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Case Study

Delivering Local Infrastructure through PPPs: Evidence from the School Sector

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Abstract: This paper discusses the use of public–private partnership (PPP) contracts in the school sector. With this purpose, four Portuguese case studies are carefully examined. The authors argue that the lessons provided by the literature are not being implemented by public authorities. In fact, while crafting these new governance structures, local governments seem to fail in protecting the public interest. To cope with this state of affairs, the authors draw a risk management strategy and advocate several contract management guidelines. The authors' findings suggest that increasing transparency in procurement procedures and fostering the standardization of the tender documents and contractual clauses are absolute requirements in achieving value for money. Albeit these best practices are now beginning to be prevalent among academics and practitioners, local decision makers still strive to cope with the complex process of handling the whole life-cycle management of PPP arrangements. **DOI: 10.1061/(ASCE)CO.1943-7862.0000558.** *© 2012 American Society of Civil Engineers.*

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Introduction

Public–private partnerships (PPPs) in infrastructure projects are long-term agreements between a public entity and a private partner, with the objective of assuring the financing, construction/renovation, and operation of a public infrastructure service (Regan et al. 2011). This type of agreement allows public partners to transfer some of the project risks to private partners and benefit from their know-how (Love et al. 2011). The primary objective of all PPP arrangements should be to achieve the best value for money (VfM) or to get the best ratio between the benefits of the service or infrastructure and the costs for the public sector. However, in the school sector, assessing the VfM might be somewhat subjective (Khadaroo 2008). There are six key conditions to reach the best VfM: true competition in the access to the market, a proper risk allocation, a long-term contract, an output-oriented approach, performance monitoring with incentives (including an accountability system), and the outperformance of private over public project management (Grimsey and Lewis 2005).

In practice, although recognizing the potential of PPP agreements, academic findings and empirical observations lead to mixed conclusions about their actual benefits. Some praise their budget advantages, better VfM, higher quality of service, strict compliance with deadlines, transference of risks to the party better able to manage them, maximization of the private skills, incentives for innovation and efficiency (see Murphy 2008). However, there are significant transaction costs involved and thus the need for a minimum project size (Jahren and Ashe 1990). In fact, the high asset specificity of infrastructure and the uncertainty inherent to long-term contracts (because of problems of bounded rationality) lead to a complex bilateral monopoly (Williamson 1985). Since they are subject to many unknown factors, PPP projects require specific know-how and sometimes seem to imply a loss of control by the public sector (Vining and Boardman 2008a). The hurdles start at the early stages of the projects with the complexity of the procurement phase which is fundamental for successful outcomes (Bhargava et al. 2010). Furthermore, these agreements frequently lead to ex-post opportunism, with the parts bargaining during contract renegotiation. Although, theoretically, it could be optimal for both sides (and sometimes even empirically, Brux 2010), renegotiation is mainly seen as one of the major failures of regulatory contracts (Guasch 2004).

Successful PPP projects are based on three pillars (Marques and Berg 2010): (1) all relevant criteria should be taken into account in the public tender phase (although the evaluation model should only contain the strictly necessary criteria to choose the best bidder); (2) the suitable risk management framework is determinant to protect the public interest; (3) the sound principles of contract management must be put into practice (including the definition of incentives and penalties, Love et al. 2011, and the inclusion of clauses for unpredictable events). Indeed, this comprehensive triad sets the outline of the authors' analysis, applied to four case studies in the Portuguese school sector.

Even though PPP arrangements are frequent in the school sector, only a limited number of studies on this topic were found and usually in countries such as Ireland and the UK, with a strong tradition in these procurement models (e.g., see Ball et al. 2003; Reeves 2008, and Demirag and Khadaroo 2010). Hence, this paper makes a contribution to this body of work and provides further evidence that, despite their theoretical strongpoints, the real-world enactment of PPP contracts often fails to protect the public interest (Asenova and Beck 2010).

Surely the eventual poor outcomes of the projects are not intrinsic to the PPP procurement model. Indeed, past studies have shown that PPPs in infrastructure in fact may cut costs

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(e.g., Anastasopoulos et al. 2010c), construction time (e.g., Herbsman and Glagola 1998), and on many occasions simultaneously improve the level of service delivered (e.g., Pakkala 2005), provided that the proper incentives are in place (e.g., Zietlow 2005). On the other hand, the suitability of PPP contracts is contingent upon the actual type of infrastructure project (even within the same type, several features might influence the optimal contracting choice, Anastasopoulos 2010b). For instance, nowadays, it is quite clear that PPP agreements can work well in highway and road projects (Anastasopoulos et al. 2009). However, for infrastructures where the conditions are unpredictable or very unstable over time (e.g., because of a great exposure to technological advancements and innovations that render former specifications obsolete) PPPs might not respond so well mainly due to their long-term nature (for the case of hospital PPPs, see Shaoul et al. 2008). On a related topic, one should note that, more than the PPP model itself, it is the way public authorities handle the various phases of the process that often leads to poor outcomes (Cruz and Marques 2012).

School infrastructures might not be exposed to singular uncertainty and, depending on each country's educational system, demand is generally controlled by the public sector (i.e., number of students); therefore, demand risks are not likely to be transferred to the private sector. Nevertheless, it seems that schools delivered via PPP schemes might have several shortcomings concerning the actual benefits for the public (Demirag and Khadaroo 2008). In this investigation, the causes of these problems are identified and examined and suggestions to mitigate them are provided. Moreover, since in Portugal local governments are the competent authorities for delivering several types of school infrastructure, the utilization of PPP arrangements by these public entities is examined. Indeed, there might be additional difficulties that need to be tackled (usually having numerous competencies but only limited taxation powers, one might say that local governments were thought to spend rather than make money).

The remainder of the paper, based on recent academic research (Carvalho 2009), is organized as follows. The second section deals with some theoretical issues concerning PPP arrangements while the third section contains an overall characterization of the Portuguese educational system. Afterwards, the analysis and discussion of four Portuguese case studies is presented. The fifth section comprises the authors' suggestions and recommendations and the last section provides the concluding remarks.

