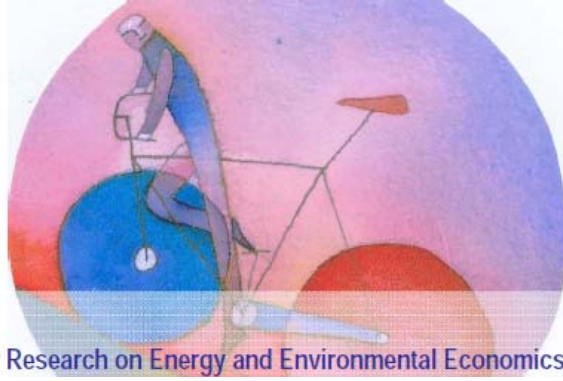


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*Elisabetta Iossa, Giancarlo Spagnolo and Mercedes Vellez*

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***IEFE - The Center for Research on Energy and Environmental  
Economics and Policy at Bocconi University  
via Guglielmo Röntgen, 1 - 20136 Milano  
tel. 02.5836.3820 - fax 02.5836.3890  
www.iefe.unibocconi.it – iefe@unibocconi.it***

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# The Risks and Tricks in Public-Private Partnerships<sup>\*</sup>

BY

Elisabetta Iossa<sup>†</sup>

Giancarlo Spagnolo<sup>‡</sup>

Mercedes Vellez<sup>§</sup>

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**ABSTRACT:** PPPs have been implemented broadly around the world in the infrastructure sector -water and sanitation, transports, energy, and telecommunications- and, more recently, in the provision of public services -education, health, prisons, and water and waste management. Key aspects of the contract design, such as risk allocation and payment mechanisms, significantly affect the PPP outcomes because they affect the incentives of the public and private parties to deliver a public service that satisfies user needs. Nevertheless, contractual provisions used in practice often do not implement the efficient risk allocation. In this paper, we discuss the crucial role of the public sector in designing and imposing standardized contracts, monitoring their compliance, disclosing contractual information to the general public, and transferring risks to the private sector in order to reduce the likelihood of PPP performance failure.

**KEY WORDS:** Concession contracts, Incentives, Public Private Partnerships, Risk Allocation.

**JEL CLASSIFICATION:** D02, D20, D82, L33, L38

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<sup>†</sup> University of Rome "Tor Vergata", CEIS, CMPO, CEPR, IEFÉ-Bocconi. This author thanks financial support from the University of Padua, Grant n. CPDA121089/12.

<sup>‡</sup> University of Rome "Tor Vergata", SITE-Stockholm, and CEPR.

<sup>§</sup> University of Rome "Tor Vergata", and Center for the Study of the State and Society (CEDES), Buenos Aires.

# 1. Introduction

Public-Private Partnerships (PPPs) are long-term contractual arrangements between the public and private sectors in which the contractor (typically a consortium of firms) has responsibility for significant aspects of the building and operation of an infrastructure for the delivery of public services. Although there is no unanimous definition of PPPs, most of them include BOT and DBFO contracts.<sup>1</sup> In a BOT contract, for example, the contractor takes responsibility for building (B), operating and managing (O) assets. Investment in capital assets is also undertaken by the contractor, but it is financed by the public authority, which retains the financial risk. Upon contract expiry, the ownership of the assets is transferred (T) to the public authority under the terms of the original agreement.<sup>2</sup> In a DBFO contract, the contractor is in charge of all the stages of the project: the design (D), building (B), finance (F) and operation (O).

PPPs have been implemented broadly around the world. In the 1980s, the United Kingdom pioneered the development of a particular form of PPPs, creating the Private Finance Initiative (PFI) in 1992 to further promote PPP agreements. As of December 2006, 794 PFI projects had been signed involving around £ 55 billion of capital value (CBI, 2007; HM Treasury, 2006). Other European countries have also invested in PPPs, especially Ireland, Portugal, Greece, the Netherlands, and Spain (PWC, 2005; EIB, 2004) and large PPP projects have been implemented in the US. In a review of PPP activity, PricewaterhouseCoopers (PWC, 2005) reports that 206 PPP contracts were signed worldwide in 2004-5 involving USD 52 billion in investments. Numbers, however, have gone down with the economic crisis: EPEC (2012) reports that in 2012, the value of PPP transactions reaching financial close in the European market amounted to EUR 11.7 billion. This represents a 35% drop compared to 2011 (EUR 17.9 billion) and the lowest market value since 2003.

PPP agreements in developing countries have grown steadily since the 1990s. According to the World Bank's Private Participation in Infrastructure,<sup>3</sup> 2750 infrastructure projects involving

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<sup>1</sup> See Hodge and Greve (2007) and EC (2003) for a survey on the definitions of PPPs used in the public management literature.

<sup>2</sup> Variations of the BOT contract can be implemented in practice: Design-Build (DB), Design-Build-Operate (DBO), Build-Own-Operate-Transfer (BOOT), Build-Lease-Operate-Transfer (BLOT), Build-Transfer-Operate (BTO), etc. For instance, in a DB contract, the main benefits arise from making the contractor responsible for designing (D) and building (B) a facility, e.g. a road, while allocating financial, operation, and demand risk to the public authority. In a DBO contract, additional benefits arise from the fact that the contractor operates (O) the facility, and then it has incentives to design and build taking future operation costs into account.

<sup>3</sup> However, this dataset includes contractual arrangements that are not strictly "PPPs" according to our definition, as it includes for example service contracts where the contractor takes responsibility only for operations.

private and public investment for capital value of USD 786 billion have been implemented in 1990-2003 (in 2002 constant dollars) and about USD 1530 billion between 2002-2012 (in 2012 constant dollars). Between 1990-2003 around 1000 projects and 47% of the investment took place in Latin American and the Caribbean (LAC) countries (IMF, 2004); similar trend extends to the period 2002-2012.

Since the 1980s, and particularly after the United Kingdom developed the PFI program, PPPs have been introduced in many sectors, mainly water and sanitation, transports, energy, and telecommunications. In recent years, countries with a large experience in this kind of private participation in public services provision, such as the United Kingdom, Australia, Canada, Ireland and the Netherlands have introduced PPPs in areas such as education, health, and water and waste management (Hammami et al., 2006).

World-wide experience with PPPs suggests there is no a 'one-size-fits-all' principle that might simplify the design of a PPP contract for a given objective and sector (Chong et al., 2004). A number of factors influence the likelihood of performance failure in a PPP agreement (though these factors are not specific to PPPs). The first three factors listed below could be considered as 'external' to the contract; whilst the fourth factor as 'internal':

1. The characteristics of the targeted sector and the market structure;
2. The degree of macroeconomic and political instability;
3. The country's regulatory and institutional framework;
4. The contract design and management, in particular the payment mechanism and the risk allocation built-in the contractual terms;

Consider these factors briefly. The characteristics of the sector targeted by a PPP contract and the prevailing market structure help in explaining PPP performance. Differences across sectors have for example been observed in the incidence of contract renegotiation for LAC countries. The highest renegotiation incidence corresponds to concessions for essential facilities such as transports and water, where 55% and 74% of the contracts ended up under revision (Guasch, 2004). In the UK, the HM Treasury recommended against the use of PPPs for IT services because fast changing technology make long-term contracts unsuitable.

The degree of macroeconomic and political instability also matters in accounting for PPP outcomes. In an uncertain macroeconomic environment, contract design failures are more likely since it is difficult for the contracting parties to envisage future contingencies and write the contract terms accordingly (thus aggravating problems arising from contract incompleteness). Ex

ante, a high aggregate risk level discourages long-term contractual relationships and weakens incentives to undertake investments in infrastructure projects that typically have long maturity. Empirical evidence shows a correlation between macroeconomics instability and renegotiation incidence: the peaks of contract revision occurred when negative shocks hit LAC countries and triggered severe macroeconomic crises. For instance, generalized renegotiations were observed soon after the Argentine hyperinflation in 1990, the Mexican crisis in 1995, the Brazilian devaluation in 1999, the Colombian recession in 2000, and the Argentine crisis in 2001 (Guasch et al., 2003). Moreover, political instability translates into higher risks of government-led renegotiations which may affect the profitability of the project and impact on the insolvency of the private partner.

