partner, where state-owned enterprises or their subsidiaries remain majorly owned by government entities are not considered as private sponsors.

Source: Asian Development Bank (2013).

to Greece). It is not enough to assume that hard budget constraints exist and that markets will adequately assess and discount the risks involved in specific investments. Consequently, the empty buildings in Spain are reminiscent of the late-1990s Asian crisis, or the earlier difficulties in Latin America.

## 2. PPPs and Information Asymmetries

A PPP, for brevity, comprises a long-term contractual arrangement between a governmental body (whether an agency at the central level or a local authority) and a private firm. Under this arrangement, the firm is delegated the responsibility of delivering some services, including the provision of any associated infrastructure. This includes several tasks, namely financing the investment as well as building, managing, and maintaining the infrastructure necessary to provide the services. The firm takes the responsibility for accomplishing all these tasks. PPPs are vehicles to enable the use of private capital together with (or in lieu of) public funds, for the realization of public projects. The fact that the private sector does not spontaneously provide these services suggests the need for public interventions of some sort, and this typically has a financial obligation that may not be realized immediately. Thus, the temptation to think of PPPs as kicking the fiscal can down the road is likely to be short-sighted and problematic.

A key feature of PPPs is their potential for generating more efficient project outcomes. Often, private investment is needed to utilize more efficient management practices than are generally possible in the public sector. Indeed, the private sector's greater managerial efficiency can provide a benchmark for improving the management of sectors that might have to largely remain in the public sector. Initially utilized in the transportation, energy, and water sectors, PPPs are currently employed in a significantly larger variety of projects. These include, *inter alia*, prisons, waste management, schools, hospitals, leisure facilities, and housing.

Despite the widespread utilization of PPPs, the evidence to date on their performance is mixed. In the UK, private finance initiative (PFI) projects have started yielding cost savings relative to traditional procurement arrangements. However, PPPs have failed to deliver the expected benefits, e.g., in specialized IT projects. This suggests that reliance on PPPs is not equally desirable in all sectors and, in particular, that PPPs are not suitable for sectors that evolve very rapidly (Iossa and Martimort 2008). The French experience in the water sector is also not especially positive, and water prices have been found to be higher under PPP arrangements than under traditional procurement arrangements (Saussier 2006). A particular difficulty in most PPPs is that contracts are renegotiated before reaching their agreed termination date. Renegotiation phenomena are pervasive, especially (though not exclusively) in less developed countries (LDCs). A large number of projects were abandoned in the

LAC region due to the private (or public) partner's inability to abide by contractual obligations (see, among others, Guasch 2004, and Iossa and Martimort 2008).

Given the evidence, it is now clear that properly structuring PPPs and ensuring that they deliver agreed benefits is a complex task. Most of the difficulties arise due to information asymmetries that make it easy to renege on contracts. Ensuring effective risk sharing, including the provision of public resources as agreed within the requisite timeframe, is critical to ensure effective functioning of PPPs. We also posit the need for third-party arbiters in ensuring that contracts are honoured. Understanding the main features of PPPs as well as the incentives faced by partners in PPP arrangements is necessary to effectively assess ways to minimize the risks and maximize the potential of PPPs. One can then discuss ways to tackle the different incentive issues and identify instruments to ensure effective service delivery.

### 2.1. Key Features of PPPs

Under a PPP arrangement, a firm is given the responsibility for financing the investment as well as for building, managing, and maintaining the infrastructure used to provide the services. When a PPP is created, the entire project is delegated to the private firm through a global contract. This combines the investment's financial aspects with the conditions under which the infrastructure is to be built, managed, and maintained. Moreover, this contract allows the firm and investors to be compensated over a long period. This is likely to have budgetary consequences over the project's lifespan.

The private sector's involvement does not mean that the public sector has no role to play. Conversely, governments and, more generally, public institutions should ensure that social obligations are met. This requires effective sectoral reforms as well as adequate public financial management. For successful PPPs, it is important to recognize that both public and private sectors each have certain advantages, relative to the other, in performing specific tasks. The government can contribute to a PPP in several ways. First, it can provide capital for its share of the investment (through tax revenues), transfer assets, make guarantees, or provide in-kind contributions that ease the partnership's functioning. In addition, the government provides social responsibility, environmental awareness, local knowledge, and an ability to mobilize political support. In turn, the private sector provides expertise in commerce, management, operations, and innovation for efficient business operation. The private partner is frequently required to invest in the project, although this may depend upon the specific contractual agreement (see, for instance, Asian Development Bank 2008). In fact, transferring responsibility to the private sector for mobilizing the required finance for infrastructure investment is one of the major differences between PPPs and conventional procurement (World Bank 2012).

PPPs have several specific objectives. First, they are meant to improve the quality and performance of public services to the benefit of users/consumers. Second, they are supposed to reduce or, at least, ease the time profile of the taxpayers' burden. Third, they should help the public authorities, who are responsible for delivering services and optimizing the realization and quality of those services. These objectives are pursued by two main means. First, the public partner takes advantage of the financial resources and the technical expertise of the private sector. Second, the risks associated with the project are allocated between partners so that each partner bears the risks that it can handle more efficiently.

Despite some common features of PPPs, they are not approached the same way everywhere. Some countries choose to utilize PPPs only in certain sectors. This can reflect investment priorities or areas requiring the greatest improvement in service performance. Sectoral concentration can also reflect the willingness to prioritize sectors in which PPPs are expected to attain the most success. Other countries, conversely, identify sectors (or services within sectors) for which reliance on PPPs is ruled out. These are sometimes called *core services*, i.e., services that should be exclusively provided by the government and hence should not be delegated to the private sector through a PPP. Definitions of core services can vary across countries, mirroring local preferences and perceptions (World Bank 2012).

## 2.2. A Sectoral Investigation

PPPs potentially provide flexible tools for decision makers to enable efficient infrastructure and/or service delivery. However, a PPP must be designed with attention to the exact context within which it will be implemented for its success. This involves tailoring the partnership to accommodate the main technical characteristics and constraints of the concerned sectors. Conducting such a comprehensive and reliable investigation thus requires an initial sectoral analysis.

We first discuss the characteristics and circumstances that can make PPPs more suitable in certain sectors than in others.<sup>22</sup>

*Bundling.* An essential feature of a PPP is that different phases of a project are bundled into a single contractual agreement that concerns design, construction, financing, operation, and maintenance. The various firms that will jointly develop the project form a consortium to establish a special purpose vehicle (SPV), which becomes the private contractual partner. Bundling the project's different phases is useful when governmental bodies are aware of the needs that the project should address, but do not know the best way to do so. This knowledge gap makes it more efficient for them to rely on the private sector for the design and the realization of the whole project. The contract should be designed to provide the private sector with appropriate incentives to find innovative solutions

and effectively employ their technical and managerial expertise. The risks of the project must also be efficiently allocated. For instance, the private partner must bear risks associated with the design, construction, and timely delivery, which it can control. If the rewards match the risks, the private partner will have incentives to complete the infrastructure and start providing the service within the stipulated termination date and budget.

