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Comparing PPP with Traditional Procurement: The Case of Schools Procurement in Ireland

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Abstract:

Advocates of Public-Private Partnerships (PPPs) argue that it can deliver public infrastructure more efficiently than traditional procurement through timelier completion and superior value for money. Despite these claims comparative analysis of the performance of both procurement methods has received scant attention in the PPP literature to date. This paper addresses this issue by providing an in-depth, case-based comparison of PPP versus traditional procurement in the schools sector in Ireland. Through detailed semi-structured interviews with key stakeholders and an examination of the available documentation, we assess whether the key objectives of using PPP have been achieved. Overall, we find no evidence that PPP leads to faster delivery of infrastructure when the overall procurement process from contract notice to delivery is accounted for. In addition, we find only limited evidence to suggest that PPP results in better value for money.

Keywords: Comparative Analysis; Public-Private Partnerships; Traditional Procurement; Value for Money; Education

1. Introduction:

A fundamental rationale for the use of the PPP is that it provides a superior alternative to traditional approaches to procuring infrastructure that have a history of cost inefficiencies and time over-runs. Much of the literature and commentary on PPP proposes that it provides a mechanism for achieving greater efficiency, value for money, improved innovation and faster delivery times compared to traditional procurement (Grimsey and Lewis 2005; Geddes 2011). Although there is now an extensive and growing literature on the use of PPPs, there is still a distinct scarcity of studies that compare the performance of PPP relative to more traditional forms of public procurement. This paper seeks to address this gap in the literature by comparing the experience with procuring schools infrastructure in Ireland under both procurement approaches.

Under traditional procurement (TP), the public sector typically specifies the quantity and quality of the service and enters into separate contracts for the design and construction of an infrastructure asset such as a school or a hospital. The project is financed by the public sector, which also assumes responsibility for the operation and maintenance of the asset once construction is complete. PPP differs from TP in some key respects. Whilst there are a variety of PPP models, they are generally characterised by a long-term contractual agreement between the public sector and a private contractor that bundles the design, construction, operation and/or maintenance of the infrastructure and contains provisions for the sharing of project risks. In addition, PPP projects are frequently privately financed. The key difference between both methods is “the allocation of risk and the role of risk as an efficiency driver” (Burger and Hawkesworth 2011: 4).

PPPs, therefore, represent a radically different approach to procuring infrastructure assets and services and governments around the world have been attracted to PPPs on the basis of a number of proposed benefits which Delmon (2017: 2-3) usefully describes as including:

- Improved prospects for delivering projects on time and on budget;
- Increased innovation and competition leading to better design, a focus on minimising lifecycle costs and managing lifecycle risks;
- A greater emphasis on project evaluation and due diligence;

- A focus on value for money as the main criterion for choosing projects to be delivered by PPP.

Whereas these benefits have been widely cited there is a dearth of empirical evidence on the actual performance of PPP compared to the TP approach it is expected to improve upon. This paper presents a comparative analysis of both procurement methods which have been used for the delivery of new schools infrastructure and services in Ireland. The paper is structured as follows: the first section reviews previous studies of the comparative performance of traditional procurement and PPP. This is followed by a review of the arguments in favour of PPP in terms of value for money and faster completion of projects. The paper then briefly reviews how PPP has been used for the procurement of schools in Ireland. It proceeds to describe the cases of schools procurement which are used to compare the different procurement models. Following a description of the research methodology, we present our comparative analysis before providing a discussion of our results and conclusions.

2. Comparing PPP with traditional procurement models: a review of the literature

Despite the large volume of empirical research on various aspects of PPPs, only a handful of studies have sought to directly compare the performance of PPP compared to traditionally procured projects. These comparisons tend to be based on the time taken to deliver projects (time performance) and the relative cost (value for money comparisons) of projects under both forms of procurement. Table 1 provides a summary of the main comparative studies and their broad findings.

