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Introduction

One of the main tasks of government is to provide infrastructure services at a reasonable cost. Infrastructure projects, such as highways, bridges, tunnels, and ports, are large, sunk investments that need to be maintained and operated once they are built. The process by which projects are selected, designed, operated, and maintained is therefore critical.

During the 1970s and 1980s, countries as diverse as the United Kingdom and Chile privatized many public enterprises, driven by both efficiency and ideological considerations. Public services such as telecommunications, electricity, and sanitation came first. Next, governments sought to extend the benefits of private participation to sectors deemed exceedingly difficult to privatize, such as transportation, schools, and hospitals. This led to the development of public-private partnerships (PPPs), long-term contracts between the state and a private company to provide infrastructure. These contracts bundle financing, construction, operation, and maintenance within a single firm.

Prior to PPPs, the state usually provided infrastructure. The construction of a project was contracted out to a private company and financed with taxes or public debt. The firm built the project and received the agreed payment, thereby completing the contract. Afterwards, a different division of government took charge of operating and maintaining the facility.

The separation between building and operating the project under public provision means that the design phase does not appropriately incorporate future maintenance and operating costs. Moreover, governments often prefer to spend resources on new projects rather than on routine maintenance. Lack of attention to maintenance leads to the decay of facilities and a deterioration of quality of service until governments

respond to local pressures and rebuild or retrofit the infrastructure at high cost.

The use of PPPs introduced a new approach whereby a single private company finances and builds the project and is then responsible for the operation and maintenance of the installations, subject to performance standards.

PPPs have grown rapidly over the past two decades. Given the budgetary problems that many developed countries have faced since the 2008 financial crisis, this trend will most likely continue as those economies recover. The provision of infrastructure under the PPP model has been used in large projects such as highways, water and wastewater plants, power stations, bridges, seaports, airports, hospitals, jails, and schools. This trend and the experience of the past 25 years raise the questions this book seeks to answer: When should a PPP be preferred over public provision or privatization? How should PPPs be implemented? And what is the best governance structure for PPP contracts?

1.1 The Scope of This Book

Some Definitions

There are many definitions and types of infrastructure. For our purposes, *public infrastructure* refers to a long-lasting and irreversible investment used to provide public services, such as highways, seaports, airports, sanitation systems, schools, or hospitals. The variety of definitions of PPP that academics and practitioners use led Donahue and Zeckhauser to conclude that "the public-private association has become a perniciously broad category" (2011, p. 259). Nonetheless, most definitions include the participation of both the public and private sectors and the fact that the contract establishes how risk is shared between the two parties.

In this book, a PPP is defined as an agreement by which the government contracts a private company to build or improve infrastructure works and to subsequently maintain and operate them for an extended period (for example, 30 years) in exchange for a stream of revenues during the life of the contract. Sometimes, as in the case of a toll road, revenues accrue mainly from user fees. In other cases, as with hospitals, users are not charged and the government makes periodic payments. More generally, the concessionaire is remunerated with a combination of user fees and government transfers. In all cases, at the end of the contract the asset reverts to government control.

Public Provision, PPPs, and Privatization

There are three ways to provide infrastructure: public provision, PPPs, and privatization. Under public provision, a private firm builds the project, receives the negotiated payment, and concludes its contractual agreement with the government. In contrast, the company that builds or improves the infrastructure under a PPP also operates and maintains the project after the construction phase is completed. Privatization differs from a PPP in that the infrastructure is permanently transferred to the private company, and from that point on, the firm assumes all the associated business risks.[1]

In theory, under a PPP, the concessionaire assumes the risk of changes in maintenance and operating costs, unforeseen changes in revenues, and even the possibility of expropriation during the life of the contract. In practice, however, the contracts are ambiguous, and governments often share these risks while the contract is in force because of contract renegotiation.

The Scope of PPPs

While the issues addressed in this book are relevant for the majority of PPPs, one of our objectives is to delimit the type of infrastructure for which PPPs are appropriate and those for which traditional provision or privatization would be a better choice. The answer depends, in part, on the technical and economic characteristics of the infrastructure in question. Consequently, as discussed in Chapter 4, we have more to say about highways, where PPPs are especially suitable, than power stations, which generally work better under privatization, or schools, where PPPs are not a good choice because it is difficult to define objective performance standards.