*Positive externalities between the project phases.* When the risks are efficiently allocated between the partners, the very act of bundling project phases may lead to efficiency gains if positive externalities (synergies) are present between the design/construction activities and the management/maintenance activities. For instance, this can occur when the infrastructure's quality—which typically affects the service's quality—decreases management and maintenance costs. As bundling induces the private partner to account for the impact that the quality of the infrastructure has on the management and maintenance costs, it helps mitigate underinvestment problems, which arise whenever some quality aspects cannot be specified in contracts, but can be curbed by the private partner to contain costs. We can thus state that, in general, bundling can lead to significant efficiency gains, and hence is desirable if building infrastructure of a sufficient quality reduces management and maintenance costs. This is the case with hospitals. The quality of both the infrastructure and the medical equipment has an important positive effect on the performance. It is also the case in transportation. Both maintenance costs and user benefits are strictly linked to the quality of transport infrastructure. Prisons are another good example. Improvements in the infrastructure design enable significant reductions in management costs.

*Contractual length.* The presence of externalities between construction and operation is one reason why PPP arrangements must have a long duration. This core aspect determines how carefully the private partner will account for the effects of the construction investment on the management and maintenance costs. If the contract's duration is too short, the private partner will not have the incentive to internalize those effects and consequently under invests. On the other hand, it may not be a good idea to lengthen the duration excessively for two possible reasons. First, the prolonged absence of any competitive pressure may lead the private partner to become inefficient. Second, when the users' preferences evolve quickly over time, the contractual terms tend to rapidly become obsolete. This may require renegotiation of the contract. Therefore, PPP arrangements may not be suitable in sectors in which the users' preferences evolve quickly. Similar difficulties have been experienced with the IT services in the UK.

*Absence of positive externalities between project phases.* Bundling is of little—or no—use when there are limited or no positive externalities between construction and operation



activities. This is the case, for instance, with the so-called *soft services*, such as meal preparation and distribution, cleaning, laundry, maintenance of buildings and technological services, parking, and so on. In the UK, these services, initially embodied in PPP arrangements, are currently regulated under independent contracts. Frequently, these contracts are relatively short-term to encourage participation by a larger number of firms. Finally, negative externalities may arise between project phases, e.g., when building high quality infrastructure increases management and maintenance costs, even if it generates larger social benefits. A good example is found in the *security dimensions of the plants*. It is, then, not advisable to induce the private partner to internalize these externalities because that would exacerbate the problem of underinvestment in quality/security. Unbundling may thus be optimal.

We now more closely examine PPP arrangements in the provision of three services of general interest, namely transport, energy, and telecommunications. Without the ambition of being exhaustive, we shall focus on a few aspects that seem to be especially important in those sectors.

### 2.2.1. Transport

Over the past two decades, the European public transport sector has experienced a substantial institutional evolution. First, reliance on contracting has become widespread over all transport modes. This has led more and more risk to be transferred to private operators. Second, competitive tendering practices have progressively replaced direct awarding of contractual rights. Finally, many municipal operators have been privatized. The utilization of PPPs for the realization of transport projects is a substantial part of this trend (Iossa and Martimort 2009). The Isle of Skye Bridge, which was completed in 1992 and connects the Isle of Skye to the mainland, was the first European transport project realized under the UK PFI approach (Grout 1997). Since then, PPPs have become widespread in urban transportation projects. They have also been used for big infrastructure projects and isolated links, such as the Eurotunnel and the London Underground upgrade-and-maintain project. After becoming very popular also in France, Italy and Spain, they have been recently adopted in Eastern Europe for the realization of transport infrastructure (European Investment Bank 2004).

The trend can also be observed outside Europe. In the U.S., the introduction of PPPs in transportation infrastructure dates back to the 1970s, when they were used to build inner-city infrastructure. Over time, PPPs have been extended to other road projects, such as the Dulles Greenway highway in Virginia and the SR-91 and SR-125 toll roads in California (CBO 2007), although main interstate highways are largely public. In many cases in the US, PPPs are used to raise financing for infrastructure, given the political difficulties in implementing taxes or even user charges. In Australia, toll roads were first built

through PPP arrangements during the 1990s in New South Wales (Iossa and Martimort 2009).

Increasingly substantial involvement by the private sector in financing and building transport infrastructures has evolved: since the 1990s, the private sector has invested US\$180 billion to develop transport projects in LDCs. Furthermore, 1000 private projects were in progress in 2006, most of them concerning roads and many others concerning railroads (Iossa and Martimort 2009).

#### 2.2.1.1. Main features of transport PPPs

We identify four main features (see also Martimort and Iossa 2009):

- Bundled projects—typically including design, building, financing, and operating—are contracted out to a consortium of private firms, which takes the responsibility for the entire project development.
- A significant part of the risks involved in the project is transferred to the private partner, but are dependent on tolls.
- The use of private capital is a crucial aspect of the partnership. User charges are often set to reward the private investors. For instance, highway users pay a toll in countries such as Italy and France;<sup>23</sup> airlines and lessees pay a landing fee and a rental charge to airport contractors; train operating companies, which obtain revenues from passengers, pay railway contractors for the right to access the rail infrastructure.
- The contractual relationship typically ranges from 20 to 35 years.

#### 2.2.1.2. Risks in transport projects

Transport projects involve both construction and operational risks. Construction risks are related, *inter alia*, to incorrect time estimates, unforeseen ground conditions, failure to obtain necessary services, or protestor actions. Operational risks include demand risk (directly affecting revenues—e.g., in the 1990s Mexican case), interest rate and foreign exchange risks, or risks associated with hydrogeological and weather conditions.

Demand risk in the operation phase is especially problematic. In the majority of cases, reliable forecasts of future traffic flows are difficult to produce.

- One difficulty arises when other transportation modes and facilities are available. Demand can be dramatically influenced by the competition that they induce. For instance, the success of a toll road project depends on whether alternative toll-free roads are available.
- Furthermore, both user needs and, more generally, macroeconomic conditions tend to change over time. Assessing the efficiency of the firm in tackling risks is necessary to establish the exact extent to which these risks should be transferred onto the private firm.