<< Insert Table 1 Here >>

Overall, the comparative studies listed in table 1 fail to deliver a clear consensus as to the relative superiority of one form of procurement over the other. An early study by consultancy firm Mott MacDonald (2002) examined 39 traditional and 11 PPP projects and concluded that PPP projects were more likely than TP projects to be delivered on time and on budget. This study examined the relative degree of 'optimism bias' – the tendency to be overly optimistic about planned actions (Raisbeck et al., 2010). It compared outturns with initial estimates of work duration or capital expenditure and found significant levels of optimism bias for

traditionally procured projects compared to PPP. This study has, however, been heavily criticised. UNISON (2005) and Pollock *et al.* (2007) re-examined the cases used in the Mott MacDonald study and identified a number of methodological problems which biased the study in favour of PPP. Criticisms regarding the sampling method, representativeness of the samples and the relevance of the time period covered led to the conclusion that the findings of the original study were unreliable.

Raisbeck *et al.* (2010) conducted an Australian-based comparative study which sought to apply a rigorous methodological approach by developing two project pools of 21 PPP and 33 traditional projects procured in the early 2000s. They examined the issues of time and (capital) cost performance by comparing actual and expected outcomes. The authors concluded that PPP procurement delivered projects faster than TP and was between 11 and 31 per cent more cost-efficient. Blanc-Brude *et al.* (2006) drew different conclusions from their study of road projects in the EU. They based their comparison on ex-ante estimates of construction costs which they found to be 24 per cent higher for PPP projects. The UK Audit Commission (2003) conducted a detailed study of 10 traditional and 8 PPP projects procured in the schools sector and failed to find evidence that PPP performed better than traditionally built schools in terms of delivery time, cost and quality.

These comparative studies (summarised in table 1) have faced a number of methodological difficulties and have been the subject of a number of criticisms. For example, Hodge and Greve, (2017) express concern that industry-funded studies may have a vested interest in portraying PPP favourably, noting that non-academic literature is often favourable towards PPP while the academic literature is far more mixed. One of the most fundamental challenges for comparative studies is that no projects are alike. Comparisons are therefore problematic where projects are procured under different institutional frameworks and legal systems. Similarly, there are challenges in comparing projects across different sectors such as transport, water, healthcare and social infrastructure. In the context of PPPs, Raisbeck *et al.* (2010) point out that a 'whole of life' (or a significant part of it) procurement method is difficult to compare with a traditional 'design and construct' approach that relies on a separate operations and maintenance framework.

Against this backdrop, one of the key contributions of this paper is that it addresses the challenge of comparing procurement methods and adds to the relatively low stock of comparative studies in the published literature. In addition, it adopts an approach that aims to address some (but not all) of the criticisms of previous studies, as well as the challenges involved in comparing procurement approaches. Specifically, we contribute to the PPP literature by conducting a detailed case-based comparison of traditional versus PPP procurement in the same sector (schools) and jurisdiction (Ireland) over the same time period (2013-2015). In contrast to previous studies that have generally focused on construction cost performance, we examine the question of comparative performance in terms of overall value for money, which is widely regarded as the principal performance criterion for PPP. By conducting a detailed case-based analysis of two projects procured by different methods our paper makes a novel contribution and addresses a significant gap in the extant literature.

3. Examining the performance of PPP and traditional procurement

The performance of methods for procuring important infrastructure can be assessed in terms of different criteria including economic, financial and engineering performance, as well as issues around the governance of different arrangements. As the objective of this study is to compare the procurement of schools in Ireland using PPP with the traditional approach our comparison is made on the basis of the principal objectives of PPP procurement as described in the Irish government's *Framework for PPPs* (2003). This statement of official PPP policy in Ireland describes the goals of PPP as including: (1) "speedy, efficient and cost-effective delivery of projects" and (2) "value for money for the taxpayer, *inter alia*, through optimal risk transfer and risk management" (2003:3).