Theoretical Considerations Of PPP Contracts

The Rationale Behind PPP Arrangements

Educational infrastructures of good quality are essential and they seem to have adequate characteristics to be provided through PPP arrangements (Audit Commission 2003). However, PPP regulatory contracts are complex and, usually, incomplete (thus, prone to ex-post opportunism). Indeed, because of their long-term nature, PPP contracts are regarded as incomplete (owing to the so-called problem of bounded rationality, i.e., the impossibility of accounting for every possible future outcome, Williamson 1985). The Green Paper on PPPs (European Commission 2004a) states that these partnerships can be of two different types: purely contractual and institutionalized. Within the contractual type (cPPP), concession agreements are particularly relevant. With this model, there is a written contract establishing that the private partner is solely responsible for delivering the service (or project). Institutionalized PPPs (iPPPs) are public–private entities (joint ventures) created with the purpose of establishing the partnership simultaneously owned by private and public partners (mixed capital companies). In any case, a PPP arrangement must comply with the following conventions (so that appealing features, such as the off-balance sheet treatment for public authorities, may be accepted; Cruz and Marques 2012; EPEC 2010; European Commission 2004a):

1. The private partner must contribute with equity. If a significant part of the capital raised for the infrastructure investments is equity and not just debt (as in many project finance schemes), the private partner has incentives to really commit with the project (aligning the objectives of public and private sectors);
2. The agreement entails a long-term relationship. More than just procuring infrastructure, the public partner is also contracting a service (preferably, paid back to the private investor directly by customers through fees) adopting a whole-life-cycle approach;
3. Some risks must be effectively transferred to private partners. Whenever the private sector is better equipped to manage and mitigate the risks involved in infrastructure projects, it should bear them as there is a lower economic cost (even considering the premium associated with every risk transferred).

Ultimately, public authorities are the entities responsible for the availability of public infrastructure services (with or without PPP contracts). Nevertheless, this kind of agreement allows the public sector to focus on its natural ability of monitoring rather than replacing the market. Moreover, the opportunity for providing new infrastructure off the public balance sheet might be decisive for overburdened local governments. But private equity is much more expensive than debt (the capital cost of private firms is higher) and thus efficiency gains must overcome these differences. Hence, more than just alternative procurement models, PPP arrangements should appear as alternative governance models, devised for the whole life-cycle of public infrastructures.

Ex ante Concerns: Market Access

Real competition for the market is essential in PPP arrangements (see Demsetz 1968). With a higher number of bidders, the propensity for collusion decreases and prices are more likely to be close to average production costs (Bajari et al. 2009). While regulating the access to the market, public authorities should consider the robustness of each bid (in economic terms) and therefore the likelihood of renegotiation (Semple et al. 1994). However, to do so, the bids must be comparable. In PPP arrangements the comparability of the bids is often a problem because each bidder has its own estimates and assumptions. If no fixed starting point or standard guidelines should be respected by every proponent, the tender can lead to the winner's curse, where the most optimistic bidder (not necessarily the best) acts hoping for the subsequent renegotiation of the contract (Marques and Berg 2010). Renegotiation is often seen as a drawback in PPP contracts because new agreements are formed without pressure from competition (and with information asymmetries favoring the incumbent). Thus, prices do not correspond to production costs and the final users are directly (higher fees) or indirectly (higher taxes) harmed (Bajari et al. 2009). To deal with adverse selection problems (uncertainty concerning the bidders' level of competence), public authorities should induce self-revelation by the proponents (Brousseau and Glachant 2002). This could be achieved by defining, ex ante, payment formulae linked to various counterparts by the bidders (Love et al. 2011). At the same time, an affordability cap (to provide a macro-economic vision concerning local sustainability) and a public sector comparator (PSC) should also be computed.

There are other lessons that should be considered by public authorities willing to take the PPP route. The National Audit Office in the UK (NAO 2009) reported that the authorities were overly

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optimistic in their assumptions of how quickly the first schools could be delivered, leading to unrealistic expectations (the total capital cost of the school PPP program in the UK is now estimated to be between £52 and £55 billion, a 16 to 23% increase from previous estimates). The use of pilot school PPPs could help to create a "body of knowledge" (Audit Commission 2003), however, the time-frames required by these processes are often incompatible with the political pressures felt by local decision-makers.

The major PPP project in the school sector issued in the State of Victoria, Australia should also be carefully analyzed by municipal developers (Partnerships Victoria 2009). Since 2000 (and up until 2009), 18 PPP projects in several sectors have been contracted in Victoria; they equate to almost $5.8 billion (AUD) of capital investment. Therefore, Partnerships Victoria was able to develop several guidelines for managing this type of procurement. In the school PPP the following criteria were used (for subcriteria see Partnerships Victoria 2009): A—Interface Management; B—Commercial; Ci—Financial; Cii—Risk Adjusted Cost; D—Third Party Use; E—Design; F—Project Management; G—Service Requirements.

Whole Life-Cycle Concerns: Risk Management Framework

The new international standard on risk management, ISO 31000:2009, defines risk as the "effect of uncertainty on objectives." Therefore, the concept of risk is related to the potential for events that have uncertain consequences and may constitute threats to success (downside risk) or, if properly managed, welcome effects (upside risk, Chapman and Ward 2002). The level of risk (the magnitude of a particular risk) depends on the project but it can be defined as the combination of consequences and their likelihood (Marques and Berg 2011). The three main phases in risk management are risk identification, risk allocation, and risk mitigation (for examples of useful tools for coping with these tasks see Knight and Fayek 2002, or Attalla and Hegazy 2003). Managing risks consists of a cradle-to-grave process (whole life-cycle approach), starting in the preparation and design stages and encompassing construction and operation (Boussabaine and Kirkham 2004). In the school sector, as in all infrastructure services, the values at risk are mainly the cost, the time (schedule), and the quality.