- In transport projects, as the service is sold to end-users rather than to one or few off takers (as is the case of oil and gas, for instance), it is difficult to hedge the demand risk that private firms cannot efficiently tackle, for example, by fixing revenue levels affecting earning and cash flows. It is thus necessary to rely on other instruments to mitigate demand risk in PPPs. For instance, in highway development projects, the public sector can provide the private partners with guarantees on traffic level, in the form of traffic floors or collars (Gatti 2014).

Firms can influence demand for the service in two essential ways: (1) by exerting an effort to build good quality infrastructure, and (2) by exerting an effort to efficiently provide the service. In motorway projects, for instance, the benefit that users obtain depends on the motorway's level of safety. This, in turn, is related both to the quality of the motorway and its maintenance. In railway projects, quality dimensions such as comfort, reliability of services, and on-train services strongly impact demand.

Some quality dimensions are observable and verifiable. For example, consider train punctuality and crash rates in rail concessions; schedule reliability in bus concessions; and congestion levels and mortality rates in highway concessions. These dimensions can be contracted, and, in principle, it is not problematic to design the contract so that the firm holds responsibility for these aspects. Quality targets can be stipulated in the contractual agreement, and the firm can be motivated to meet them through rewards and punishments. This is a common practice in many real-world contexts.

Data collection on verifiable quality dimensions for regulatory and accountability purposes is now widespread for general interest services. Bergantino, Billette de Villemeur, and Vinella (2011) report a few examples in transportation sectors. In the U.S., the Bureau of Transportation Statistics of the Research and Innovative Technology Administration provides detailed information regarding departure and arrival delays for various transportation modes ranging from aviation to maritime, highway, transit, and rail. In France, the *Observatoire des retards du transport aérien* collects and publishes data on flight punctuality. In Italy, the regulated rail company is currently compelled to disclose information regarding arrival delays.

The effort dimensions are more problematic to measure as they are not verifiable. These are at the root of moral hazard problems.

In addition, adverse selection problems can arise. A firm may effectively hold some private information, for example, regarding the costs of the activity, which it can use to its advantage in its contractual relationship with the government. When this is the case, it becomes necessary to find contractual solutions that address the

two information issues at once. In some projects, such as highway projects, the presence of adverse selection is less likely. This is because the marginal cost of providing the service is very small (close to zero) and the private party often faces the same demand uncertainty as the public party. Hence, moral hazard is the main concern in these projects.

Given the difficulty in making precise demand forecasts, the firm's profits are largely uncertain before the operation phase begins. One natural consequence of this uncertainty is difficulties in attracting private investment, especially when projects are big and private sponsors are risk averse. For instance, cross-border infrastructure has received very little attention thus far from private financiers in Europe (EC White Paper 2006). Even if private investors show up, they tend to behave opportunistically. This is possible because, when the right to run the project is awarded, they are generally required to present traffic forecasts, which are then used to define the contractual arrangements. Thus, at that stage, private firms have an incentive to present over-optimistic forecasts to obtain the right to conduct the activity. However, once this is acquired, it may then become clear that traffic flows are lower.

Changing demand parameters leads to costly renegotiation, default, or bailouts. For instance, many highways projects had their contracts renegotiated in Latin America during the 1980s, at the private operators' initiative (Guasch 2004). In a recent motorway project in Hungary, the traffic flows proved to be very low during the operation phase. The private operator responsible for designing, financing, building, operating, and transferring the infrastructure earned very little revenue and therefore stopped repaying its debt. The public partner had to intervene to take over the debt obligations and bailout the concession (European Commission 2004). The list of failed PPPs in transport is extensive and we report some additional cases in sub-section 6 below.

### 2.2.2. Energy

This subsection looks at the energy sector, focusing on the EU approach to PPP arrangements. The main priority of EU energy policy is to coordinate and optimize network development on a continental basis. As specified by the European Commission (2011), this means that

- Solidarity among member states should become fully operational;
- The internal market should be completed;
- Alternative supply/transit routes should be made available;
- Renewables should be further developed and begin to compete with traditional generation supply.

The aim is to ensure that strategic energy networks and storage facilities will be completed by 2020. Twelve

trans-European priority corridors and areas have been identified to this end. They include electricity and gas networks as well as carbon dioxide transport infrastructures. EU goals are to be achieved by identifying specific energy infrastructure projects considered to be of “common interest” to member states. For instance, many projects are expected to focus on the European transmission system; and operators will need to build many more such projects than in the past.

### 2.2.2.1. Financial aspects and PPP arrangements

The EU program is ambitious and requires huge investments. This poses difficulties at a juncture where resources are scarce. Significant public resources are unlikely to be forthcoming, especially in countries that have developed high levels of public debt due to counter-cyclical policies or the realization of past liabilities. Private resources are also limited because commercial banks have drastically reduced infrastructure investments over the last years.

Thus, two main solutions are being considered:

- Involvement of institutional investors (pension funds, insurance companies, mutual funds, sovereign wealth funds);
- Issuance of project bonds.<sup>24</sup>

Involving *institutional investors* may be useful because their liabilities are long term. Hence, they may buy and hold investments in long-dated productive assets, acting in a counter-cyclical manner. The EU would work as a catalyst for these investors. In October 2011, the Connecting Europe Facility (CEF) was launched to fund €50 billion of investments in the trans-European networks for energy as well as transport and digital services between 2014 and 2020. The CEF is meant to use many financial instruments as alternatives to traditional grant funding, including special lending, guarantees, and equity investments.

More than institutional investors, *project bonds* are viewed as the main EU financing instrument for the trans-European networks for energy, transport, and digital services. A pilot phase was launched in 2012. The idea is that PPPs would be created for specific projects. However, rather than relying on bank loans, these companies would issue long-term well-rated bonds. To mitigate the risk, at least to some extent, the European Commission and the European Investment Bank (rather than the single states) would participate in the projects.

This strategy seems to be supported by the following logic. As the concerned projects are essentially trans-European rather than national, they are huge and involve risks that encompass several countries at once. In addition, capital is to be attracted from as many countries as possible. Simultaneously, risks are to be shared as widely as possible across participating countries—the private sector is still

destined to be involved. However, the PPP companies responsible for specific projects will share risks with the public sector, with guarantees made at the EU level more than at the country level. This puts greater premium on ensuring the standardization of public finance data across countries.