Similarly, institutional development plays a more important role under PPPs than under public provision because the long-lived contractual relationship between the government and the concessionaire under a PPP provides more scope for expropriation and regulatory taking by the government.

[1] Each approach includes a range of contractual agreements. Guasch (2004) identifies 12 contractual forms that he organizes by increasing order of private participation: public supply and operation; outsourcing, corporatization, and performance agreements; management contract; leasing; franchise; concession; build-operate-transfer (BOT); build-own-operate; divestiture by license; divesture by sale; and private supply and operation. In this list, PPPs are represented by franchises, concessions, and BOT arrangements. Whether a lease (also known as an *affermage*) is a PPP depends on the definition used: for example, Guasch (2004) classifies it as a PPP, but Yescombe (2007) does not. In this book, we use the terms *PPP*, *concession*, and *franchise* interchangeably.

This explains why we concentrate on middle-income and developed countries, which tend to have institutions that work reasonably well or that can conceivably be improved, and less on low-income countries, where public provision is likely to suffer relatively less from the lack of a basic institutional framework than PPPs.

1.2 Trends

Figure 1.1 shows annual investment in PPPs in Europe from 1990 to 2011, both as actual values and as three-year centered moving averages. PPPs in Europe increased more than fivefold, on an annual basis, between the 1990s and 2005–2007. By contrast, investment in PPPs during 2009–2011 was 38 percent lower than during 2005–2007.

Table 1.1 shows investment in PPPs by country. PPPs account for the largest fraction of overall public investment in the United Kingdom and Portugal (27 percent and 21 percent, respectively, for the period between 2000 and 2009).[2] They have been used in Europe to award projects in defense, environmental protection, government buildings, hospitals, information technology, municipal services, prisons, recreation, schools, solid waste, transport (including airports, bridges, ports, rail, roads, tunnels, and urban railways), tourism, and water. The transport sector is the sector with the most investments in PPPs, accounting for 83 percent of PPP investments in Continental Europe and 36 percent in the United Kingdom. Two-thirds of the investment in the transport sector has been in roads. Table 1.2 shows the distribution of revenue sources for European PPPs for roads, bridges, and tunnels. For 61 percent of these projects, the main revenue source for the concessionaire is tolls paid by users, while tolls paid by the government, often referred to as *shadow tolls*, are the main source of compensation for 33 percent of projects. The remaining 6 percent correspond to availability contracts, where the government pays the concessionaire based on performance standards.

Figure 1.2 shows investment in PPPs in low- and middle-income countries. Investment grew at an average annual rate of 28.3 percent between 1990 and 1997, followed by a slowdown after the East Asian crisis. A new growth spurt began in 2003, with investment reaching $180 billion (U.S. billion) in 2010. In contrast with Europe, the impact of the financial crisis of 2009 barely affected the upward trend in PPPs in middle- and low-income countries.

[2] Other advanced economies with significant PPP programs include Australia, the Czech Republic, and Hungary (see Hemming, 2004).

Table 1.1. *PPP investment in Europe*

Country	Total investment, 1990–2006 (million €)	Fraction of public investment, 2001–6 (%)
Belgium	2,112	3.5
France	7,670	1.3
Germany	5,658	1.5
Greece	7,600	5.9
Hungary	5,294	7.3
Italy	7,269	2.5
Netherlands	3,339	2.2
Portugal	11,254	22.8
Spain	24,886	6.9
United Kingdom	112,429	32.5[a]

Source: Blanc-Brude, Goldsmith, and Välilä (2007).
Notes: The table lists the ten countries in Europe with the most investment.
a. If the London Underground is excluded, this becomes 20%.