The accurate allocation and mitigation of risks are major assignments for the success of PPP projects (Li et al. 2005). To assist public authorities in this process, the Irish National Development Finance Agency created a template project agreement for the design, construction, finance, operation, and maintenance of public infrastructure (NDFA 2007). This standard contract includes a risk matrix with a suggested (and commented) allocation of risks. The purpose of this process is to reduce economic costs, compel the private partner to fulfill deadlines, meet quality patterns at predefined costs, increase the project efficiency, and establish more consistent cost predictions (Touran and Lopez 2006). Theoretically, the PPP model is often seen as the preferable means to transfer risk away from the public sector. In the case of public schools, the threat of having a situation where the final users are charged with higher fees in case of any problematic event (transference of risks to customers) is minor, unlike what happens with utility services (e.g., see Marques and Berg 2010). The major risks involved with school infrastructures encompass design and construction issues (OECD 2011) which are traditionally well managed by the private sector. Hence, from a risk management point of view, the school sector seems to be suitable for the use of PPP arrangements. In addition to possible political risks (preferably a responsibility of the public sector, see Ke et al. 2010), the main risks involved are production risks (construction, maintenance, and technological change) which should be transferred to the private sector. Commercial risks (e.g., demand, collection, and competition) are less significant in this sector. Finally, context risks (e.g., legal, regulation, unilateral changes, and force majeure) can be either mostly retained by the public sector, or properly shared between the partners.

Ex-Post Concerns: Contract Monitoring

After the award of a PPP contract, and to cope with moral hazard problems (uncertainty about the level of effort of the private partner and ex-post nonverifiability of results), it is crucial to monitor and manage the contract (Yuan et al. 2010). In general, this implies monitoring the performance of specific factors of the project (for instance availability) and managing compensation for exceptional events (Partnerships Victoria 2003). As illustrated in Fig. 1, a sound contract management must ensure that this happens effectively. For instance, in the British construction industry the development and use of key performance indicators has been a requirement for several years now. The Royal Incorporation of Architects in Scotland was one of the first entities to develop a set of quality indicators in the design of schools (RIAS 2002); the evaluation used eight main headings: (1) uses and spaces; (2) character and form; (3) access; (4) internal environment; (5) external environment; (6) social integration, sustainability, and ecology; (7) engineered systems and performance; and (8) construction. Before this there was already the notion that performance indicators were required to enable measurement of project and

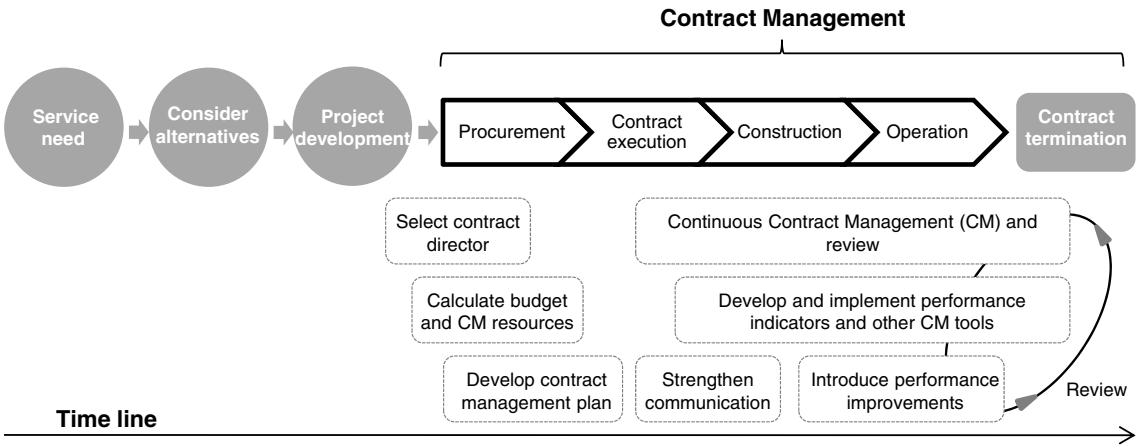

Fig. 1. Contract management in PPP arrangements

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organizational performance throughout the construction industry (DETR 2000). As far as the authors know, the Services Specification section (Schedule 24) of the Project Agreement of the Victorian schools PPP project is the most advanced tool for contract management in this sector, including several performance indicators (PViS 2009). However, single-handedly, this annex to the main contract has 94 pages (the whole agreement has several hundreds of pages). This level of development might be beyond the capabilities of most small municipalities. Naturally, monitoring contracts also has costs; however, without a good framework of incentives (and penalties) there is little chance of attaining success.

Public authorities should always appoint a project (or contract) manager who would be responsible for the adherence of all parties to the contract, at all times (as in Irish PPPs, NDFA 2007). The transparency of every step of the decision-making process (which is highly encouraged within the EU) is crucial in PPP arrangements. No matter how complex, every contractual relationship involving a public service (or infrastructure) should be subject to public scrutiny and discussion. To guarantee the success of a PPP arrangement in the basic school sector, a good level of communication between local governments, private partners, and schools (including teachers, parents, and students) must always be secured. The relationship between these parties is fundamental for the success of the model. Indeed, the Canadian experience with school PPPs shows that stakeholder engagement in the procurement, delivery, and operation phases of a school is essential for the success of the model (CCPPP 2010). A comprehensive framework to facilitate this process can be found in CELE (2009). When the private partner has to be compensated, it is necessary to prepare a new business case. During renegotiation, the scope for the public partner action is bounded by the more transactional (uncooperative) or more relational (cooperative) character of the contract as well as by the level of trust established between the parties (Reeves 2008). These complex negotiations should not allow the unrestrained increase of the procured equity internal rate of return (IRR) and cash flow/debt ratio of the private partner (Yescombe 2007).

The Portuguese School Sector

The Portuguese educational system encompasses preschool education, school education, and extra-curricular education. The school education is then divided into basic, secondary, and higher education. Recently, the Portuguese central government carried out several reforms in the school sector. These reforms included a massive Secondary School Building Modernization Program (SMP) and the decentralization of competencies to local governments regarding basic education (compulsory education). SMP aims at rebuilding or modernizing 332 of the 477 schools that provide upper secondary education in Portugal. This ambitious program started in 2007 and should be completed by 2015; the first 205 schools, which represent a total investment of €2.45 billion, should be available in 2012 (OECD 2009). With the new competences transferred to local governments, the number of PPP projects in the school sector is expected to increase in the coming years. The main reason for this procurement strategy is related to the new debt limits imposed to municipalities (125% of the total revenue of the previous year). In fact, according to the Eurostat rules (EPEC 2010), if there is an effective transference of "most of the project risk" to private partners, PPP arrangements (cPPP or iPPP) allow for the debt to be registered off the local government's balance sheet. The transfer of competencies to municipalities included basic education (a total of 9 years) and also nursery schools, which triggered the construction of new infrastructures under PPP schemes. These competences cover the construction, maintenance, and management of the infrastructure, and also the nonteaching staff, school meals, transportation, and extracurricular activities for the first cycle of basic education and other school and social activities for the remainder cycles.