### 2.2.3. Information and communication technology (ICT)

PPP/PFI solutions do not seem to be particularly appropriate for ICT projects, especially because of their fast-moving nature and preferences for the involved services. This inappropriateness has been stressed in the economic literature—Iossa and Martimort (2008), for example, argue that “PPPs seem unsuitable for fast-moving sectors; performance failures have been widespread in PPPs for specialized IT in the UK.” Iossa and Russo (2008), concur that “in sectors where users’ preferences change rapidly over time, PPP arrangements are inappropriate, as the UK experience in IT projects witnesses.”<sup>25</sup>

Real-world practices are moving away from PPPs in IT. For instance, the *Public Private Partnership Policy Framework and Guidance* of the Northern Ireland Department of Finance and Personnel (section 5.2.6) states that “(...) resources should not be wasted investigating PPP solutions where they are clearly not appropriate. For instance, PFI solutions are not usually considered appropriate for Information and Communication Technology (ICT) projects.”

This approach is also being followed by the Broadband Delivery UK (BDUK) project, currently in progress. BDUK is meant to improve the UK’s broadband network, particularly emphasising on making high-speed broadband available in rural communities. The ambition is to provide superfast broadband to at least 90% of UK households, and to provide universal access to standard broadband with a speed of at least 2 Mbps. This is one of the major infrastructure projects in which there is capital investment from the public sector, to which Infrastructure UK (IUK) provides support. The government has allocated £530 million to stimulate commercial investment to roll out high-speed broadband in rural communities. BDUK is responsible for managing the rural program, whereas local authorities and the devolved administrations are responsible for individual projects. Local authorities can run mini-competitions to select a specific supplier to deliver broadband services for a local project.

As this project largely targets rural areas, it is unlikely to be very profitable or attract private investors. Moreover, the “social” benefits of the project are a good justification for the public contribution. Nonetheless, this story seems to confirm that PPP arrangements are not regarded as an appropriate instrument for IT projects, or where social concerns place a constraint on the user charges that might make a project interesting for the private sector. The latter may also apply with some other rural infrastructure, such as feeder roads.

### 2.3. Information Asymmetries between Partners

As the creation of a PPP involves delegation of some tasks from the government to a private firm, a natural question is whether this can be done at no cost—and if so, under what circumstances. This depends on the extent to which the partners' interests are initially aligned, or can be aligned in the stipulated contract.

PPPs face the immediate difficulty of the existence of information asymmetries between the government and the firm. Hence, these must be considered in contract design. In many situations, during the execution of the contract, the firm is (or becomes) better informed than the government regarding not only some relevant aspects of the activity, but also regarding its own actions that can impact those aspects. For instance, the government cannot observe (or, even if it does, no third party, such as a court of justice, can verify this) whether the firm exerts the specific level of effort that is desirable from the social perspective in building the infrastructure. As providing effort is costly for the firm, but the degree of effort cannot be specified in contracts, a moral hazard problem arises; this is usual when the source of private information is endogenous. That is, the firm has an incentive to shirk from exerting effort during the construction phase to maximize returns.

In addition, the government is unlikely to observe the exact conditions under which the firm manages the activity once the infrastructure is in place. For instance, it may not know whether the service demand or the production cost is high or low. In contrast, the firm will learn this information by the time the project is in operation. This divergence in knowledge levels is the root of an adverse selection problem, as usual when the source of private information is exogenous. That is, the firm has an incentive to cheat, *vis-à-vis* the government, regarding the conditions under which it actually operates, because this allows it to increase its profits.<sup>26</sup>

The two information problems are generally linked. This is due to the presence of synergies between project phases, which is one of the main reasons for which various tasks are bundled in a unique activity and entrusted to a single responsible firm. The effort that the firm exerts during the construction phase impacts the conditions it faces during the operation phase. For instance, exerting effort may increase the likelihood of facing a high demand for the service (because the infrastructure is more reliable) or a low cost of production (because the cost is an inner characteristic of the infrastructure). This is why effort provision by the firm is desirable.<sup>27</sup>

From a standard agency theory, we know that moral hazard is not an issue (and can be handled at no cost) as long as the firm is risk neutral and not protected by limited liability. Nor is adverse selection an issue if contracting occurs *ex ante*, i.e., when not only the government but also the firm is uncertain regarding the future

operating conditions, as is very often the case with PPPs. Under these circumstances, offering a *state-dependent* compensation scheme will allow the government (1) to prevent the firm from exploiting its informational advantage and (2) to implement the efficient allocation (namely, recommend the efficient output level and give up no rent to the firm). Differentiating the compensation to the firm across states of nature is useful for incentive purposes.

This is backed by the well-known *revelation principle* (Gibbard 1973; Green and Laffont 1977; Dasgupta, Hammond, and Maskin 1979; Myerson 1979). In principal-agent relationships, there is no loss of generality for the principal (the government, in this context) in restricting attention to *direct revelation mechanisms*. "Directness" of an incentive mechanism resides in whether the agent (the firm, in this context) has no other actions to take other than merely reporting private information to the principal (or, equivalently, picking one particular option within a menu of contractual options, each tailored to a different possible state). To make such a mechanism "truthful," it is necessary to construct it in such a way that the incentive compatibility constraints of the agent are satisfied. This involves motivating the agent to announce the information correctly to the principal, rather than to camouflage it (see, for instance, Laffont and Martimort 2001).

On the one hand, moral hazard requires that the firm bear some risk. The firm is not motivated to engage in costly effort unless it faces a sufficiently significant penalty for non-compliance, while being assigned a sufficiently large reward for good performance. A compensation scheme with this characteristic mirrors the need to transfer, in the words of OECD (2012), a "sufficient and appropriate" amount of risk to the firm. In long-term PPP agreements in which not only the level of output and the compensation to the firm are contractual variables, but also the termination date is stipulated, the firm should be allowed to enjoy the benefits of its effort for a sufficiently long period of time (see, for instance, Iossa and Martimort 2008, and Danau and Vinella 2014).

Adverse selection requires that firm compensation should be sufficiently higher for good performance than bad performance, though not excessively higher. The former requirement discourages the firm from claiming that performance is bad when, in fact, it is good, while the latter prevents the reverse.<sup>28</sup>

The bottom line is that, as long as no friction arises other than the two information problems described thus far, delegation to a risk-neutral private firm generates no agency costs for the government. The firm can be induced to deliver the efficient level of output without the need to concede any information rent to it. This goal is achieved by designing a sufficiently dispersed compensation scheme, under which the firm breaks even *ex ante*, obtaining a higher return when the operating conditions are favorable



and a lower return when they are not.<sup>29</sup> This conclusion might lead one to believe that, after all, it is not very difficult to setup a successful PPP because information issues can be handily circumvented. However, an important clarification is in order.

The conclusion above is drawn under the implicit assumption that both the government and firm fully commit to contractual obligations within the PPP arrangement. However, in practice, the partners are often unable to do so. Difficulties then arise with contract enforcement. Consequently, delegation to the private firm is more problematic and may become costly. One should thus try and understand how the contract, which decentralizes the efficient allocation under full commitment, can be made self-enforcing as it is implemented.