Value for money (VfM) which is a commonly articulated objective of PPP is defined by HM Treasury in the UK "as the optimum combination of whole-of-life costs and quality (or fitness for purpose) of the good or service to meet the user's requirement. The term whole-of-life is used to refer to the lifecycle of the good or service. VfM is not the choice of goods and services based on the lowest cost bid". (HM Treasury 2006: 7). In countries such as the UK and Ireland, the establishment of VfM is an important element of the governance of PPP, and it is widely used as a principal criterion for choosing between procurement methods such as PPP and TP.

Given the long-term nature of most PPP contracts, it is not possible to accurately establish if PPP has delivered VfM until the end of the contractual period. In order to gauge if PPP delivers VfM at the *ex-ante* or early stages of the PPP contract, it is necessary to conduct a financial analysis that involves estimating the whole-of-life-cost to government under both PPP and TP. In Ireland, VfM analysis is conducted by the National Development Finance Agency (NDFA), but the relevant data is not made available to the public. Given this constraint, our comparison of PPP and TP assesses the question of VfM in indirect terms. Our study of comparative performance is therefore based on the official objectives of PPPs as stated by government namely, timely delivery of new infrastructure and VfM. The latter is assessed in terms of the principal drivers of VfM as identified in the relevant PPP literature, that is (1) competition (2) risk transfer and (3) innovation. The following subsections summarise the main propositions from the PPP literature in relation to these aspects of performance.

3.1 Delivery time performance

There is a strong body of evidence which demonstrates that large traditionally procured infrastructure projects are characterised by significant time delays (Flyvbjerg *et al.* 2002; Flyvbjerg *et al.* 2003). One of the principal arguments in favour of PPP is that it provides incentives for the completion of projects on time and on budget and a number of empirical studies provide support for PPP in this regard (for example, NAO (2003) and Lammam *et al.* (2013)). In theoretical terms, the advantages of PPP are attributed to features such as 1) the bundling of the design, build and operating stages of projects; 2) the use of private finance, and 3) the transfer of appropriate risks to the private sector. Whereas the extant literature provides persuasive arguments regarding the relative superiority of PPP as a mechanism for achieving faster delivery times, it tends to ignore the important distinction between the construction stage of PPP projects and the preceding procurement period. The distinction between these pre- and post-construction stages is important in the context of comparing procurement methods.

Focusing on construction times, the main theoretical and empirical literature supports the proposition that PPP results in faster delivery of projects. The transfer of construction and operating risks to private contractors incentivises speedy completion of projects as revenues for the private sector depend on satisfactory completion and ongoing availability of the asset

(Grimsey and Lewis, 2005). Consideration of these advantages must, however, be set against the recognition that PPPs are characterised by longer tendering periods compared to other procurement methods (NAO, 2007; Reeves *et al.*, 2015). This can be attributed to the more complex nature of PPP procurement due to long-term contracts, greater uncertainty and prolonged negotiation periods (Owen and Merma, 1999; Ahadzi and Bowles, 2004; KPMG, 2010; HM Treasury, 2012). Whether or not PPP leads to faster overall delivery of infrastructure projects depends on the trade-off between potential faster construction times versus the possibility of longer tendering periods.

3.2 Competition

Competitive tendering replaces competition *in* the market (between sellers) with competition (between bidders) *for* the market, and it is argued that this form of competition can yield the same efficient outcomes as competitive markets (Chadwick, 1859; Demsetz, 1968). Sappington and Stiglitz (1987) identify how mechanisms such as competitive tendering and franchising require sufficient levels of competition at the bidding stage. Moreover, there is evidence from both the theoretical and empirical literature highlighting how the intensity of competition for the market is positively related to greater efficiency and cost reduction, which is the desirable outcome for policymakers (Szymanski, 1996; Domberger and Jensen, 1997; de Bettignies and Ross, 2010; Saussier and Tirole, 2015).