Thus, in Portugal, the utter responsibility of providing the population with the adequate basic education is exclusively municipal (except for the teaching staff). In addition to this main actor, several other entities play an important role in the provision of this public service. To manage the SMP initiative, the Portuguese government created in 2007 a public company called Parque Escolar (PE). This corporatized body has the responsibility to plan, develop, and carry out the program. Finally, it is crucial to mention the ultimate group of players: the contractors. In the school sector (as for other infrastructures), construction companies play the role of private partners in PPP arrangements. These companies have been eagerly adapting to these new procurement procedures and they frequently appear to be far more prepared to enter in these agreements than the entities on the public sector side. Whereas there is no sector-specific legislation for school PPPs, all these contracts are regulated by general public procurement and PPP laws (that follow the recent EU Directives).

In the beginning of 2009, the Portuguese Parliament approved a legal document allowing for the use of accelerated procedures in public procurement for 2009 and 2010, encompassing all schools. Thus, for contracts with a global amount under €4,845,000, public authorities could choose between the restricted procedure and the direct award for procuring the services. This diploma followed the conclusions of the Brussels European Council (December 2008), in light of what was agreed in a G20 summit on financial markets (November 2008). The consequences of this special regime are dubious. Some argue that it accelerated the renovation of schools; however, transparency was highly harmed (at both local and central levels) with a clear distortion of competition. In the next section, these issues for the first four basic school PPPs in Portugal is discussed.

Case Studies

Description

By the time of analysis, there were only four PPP arrangements at the local level for the delivery of school projects in Portugal. To gather data on these cases tender documents (call for tender, specifications, evaluation model, requirements, etc.) and the preliminary studies of the projects were examined. For the projects already under implementation the PPP contracts signed (shareholders' agreements and other contractual documents) were also examined.

Interestingly, all the analyzed calls for tenders asked for private partners willing to undertake a major capital participation (51% of the shares) in a new iPPP which would have the responsibility of delivering local infrastructure. In fact, the use of iPPP arrangements is at odds with the PPP models adopted, for instance, in the UK (leader in the adoption of school PPPs). Mixed companies appear as an alternative both to the traditional public production (e.g., a municipal department) and to the delegation of public infrastructure services to private firms through concession contracts. Purportedly, one of the drivers influencing the choice of local decision makers towards this model is the ability of, to some extent, keeping control over the services (when compared with cPPP arrangements, Cruz and Marques 2012). However, this is usually attained by having the local governments holding a majority stake in the companies'

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shares (the same phenomenon, of dominant influence, can be observed in other EU countries, European Commission 2004b). It would be important to assess whether these singular schemes were merely designed to avoid fiscal consolidation (of the debt associated with the projects) or if local governments are indeed seeking the best VfM. Fig. 2 shows the standard contractual framework of the cases studied at the local level.

Only two PPP contracts were already awarded and are in operation. Most cases encompassed financing, design, construction, maintenance, and conservation for a period between 25 and 30 years (in all cases, teaching was kept a public responsibility). Local governments tried to bundle several types of infrastructure into one single procurement procedure (always using open tenders). However, neither an affordability cap nor the PSC were ever calculated (showing little concern with economic sustainability and expected VfM). Actually, all case studies have shown serious deficiencies in the economic and financial viability studies. All bidders had to present their own business models using project finance schemes. Table 1 summarizes the information regarding each case study.

In all cases studied, there was an attempt to coordinate the PPP with a request for funding from the EU financing program (QREN). Despite the intention of keeping equity investments to a minimum, this was not always successful, particularly because of the great amount of time spent with the procurement phase and the QREN applications. In the following section, the PPP arrangements are analyzed using a systematic approach. The investigation is divided according to the three most important dimensions influencing the success of these arrangements: market access of private investors, risk management of the projects, and monitoring of PPP contracts. Since these arrangements are quite recent, emphasis is given to the market access phase.

Market Access

For Case 1, 10 different companies requested the tender documents and four bidders actually entered the public tender, which suggests the existence of effective competition for the market in Portugal. The call for tenders was published on October 25, 2006 (investors had 27 days to submit their bids) and the total value of the project was around €50 million. Such level of participation is desirable because it helps in attaining VfM (Bajari et al. 2009). However, this scenario was completely different for Case 2. In fact, only one private investor (a consortium of four companies) bid for this contract; the total value of the project was around €70 million. The lack of private sector participation is damaging for the public interest. The main reasons for this strange behavior of the market are related to the very short time given for bid preparation (only 15 days, the call for tenders was published on April 1, 2008). Moreover, the complexity of the submitted bid (architectural projects included, since design was a responsibility of the private partner) was in some way discordant with the time frame given to the bidders. Although the time given to tenderers respects the minimum legal threshold (and both Portuguese and EU law are vague regarding procurement procedures of iPPP arrangements, see COM (2007)6661), these practices undermine the reputation of local administrations and the use of PPP arrangements (even if this is the rational choice and the one that provides VfM) which may lead to distrust and public and political contestation.