## 2.4. Limited Ability to Commit to Contractual Obligations

In the literature on contract design, situations where the contractual parties are unable to commit to their obligations have been labelled as situations of *limited commitment*. Estache and Wren-Lewis (2008) illustrate that this label can be used to encompass different possible situations. First, with “limited enforcement,” the firm may renege on the contract during its execution, even if the government disagrees. Conversely, in a second situation, referred to as “non-commitment,” the government may renege on the contract even if this is detrimental for the firm. A third situation is referred to as “commitment and renegotiation,” in which the parties commit to their obligations but if they both wish, the contract can be renegotiated at a later stage.<sup>30</sup>

Examples of PPP projects in which the firm reneges on the contract during its execution and attempts to reach a more favorable deal are pervasive worldwide, as illustrated in Section 1. In institutionally weak contexts, such as in many developing countries, the rule of law often can be circumvented. Thus, contract renegeing and, possibly, renegotiation is a likely consequence. For instance, in Ghana, the current monopoly enterprise for fixed telephony entered the mobile business, despite this move being explicitly prohibited. In Tanzania, the regulator failed to enforce regional mobile licenses, and the dominant operator began to expand at the national level (Estache and Wren-Lewis 2008). A large fraction of infrastructure renegotiations in Latin America are found to occur at the firm’s initiative.<sup>31</sup> Though less common, firms also renege on contracts also in advanced economies. In principle, institutions in these countries are more solid and hence contracts are more easily enforced. For instance, a firm that refuses to produce can be fined heavily. Nonetheless, governments often prove reluctant to engage in litigation, which can be costly and time consuming. As an illustration, in France, the subsidies awarded to urban transport concessionaires have progressively increased (Gagnepain, Ivaldi and Martimort 2013).

There are (at least) two other reasons why governments may accommodate firms’ requests. The first set relates to electoral concerns. When high-profile projects generating much media attention and/or projects involving critical infrastructure and services that are essential for the population are at stake, governments may be afraid of a severe backlash if the contractual relationship with the initial partner breaks up and the project’s completion is delayed until a new agreement is reached with another partner. In those cases, the threat of imposing sanctions on reticent firms is, in fact, not credible. Governments end up being stuck in the partnership and keep increasing the contractual terms, as appears to have happened in some cases in India.

Corruption and rent seeking might occur as well. Politicians/bureaucrats may be ready to accept bribes from firms, together with other present or future benefits (such as the career promises for friends and relatives), in exchange for a favourable revision of the contractual conditions. In infrastructure projects, corruption may also take the form of softer *ex-post* price regulation, which allows both firms (through larger profits) and officials (through rent seeking) to benefit at the consumers’ expense. Focusing on this form of corruption, Martimort and Straub (2008) show that reliance on a private firm may open the door to more corruption, as compared to public provision. This occurs when the shadow cost of public funds to be borne by taxpayers as long as a public firm receives budgetary subsidies is low relative to the distortion that the price raise induces—to the detriment of consumers—when a private firm is delegated the activity. When officials and bureaucrats are corrupted at various levels in the governmental hierarchy and are biased toward and/or influenced by the private sector, this dynamic would hold even if the taxation systems are largely inefficient. In general, countries with multilevel governments are especially prone to corruption. In many cases, this reflects a weak and opaque institutional framework especially at the subnational level, poor information on comparable local information, and term limits that reduce electoral discipline. Capture and lack of transparency are far from negligible issues, as regional and local governments are responsible for a large part of total national capital investments in an increasing number of countries.<sup>32</sup>

While it is expected that firms will renege on contracts, in fact, it is equally plausible that governments will lack the desire or ability to commit to contractual obligations. In developing countries, governmental failure to honor contractual terms is even more serious a concern than the firm’s failure. This is because, as Estache and Wren-Lewis (2008) stress, the governments’ inability to secure investors’ remuneration may discourage further large-scale investments, which are desperately needed in those countries, especially in utility sectors (see also Banerjee, Oetzel and Ranganathan 2006). Political risk also heavily challenges public-private contracting in

transition economies, such as in Central and Eastern Europe. For instance, in Hungary, transportation projects have been delayed by the repeated changes in political attitude toward PPPs (Brench, Beckers, Heinrich and von Hirschhausen 2005).

In environments characterized by limited commitment, the obvious reason under which either the firm or the government might renege on the stipulated contract is that this may allow for a higher payoff than would be attained if the contract were honored. At the initiative of one or the other party, a new negotiation can occur. If renegotiation succeeds, the partnership continues under a new deal. Otherwise, the partnership breaks up and the project is abandoned. Alternatively, another firm may be required to bring it to completion.

Incentives to renege on the contract arise naturally. To solve information problems, the government needs to design a compensation scheme under which the firm, while breaking even *ex ante*, is “rewarded” when the state of nature comes out to be favorable and “punished” otherwise. Consequently, one possibility could be that once the true state is observed by the firm and correctly revealed to the government, the firm is unlikely to be happy if the operating conditions are actually bad because, in that case, it receives the lower compensation stipulated in the contract. Another possibility is that the government is unhappy if the operating conditions are good because, in that case, it owes the firm the higher compensation that the contract prescribes. This suggests that, while offering an incentive compatible scheme is helpful to tackle information problems *ex ante*, this is less safe as a strategy *ex post*; it may well cause enforcement difficulties.

Two core points are worth making. First, the incentive issues that arise on the firm’s side due to the information advantage that it enjoys *vis-à-vis* the government, do not exhaust the list of incentive issues that potentially challenge the overall performance of PPPs. For a proper arrangement to be set up, it is essential to consider another important temptation—that of refusing to abide by the obligations during the contract’s execution. Remarkably, this temptation concerns not only the firm but also the government. Therefore, for successful PPP arrangements, it is generally necessary to find ways to incentivize *both* partners to behave virtuously.

Second, the contractual payoffs of the two partners underline how difficult it is to ensure the contract is honored. Whether enforcement is problematic depends on what is at stake for each of the partners in the renegotiation process (if any). Incentives to renege may appear even in the absence of information concerns that induce the government to differentiate the firm’s compensation across possible states of nature.

A clear strategy is needed, together with a set of instruments, to prevent the two partners from behaving

opportunistically. This requires a full understanding of how a hypothetical renegotiation process might unfold and what each party could lose and gain as a consequence.

## 2.5. Securing Contract Enforcement

Finding a way to ensure that the contract is enforced even in environments in which the partners are unable to commit is an intriguing challenge. The appropriate recipe depends on the particular context and issues to which it is tailored.