For similar reasons, the regulatory and institutional framework heavily matter since the quality of contract enforceability and governance are critical factors affecting PPP agreements. In LAC countries, weak governance and the government's lack of commitment not to renegotiate also accounted for the recurrent contract revisions. In many of these countries, the regulatory agencies were rarely given training and instruments to carry on their mandate with competence and even lacked political support from the government. Moreover, in some cases, the government had political control over them, raising concerns on autonomy and accountability issues (Estache, 2006). There were instances in which the private partner considered its main counterparts to be ministers and secretaries rather than the regulatory agency. For example, in the Buenos Aires water concession, the Secretary of Environment and Sustainable Development bypassed the regulators arguing regulation of water provision was too complex to be managed by the regulatory agency.

Aspects of the contract design, such as the risk allocation or the payment mechanism, significantly affect the PPP outcomes. Project-related risks, such as construction risk, cost overruns risk, and demand risk, are allocated through the contract design. The sheer complexity of PPP agreements makes contract design a key issue for the success of a PPP project: the contract may transfer an inappropriate type and amount of risk to the contractor. In LAC, most cases of renegotiation or contract termination were due to contract design failing to manage risks (Guasch, 2004). But also in the EU risk assessment and allocation are problematic issues, leading to contract revisions and unanticipated financial burdens for the public sector (Renda and Schrefler, 2006).

In this paper, we shall focus on the main risk allocation issues in contract design for PPP agreements, as this is an aspect where PPPs have the greatest potential, but also the highest risk

of failure compared to traditional forms of procurement. Risk allocation issues are key not just because they affect the sustainability and bankability of the PPP project, but also, and especially, because they affect the incentives of the parties involved in the project to deliver a public service that satisfies user needs. Moreover, incentives are a central aspect in PPPs provision, given that the long-term nature of the contract shields the contractor from competition for a long time. We shall argue that the potential for an efficient PPP rests with the way the contract design shapes these incentives. But achieving an efficient contract design and implementation will typically be very difficult because of conflicting interests, unless a system of standardized contracts, regular performance monitoring and open access to contractual information is in place.

We shall start in Section 2 by discussing the importance of standardized contracts to reduce the risk of contract misspecification and inefficient risk allocation. We shall also discuss governance and transparency issues associated with the public procurement process and the PPPs. In section 3, we shall discuss the efficient risk allocation and describe the incentive structure and risk transfer between the contracting parties for the main forms of PPPs. We shall then argue in section 4 that contractual provisions used in practice often do not implement this efficient risk allocation, and we provide some explanations as to why this occurs. In Section 5, we present some policy recommendations and conclude.

## **2. The Role Of Contract Design**

### **2.1 Contract misspecifications and standardized contracts**

PPP contracts are based on an output specification approach: the public authority defines the basic standards of service whilst the contractor chooses how to meet and possibly improve upon them. This approach incentivizes innovative solutions, allowing for private sector's skills and knowledge to feed into public service provision, but also involves a greater risk of contract misspecifications for the public sector. In particular, problems may arise because output specifications may not be clearly described or defined consistently with the infrastructure needs that the PPP intends to satisfy. Since output specifications form the basis of the contractual obligations, they should be identified by conducting a careful assessment previous to the contract drafting. Mistakes at the contract drafting stage can then be very costly for the public authority because of the long-term nature of most PPP contracts.

A number of factors can lead to contract misspecifications. They can be due to mistakes resulting from an incompetent public authority staff (or the consultants acting on its behalf) in charge of contract drafting. Lack of appropriate incentives for the public authority and thus inadequate effort in information acquisition and processing can also result in contract misspecifications. Corruption and favouritism explain contract misspecifications that lead to the contractor receiving very favourable contract terms. Engel et al. (2009) reports that 64 out of 106 PPPs projects audited in China showed signs of corruption.

Making the public authority staff (or its consultant) accountable for its actions so as to provide adequate incentives is not an easy task. Labour market regulations often constrain the use of incentive mechanisms for the public sector and lack of financial stakes make it difficult to provide incentives in the first place. Also, PPP contracts are generally long-term contracts, so when mistakes are discovered, the public sector employee may have moved job already.

In the early stages of PPPs, contract's drafting mistakes have often arisen simply because of lack of experience of public administrations on the writing of PPP contracts. In Europe, a challenge for the public sector has been to rapidly build up the capacity and knowledge to devise and implement PPPs, and to manage the PPP contractual relationships over the long-run. The public sector's progress on this front has not kept pace with that of private sector partners. In the UK, recognition of this problem by the National Audit Office has led to a series of programs aimed at training public officials and to an extensive use of external consultants.

External consultants can be a means to acquire competence and knowledge for the benefit of the public authority, but it also has limits. First, the use of consultants does not address the problem of corruption. A priori, there is no reason to believe that external consultants are less prone to corruption than public sector bureaucrats, although it could be argued that *large* consultancy firms may have more to lose from being involved in a corruption scandal than single individuals. Second, large consultancy firms that have the specific knowledge to deal with contracts, as complex as PPP contracts, find themselves hired by the public sector in one contract and by the private sector in another. Working for both sides, although at different points in time, may reduce asymmetric information among the parties and be conducive to rogue deals.

To the extent that experience with PPP in a specific sector accumulates, i.e. the PPP market matures, the public authorities should standardize parts of the contracts for that specific sector in order to reduce the likelihood of contract and output misspecification. From ongoing projects in a sector it is possible to learn what the generic risks are, and then use this information to design a



standardized contract (or some parts of it) that allocates these risks properly. The use of standardized contracts also reduces transaction costs resulting from agreeing and drafting the contract, provided that both parties are willing to accept the standardized terms. Standardized contracts are widely used in the UK (HM Treasury, 2007), and are being introduced in Italy.

A question that arises when standardized contracts are designed by the central government is whether local administrations engaging in PPP projects should be required to adopt the standardized contracts (when the national law allows it). On the one hand, compulsory standardized contract terms bring the cost of increased rigidity and, in particular, the cost of loss of valuable local or specific information not reflected in the standardized contract. On the other hand, optional standardized contract terms do not address the possibility that corrupt local administrations purposefully design inefficient contracts to increase the profitability of the project for the firm, neither do they help addressing the cost of incompetent public administrations that choose wrong contract terms. This trade-off could be managed by adopting an 'intermediate' approach: the public authority could be given the option to introduce motivated changes into the standardized contract. The benefit of this increased flexibility would then have to be weighed against the cost of a higher risk of corruption and favouritism. This point is further developed in Iossa and Martimort (2013b) who analyze the impact of corruption on contract design. They argue that corrupted local authorities may have incentives to keep important contingencies that may realize during the project implementation as unregulated because this contract incompleteness justifies higher risk premium to the private partner. Limited discretion with standardized contract choices may limit this problem.

## **2.2 Transparency, Confidentiality and Governance in PPP contracting**

Since the 'Cadbury report' identified the lack of disclosure in CEOs and directors compensation contracts and the side transactions as crucial determinants of corporate governance failure, most corporate governance codes and regulations incorporate stringent disclosure requirements on the details of crucial contracts (OECD, 2004).<sup>4</sup>

In Public Procurement, stringent disclosure requirements are seen as a potentially powerful remedy to fight corruption (Rose-Ackerman, 1999; Kaufmann, 2005). Coppier and Piga

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<sup>4</sup> The Cadbury Report, titled *Financial Aspects of Corporate Governance*, is a 1992 report issued by "The Committee on the Financial Aspects of Corporate Governance" chaired by Adrian Cadbury that sets out recommendations on the arrangement of company boards and accounting systems to mitigate corporate governance risks and failures. The report's recommendations have been used to varying degrees to establish other codes such as those of the European Union, the United States, the World Bank etc.

(2007) find an inverse cross-country relationship between the level of transparency in public procurement and the perceived level of corruption in a country, as measured by the Corruption Perception Index by Transparency International. According to their estimates, governments' attempts to fight corruption by increasing disclosure and transparency can be effective.