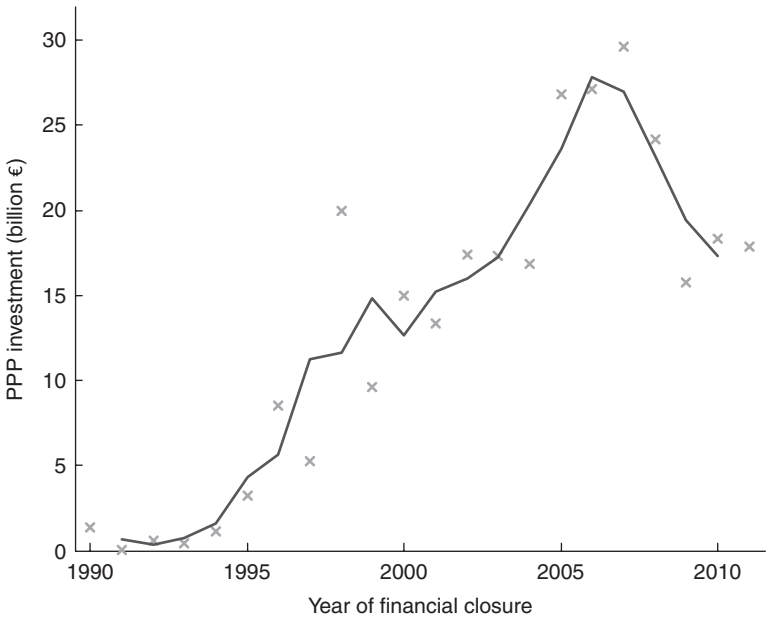

Figure 1.1. PPP investment in Europe, 1990–2011 (in billion euros).

Table 1.2. *Toll type for PPP roads, bridges, and tunnels in Europe, 1990–2007*

	(1) Availability contract	(2) Real toll	(3) Shadow toll	(4) Total
Austria	0	2	0	2
Finland	2	0	0	2
France	0	8	0	8
Germany	0	8	0	8
Greece	0	6	0	6
Hungary	0	5	0	5
Ireland	0	8	0	8
Italy	0	7	0	7
Latvia	1	0	0	1
Netherlands	2	0	1	3
Norway	0	3	0	3
Poland	0	1	1	2
Portugal	0	6	11	17
Spain	0	31	14	45
United Kingdom	4	3	20	27
Total	9	88	47	144

Source: Data kindly provided by Timo Välilä at the European Investment Bank.

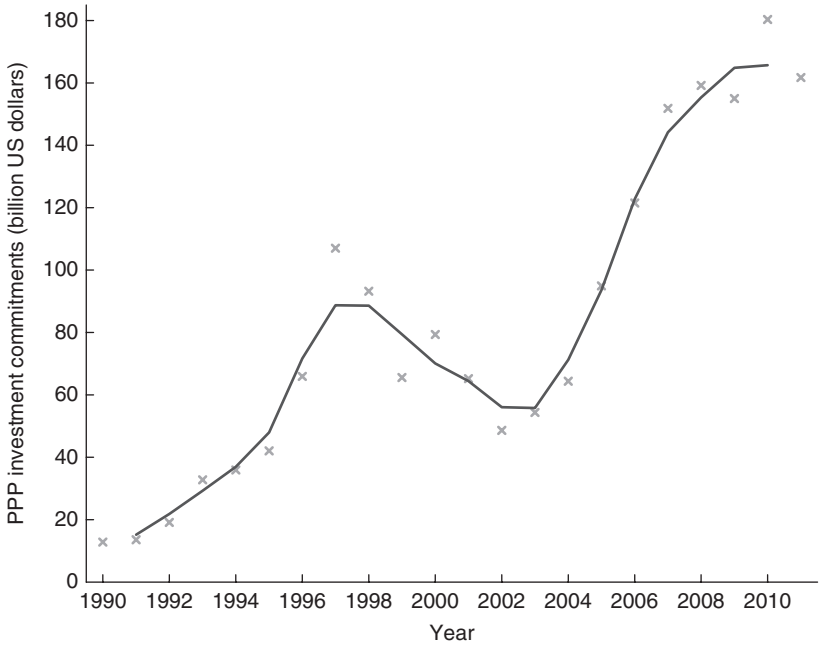

Figure 1.2. PPP investment in low- and middle-income countries, 1990–2011 (in million U.S. dollars).