With regard to *ex-ante* contracting and information issues on the firm’s side, Danau and Vinella (2014) suggest a strategy to tackle enforcement problems that rests on a proper choice of the PPP project’s financial structure.

First, to induce the firm to honor the contract, it must (1) be required to invest a sufficiently significant amount of money upfront, and (2) be allowed to recover that investment during the implementation period. As the firm is aware that breaking up the partnership would impede recovery of its initial investment, it will have an incentive to preserve the relationship with the government. Indeed, this means that the private partner must be able to provide as large a contribution as necessary to motivate it to honor the contract. The bottom line is that private firms must be well end owed to be allowed to participate in the partnerships. This should deter the speculative and likely volatile investors.

Second, the firm’s own investment should be complemented with the injection of some external/debt capital, regardless of whether this is truly necessary to complete the investment. In other words, even a wealthy firm that could finance the investment entirely should be instructed to take a loan. This may look counterintuitive, but debt finance can play a strategic role. Danau and Vinella (2014) show how a beneficial outcome can be attained by such a step. Specifically, the government should provide guarantees for the firm’s debt. It should be stipulated, in addition, that the guarantees will operate *conditionally* on the partnership continuing under either the initial contract or a new deal. However, the guarantees are not necessarily of equal magnitude in the two cases. The guarantees provided for the hypothetical new deal should be sufficiently large to eliminate any benefit that the firm and/or government could obtain by renegotiating. As a result, renegotiation would not be in the partners’ interests. Accordingly, breakup of the partnership would represent the only real alternative to honoring the contract. As far as the firm is concerned, we know that this option is not appealing—provided that the firm is required to put sufficient money on the table at the outset of the project. Thus, the only remaining concern is to find a way to make the option equally unattractive for the government.

As Danau and Vinella (2014) show, the government may be tempted to terminate the partnership when the private investment is large and hence there is much to appropriate if the relationship breaks up. The gain would include not only the firm's investment but also the external capital, which is not covered by governmental guarantees when the PPP is prematurely terminated. Indeed, the government trades this expropriation gain against any cost that interrupting the partnership would generate.

A cost would arise for the government in the form of a loss of reputation and/or credibility. Reasonably enough, this may follow from the government not being sufficiently authoritative to have the contract honored by the private firm, despite the fact that the latter invested in the project upfront (Guasch, Laffont and Straub 2006). It may also follow from the government's inability to keep its own promises to the private financiers involved in the project and other potential investors, customers, and voters (Irwin 2007). Clearly, the gain must be made small relative to the costs associated with the partnership's failure to incentivize the government to honor the contract.

This leads to the third ingredient of the Danau-Vinella recipe: private liabilities should be contained to a sufficiently small size. In addition to requiring that the firm should not invest too much in the project, regardless of its wealth, this requires that the firm should not rely massively on debt, even if it has unlimited access to the credit market. In other words, PPP projects that are likely to be efficiently run should not be excessively leveraged.

In sum, the project's financial structure, and, in particular, the exact mix of private and public funds (i.e., own funds of the firm, funds provided by external sponsors and, possibly, governmental transfers) to be used to cover the investment becomes the instrument for boosting commitment to contractual obligations and promoting contract enforcement.

## 2.6. Examples of PPP failures

To illustrate the relevance of the various aspects discussed and the policy recommendations previously described, we now provide several examples of PPP arrangements that failed to achieve the desired outcomes. The first example shows the pressure governments face to bailout projects that are especially important from a social perspective. Consequently, they have to support banks when such projects become financially distressed, and, in some cases, can generate significant macroeconomic problems (e.g., excess building in Spain recently and road building in Mexico in the 1990s). The second and the third examples illustrate how vulnerable projects are to renegotiation and default, respectively, when they are excessively leveraged and when debt obligations are supported by unconditional governmental guarantees.<sup>33</sup> Especially, in cases where local government accountability or own source revenues are limited, accountability can be limited (Ambrosiano and Bordignon 2006).

### 2.6.1. Mexico's road building project in the 1990s

Between 1989 and 1994, Mexico embarked on an ambitious road building program. More than 50 concessions were awarded for 5,500 km of toll roads. The concessions were highly leveraged. Debt financing for the projects was provided on a floating-rate basis by local banks. Many such banks were owned by subnational governments and faced pressure to lend money to concessionaires. Since the local governments had no own-source revenues, they could not compensate the concessionaires who ceased to repay the banks. In fact, because traffic volumes turned out to be lower than forecasted and interest rates rose over time, the banking system absorbed a considerable increase in liabilities.

Although there were no explicit federal government guarantees, these project failures exacerbated a banking crisis. Eventually, the government needed to restructure the entire toll road program. It bailed out the concessions, taking over 25 of them and assuming US\$7.7 billion in debt (Ehrhardt and Irwin 2004).

### 2.6.2. Victoria trams and trains

In 1999, the state government of Victoria, Australia awarded five franchises (which are similar to concessions) for the operation of trams and commuter rail in Melbourne, as well as regional trains in Victoria. According to the government's estimation, this would lead to a total savings of A\$1.8 billion over the life of the contract. However, the total equity contribution from the sponsors was only \$135 million, or 8% of the total investment.

The payment structure of the PPP heavily relied on expected growth in patronage and a reduction in costs. In fact, neither the growth nor cost reductions were realized. Consequently, the franchisees experienced losses. Because the project was highly leveraged and the equity at stake was thus relatively low, the operators had little to lose in quitting the projects. Therefore, they could credibly threaten the government with walking away from the franchises rather than to endure the losses or striving for improvements. This weakened the government's position *vis-à-vis* the existing operators. Eventually, the government was induced to renegotiate the contractual terms with those operators (Ehrhardt and Irwin 2004).

### 2.6.3. The London underground project

Even in developed countries, the central government can foot the bill in case of a default at the local level, without actually having been involved in a PPP. In 2002–2003, Greater London Council launched a project for maintaining and upgrading the London underground. The public sector was uncertain whether Metronet, the consortium responsible for the project's realization, could borrow sufficient funds to cover the investment. Transport for London, a local government body, guaranteed 95% of Metronet's debt obligations to motivate the banks to lend money to Metronet. Eventually, the consortium failed and the partnership broke up. Despite this, the guarantee

commenced because it had been provided without specifying any conditions and hence continued regardless of the partnership's failure.

Eventually, the tab was passed to the central Department for Transport, which had to pay £1.7 billion to help Transport for London meet the guarantee (House of Lords 2010). The debt risk was transferred to taxpayers, who incurred a direct loss of between £170 million and £410 million (National Audit Office 2008–2009).