It is unclear if competition is greater for PPP contracts compared to other forms of procurement. Engel *et al.* (2014) emphasise that the benefits of competition only accrue when there is “real competition” for the contract. Boardman and Vining (2012) assert that PPPs, which are characterised by large-scale, complex and bundled projects, are unlikely to attract many interested firms. A low number of bidders can result in some associated pitfalls, such as higher transaction costs due to post-contractual lock-in and contract renegotiations where firms seek to extract higher profits (Williamson, 1975; Lonsdale, 2005; Engel *et al.*, 2014). As the achievement of better VfM is a fundamental objective of PPP, it is, therefore, important to establish if PPP contracts attract more or fewer bidders than TP methods.

3.3 Risk transfer

One of the key benefits attributed to PPPs is that it can achieve cost savings and VfM through the optimal allocation of projects risks (e.g. construction, operating and finance risks). Under traditional forms of procurement most project risks are borne by the public procuring authority, whereas under PPP, different risks are identified and contractually allocated to the party best suited to manage them (Cooper *et al.*, 2005). By assuming the risks that they are most capable of managing, the private sector is incentivised to manage them efficiently thereby achieving VfM compared to alternative forms of procurement (Jin, 2010). Optimal risk transfer is also encouraged under PPP due to the bundling of the different stages of infrastructure development (i.e. design, build, finance and operation) within a single contract. Private contractors are therefore incentivised to complete projects on time and within budget as payment depends on meeting agreed milestones and performance standards (Grimsey and Lewis, 2004).

There are, however, some obstacles to successful risk allocation and transfer. Froud (2003) questions whether in fact some risks are merely “theoretically” transferred, noting that in the event of a service breakdown the State would most likely step in, as it cannot transfer the political risk of a closed public service. Also, effective risk transfer depends on contract enforcement and penalising private contractors in the case of poor performance. There is evidence which shows that this does not always happen (Lonsdale, 2005; Reeves, 2008). For example, Demirag *et al.* (2012) observe that in practice, risks are not always managed and are simply insured or hedged against which in turn adds cost. In addition, an abundance of literature has demonstrated that the financial case for using more costly private financing under PPP relies on the transfer of risk from the public to the private sector (Pollock *et al.*, 2002; Shaoul, 2005; Khadaroo, 2008). Nonetheless, there is no evidence to suggest that effective risk transfer cannot take place under other forms of public procurement (Heald, 2003; Coulson, 2008).

3.4 Innovation

The quality of the infrastructure asset and related services is an essential part of the VfM calculus. One of the proposed advantages of PPP is that it encourages greater innovation in the design and construction of infrastructure which results in improved asset and service

quality (Yescombe, 2007; Engel *et al.*, 2014). Innovation under PPP can contribute to VfM due to reduced construction times and overheads as well as reduced operation and maintenance costs. In addition, by bringing the facility into use earlier PPP can result in faster generation of income (Linder, 1999; Gunnigan and Eaton, 2008).

The scope for improved innovation under PPP is attributed to a number of factors. First, as the PPP “tendering process is undertaken on the basis of an output specification of service requirements incorporating building design and services standards, rather than a prescriptive input specification, the private sector has more freedom to innovate, which should lead to better quality at a lower cost” (Audit Commission, 2003:4). Second, innovation is encouraged by the competitive tendering process and the long-term nature of contracts that promote the use of designs that reduce life-cycle operating costs over the length of the contract (Roumboutsos and Saussier, 2014). Third, the involvement of specialist procurement agencies can lead to an increased focus on encouraging the private sector to deliver innovative solutions (Hoppe *et al.*, 2013). Finally, the creation of meaningful collaborative partnerships can create the space for generating and sharing innovative ideas (Roberts and Siemiatycki, 2015; Himmel and Siemiatycki, 2017).