Table 1.3. *PPP investment in developing countries, 1990–2008*

	U.S. dollars				
Country	Energy[a]	Telecommunications[a]	Transport	Water and sewage	Total
Argentina	29,540	29,328	14,094	8,176	81,137
Brazil	75,993	107,554	32,142	4,576	220,265
China	37,339	14,518	47,449	8,427	107,732
India	45,868	52,898	24,766	331	123,864
Indonesia	15,492	24,972	3,743	1,020	45,228
Malaysia	14,313	9,596	16,552	10,144	50,605
Mexico	10,753	54,068	25,374	1,675	91,869
Philippines	19,268	14,280	3,478	8,071	45,096
Russia	30,484	48,813	706	2,225	82,228
Turkey	12,678	24,293	8,170	942	46,082

Source: World Bank-PPIAF PPI database.
Notes: The table lists the 10 developing countries with the most investment.
a. Projects in this sector do not fit our definition for PPPs, because they correspond to infrastructure that is privatized and regulated as a natural monopoly.

Table 1.3 presents detailed information for the 10 developing countries that have invested most via PPPs and covers the energy, telecommunications, transport, and water sectors. Most projects in energy and telecommunications are regulated utilities and, given the perspective on PPPs that we adopt in this book, are better classified under private provision.

Although the United States lags behind Europe and many developing countries in the use of PPPs, its growth rates have been impressive. Figure 1.3 shows PPP investments in the U.S. transport sector during the past two decades (no reliable data are available for other sectors). Investment via PPPs increased almost fivefold, on an annual basis, between the decade of 1998–2007 and the three-year period of 2008–2010. Approximately $23 billion was invested in this sector via PPPs between 1998 and 2011.

The evidence presented in this section suggests that PPPs are becoming an increasingly important mechanism for the provision of infrastructure in Europe, developing countries, and the United States. In the next three sections, we explore the extent to which PPPs live up to the expectations that were created 30 years ago, when the current wave of PPPs began. We begin with a brief diagnostic of the shortcomings of public provision. Next we examine the various arguments used to make the case that PPPs effectively address these issues. Finally, we assess the major shortcomings of PPPs in dealing with these problems.

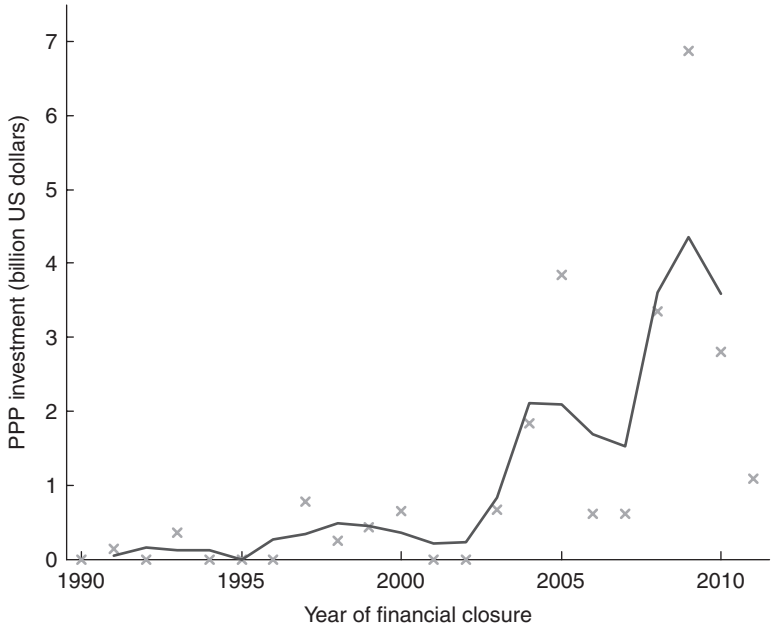

Figure 1.3. Growth of PPP investment in the U.S. transport sector, 1990–2011 (in million U.S. dollars).

1.3 Problems with Public Provision

Governments face four challenges when providing infrastructure services: First, choosing which projects should be built – that is, government must have a plan and a procedure for selecting projects; second, verifying that built projects fulfill their service obligations – this is more exacting than having the project comply with a set of technical requirements; and third, ensuring that neither the government nor the public are overcharged in a fee-for-service model. The fourth challenge is to finance the infrastructure, which requires finding the necessary resources, either from the government's budget or through user fees.