The direct costs of disclosing information on contract terms and performance evaluation appear to be rather small in general (Leuz, 2007), and even more so for repeated procurements and large infrastructure projects like PPPs. Disclosure costs in terms of potential competitive harm for the contractor (and for potential private partners in the phases that precede the signature of the contract) should be rather small when disclosure regards contractual and output-related performance measures. Instead, costs are expected to be much larger when disclosure refers to investment choices and other input-related variables that may convey delicate information about production processes and strategic choices.

However, one cost of disclosure rules that is not often discussed, but that has been identified early in relation to public procurement rules, is that public knowledge on the price and quality conditions offered by the winning private partners may harm the competitive process by facilitating anti-competitive agreements among competitors. Bid rigging illegally tries to keep procurement prices at a level higher than the competitive one, and prevent competitors from cutting prices by threatening 'price wars'. And, as George Stigler wrote regarding public procurement auctions: "The system of sealed bids, publicly opened with full identification of each bidder's price and specification, is the ideal instrument for the detection of price cutting." (1964, p. 48).

In comparison with public procurement of standardized products or services, the governance of PPPs is likely to be even more problematic, as for a specific public buyer PPP procurements tend to be infrequent, large, complex, and often asset specific. These features make benchmarking and other standard forms of outside control more complex. At the same time, stakes are higher than in standard procurement, so bad governance can be much more costly.

Early reports on PPP best practices recognized well the particular governance problems of PPP procurement, and therefore suggested (IPPR, 2001) or prescribed (NHS, 2003) great levels of transparency and a widespread and proactive disclosure of contractual terms. Ex post analyses such as Gosling (2004), however, have revealed that even in a country like the UK, with a very good general level of accountability and a lively public debate, non-binding 'best practice' recommendations to disclose information were seldom followed by public administrations, even

when directly asked for the information. It is clear, therefore, that in countries with weaker general accountability and public debates, non-binding disclosure requirements are likely to have little or no impact.

We mentioned that the standard ground for classifying private information as ‘confidential’ is that, if disclosed, such information could place the contractor in a disadvantageous position relative to competitors.<sup>5</sup> This suggests there is a trade-off between accountability and willingness of private parties to disclose delicate information on how certain needs could be faced in a PPP. Such information is crucial, for example, in the early stage of assessing the suitability of PPP for an infrastructure project.

The trade-off between accountability and confidentiality should be relevant for information about the production processes and strategic choices of the contractor. The disclosure cost in terms of potential competitive harm for the contractor should therefore be small or absent when disclosure is limited to contractual terms (payment schemes, quality standards, deductions, prices, etc.) and other output-related measures (revenues). As PPP contracts are based on output specifications and the assessment and selection phases are in the past, from a PPP governance perspective the contractual information that needs to be disclosed once the contract is signed is that about output variables, the business outline, the risk allocation, the payment mechanism and the Public Sector Comparator.<sup>6</sup> Information should be disclosed within a pre-established, short, and binding time limit from the contract signature; a timetable for publishing sensitive issues could also be determined. The time limit could be established by law, by the national auditor, and/or by the contract, but in any case it must be short and strictly binding. Notice that such information should imply little or no competitive harm for the contractor.

The arguments for keeping as confidential the contractual and output features that convey no information on inputs are, therefore, extremely weak. In fact, most reports and best practice documents suggest maximal disclosure of PPP documentation, limiting confidentiality to a very strict set of information (HM Treasury, 2007). This notwithstanding, to our knowledge, non-disclosure of PPP contracts remains the norm.

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<sup>5</sup> The information sharing literature has shown that disclosure may give a firm either a strategic advantage or disadvantage depending on whether its strategy and the strategy of rivals are strategic substitutes or complements and on whether the information is regarding the firm’s own cost, demand or some industry-wide parameter (see e.g. Vives (1999) for a review).

<sup>6</sup> The Public Sector Comparator regards the PPP suitability assessment, as it estimates the potential gain from a PPP as opposed to in-house provision.

## 3. Risk Allocation, Incentives, and Types of PPPs

### 3.1 The main characteristics of PPPs

There is no unanimous definition of PPP. We use the term PPP to refer to a contractual arrangement between a public authority and a contractor for the provision of public services with the following four main characteristics:

1. the bundling of project phases into a single contract;
2. an output specification approach;
3. a high level of risk transfer to the contractor; and
4. a long-term contract duration.

PPP contracts are based on *output specifications* in the sense that the public authority defines only basic standards of service, leaving the contractor with the choice as to how to meet and possibly improve upon these basic standards. The idea of the output specification is to provide incentives for innovative approaches, allowing for private sector's skills and knowledge to feed into public service provision. By leaving the private partner's discretion over how to meet the output requirements, scope is created for innovation and flexibility at the project design stage and throughout the contractual period.

PPP contracts are (meant to be) characterized by a relevant level of *risk transfer* to the contractor, although the optimal risk allocation varies with the form of PPP used for the project, as different is the scope of activities delegated to the private sector. For each type of PPP contract, risk is allocated to the contractor through contractual incentives and penalties incorporated within the payment mechanism, and through the activities for which the contractor is responsible.<sup>7</sup>

PPP contracts are generally *long-term contracts* with duration increasing with the level of financial involvement of the private sector in the provision of investments. Upon contract expiry, the public authority regains possession of the assets and can re-tender aspects of the service provision to other providers or take provision in-house.

### 3.2 Categories of risks

In every infrastructure project there are risks associated with the nature of the project. For example, a project to construct a highway to diminish travel times is subject to the risk of

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<sup>7</sup> See Grimsey and Lewis (2002) for a discussion of how risk allocation in PPPs differs from that in traditional procurement.

construction delay due to unexpectedly bad geological conditions, inefficient construction practices, additional environmental studies to be done before the works begin, unexpected problems raised by their results, or simply construction permits not released on time. Once the construction phase ends, the project faces the risk of not raising sufficient revenues to cover operation costs and recoup invested funds because of traffic volume being lower than expected.

We list below the main types of risk at general level:<sup>8</sup>

1. *Statutory/Planning risk* alludes to the uncertainty that construction permissions of the infrastructure project may be refused, that unacceptable conditions may be applied to any planning permission granted, and that the planning process may take longer than anticipated and cost more than expected.
2. *Misspecification of output requirements risk* refers to the possibility that the output characteristics specified in the contract and which form the basis of the contractual obligations are ill or not clearly described.
3. *Design risk* comprises the possibility of failing to complete the design process in time and within the budgeted costs, of failing to deliver a solution that works satisfactorily and meets the requirements set by the public authority, and of changes in technical standards during the design phase.
4. *Construction and time schedule risk* refer to construction delay and cost overruns that may arise from changes in labor and materials costs, inadequate cost management, inefficient construction practices, adverse site and weather conditions, protester action, delays in obtaining approvals and permits, and the failure of private partners to perform.
5. *Operation risk* relates to large operation costs and failure to meet availability and performance standards that may arise from shortage of skilled labor, labor disputes, late delivery of equipment, poor maintenance schedule, inadequate cost management, etc.
6. *Availability risk* covers situations where, during the PPP's operational phase, an underperformance linked to the state of the PPP assets results in services being partially or wholly unavailable, or where these services fail to meet the quality standards specified in the PPP contract.
7. *Demand risk* alludes to the possibility of making lower-than-expected revenues if the actual demand for service falls short of the demand initially forecasted.

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<sup>8</sup> For a further discussion, see Bing et al. (2005) and Loosemore (2007).

8. *Risk of changes in public needs* refers to the possibilities that output specifications set up in the initial contract become inadequate because of changes in society's preferences. The relative importance of this risk increases with contract length, as for a longer contract the chance of changes in public needs is greater.
9. *Legislative/Regulatory risk* includes the changes in the legislative and regulatory framework, e.g. unexpected modifications in tax legislation, tariff-setting rules, and contractual obligations regarding investment and quality standards.
10. *Financial risk* comprises operating and capital losses that may result from interest and exchange rate fluctuations, capital controls restricting convertibility and transferability of profits, etc.
11. *Residual value risk* is the uncertainty of holding a facility (e.g. land, buildings, water plant) whose value at the end of the contract is lower than that anticipated at the start.