Despite the lack of investment by local governments in the public tenders (e.g., in the cases studied, there is both a lack of internal expertise and of qualified external consultancy) a significant amount of time was spent to achieve financial close: five months for Case 1 (the first school was completed in September 2008), a little over 1 year for Case 2 (the first two schools were completed in

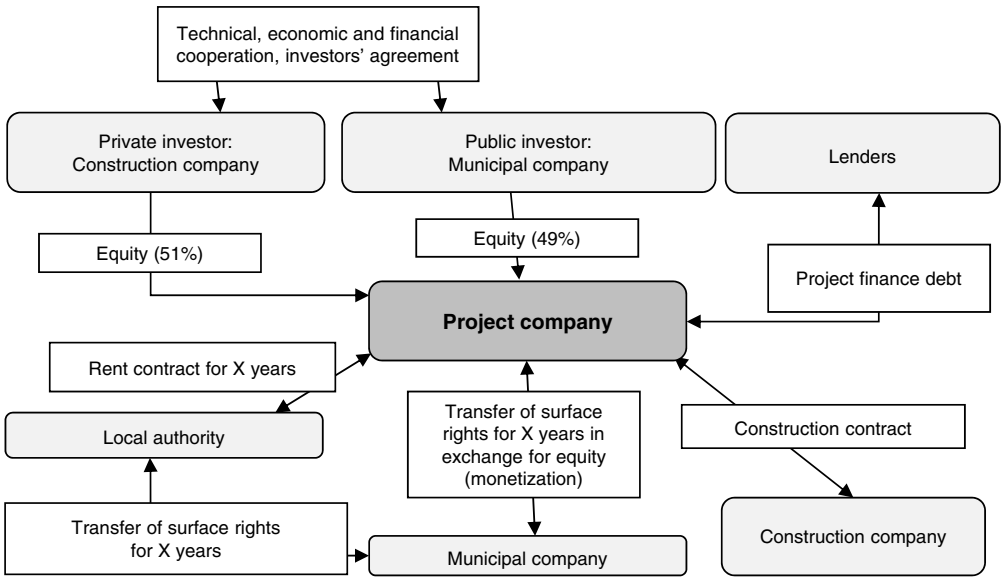

Fig. 2. Standard contractual framework (adapted from Carvalho 2009)

Table 1. Summary Information Regarding the Studied iPPPs

Case study	Scope of the PPP	PPP duration (years)	Risks transferred to the private sector	Status
Case 1	10 new schools	25	Construction, financing, and heavy maintenance	Running
Case 2	6 new schools and 1 multipurpose venue	25	Design, construction, financing, and maintenance	Running
Case 3	Construction/refurbishment of 26 schools and 4 car parks	≥25	Design, construction, financing, and maintenance	Stalled
Case 4	2 schools and 2 geriatric centers	30	Design, construction, financing, and maintenance	Stalled

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September 2011), and Cases 3 and 4 have been stalled for several years now (since February 2008 and February 2009, respectively). Contestation by the nonselected bidders was usual during procurement phases and, in some cases, these disagreements were responsible for delaying contract award. Several specific points were raised by the unsuccessful proponents; nevertheless, the main concerns were related to the comparability of the submitted bids. In fact, one of the bidders stated the following in the complaint (translation by the authors): "The submitted bids are dissimilar in several ways, however, in certain aspects the differences in the assumptions are so pronounced that any comparative judgment is rendered impracticable."

Regardless of all these problems, in schools already in operation, the final users (school staff) replied with positive feedback (Ismail and Pendlebury 2006 found similar judgments for PPP schools in the UK). Still, the authors argue that there were several decisions along the PPP processes that clearly affected the best possible VfM of the projects. For instance, because of the lack of experience of local decision makers, using open tenders can contribute to higher transaction costs. In fact, including subjective criteria to attest for the technical and financial capability of the bidders (i.e., setting these items as evaluation criteria instead of threshold or qualification criteria) certainly allowed for greater discretionary power in bid evaluation. The evaluation criteria used in the tenders are presented in Table 2. It was, indeed, extremely difficult to compare the bids because of their lack of standardization, especially concerning their financial maps.

The bundling of different kinds of projects (schools, multipurpose venues, underground car parks, and geriatric centers) in one single award might also be susceptible to some criticism. On the one hand, bundling is often seen as a major step in order to assure the economic viability of the projects, where developers seek these extra undertakings in order to be able to diversify and increase the revenue sources. On the other hand, this may not be desirable because it inhibits competition (by reducing the likelihood of having so many companies with all the required competences) and does not maximize the use of private expertise and specialization in a single type of project. One should note that municipal PPPs differ widely from other infrastructure mega-projects. Of course, in principle, there is a minimum threshold from which it compensates to undertake the complex process of structuring a PPP from an economic viewpoint. However, at the local level, things are slightly different in terms of decision drivers. Local councilors are under great pressure to deliver outputs (new infrastructure) and, simultaneously, they often do not have the scale nor the financial capability (in legal terms) to carry out new projects. For instance, the State Government of Victoria in Australia ensued a PPP to design, build, finance, and maintain 11 new schools for a 25-year period in December 2008 (PViS 2009). However, the State of Victoria, in addition to having a long-standing tradition of delivering infrastructure through PPP arrangements (for instance, with seminal contributions in terms of contract management practices), is a region with more than 5.5 million people; the total value of the Victorian schools PPP contract was $254,800,000 (AUD). The average population of the four municipalities studied in this paper is 95,961. The two contracts signed had an average value of €60,000,000. Unlike other major investments, municipal PPPs attract small to medium-sized contractors that choose to specialize in certain sectors. Taking into account the political economy of local government, the authors believe that effective competition is key to protect the public interest in local PPPs.

As has been seen, unstable or underdeveloped markets hinder competition. However, this does not seem to be a major concern in the Portuguese school sector, even at the local level. On the contrary, the problem seems to be the fact that every municipality has its own way of dealing with PPP arrangements. Each tender had its own (sometimes too narrow) time frames, subcriteria, weights, and objectives. Hence, limitations are within the local public sector which has very little contracting experience when it comes to PPP projects. For this reason, local governments should heavily allocate resources to this phase.