Infrastructure is a sector in which governments usually fail to meet these objectives. For example, although 6,000 kilometers of new roads were paved in Brazil between 1979 and 1984, 8,000 kilometers of old roads deteriorated because of poor-quality maintenance, so the stock of fair- to good-quality roads decreased (see Rioja, 2003). Some of the reasons for this failure are political and organizational; others relate to specific aspects

of infrastructure provision. The first group includes political capture, corruption, and bureaucratic deficiencies. The second involves technical difficulties and the inability to predict future demand trends or technical advances.

Poor Project Selection

Few countries use social project evaluation to filter wasteful projects. This leads to projects that are white elephants (that is, projects that have negative social value or that are overengineered). Even when objective criteria for project evaluation exist, they may be distorted by underestimating costs and overestimating demand, two common problems of infrastructure provision.[3]

One of the reasons for poor project selection is the capture of government objectives in the interest of only a subgroup of society. This distortion may steer project choices away from those that benefit society at large or lead to projects that are too expensive but benefit specific lobbies. Pork-barrel politics is an example of capture of government: the political establishment, seeking reelection, pressures government into building new projects for its constituencies, independent of the efficient assignment of resources. This leads to underutilized projects, such as bridges to nowhere in Alaska and other places.[4]

An example of a country with numerous white elephants is Belgium, where the political pressures to replicate spending on both sides of the linguistic divide led to a category of projects denominated *grands travaux inútils*. These include several kilometers of abandoned subway tunnels, almost-empty light rail lines, and many unused viaducts and bridges.[5]

Infrastructure Maintenance

The incentives politicians face distract them from assigning resources for routine maintenance. Building new projects and reconstructing severely damaged infrastructure are more effective uses of resources from the political viewpoint, so maintenance spending often goes only to severely impaired infrastructure. The cost of this stop-and-go approach is much higher than the cost of continuous maintenance – a tripling of costs is common in the case of roads. Moreover, while the road is in disrepair, which occurs during

[3] See Flyvbjerg, Holm, and Buhl (2002, 2005) for extensive evidences.
[4] Cadot, Röller, and Stephan (2006) show that pork barrel is an important determinant of transport infrastructure choices in France.
[5] See *Le Petit Guide des Grands Travaux Inutiles*, Jean-Claude Defossé (1990).

a substantial fraction of its life, speeds are lower and vehicles using the road are damaged (see Chapter 3). Finally, the increased risk of accidents is an additional cost of inadequate maintenance.

Inefficient Pricing

Under public provision, user fees are usually set too low for political reasons. This is inefficient because it may lead to congestion of the facility, overuse of the service, or lack of maintenance because user fees do not even cover variable costs. In addition, the distributional impact is negative because the heaviest users are usually the wealthiest segment of the population, or because the poorest segments are excluded from the service.

Capture and Corruption

Another problem is sectorial capture of government by the construction lobby, caused by repeated interaction between a few large construction firms and government. In particular, firms may try to use their influence to limit competition, for instance, by requiring qualifications that exclude newcomers or foreign firms. For example, the PPP law passed in Brazil in 2004 included conditions that precluded the participation of foreign firms in PPPs involving the transport sector.[6] The construction lobby may also use the political system to put pressure on the government in return for campaign donations. It may threaten to stop participation in new projects in response to attempts to improve the oversight of the infrastructure procurement process. Similarly, attempts at stringent supervision may lead to strategic delays in finishing the project, with the associated political cost. Alternatively, politicians may push for early completion of a project, even if this means that the terms of the contract have to be renegotiated at a high cost after the election.

Finally, there may be outright corruption, in which the government favors certain projects and firms, accepts the influence of specific firms in the design of contracts, or allows modification (renegotiation) of the terms of a contract to favor a firm in response to direct or indirect hidden payments.

[6] In the first years after the 2004 law was introduced, capital and other financial requirements were used as an exclusionary mechanism against foreign firms because their leverage was higher than the norm in Brazil. See Portugal (2010, pp. 36–37).