### **3.3 Efficient Risk allocation**

In a contract, the risk allocation between the contractual parties should accomplish two sets of goals: to provide incentives for the parties to undertake efficient non-contractible actions (because they are non-observable), and to provide insurance to a risk-averse party against the project's risks. In a PPP contract, in particular, risk allocation should provide incentives to reduce the long-term cost of a project, to complete the project in time and within budget, to deliver the service at agreed standards, and to insure the risk-averse public and private partners against risk. Risk insurance for the public partner helps to improve its profile of project expenditures by converting variable operation and capital costs into predictable unitary payments. Risk insurance for the private partner contributes to reduce the cost of capital.

In order to accomplish the above goals in the most effective way, two principles should guide the allocation of risk between the public and private partners:

(P1) Given partners with similar risk-aversion, the risk should be allocated to the party that is responsible or has relatively more control over the risk factor, and

(P2) Given partners with similar responsibility or control over the risk factor, the risk should be allocated to the less risk-averse party.

When we put together both the issue of incentives and that of risk premium minimization, we find that *risk is optimally allocated* if the following holds:

- (i) When the public authority is more risk averse than the contractor, then risk transfer to the latter helps both to ensure incentives over non-contractible actions and to minimize

the total cost of the project. The optimal risk allocation then calls for the contractor to bear all the risk.

- (ii) When the public authority is less risk averse than the contractor, then risk transfer to the latter generates a trade-off: it helps to ensure incentives, but it may lead to an excessive risk premium.

Taking into account that in general the public authority is less risk averse than the contractor because of its wider possibilities to diversify risk, the above two principles lead to the following criteria for risk allocation:

- (i) The public authority should fully bear risks that the private sector cannot control (or cannot control as well as the public authority) either in terms of likelihood of occurrence or in terms of impact, and that are uninsurable.
- (ii) The contractor should bear risks that the private sector can control (or can control better than the public authority) both in terms of likelihood of occurrence or in terms of impact. However, some risk sharing may be appropriate when risk is difficult to forecast and transferring all risk to the contractor may result in an excessive risk premium (i.e. high cost of capital), and unbankable projects.

In light of the above, we discuss below how specific risks should be allocated between the public and private parties in the case of the DBFO model where the contractor is responsible for all the stages of the project.

### **3.3.1 Statutory/Planning risk**

As a general rule, the public authority is best placed to manage the statutory process by virtue of its legislative basis, experience, and resources, and therefore, the contractor cannot control this type of risk as well as the public authority. When the public authority carries out the statutory and planning processes in advance of the tender process, and thus fully bears the associated risk, the benefit is that there is certainty about the conditions to be applied to the project.

In many LAC countries, the public sector faces fiscal constraints and lacks expertise and technical capacity to manage the statutory/planning risk it should bear according to the efficient risk allocation. Hence, the public sector may fail to perform the tasks corresponding to it under such an allocation. It may be argued that, if the public authority cannot effectively perform these tasks, it should transfer them to the private partner. But notice that such a transfer would expose the private sector to the statutory/planning risk it cannot control, i.e. the transfer will be

inconsistent with the efficient risk allocation, thus requiring an increase in the risk premium that costs more to the public administration than the risk it has transferred.

Compared to the case where the risk is retained in the public sector, the PPP project becomes more expensive in terms of higher service charges, higher subventions required from the public sector, lower contractor transfers, etc.

### **3.3.2 Misspecification of output requirements risk**

In general, information acquisition and processing by the public authority are always needed at the outset in order to correctly specify the output requirements, and thus reduce the risk of contract misspecification. To provide incentives for public administrations to invest time and effort in information acquisition, it is necessary that the public authority bears the risk of misspecification of output requirements.

However, transferring risk of output misspecification to the public sector may often not suffice to ensure adequate incentives for the public authority, because of the general difficulties in making public sector officials accountable for their actions. Because of these factors, transferring the risk of contract misspecification to the public sector-party may not suffice to ensure minimal contract misspecifications. The problem is particularly severe when PPPs are undertaken by small local administrations who may not have received enough training to deal with complex projects such as PPPs. It is therefore often advisable to design centrally standardized contracts to be used by local administrations, and to set up centralized PPP units to advise local administration (as done for example in the UK and in Italy).

### **3.3.3 Design, construction, time schedule, and operation risk**

Under the DBFO model, the contractor is responsible for designing, building, financing, and operating the facility used to provide public services. The *bundling* of project phases into a single contract is the main characteristic of PPP contracts. If the design, construction, time schedule and operation risk are transferred to the private sector, the bundling of project phases encourages the contractor to think about the implications of its actions on different stages of the project (from the building to the operation) and thus favours a whole-life costing approach (Bennett and Iossa, 2006; Martimort and Pouyet, 2008; Iossa and Martimort, 2013a). Furthermore, bundling may also boost incentives to innovate and gather private information about future costs to adapt service



provision to changing circumstances (Hoppe and Schmitz, 2013). This is why design, construction, time schedule and operational risks should be transferred to the private sector.

Risk sharing may, however, become desirable in situations where the public authority has an informational advantage over the contractor, for example over the value of the assets. This is particularly relevant when the PPP contract involves renovation rather than construction of a facility or infrastructure, as it is often the case for PPPs in transport, water, and energy. It is also relevant for prison services, clinical services, and water services, where the public sector owns assets such as pumps, water pipes, metering systems, etc. In these cases, the authority has better knowledge of the state of the underlying assets and may therefore be in a better position to evaluate (at least some of) the cost and risks associated with service provision, as shown by Martimort and Sand-Zantiman (2006).

#### **3.3.4 Demand risk**

Payment mechanisms in PPPs can be based on user charges, usage, or availability. In a payment mechanism based on user charges, the contractor gets revenues directly through fees applied to end users of the infrastructure facility. To the extent that users pay the corresponding fees and there are no other payments from the public sector or income guarantees, the demand risk is fully transferred to the private sector. Bearing the demand risk, the contractor has direct incentives to improve performance in order to encourage service usage and thus increase revenues.<sup>9</sup> If the contractor is able to control demand risk, it is efficient to fully transfer this risk to the private sector by implementing a user charge-based payment mechanism.

However, in many sectors demand is difficult to predict accurately and its associated risks are high. This is often the case in projects involving construction of new infrastructure, like a road, bridge, or tunnel, where the expected revenues are calculated using forecasts of future service demand. In these cases, a full transfer of demand risk to the contractor might raise the cost of capital substantially, calling for higher user charges or longer contract duration to reimburse investments. It may then happen that an excessive demand risk wipes out the project's benefits because the resulting cost-covering user charges are so large that users prefer to seek for alternative services, thus making the project unbankable. Under these circumstances, the public authority could lower user fees and pay the contractor a subvention to complement the collected revenue, so the demand risk is partially transferred to the contractor.

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<sup>9</sup> Moreover, it is possible to manage demand by setting a pricing rule that charges users according to usage, e.g. in the transport sector, tolls can vary by vehicle type and time of day.

A number of subvention schemes may be offered to the contractor when the expected revenues are not sufficient to ensure project bankability. First, capital expenditures contributions (capex) may be offered by the public authority taking the form of: (i) capital grants; (ii) loans; (iii) equity. In order to avoid public sector exposure to construction risk, the construction phase should be funded by the contractor, and capex contributions should be injected only after project completion. Capital grants minimize conflicts of interest, but the public authority should take into account that a capital grant is a sunk cost which is not refunded in the event of contract termination. Moreover, as long as senior debt will be repaid first in case of contractor's default, the use of capex contributions may not be appropriate. Second, revenue support to improve the private partner overall cash flow may be linked to the number of users, thus being equivalent to user charges in terms of incentives and risk transfer. Alternatively, they may decrease over time to provide incentives to encourage usage, or decrease as usage level increases to avoid windfall earnings under unexpected increase in demand. Revenue support can also take the form of revenue guarantees payable only in years where revenues from user charges fall short of a specified level. It has to be noted that subventions weaken the rationale for PPPs since they reduce incentives for the private contractor, which may make PPPs unsuitable.