Table 2. Evaluation Criteria and Respective Weights for School iPPPs

Criteria	Weighting (%)
Case 1	
(a) Financial structure	45
(a1) Strategic and development plan	50
(a2) Financing structure	50
(b) Contractual framework	40
(b1) Organizational and contractual model	30
(b2) Draft of the statutes	10
(b3) Shareholders' agreement	60
(c) Technical quality	15
(c1) Execution plans	50
(c2) Partial schedules	50
Case 2	
(a) Financial structure	45
(a1) Strategic and development plan	50
(a11) Economic viability	45
(a12) Cost to the public sector	30
(a13) Total investment value	25
(a2) Financing structure	50
(b) Contractual framework	40
(b1) Organizational and contractual model	25
(b2) Draft of the statutes	15
(b3) Shareholders' and technical and financial cooperation agreements	60
(c) Technical quality	15
(c1) Execution plans	50
(c2) Partial schedules	50
Case 3	
(a) Financial structure	40
(a1) Strategic and development plan	50
(a2) Financing structure	50
(b) Contractual framework	30
(b1) Organizational and contractual model	25
(b2) Draft of the statutes	10
(b3) Shareholders' and technical and financial cooperation agreements	45
(b4) Maintenance and conservation	20
(c) Technical quality of the bid	30
(c1) Execution plans	50
(c2) Partial schedules	50
Case 4	
(a) Financial structure	60
(a1) Global investment plan	30
(a2) Value of the rent (for surface rights)	10
(a3) Value of the monthly payments (to the private partner)	30
(a4) Cost adequacy	20
(a5) Operating results	10
(b) Contractual framework	10
(b1) Draft of the statutes	30
(b2) Shareholders' agreement	70
(c) Technical quality	30
(c1) Time for completion	40
(c11) Time for completion	70
(c12) Guarantee of compliance	30
(c2) Quality of the project	40
(c21) Project adequacy	50
(c22) Quality of the project	50
(c3) Maintenance of the equipment	20

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In each case, there were several criteria to award the PPPs (some not fully specified in the public tender documents). However, a number of items should have been considered as standards for bidder qualification rather than evaluation criteria. None of the evaluation models included criteria to assess the robustness of the bidders' business models (and thus, the probability of future renegotiations). Likewise, because it is important in case of new project requirements or renegotiations, the equity IRR of private partners should also have been considered as one relevant criterion.

Local governments may be losing an opportunity to promote innovation. For example, the inclusion of smart boards to improve the interaction and efficiency in the classroom and of small construction details to make the schools more eco-friendly (and with less energy and maintenance costs) would only be possible if a greater involvement of the private partner was fostered. Municipalities should work together, with help from the central state and entities such as PE, for the setting of standard guidelines on how to regulate access to the market. After the award, public entities should conduct debriefing interviews with the unsuccessful bidders (as in the Irish schools sector, see Reeves and Ryan 2007) to optimize following PPPs regarding the schools of another municipality.

Risk Management Framework

Demand risks, which frequently jeopardize the success of many PPP projects (e.g., in transport infrastructure), are less severe for Portuguese basic schools, mainly for two reasons: firstly, basic education is compulsory (thus the number of students can be estimated more accurately); secondly, since public schools provide free education, income is only vaguely influenced by the number of students. As has been seen, PPP contracts must force private partners to consider whole life-cycle costs; this should be done with an output-oriented approach, fostering innovation and therefore efficiency gains (Regan et al. 2011). In the analyzed case studies, the transference of risks to the private sector was not fully effective. This problem was also observed in the first PPP projects in the school sector undertaken in Canada (Vining and Boardman 2008b). As shown in Fig. 3 (applicable to the PPPs already in operation—case studies 1 and 2), the risk transfer was insufficient since the responsibilities for cleaning, gardening, and surveillance, as well as water, gas, and electricity bills remained on the public side. There is, however, a distinction between allocating activities and risks. Transferring risks to the private partner implies the inclusion of penalties for not completing the activities satisfactorily. Public authorities should only assume risks that are under their control. Thus, if one municipality decides to use the iPPP model and carry out such a demanding process *a priori*, the transference of the maximum number of production risks should take place, since it reduces the economic costs of the project. Duties such as gardening, cleaning, security, and infrastructure management should be a responsibility of the private partner. Several hypothetical reasons can be formulated to explain why the services were allocated to local governments (e.g., municipalities sought to keep their employees, although there are ways to overcome this). However, there is yet another possible explanation. The leading private partner in case studies 1 and 2 is the same construction company. Usually in local iPPPs contractual documents are drafted by lawyers acting for the private investors (indeed, the quality of the drafts is frequently a criterion in the multi-criteria evaluation models of the tenders); this was actually the case of the contracts analyzed here. Since the private partner plays a major role in structuring the PPP arrangement, it might be able to persuade local officials (who are generally unfamiliar with PPPs) that this is the option that delivers the best results.

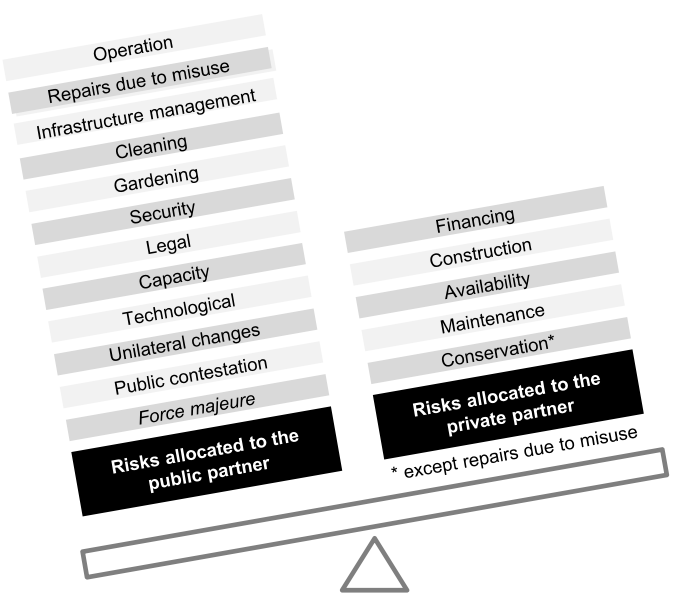

Fig. 3. Risk allocation

Managing the risks in PPP projects should also include the sources of uncertainty (that might result in cost/time-overruns and change orders, Anastasopoulos et al. 2012). The lack of data, clarity, and detail as well as the lack of structure in the assumptions being used are also sources of risk (Chapman and Ward 2002). In the future, when local governments opt for PPPs in the school sector, the tender documents should identify the project risks and call for proposals of mitigation measures. A best practice would be the inclusion of a comprehensive risk matrix in the PPP contracts where the allocation of risks (public, private, or shared) should be explicit and objective (to avoid future disputes about the side accountable for any liability). A good measure to enable risk transfer is the bundling of different elements of an infrastructure project, thus adopting a whole life-cycle cost approach. However, one of the PPP arrangements did not cover the facilities' design. This exclusion places design risks on the public side (moreover, it may be a focus for dispute in case of underperformance of the infrastructure in the future) and reduces the potential for innovations by the private partner in this field.