## 2.7. Some Policy Implications

### 2.7.1. Need for reliable third parties and the separation of powers

For a government with a limited ability to commit to contractual obligations, it is difficult (and perhaps, impossible) to provide credible guarantees to the firm's financiers. This reveals a more institutional perspective on the enforceability of PPP contractual arrangements and hence on attaining desirable outcomes in PPP projects.

If the partners' interests in renegotiating the contract are to be eliminated, it is essential that the project be partially financed with external funds and that debt finance be strategically employed. However, Danau and Vinella (2014) argue that a credible third party should be involved, under whose aegis external sponsors can be involved and receive guarantees for their credits.

One could also think of creating some *ad hoc* institution that should perform the specific task of acting as an "external guarantor" in the enforcement of PPP contracts in institutional environments where the partners (and, in particular, the government) fail to commit to their contractual obligations. This possibility implicitly calls for an appropriate separation of powers and specialization of tasks at the institutional level.

One option would be the suggestion by Bhattacharya, Romani, and Stern (2012). They argue for the creation of a new development bank specifically dedicated to promote infrastructure and sustainable development as well as to operate in a technical assistance capacity in the selection, management, and funding of infrastructure projects, which is particularly needed in developing countries. Existing development banks, including the World Bank and regional development banks, are also increasing their focus and financing on the question of public investment gaps. This issue is taken up further in Section 3.

## 3. Policy Design Issues and Case for Multilateral Risk Mitigation

In this paper, we have emphasized the need for private sector involvement in investments to ease national fiscal constraints and to enhance efficiency in the provision of key services. Incentive problems arise due to the asymmetric information concerning risks. They are exacerbated by the limited information available on projects and on the buildup of liabilities at the

relevant level of government (affecting the credibility of government contracts). Standardized information such as using the IMF's GFSM standard is critical for recording and reporting liabilities on an accrual basis over the medium term. Limited information leads to the potential for renegotiation in favor of firms, with high-risk projects together with a potential for rent seeking, even though sectoral variations are likely to exist.

The lack of credible and complete time series data at the local level is a critical concern for performing a cross-country fiscal analysis, affecting the potential for enhanced long-term cross-border investments. Addressing these gaps requires not only a technical framework for data collection but also political-economy mechanisms through which local authorities might be willing to generate and share consistent information.

### 3.1. Tightening the Definitions of PPP Liabilities

As a result of the aforementioned difficulties, the International Accounting Standards Board (2011) has issued a new set of guidelines (IPSAS 32)<sup>34</sup> that force an upfront accounting for PPPs and would significantly affect deficits and recognition of liabilities for general government—i.e., for both central and subcentral governments and related agencies. This ensures that the operator is effectively compensated for services rendered during the concession period. It requires the government or granting public agency to recognize assets and liabilities in their financial statements when the following conditions are met:

- The government or granting public agency controls or regulates the services to be provided, the target beneficiaries, or the price;
- The grantor controls a significant residual interest in the asset at the end of the arrangement through ownership, beneficial entitlement, or otherwise.

This avoids the situation where neither the public nor private partner recognizes the asset/liability at the end of the period. Indeed, as has been recently seen in Ireland and Spain (and with Mexican roads in the early 1990s), even if no explicit guarantees are made by the federal or state governments, when there is sufficient pressure on the banking system, the central government is likely to assume a significant portion of the liabilities.

The implications are as follows:

- The annual budgets for each level of government must be cast in a medium-term framework;
- It is essential to undertake a full and careful evaluation of assets and liabilities associated with accounting and reporting of risks with a sufficiently long time horizon (using international standards for budgeting and tracking liabilities, such as the GFSM, which also provides consistency with the System of National Accounts).



### 3.2. Importance of Contract Guarantees and Technical Assistance—Role of Multilateral Agencies

Overall, the role of a new development bank or the existing multilateral banks would span measures at the national and international levels, ranging from financial and risk mitigating aspects, as well as the provision of technical advice.

- At the **national** level, the concerned bank would provide national authorities with *technical assistance*, helping them quantify their knowledge of the country-specific factors relevant for the selection, development, and management of projects with the highest social returns. In addition, it would enhance institutional credibility, synergies, and complementarities, thereby *fostering commitments and risk mitigation* both in the relationships between public and private sectors and in the relationships between different governmental tiers, as far as multilevel governance contexts are concerned.
- At the **international** level, it would provide *financial assistance, pledging guarantees, and sharing the best international practices* for project evaluation and risk assessment, the most suitable instruments for risk mitigation/insurance, and the most innovative finance techniques.

In Europe, these initiatives have already been undertaken, some at the country level, others at the EU level, with both technical and financial purposes. At the country level, the most important example is found, perhaps, in the UK, where the creation of IUK was announced in 2009. This agency is tasked with advising the government on strategic long-term infrastructure planning, prioritization, financing, and delivery across sectors, ranging from energy and waste to water, telecommunications, and transport. To pursue these objectives, IUK combines, under the Treasury umbrella, the program and project delivery capability of Partnerships UK (PUK), the lending capability of the Treasury Infrastructure Finance Unit (TIFU), and the policy development capability of the Treasury PPP policy team (see World Bank Institute 2012). This rich bulk of institutional and technical expertise reflects how complex it is to ensure that only valuable infrastructure projects are undertaken and that risks are properly assessed and efficiently shared between the public and private sectors so that each project is well structured and technically and financially viable.<sup>35</sup>

At the EU level, the European Investment Bank has launched the CEF programme to promote new forms of private financing, including the participation of pension/mutual funds and insurance companies, as well as the issuance of project bonds. Arguably, involving institutional funds would be even more useful in emerging economies as their financial systems are essentially bank based and their financial markets are still small relative to the size of their economies (Schwartz, Ruiz-Nunez and Chelsky

2014). Over time, the development bank's support would stimulate those markets to grow and consolidate, leading to the use of more sophisticated financial instruments, such as project bonds.