A payment mechanism based on usage can be seen as a variant of user charges, in which the public authority pays the contractor, instead of service users. In this scheme, the public authority sets tariffs to be charged on users according to its objectives. After receiving the associated revenues, the public authority makes unitary payments to the private partner depending on the actual usage level.

In most cases, there are bands for usage levels specifying the payment due for each level of usage, and thus setting limits to the demand risk transferred to the private partner.<sup>10</sup> When risk sharing is optimal, bands at low usage levels bounds the risk to the contractor that demand is lower than expected. In practice, lower bands provide a certain minimum usage payment to cover debt service, but not to ensure a positive return on equity. On the other hand, using bands at high usage levels caps the number of users for which the public authority should make payments, thus bounding the public authority's financial liability.

In a payment mechanism based on availability, typically used for prisons, schools and hospitals, the public authority makes unitary payments to the contractor for making the service available regardless of the actual service usage. To encourage good performance the contract

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<sup>10</sup> See Kerf (1998) for an in depth description.

could establish ‘bonuses’ to be awarded if and only if certain target performance levels are reached. In addition, the payment scheme may include deductions if the private partner fails to comply with availability targets. Deductions should depend on whether the contractor can or cannot control the events causing unavailability, the private partner’s effort to provide alternative services, the spread and recurrence of unavailability episodes, and the rectification period needed. The weightings of deductions are important: if deductions are too low, it may be convenient for the contractor to under-perform; while if they are too high, risks increase and the contract may require a higher pricing (HM Treasury, 2007). The simplest approach is to categorize various types of performance shortcomings and use a grid of monetary deductions. An alternative two-stage approach is to assign penalty points to the contractor any time a performance failure occurs, eventually attaching more points to a serious and recurrent failure, and to set a rule that translates points into monetary deductions. Generally, deductions are made when a certain number of points have been assigned to the contractor within a defined time period. To provide incentives to perform, there should be an adequate calibration between the seriousness and frequency of a failure, the number of penalty points assigned where applicable, and the financial impact of deductions on the private partner (HM Treasury, 2007).<sup>11</sup>

In any case, performance targets should be based on objective measures of service availability and should be established in the contract terms, e.g. lanes ready-to-use in roads and capacity to undertake water treatment works. Therefore, with availability payment and no user charges, there is no demand risk for the contractor. The case of prisons explains their logic: here the demand (number of prison inmates) cannot be affected by the private sector action or effort, whilst it does depend on the judicial system, the law and offence rates in specific areas. Transferring demand risk to the private party through a payment contingent on the number of inmates would increase risk premium and the cost of capital without impacting on incentives. Demand risk for prisons should therefore be retained within the public sector. However, to retain incentives, the payment mechanism for prisons should include penalties for poor performance to be deducted from unitary payments (for example linked to number of suicides or riots in a prison).

### **3.3.5 Risk of changes in public needs**

The public authority is often in a better position than the contractor to acquire information on the likelihood of changes in users’ needs. Also, changes in public needs can be indirectly affected by

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<sup>11</sup> See also Albano et al. (2006) for an in depth discussion on performance-based payments.

changes in public sector policy (e.g. the demand for underground services is affected by public transportation policies regarding the availability and cost of bus services). For these reasons, the risk of changes in public needs that bring about the need to change output specifications prescribed in the contract should generally be borne by the public authority.

However, the optimal allocation of the risk of changes in public needs should also provide incentives for the contractor to make requested changes in the service provision at a reasonable cost so as to control the impact of risk. Whilst the contractor should be contractually obliged to provide the extra asset/service, changes in public needs can be very costly for the public sector because of the strong bargaining position of the contractor locked into the contract, and because of the lack of accessible alternatives and cost benchmarks. This may make it preferable to introduce some sort of risk-sharing agreement between the private and public partner.

Risk sharing can also help to provide incentives for the contractor to acquire information on the cost of changes and thus inform the decision as to whether those changes are indeed necessary. This is also important since the private partner is often in a better position to identify the best means to satisfy the needs of the public sector.

### ***3.3.6 Legislative/Regulatory risk***

Changes in the legislative and regulatory framework affecting operation costs and profits are likely to occur during the concession. When these changes are of a general nature and affect the whole industry, e.g. modifications in tax legislation, the rising costs can be either transferred to the contractor or shared with the public authority. For instance, indexation provisions may allow the concessionaire to pass on the rising costs to consumers through price increases. On the other hand, when changes in law and regulation affect only the concession project, it is often the public authority that bears the risk of rising costs (HM Treasury, 2007). Generally, the risk of changes in law should not lie with the contractor as it cannot control this type of risk. But in many cases, the public authority has little influence over national legislation and the private sector can minimize the impact of the change in law on the service provision. Because of this, there is an argument for risk to be shared between the two parties.

### ***3.3.7 Residual value risk***

When the facility is built by the contractor, it is likely that during the design and construction phase the private partner can undertake non-contractible actions affecting the quality of the

assets. For facilities like leisure centers and accommodations that have some value when used for private purposes, incentives are given for the private partner to undertake those actions to the extent that it retains ownership of the assets once the contract expires. However, for most infrastructure facilities like roads, bridges, energy, and water plants that have limited alternative use outside the public sector and service continuation requires the facility to remain in public hands, the public authority should keep ownership of the assets when the contract expires.<sup>12</sup>

To provide incentives for the contractor to look after the facility during the contract life and specially towards the end of the contract, it is then crucial to set out contract clauses providing for a final compensation payable to the private partner conditional on the state of the facility once the contract expires. In this regard, an independent third party can be called to verify the state of the assets in order to compute the compensation to be made. Alternatively, and often most effectively, the entrant could compensate the incumbent contractor the facility residual values (Iossa and Legros, 2004).

#### **4. Limits and tricks in risk transfer**

In practice, risk allocation often differs from what the criteria for optimal risk allocation recommend. This may happen for a number of reasons. First, there is the issue of whether governments are able to commit to the risk allocation specified in the contract. The need to ensure service continuation often makes the public authority renege on contractual provisions either by bailing out a contractor in difficulty or by not levying the contractual penalties specified in case of underperformance. If, for instance, an essential facility were found to be massively behind schedule and over budget during the construction stage, the public sector might have to take back full control of the project, as it is the provider of last resort in all PPP projects. Renegotiation is indeed a widespread phenomenon in concession contracts, as reported in Guasch (2004), among others.

Renegotiation practices, however, have serious negative effect in the long run. At tender stage, the possibility of renegotiation may be anticipated by the private sector, creating incentives to act strategically and bid very aggressively to get the contract. Firms who did not anticipate the contract renegotiation (possibly just because they have lower knowledge of the public authority)

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<sup>12</sup> Bennett and Iossa (2006) show that this is indeed optimal on the incentives of the private partner to undertake non-contractible investments to maintain the infrastructure/facility.

then lose the tender.<sup>13</sup> Furthermore, the anticipation that the public sector will bail out the firm or not levy the due penalties has a negative impact on the incentives of the private sector to perform during the contract implementation.

Second, PPP contracts have raised important issues for the public authority regarding accounting practices, which have had an impact on the risk allocation. The need of governments to keep public accounts within limits, at least 'apparently', has induced them to use PPPs only because of its accounting treatment. This problem has been particularly severe in Europe because of public debt restrictions due to EU treaty and subsequent agreements. In particular, the accounting treatment of monetary transfers to the private sector for PPP projects of prisons, schools or hospitals, has allowed the public sector to finance the construction of infrastructure 'off the balance sheet'. Thus, the undervaluation of the public cost of PPP financed infrastructure has made the fiscal budget look healthier than it actually is. This has led to bias decisions in favor of PPPs as opposed to more traditional procurement arrangements.<sup>14</sup>

The Eurostat, the Statistical Office of the European Commission, has attempted to reduce the incidence of this problem by regulating the accounting treatment of PPPs. In 2004, the EUROSTAT has established that a PPP project can be taken 'off balance' only when the contract allocates significant project risks to the private sector, specifically the construction risk, demand or availability risks. National statistical institutions are supposed to monitor the compliance with the European rule, yet, to our knowledge, legislation enforcement has so far been quite obscure:<sup>15</sup> the data is not accessible to the general public, and public officers have confidentially told us that many PPP projects have been declared 'on balance' even if the above risks are not fully transferred.