Contract Monitoring

According to the two case studies already in operation (and with the provisions of the two stalled cases), the supervision of the PPP contracts in the Portuguese school sector has been inadequate. Public authorities did not appoint a contract manager (or an "independent tester" as in Ireland, NDFA 2007) for any of the case studies. Also, the fact that the annual account, performance, and activity reports of mixed companies (iPPPs) are not discussed in the municipal parliaments is perplexing since this procedure would improve transparency and accountability without relevant added costs. As shareholders, the responsibility of performing an effective contract monitoring is accentuated. In fact, property rights should reduce asymmetric information and the public partner should be able to undertake an "internal regulation."

The intention to calculate the payment of private partners depending on availability is a sound principle (the two operating case studies have clauses with this purpose). Nevertheless, this was not done properly. Generally, the availability encompassed the schools as a whole (mainly covering the risk of late infrastructure delivery); this

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assessment was not made considering partial availability or any kind of performance indicators related to the quality provided during the lifetime of the projects.

The definition of robust (yet fairly simple) performance indicators to manage the contract was not done for any of the case studies. Furthermore, local governments do not usually consult with experts in the later phases of the PPP life-cycle; the substantial difference in the resources available for the public and private parties during negotiations is one factor contributing to the unbalanced settlements. The PPP contracts should also contain dispute clauses stipulating the procedures in case of future disagreements (e.g., arbitration, mediation, and deadlock clauses) as well as awards and sanctions related to the private partner's performance, preferably connected with payment mechanisms.

Improvement Proposals

There seems to be an urgent need to improve the level of transparency and standardization in the public tenders as a way of obtaining financial maps (and other features) easier to compare. Access to tender documents should be facilitated and private investors should have time to prepare their bids. It is also a requirement to improve the monitoring of some legal parameters. For instance, regarding the comparability among bidders, it is crucial to ensure that the discount rate used for bid preparation is predefined for evaluation purposes (Grimsey and Lewis 2005). Having a more active participation of a specialized central (or regional) entity on local PPPs could also be advantageous (such as Partnerships Victoria in Australia). In addition to helping with the structuring of the procurement phase, this entity could support municipalities and users by displaying relevant information on the Internet, allowing for the benchmarking of the projects and their performance. Indeed, in Portugal, there is a pressing need to develop national guidelines fostering the standardization of PPP contracts, in order to (1) promote a common understanding among local decision makers of the main risks involved in a standard PPP project, (2) allow consistency of approach and pricing across a range of similar projects, and (3) reduce the time and costs of negotiations between the parties (HM Treasury 2007). Taking this into account, it would be very important that PE, the central state company which has been carrying a similar activity throughout the country (delivering secondary schools), would cooperate with local governments in the design and monitoring of PPP arrangements in the sector. Because of their long-term nature (at least 25 years), these are once in a life time projects where every contribution of know-how to implement good practices should be welcomed by local governments. Unfortunately, in Portugal, contiguous municipalities do not usually cooperate with each other to plan and deliver local infrastructure.

In addition to the problems with the comparability of bids and the lack of expertise of the public sector to manage PPP projects, one of the major flaws concerns the performance measurement of the private partners. For practicality, the incentives for good performance (and penalties for poor performance) should be fairly simple and easy to implement (Cruz and Marques 2011). Here, a possible formulation to be applied in the school sector (Carvalho 2009) that would allow decision makers to "use the contract as a tool" is presented. Eq. (1) was designed to assess the monthly payment to the private partner according to the availability of school facilities and other performance factors.

$$\text{Monthly payment} = \max\begin{cases}\text{predefined payment} - \text{bad performance deduction} - \text{unavailability deduction}\\ 0\end{cases} \tag{1}$$

To calculate *bad performance deductions* in the school sector, a small group of performance indicators is suggested. The use of performance indicators is widespread in the delivery of infrastructure projects, such as highways, giving rise to the so-called performance-based contracts (Anastasopoulos et al. 2010c). Conversely, the introduction of output oriented indicators for the whole life-cycle management of schools is quite recent (e.g., CELE 2009; OECD 2011). The appraisal of these indicators can be made using a scale from 0–20 (arbitrary), where 0 corresponds to a bad performance and 20 to an excellent performance. Using this system together with Eq. (2), it is possible to assess the *low performance factor*, that multiplied by (for instance) 20% of the predefined payment should be equal to the *bad performance deduction* branch (Eq. 3).

$$\text{Low performance factor} = \frac{n \times 20 - \sum_{i=1}^{k} \text{performance indicator assessment}}{n \times 20} \tag{2}$$

where n = the number of performance indicators used.

$$\text{Bad performance deduction} = \text{low performance factor} \times 0.2 \times \text{predefined payment} \tag{3}$$

Note that weights were not considered in these formulae, thus every performance indicator has the same contribution to the overall assessment (nevertheless, this can be easily adjusted). Several sources were used to suggest the scope of the performance indicators (namely, RIAS 2002; DETR 2000, and PViS 2009). This proposal shows that payment mechanisms do not need to be extremely complex (and thus unattractive for both public and private partners) to contain incentives for efficiency. There are, however, other (more complicated) payment mechanisms available for PPP arrangements that should be progressively considered by municipalities (e.g., for a survey on payment mechanisms for the transport sector see Aziz 2007). Indeed, if the PPP option is to remain a growing strategy, the authors believe that local authorities should start small and then consistently evolve to more mature stages (like Partnerships Victoria). Based on the reviewed works, in Table 3 the authors suggest several fields to be measured by performance indicators that may be relevant for the school sector and were dispersed in the dedicated literature (in particular, see OECD 2011). According to this scheme, the key performance indicators adopted must be all in the same scale (e.g., 0–20).