### Endnotes

- <sup>1</sup> University of Bonn, Centre for Development Research (ZEF); London School of Economics, Asia Research Centre
- <sup>2</sup> Intergovernmental Group of Twenty-Four on International Monetary Affairs and Development
- <sup>3</sup> University of Bari, Department of Economics and Quantitative Methods
- <sup>4</sup> London School of Economics, Asia Research Centre
- <sup>5</sup> Gatti (2014) reports that, according to a study conducted by Moody's in 2010, infrastructure projects in the construction phase tend to default earlier, recover more slowly, and emerge later from bankruptcy, compared to infrastructure projects in the operation phase.
- <sup>6</sup> See <http://ppi.worldbank.org/index.aspx>
- <sup>7</sup> *Infrastructure Policy Unit 2012 Global PPI Data Update* at <http://ppi.worldbank.org/features/August-2013/PPI%202012%20Globa%20Update%20Note%20Final.pdf>
- <sup>8</sup> For a detailed report, see World Bank *Infrastructure Policy Unit 2012 Global PPI Data Update*.
- <sup>9</sup> Financial closure in the PPI Project Database varies across types of private participation. For greenfield projects and concessions, financial closure is defined as the existence of a legally binding commitment of equity holders or debt financiers to provide or mobilize funding for the project. The funding must account for a significant part of the project cost, securing the construction of the facility. For management and lease contracts, a contract authorizing the commencement of management or lease service must exist. For divestitures, the equity holders must have a legally binding commitment to acquire the facility's assets. The database includes only projects that have reached financial closure. Source: [http://ppi.worldbank.org/resources/ppi\\_faq.aspx](http://ppi.worldbank.org/resources/ppi_faq.aspx)
- <sup>10</sup> See sector report: <http://ppi.worldbank.org/features/December-2013/Energy-Note-2013.pdf>
- <sup>11</sup> See <http://ppi.worldbank.org/features/December-2013/Telecom-Note-2013.pdf>
- <sup>12</sup> See: <http://ppi.worldbank.org/features/December-2013/Transport-Note-2013.pdf>
- <sup>13</sup> See: <http://ppi.worldbank.org/features/December-2013/Water-Note-2013.pdf>
- <sup>14</sup> See: <http://ppi.worldbank.org/features/December-2013/2012-EAP-Regional-Note-Final.pdf>
- <sup>15</sup> See: <http://ppi.worldbank.org/features/December-2013/2012-ECA-Regional-Note-Final.pdf>
- <sup>16</sup> See <http://ppi.worldbank.org/features/December-2013/2012-LAC-Regional-Note-Final.pdf>
- <sup>17</sup> See <http://ppi.worldbank.org/features/December-2013/2012-MNA-Regional-Note-Final.pdf>
- <sup>18</sup> See <http://ppi.worldbank.org/features/December-2013/2012-MNA-Regional-Note-Final.pdf>

<sup>19</sup> See <http://ppi.worldbank.org/features/December-2013/2012-SAR-Regional-Note-Final.pdf>

<sup>20</sup> Please consult regional report: <http://ppi.worldbank.org/features/December-2013/2012-AFR-Regional-Note-Final.pdf>

<sup>21</sup> Municipalities, however, are subject to strict control by provinces, but no national standards exist, which make it difficult to report to the GFS Yearbook on general government operations.

<sup>22</sup> A rich discussion on this subject is proposed in Iossa and Antellini Russo (2008), who refer widely to the Italian PPP experience.

<sup>23</sup> We should, however, mention that, in some countries such as the UK, highway contractors receive payments directly from the budgets, or the so-called *shadow tolls* from the government.

<sup>24</sup> An overview of the financial perspectives for the European energy infrastructure is found in Tagliapietra (2013).

<sup>25</sup> Translation from Italian by the authors.

<sup>26</sup> Private observation by the firm of the operating costs is, perhaps, the most common root of adverse selection issues in delegation. However, this is not a feature of all types of projects. A word of caution is thus needed. For instance, according to Engel, Fischer and Galetovic (1997, 2001), private information on costs is not an issue in highways franchise contracts. The authors argue that once the infrastructure is built, the costs of operating and maintaining highways are known to be close to zero and hence there is little room for firms to cheat. This means that, although some problems are very widespread and can thus be legitimately accounted for in a general discussion, a more appropriate approach to PPP issues should pay attention to the different characteristics that the various sectors and activities display. This leads us to the sectoral analysis developed in this paper.

<sup>27</sup> To be more precise, effort provision by the firm is desirable as long as the expected additional benefit that it induces, as compared to a situation in which no effort is exerted, exceeds the cost of providing this effort. When effort has a probabilistic impact, the possibility of an additional benefit follows from the fact that the operating conditions are more likely to become favorable.

<sup>28</sup> For a general presentation of *ex-ante* contracting with adverse selection, see Laffont and Martimort (2001). With specific regards to PPP projects, see Danau and Vinella (2014).

<sup>29</sup> A firm's risk neutrality is not irrelevant. When the firm is risk averse, it is necessary to insure it against the possibility of facing unfavorable operating conditions and, hence, a low return. In that case, a trade-off arises between provision of incentives and provision of insurance. The power of incentives that the government can provide to the firm is weakened. Note, however, that not only the firm's attitude to risk but also the government's attitude is relevant. With *ex-ante* contracting, a risk-averse government may want to rely on a *sell-out* contract, under which the firm makes a payment up-front in order to have the right to

produce. Thus, the government obtains a fixed payoff, regardless of the state of nature. This insurance may be interesting for small local governments for which the project represents a significant share of the budget. Outside investors may be better diversified and, hence, prone to insure small governments that privatize crucial infrastructures and services for insurance reasons (see Martimort 2006).

<sup>30</sup> In this case, the contract is bound to be efficient *ex post*.

<sup>31</sup> For examples in Latin America and the Caribbean regions, see Guasch (2004) and Guasch, Laffont and Straub (2006, 2008).

<sup>32</sup> Allain-Dupré (2011) reports that, in OECD countries, subnational governments are in charge of nearly half of total capital expenditures. The reason is that regions and municipalities are considered to "better spend," *i.e.*, to identify the most appropriate paths for promoting the territorial development and competitiveness (Charbit 2011). It is thus clear that subnational governments play a core role in public investment. Although the general strategies are designed at the national level, the implementation and completion of investment projects and the subsequent management of the activity depend crucially on the regional and local levels. For instance, even in federal countries like Germany, local governments provide utilities and manage local infrastructure, and have a claim to state funding, up to a level that is sufficient for the correct functioning of these activities (Fink and Stratmann 2011).

<sup>33</sup> For further examples, see, for instance, the Reference Guide on PPPs published by the World Bank in 2012.

<sup>34</sup> See IASB (2011), IPSAS 32. This standard is also likely to affect the guidelines of Eurostat, which are not so tightly defined.

<sup>35</sup> In Italy, under the 2002 Stability Law, ISpa was created with the task of involving the private sector in the construction and management of important infrastructures, requiring significant long-run investments. However, being an off-budget agency, ISpa serves an important budgetary purpose as well. It can issue state-guaranteed bonds to raise capital for the new infrastructure projects, while allowing the government to comply with the European Stability and Growth Pact. See, for instance, Maskin and Tirole (2008) on the practice, often adopted by governments, to push debt finance off their own books to quasi-public agencies not consolidated in the national budgets.

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