Third, the budget constraint limits faced by governments have often induced them to resolve to PPPs as if it was 'the only game in town', in the sense that it could allow to build infrastructure without having to find the funding to finance them upfront. The private finance aspect of PPPs has been an attractive feature for governments with limited budget. The problem with this approach is that of course the private funding does not come for free, and for prisons,

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<sup>13</sup> See Bajari, Houghton, and Tadelis (2013) for an empirical estimate of the impact of ex post renegotiation on the ex ante bidding.

<sup>14</sup> See IPPR (2001) for a discussion of how off-balance sheet considerations mattered in the early PPP projects in the UK.

<sup>15</sup> EU Member States are obliged to prepare National Accounts to a common format as defined in the European System of Integrated Economic Accounts (ESA 95). These accounts are prepared by national statistical offices and reported to Eurostat. ESA 95 sets out the treatment of PPPs. ESA 95 is available from the Eurostat website at: [http://epp.eurostat.ec.europa.eu/portal/page/portal/government\\_finance\\_statistics/introduction](http://epp.eurostat.ec.europa.eu/portal/page/portal/government_finance_statistics/introduction) under "Manuals".

schools and hospitals, where typically public sector pays for the service, the private party will recoup its investment via public payments during the operations. Governments with short-term electoral objectives have then a great incentive to build infrastructure through PPPs even when it is not efficient to do so, as they can obtain the short term electoral gain whilst committing funding of future<sup>16</sup> governments and future generations. To ensure that the contractor could raise sufficient private finance, these governments have then had an incentive to unduly retain main project risks, even when it was not efficient to do so. In particular, generous revenue or income guarantees have been used to ensure the bankability and attractiveness of the project, leading to an inefficient risk allocation, and hence poor incentives. The following PPP case illustrates when an insufficient risk transfer may arise and how this may lead to a remarkable PPP failure.

#### **4.1 Case studies**

In this section, we discuss a couple of case studies that emphasize some of the potential benefits, costs, and risks of PPPs. The first case refers to the Transmilenio Bus Rapid Transit system in Bogota for the provision of urban bus services. The project exhibited bundling of different stages of the service provision, thus allowing for the internalization of externalities across stages. Contractors were rewarded on a performance-related basis and were in large part residual claimant for demand increase, bearing significant demand and operational risks. Incentives were thus strong, and resulted in an overall successful and efficient PPP project.

The second case study refers to the PPP for London Underground, where the degree of bundling was very limited, because the infrastructure was in part already in place and the core service was kept by the public sector. The political opposition to the project and the negative attention received in the news also contributed to make the private finance particularly expensive. Thus, high costs of capital coupled with inadequate risk transfer and inappropriate revenue guarantees, lead to the project failure.

##### ***4.1.1 The TransMilenio Bus Rapid Transit System in Bogota (Colombia)***<sup>17</sup>

The TransMilenio (TM) Bus Rapid Transit System was developed in 2000 to upgrade and operate the Bogotá's bus transport system by a partnership between the public sector and a number of private companies. Before the TM project, transport services were provided by bus companies

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<sup>16</sup> See Engel et al. (2006) for a discussion of these political incentives and their implications.

<sup>17</sup> This case study is based on the following sources: Fernholz and Morales Fernholz (2005); TransMilenio SA web page; El Tiempo (several articles).

that rented the government-issued routes to small private bus operators serving fixed routes. Since the operators' revenue depended on the number of passengers, there were often 'price wars' to attract passengers (Colombians referred to this phenomenon as 'war of the cents' because only minimal price reductions were feasible in bus fares). Outcomes from such a system were far from efficient: long delays, oversupply of seat capacity, low quality of service, and high rate of accidents due to fierce competition for passengers. The TM project rationalized bus routes, by building exclusive bus lanes in critical areas of Bogotá and using a system of feeder routes to complement the main lanes, and constructed a modern infrastructure of enclosed bus stops, pedestrian bridges, terminals, and transfer stations.

*Contracts and partners:* A publicly owned company, TransMilenio SA, was set up to manage and develop the planning and contract drafting stages of the project. It also conducted the tendering to select private partners that would build infrastructure and operate the main routes, the feeder routes, the ticketing system, and the payments system. Following the PPP rationale, there was thus bundling of different stages of the project, with some common services shared across contractors. After launching the TM project, TransMilenio SA was responsible for the management of the new bus transport system, and for conducting monitoring and verification activities in order to ensure quality performance and customer service. In this regard, a system of fines was implemented to penalize the private partners failing to comply with their contractual obligations, responsibilities and investment requirements.

*Financing:* Transport construction works, estimated in USD 240 million for the period 1998-2002 and USD 480 million for 2002-2005, were funded by the public sector. Most of the infrastructure cost was to be borne by the national and local governments. The contribution of the national government was around two-thirds of the infrastructure cost, partly financed with a loan granted by the World Bank. Private partners, on the other hand, provided financing for buses and ticket machines, as in a DBFO scheme. Their invested funds were to be recouped by charging fares to final users, with no subsidies nor guarantees offered by the public sector to the contractors. As the contractors borne demand risk, it had strong incentives to operate the system efficiently.

*Activities and risk allocation:* To conduct the operation activities, the public authority contracted with different partners and unbundled the operation of buses, the collection of revenues, and the distribution of revenues among the bus operators. The existing bus companies awarded concessions through competitive bidding to operate the bus routes. The award criterion was based in a system of points in which bidders received points according to their experience,



bus quality, and emission levels. Thus, TM encouraged the bus operators to provide an efficient, modern, and non-polluting vehicle fleet. The bus operators had to invest in new buses, so financial risk was transferred to them. .

The TM project specified in detail the technical requirements for the buses: operators of main routes should have afforded modern buses, and operators of feeder routes could use standard buses. To reduce journey times, both regular and express bus services were to be provided with predetermined schedules and making information available for users through an electronic system.

*Payment mechanism:* The payment system implemented in the TM project implied that the demand risk was jointly borne by the bus operators since all the revenues collected were distributed among them. However, the revenue distribution was based on the weekly route distance that each bus operator served regardless of the number of passengers transported. Since TransMilenio SA could penalize a bus operator failing to comply with its contractual obligations by reducing its assigned weekly route distance (and so increasing that assigned to the other operators), it turned out that the bus operator's performance affected its share in the revenue distribution (and implicitly the share of demand risk borne individually). In fact, TransMilenio SA was able to reduce up to 10% of the operator's income, thus imposing a significant monetary loss for quality service failure.

In determining the fare level, both the bankability and affordability of the TM project were taken into account. In the project planning, a fare level around USD 0.40 cents had been estimated as consistent with the project's bankability. In fact, one year before the new system was introduced, the fares charged by the existing bus service providers were increased from USD 0.30 to USD 0.40 cents. Hence, at the time the new system commenced, there was no price difference between the TM bus services and those provided by the small private bus operators. Since the TM bus services were much faster and of a higher quality, the small private bus operators found it hard to compete for passengers in the parallel routes they were allowed to serve. After the initial fare was set, the contracts envisaged a mechanism to adjust the service charge periodically. Price variation provisions aimed at protecting the bus operators from unexpected changes in operation costs they could not control.

*Outcomes and future expansion:* By all accounts, the inherited bus transport system exhibited low service quality and high levels of congestion and pollution. But soon after the TM project was launched, significant improvements were achieved in terms of the efficiency, safety,

and environmental impact of the system. One year after the TM project was launched, journey times were reduced 32%, implying an equivalent to a one hour/day saving for the average passenger; average speed in the main routes were much higher than before; pollution levels in Bogotá resulting from the bus transport system dropped; and the number of accident fatalities decreased.