Overall, the empirical evidence fails to provide convincing support for claims that PPP delivers greater innovation compared to TP. A number of studies based on case-study and survey methods have examined this question and produce no clear consensus in favour of PPP (Eaton *et al.*, 2006; Leiringer, 2006; Barlow and Köberle-Gaiser, 2008; Winch, 2012; Roumboutsos and Saussier, 2014; van den Hurk, 2016). There have also been a number of sector-specific empirical studies on the use of PPP in the schools sector, which is the focus of the analysis in this paper. Studies by the Audit Commission (2003), Ball *et al.* (2007), Hurst and Reeves (2004), Keenan and McCabe (2010), and Reeves and Ryan (2007) all cast doubt on the proposition that PPP improves innovation in the delivery of school and related services. This absence of conclusive evidence leads Leiringer (2006: 303) to conclude that claims in favour of superior innovation under PPP are “based on anecdotal evidence and wishful thinking”.

4. Background: PPP and traditional procurement of schools in Ireland

Ireland serves as an appropriate jurisdiction for comparing the PPP and TP methods of procurement. The Irish PPP programme dates back to 1999, and over the last nineteen years, 24 projects with an aggregate capital value of over €5 billion have been completed. In a review of the programme to date, the Department of Public Expenditure and Reform (2017) identified three phases of PPPs. The first phase focused on roads and primary education among others. Phase 2 focused on social housing and the third phase focused on higher education, health, and court projects. The completion of PPP projects across these three phases has resulted in Ireland ranking as one of the countries with the most mature PPP markets (Burger and Hawkesworth, 2011; Macário et al., 2015).

It should be noted however that the development of Ireland's PPP market and finalisation of PPP projects was a gradual process. In his study of the Irish experience between 1999 and 2013, Reeves (2015) concluded that PPP had delivered important infrastructure that would not necessarily have been provided using traditional procurement. However, the completion of PPP projects took time with just six privately-financed PPPs completed by 2013 while others remained under procurement or construction.

The time taken to deliver PPP projects was significantly affected by the global financial crisis of 2008 which led to a major slowdown in PPP investment both internationally and domestically. In Ireland, over twenty planned PPP projects were cancelled in the aftermath of the economic crash but as the Irish government sought to adopt policies that would restore the economy to growth; it relied heavily on PPPs. In July 2012 a Stimulus Plan consisting entirely of PPP projects was launched. This was followed by two further phases of new PPP investment that were announced in 2014 and 2015. In comparative terms, Ireland was successful in finalising a number of PPP in this period. Reeves and Palcic (2017) noted that the €1.6 billion of PPP investment in Ireland was significant in the context of the total value of €35 billion in PPP contracts that reached financial close in Europe in 2013–2014, and the relatively small size of the Irish economy.

It is worth noting that the principal drivers and rationales for PPP usage have shifted over time. In the early 2000s, the principal objective was to use PPP as a mechanism for delivery

‘additional’ infrastructure. After the crisis, PPP was largely used as a tool for stimulating economic activity. Since 2017, with the economy in full recovery, the emphasis has changed, and the principal justification for using PPP is to achieve better VfM. In February 2018, the government published its capital spending plans for the next twenty years. The plan is broadly favourable towards the use of PPP but only where it can be shown to offer better VfM. A cautious approach to the adoption of PPP is clearly signalled in the new plan which states that “the pursuit of further additional investment projects by PPP over and above this planned level of public capital investment would pose a risk that such projects may not achieve value-for-money and/or could give rise to a level of public capital investment overall that is not consistent with macroeconomic or fiscal sustainability” (*National Development Plan 2018 - 2027* :102).

In the context of the broader history of PPP policy and practice in Ireland, this paper assesses the performance of PPP versus traditional procurement in the schools sector. To date, PPP projects in the education sector rank second (after transport) in terms of the number of PPP contracts finalised. To date, eight PPP contracts covering 35 schools with a combined capital value of €558.2 million have been procured (see table 2).