For the calculation of the unavailability deduction the use of specific weights for each space/service is suggested (to consider the partial availability). In case of unavailability of a space or service, the value of the unavailability deduction can be assessed through Eq. (4)

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$$\text{Unavailability deduction} = \frac{\sum_{i=1}^{k} \text{weight of unavailable space or service}_i \times \varphi_i}{\sum_{j=1}^{n} \text{weight of space or service}_j} \times 1{,}2 \times \text{predefined payment} \quad (4)$$

where n = total number of spaces and services; k = total number of unavailable spaces and services; and

$$\varphi_i = \frac{\text{unavailability period}}{\text{total availability period required}}$$

This mechanism aims at discouraging private partners to have unavailable spaces or services. Although not included in the formula, it was also recommended to add a time penalty coefficient for long periods of unavailability (e.g., equal to 1.0 in the first month, 1.2 for the second month, and 1.4 for the third, and so forth). This payment mechanism penalizes the private party for underperforming and encourages fast intervention with regard to service availability. Payments should only start after the construction and when the operation effectively starts. Concerning unilateral changes imposed by the public partner (which can have several sources, Anastasopoulos et al. 2010a), it is recommended that if it increases the project IRR (and the equity IRR), the private partner should share the benefits with the public authority; if it decreases the IRR, the private partner should be compensated with no more (nor less) than the necessary to keep the private equity IRR constant. For this to happen, the public partner must have full access to the financial accounts of the partnership.

It is necessary to engage the general public in the projects and to enhance the flexibility of educational infrastructures (Edelenbos and Klijn 2009). For instance, allowing the private partner to commercially explore the space outside school hours, fostering a more efficient land use. Finally, in line with the findings of Ball et al. (2007), it seems that a more open and innovative mind is essential (e.g., experiencing new financing methods). The use of PPP schemes in the school sector, with all its specificities and special concerns, is a new, yet fashionable, solution in Portugal (and elsewhere). Nowadays, the judgment of public decision makers may be biased in favor of this option because of the demanding debt limitations imposed on municipalities. The difficult task imposed on this administrative level, which lately has been endowed with more responsibilities and considerably less resources, is acknowledgeable. Still, rushing out to PPP projects is dangerous and might jeopardize the economic future of local governments if postponing payments is the main decision driver. Unlike what happens with municipalities, construction and operator companies are well prepared when it comes to negotiate the clauses of the shareholders' agreements and this fact puts local governments in a weak dealing position. Moreover, the current financial global crisis will present new challenges. First, access to capital is difficult both to private and public entities (especially for countries with very high interest rates on the bond market, which is currently the case for Portugal). Second, the assistance agreement with IMF and EU put a stop to new PPP agreements until an overall assessment is completed (although it is not clear whether local governments have to submit to this ruling because of the Constitutional principle of local autonomy). And third, the budget advantages of PPP contracts might vanish if new international accounting standards are implemented, refocusing decisions on efficiency gains (McQuaid and Scherrer 2010). As Regan et al. (2011: 15) put it, "[e]xisting market conditions do not close the door on PPPs but do provide an opportunity for both government and industry to develop a more refined model that is more appropriate for the new environment."

Table 3. Scope of the Performance Indicators for Educational Infrastructures

Infrastructure management	Auxiliary services	General issues
Comfort of the classrooms	Security	Accidents
Quality of air inside the classrooms	Safety	Users' level of satisfaction
Conservation of the educational equipment	Cleanliness	Effectiveness in problem solving
Availability of the facilities	Quality of the meals	Flexibility of use
Quality of sports equipment	Waiting time in queues	
Overall maintenance and conservation status	First aid services	
	Quality of telecommunications	
	Quality of drinking water	
	Quality of the library	
	Emergency equipment	

Conclusion

The use of PPP contracts in the school sector is getting popular across the globe. In Portugal, the choice for the first local schools delivered through this governance structure was the iPPP model, with the design, construction, financing, operation, and maintenance being responsibilities of the private partner. However, in mixed public-private companies the allocation of tasks (and risks) to each partner is not straightforward, especially if the public partner holds a minority participation in the company that has the responsibility of delivering the public infrastructure or service. Indeed, the current model is not ensuring an effective transference of risks, and fails because of the absence of performance monitoring and the retaining of some responsibilities such as cleaning, surveillance, gardening and water, gas and electricity consumption on the public sector side. The private sector know-how, better efficiency, and capacity to innovate are still not being well explored. Furthermore, municipalities have shown a lack of knowledge concerning the implementation and management of these complex arrangements. Arguably, other countries are facing the same problems. Regarding the two case studies already in operation, it seems that the iPPP model was mainly used to overcome budget limitations instead of achieving better VfM. In fact, by using this scheme, the two municipalities were able to deliver the first schools 2 (Case 1) and 3 (Case 2) years after the tender. If the local governments were to simply rely on their own resources (i.e., use traditional procurement) this would be unfeasible due to borrowing restrictions. Indeed, decision makers did not perform an ex ante efficiency or VfM test and failed to carry out some international best practices (particularly the calculation of an affordability cap and the PSC). Furthermore, there is a lack of transparency and of innovation to make the use of the schools' space more flexible and up-to-date.

Several measures were identified which could improve the delivery of schools through PPP contracts. The development of quality indicators regarding performance, availability, and design should be highlighted. While PPP arrangements in the school sector are expected to increase (e.g., in India, MHRD 2010, and New Zealand, ME 2011), it is crucial to correct the bad practices identified in this study in order to improve the outcomes in the future. The crafting of

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PPPs is more demanding for local governments than for central governments. On the one hand, because of their small size and limited sources of revenue, they lack expertise and have low levels of economic sustainability. On the other hand, because of the narrower scope of activity, local decision makers are not familiar with these processes nor adequately prepared to negotiate with the specialists on the private sector side. Furthermore, because there is limited cooperation between public authorities, municipalities are required to do it right the first time. In the authors' opinion, using pilot projects and cooperation among municipalities and specialized central state entities would be welcome and crucial to protect the public interest.

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