In line with the successful TM PPP experience, the government has gradually incorporated the rest of the Collective Public Transportation system (TPC-Transporte Público Colectivo), that serves 69% of public transportation trips, into the Integrated Public Transportation System (SITP). The current TPC presents an oversupply of approximately 7,500 public transportation vehicles that exceeds real passenger demand with the subsequent increase in traffic congestion and pollution. Also TPC's buses are generally old and obsolete, and have been traditionally operated by small-scale bus owners whose remuneration is not linked to service quality. Therefore, the SITP will enhance the quality of the CPT by reducing buses oversupply, renewing the vehicle fleet, designing a route network, formalizing operators' revenues, and integrating travel fares into a unified payment system. Like in the TM, the SITP includes investments in transportation infrastructure, vehicle modernization, and complementary systems. Main infrastructure investments (such as construction of bus stops, passenger transit terminals, and bus storage lots) will be financed by the public sector or through PPP, while investments in vehicles and complementary systems will be financed entirely by the concessionaires over the 24-year life of the concession.

#### **4.1.2 The London Underground (UK)<sup>18</sup>**

The London Underground PPP project to rehabilitate and upgrade the London tube was awarded to two private-sector companies (Tube Lines and Metronet Infracos) in 2003 after 19 months of arduous negotiations on the contract terms between the parties. Political challenges, fierce critics, and the uncertainty on contract negotiation led to large costs for the public sector arising from advisory services (£109 million) and delays in the award of contracts: London Underground Ltd. (LUL) paid £134 million to Tube Lines, £116 million to Metronet, and even £25 million to unsuccessful bidders in reimbursements for bidding costs.

The London tube PPP contract was more complex than a typical operation PFI deal involving a continuum of work to improve the tube assets over the 30 years of the contract

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<sup>18</sup> This case study is based on the following sources: NAO (2004ab); The House of Commons, Committee of Public Accounts (2005) and Transport Committee (2008); Transport for London web site; Public Private Finance (various issues); Public Finance (various issues); The Economist (April 2007, June 2007); The Financial Times (various issues); The Guardian Unlimited (various issues).

duration. The Infracos would upgrade and maintain the existing infrastructure while the LUL, a public-sector company subsidiary of Transport for London (TfL), continued to provide transportation services to final users. The Tube Lines consortium was awarded the concession for the Jubilee, Northern, and Piccadilly lines, whereas Metronet signed over the other two PPP contracts, one for the concession of the Bakerloo, Central, and Victoria lines, and another for the District, Circle, Hammersmith & City, and East London lines.

*Risk allocation:* The demand risk of the PPP project was borne by LUL since it kept the responsibility for delivering the transportation service and charging user fees. The risk of cost overruns arising during the contract was shared between LUL and the Infracos. The amount of cost overruns to be borne by Tube Line and Metronet were capped to £200 million and £50 million for the first 7.5 years of the contract, respectively, provided they performed in an economic and efficient manner. However, the contracts imposed weak constraints on the Infracos' subcontracting arrangements which led to incentive distortions in the Metronet case: Metronet's shareholders were also suppliers of the consortium, so they were less concerned about cutting costs down because an increase in Metronet's costs would translate into higher revenues for the supplier companies. Hence, Metronet's supply chain arrangement lacked transparency and was vulnerable to outright corporate abuse. In fact, Metronet incurred in large cost overruns estimated four times higher of what initially expected when signing the contract. Arguing that cost overruns were due to LUL's additional works requests, Metronet proposed either to share costs with LUL or to reduce the scale of pledged works. On the contrary, no cost overruns were incurred by the Tube Lines consortium, which had implemented an outsourcing arrangement based on competitive tendering and used to stand up to the additional work requirements of LUL. The debate over the responsibility over Metronet's cost overruns suggests the original PPP contract was poorly designed: the overlapping of interests between Metronet's shareholders and suppliers provided pervasive incentives for cost-reducing efforts.

Moreover, it was expected that private financing involved in the PPP contracts would give incentives for the Infracos to efficiently manage the project's financial risks. However, substantial risk was also borne by the public sector through a debt guarantee granted to the lenders entitling them to recoup 95% of their invested funds in case of early contract termination. According to the House of Commons (2005,2008), the political opposition and public discontent about handing the maintenance of a prime public asset over the private sector during contract negotiations negatively affected lenders willingness to provide the funds, and led to debt guarantees being

provided in order to make the project bankable and ensure that it would go ahead. Moreover, unlike other PFI contracts in the UK, LUL could enact a mandatory sale of the contract to ensure the continuity in service provision in case of early termination, instead of allowing lenders to sell the contract to other providers in order to protect their investment. Despite this public guarantee on private financing, the cost of capital turned out to be £450 million above the cost of capital that would have been observed had the project be financed by the government.

*Payment mechanism:* The PPP contract specified a payment mechanism consisting on a basic infrastructure service charge (ISC) combined with bonuses and deductions. To the extent the Infracos met performance, availability, and ambience targets, they were entitled to bonuses that increased their revenue, whereas a failure to meet these targets triggered payment deductions. The Infracos' performance in rehabilitating and upgrading the tube was measured by the journey time capability (JTC), i.e. the time needed for a train to complete a journey. Availability was measured by the number of lost customer hours, with penalties varying with the severity of a failure (e.g. breakdowns, signaling and other failures were penalized more heavily at peak times), and ambience and general conditions of the trains and stations were measured by customer surveys.

*Poor performance and penalties:* Soon after the contracts began, the Infracos were subject to criticism because of their poor performance. The criticism on safety issues became stronger when two derailments occurred in the tube lines assigned to each of the consortiums. Moreover, the performance targets based on JTC were hardly attained as the rehabilitation works delayed significantly, suggesting the works schedule proposed by the companies were unrealistic. In the first year of the contracts, the companies were fined £32 million by deductions for failing to meet some of the targets, and earned just £12 million in bonuses for achieving other targets.

Despite the large (net) deductions applied to the basic ISC, the consortiums made huge profits. According to the NAO report (2004a), the Infracos shareholders earned a rate of return around 20%, a third higher than the normal rate of return in private finance deals. Therefore, the impact of payment deductions on profitability must have been small (at least relative to gains from keeping low the quality of supply). Indeed, it has been argued that the deductions were too small considering both the payments made to the Infracos to undertake the pledged works and the inconvenience suffered by final users due to service disruptions. The too low deductions for poor performance appear to have distorted the incentive scheme sufficiently to generate the widespread poor performance of the Infracos together with their high profitability.

By April 2005, Metronet had only started refurbishments works on 13 out of 32 scheduled stations, and was also 12 months behind on the refurbishment of 78 District Line trains. Moreover, it received only £121 million out of the £551 million needed to cover its cost overruns. Thus poor performance, work delays, and cost overruns resulted in Metronet going into administration between July 2007 and May 2008 after which it was bought by two TfL subsidiaries, LUL Nominee BCV Ltd. and LUL Nominee SSL Ltd., transferring the assets, employees, and contracts to ensure the continued safe operation and renewal of the Tube. According to the National Audit Office, the failure of the Metronet PPP contract was estimated to cost the taxpayers more than £400 million.

The remaining tube lines (Jubilee, Northern, and Piccadilly) remained under the PPP arrangement with Tube Lines until May 2010, when it was fully owned by a subsidiary of TfL. Although Tube Lines did not have Metronet's overspend problems, works delays on the Jubilee Line and funding shortfall problems ended up in its transfer to the public sector hands.

## **5. Concluding Remarks and policy Implications**

Outsourcing of public infrastructure and services is likely to increase in future years, as part of a general trend that is seeing a reduction of the size of the State in the economy. The recent explosion in public debts will certainly contribute to this trend, even if we are going through a stage where private funds and investments are difficult to raise because of the financial crisis.

With greater outsourcing, the role of the State must change: from direct provider of public services, governments should transform themselves in monitors of the private sector provision. Are governments able to undertake such role? If the monitor have incentives to push for the private provision to pursue its own political agenda, it is unlikely that the monitoring will be effective. As this is a possibility with PPPs, users and citizens must ask for the public sector to be more accountable.

Whether PPPs will then manage to realize the great potential to deliver cost and quality efficient public services, is an issue that will depend on whether the governance problems of PPPs that may prevent an efficient risk allocation will be addressed.

This paper has emphasized that in this respect a crucial role will have to be played by the commitment of governments to spread good practices, design and impose standardized contract terms, monitor their compliance, and disclose the relevant contractual information and

performance evaluations to the general public, whilst at the same time ensuring that PPPs are used only in those circumstances where risks can indeed be transferred.

## References

- Albano, G.L., G. Calzolari, F. Dini, E. Iossa, and G. Spagnolo, 2006. "Procurement Contracting Strategies", Ch 4 of N. Dimitri, G. Piga, and G. Spagnolo (eds.), *Handbook of Procurement*, Cambridge University Press.
- Bajari, P., S. Houghton, and S. Tadelis, 2013. "Bidding for Incomplete Contracts: An Empirical Analysis of Adaptation Costs", forthcoming in the *American Economic Review*.
- Bennett, J. and E. Iossa, 2006. "Building and managing facilities for public services", *Journal of Public Economics*, 90, pp. 2143-2160.
- Bing, L., A. Akintoye, P.J. Edwards, and C. Hardcastle, 2005. "The allocation of risk in PPP/PFI construction projects in the UK", *International Journal of Project Management*, 23, pp. 25-35.
- CBI, Confederation of British Industry, 2007. *Building on Success: the way forward to PFI*.
- Chong, E., F. Huet, S. Saussier, and F. Steyner, 2004. "Public-Private Partnerships and Prices: Evidence from Water Distribution in France", *Review of Industrial Organization*, 29, pp. 149-169.
- Coppier, R. and G. Piga, 2007. "Why Do Transparent Public Procurement and Corruption Go Hand in Hand?", *The Economics of Public Procurement* (Edited by: Gustavo Piga and K.V. Thai) Palgrave, McMillan.
- EIB, European Investment Bank, 2004. *The EIB's role in Public-Private Partnerships (PPPs)*.
- El Tiempo* (<http://www.eltiempo.com>)
- Engel, E., R. Fischer, and A. Galetovic, 2006. "Renegotiation Without Holdup: Anticipating Spending and Infrastructure Concessions", Discussion Paper No 937, Economic Growth Center, Yale University.
- Engel, E., R. Fischer, and A. Galetovic, 2009. "Public Private Partnerships: When and How", Documentos de Trabajo 257, Centro de Economía Aplicada, Universidad de Chile.
- EPEC, 2012. *Market Update: Review of the European PPP Market in 2012*, European Investment Bank.
- Estache, A., 2006. *Infrastructure: A survey of recent and upcoming issues*, The World Bank.
- European Commission, 2003. *Guidelines for Successful Public-Private Partnerships*, Directorate General Regional Policy.

- Fernholz, F. and R. Morales Fernholz, 2005. *Case Study on Mobilization of Private Capital in Bogota, Colombia*, submitted by RTI International to Municipal Finance Task Force.
- Gosling, T., 2004. "Openness Survey Paper", Institute for Public Policy Research, United Kingdom.
- Grimsey, D., and M. Lewis, 2002. "Evaluating the risks of public private partnerships for infrastructure projects", *International Journal of Project Management*, 20, pp. 107-118.
- Guasch, J.L., 2004. *Granting and Renegotiating Infrastructure Concessions: Doing it right*. WBI Development Studies, The World Bank.
- Guasch, J.L., J.J. Laffont, and S. Straub, 2003. "Renegotiation of Concession Contracts in Latin America", Working Paper No 3011, The World Bank.
- Hammami, M., J-F. Ruhashyankiko, and E.B. Yehoue, 2006. "Determinants of Public-Private Partnerships in Infrastructure", Working Paper No 06/99, International Monetary Fund.
- HM Treasury, 2006. *PFI: strengthening long-term partnerships*.
- HM Treasury, 2007. *Standardisation of PFI Contracts, Version 4*.
- Hodge, C.A. and C. Greve, 2007. "Public-Private Partnerships: An International Performance", *Public Administration Review*, May/June, pp. 545-558.
- Hoppe, E. and P. Schmitz, 2013. "Public-Private Partnerships versus Traditional Procurement: Innovation Incentives and Information Gathering", *The RAND Journal of Economics*, 44, pp. 56-74.
- IMF, 2004. "Public-Private Partnerships", paper prepared by the Fiscal Affairs Department, International Monetary Fund.
- Iossa, E. and P. Legros, 2004. "Auditing and Property Rights", *The RAND Journal of Economics*, 35, pp. 356-372.
- Iossa, E. and D. Martimort, 2013a. "The Simple Micro-economics of Public-Private Partnerships", forthcoming in *Journal of Public Economic Theory*.
- Iossa, E. and D. Martimort, 2013b. "Corruption in PPPs, Incentives and Contract Incompleteness", *Paris School of Economics*.
- Iossa, E. Spagnolo, G. and M. Vellez, 2007a. *Contract Design in Public Private Partnerships*. Report prepared for the Sustainable Development Network, The World Bank.
- Iossa, E. Spagnolo, G. and M. Vellez, 2007b. *Best Practices in Contract Design in Public Private Partnerships*, Report prepared for the Sustainable Development Network, The World Bank.
- IPPR, Institute of Public Policy Research, 2001. "Building Better Partnerships", London

- Kaufmann, D., 2005. "Six Questions on the Cost of Corruption with World Bank Institute Global Governance Director Daniel Kaufmann", in News-The World Bank, Washington, D.C.
- Kerf, M., 1998. "Concessions for Infrastructure: A guide to their Design and Award", Technical Paper No 399, The World Bank.
- Leuz, C., 2007. "Was the Sarbanes-Oxley Act of 2002 really this costly? A Discussion of Evidence from Event Returns and Going-Private Decisions", *Journal of Accounting and Economics*, 44, pp.146-165.
- Loosemore, A., 2007. "Risk allocation in the private provision of public infrastructure", *International Journal of Project Management*, 25, pp. 66-76
- Martimort, D. and J. Pouyet, 2008. "To build or not to build: Normative and positive theories of public-private partnerships", *International Journal of Industrial Organization*, 26:2, pp.393-411.
- Martimort, D. and W. Sand-Zantiman, 2006. "Signalling and the design of delegated management contracts for public utilities", *The RAND Journal of Economics*, 37:4, pp.763-782.
- NAO, National Audit Office, 2004a. *London Underground PPP: Were they good deals?*, HC 645 Session 2003-2004.
- NAO, National Audit Office, 2004b. *London Underground: Are the Public Private Partnerships likely to work successfully?*, HC 644 Session 2003-2004.
- NHS Executive, 2003. *PPP in the NHS: the PFI*, Section 1 London, NHS Executive.
- OECD, 2004. *Principles of Corporate Governance*, OECD, Paris.
- PricewaterhouseCoopers, 2005. *Delivering the PPP promise: A review of PPP issues and activity*.
- Public Finance (<http://www.publicfinance.co.uk>)
- Public Private Finance (<http://www.publicprivatefinance.com>)
- Renda, A., and L. Schrefler, 2006. *Public-Private Partnerships. Models and Trends in the European Union*, Report presented to the European Parliament's Committee on Internal Market and Consumer Protection, mimeo.
- Rose-Ackerman, S., 1999. *Corruption and Government*, Cambridge University Press.
- Stigler, G.J., 1964. "A Theory of Oligopoly", *The Journal of Political Economy*, 72:1, pp. 44-61.
- The Economist, 2007. Britain: Down the Tube; London Underground, London: Jun 30, Vol. 383, Iss. 8535, p. 42.
- The Economist, 2007. Britain: Underground; overbudget; London transport, London: Apr 28, Vol. 383, Iss. 8526, p. 36.



The Financial Times (<http://www.ft.com>)

The Guardian Unlimited (<http://www.guardian.co.uk>)

The House of Commons, Committee of Public Accounts, 2005. *London Underground Public Private Partnerships*, Seventeenth Report of Session 2004-05.

The House of Commons, Transport Committee, 2008. *The London Underground and the Public-Private Partnership Agreements*, Second Report of Session 2007-08.

Transmilenio S.A. (<http://www.transmilenio.gov.co>)

Transport for London (<http://www.tfl.gov.uk>)

Vives, X., 1999. *Oligopoly Pricing: Old Ideas and New Tools*, Cambridge: MIT Press.