<< Insert Table 2 here >>

The first three PPP projects for schools and colleges in Ireland were procured by the Department of Education. In 2003, a specialist government procurement agency, the National Development Finance Agency (NDFA) was established and was assigned full responsibility for the procurement of subsequent PPPs in the schools sector. Since 2010, the NDFA has overseen the completion of four schools bundles with a fifth currently under construction. PPP contracts involve the bundling of a group of schools into a single 25-year contract for the design, build and maintenance of the schools with each contract privately financed. After schools are constructed, responsibility for the facilities is retained by the contractor while the school board of management remains responsible for educational services. The PPP project examined in this paper (schools bundle 4), consisting of four new school buildings, was procured by the NDFA using a negotiated procedure whereby bidders were shortlisted following an initial competition, and shortlisted bidders were then required

to submit detailed bids. Following the assessment of the detailed bids, the NDFA appointed a preferred tenderer with whom they then negotiated the final contract for the schools.

For the purpose of this paper, we compare the procurement of PPP Schools Bundle 4 with another bundle of schools procured using traditional procurement (TP). The TP project we examine involved the bundling of schools into a single contract, which was then procured by the NDFA, the agency also responsible for procuring PPP schools. Once constructed, the TP schools were handed back to their respective school boards of management. The Department of Education and Skills (DES) and the NDFA refer to these projects as the “Devolved Schools Building Programme” bundles. Three such bundles were procured by the NDFA using a three-stage open competition framework panel which is described in more detail in section 5.2. These three bundles were made up of a mixture of new build and refurbishment/extension school projects. In order to enable a more accurate comparison, we compare only the new build school projects involved in this programme, consisting of two schools from bundle 1 and three schools from bundle 3.

5. Methodology and results

The criteria we use to compare both procurement methods are VfM and the time taken to complete the delivery of schools infrastructure. Data collection was based on semi-structured interviews with key stakeholders involved in both procurement processes. Face-to-face interviews were conducted with three key public-sector officials, one from the national procurement agency (NDFA) and two from the Department of Education and Skills (DES). Interviews were also conducted with four school principals (two PPP and two TP) and two members of management from the PPP project company. These interviews were conducted between July 2017 and May 2018. Information was also gathered from publicly available documentation which was provided by the relevant stakeholders (e.g. contract notice and award, user specification documents, procurement documents, planning documents, government reports, parliamentary questions and press releases).

As the financial data used by the NDFA in conducting VfM analysis is not publicly available, we adopt an indirect approach by assessing the principal drivers of VfM under both procurement methods. We, therefore, conduct a comparative analysis based on: (a) the

duration of procurement and construction periods (since longer delivery times are likely to be related to higher costs and lower VfM); (b) competition for contracts; (c) risk transfer; and (d) innovation.

5.1 Time performance:

As discussed in section 3.1, the theoretical and empirical literature to date broadly supports the hypothesis that PPPs lead to faster delivery times compared to TP. Importantly, however, the extant literature largely ignores the pre-construction tendering phase where there is empirical evidence of lengthy tendering periods for PPPs in Ireland and the UK (see Reeves *et al.*, 2015, 2017). We therefore split our analysis of time performance into two key stages: 1) the tendering period, i.e. the time from tender advertisement to financial close; and 2) the construction period, i.e. the time from financial close to the completion of the asset.

Duration of tendering periods

Figure 1 illustrates the procurement timelines for both projects with the PPP taking just over 18 months to reach financial close compared to 13 months for the TP project. The difference in tendering periods can be attributed to two key factors. First, the PPP contract is significantly more complex as it covers issues that were not included in the TP contract (e.g. private financing and facilities management). Second, the negotiated procedure was used to tender for the PPP project whereas the open procedure was used in the case of the TP project. The negotiated procedure is generally regarded as more complicated as it includes extra stages involving dialogue and negotiation (Sánchez Soliño and Gago de Santos, 2010). Both of these factors contributed to the longer tendering process under PPP.

<< Insert Figure 1 here >>

This comparison of tendering periods fails to account for some important features revealed by our interviews. The NDFA indicated that the procurement time of 18 months achieved for the PPP project was the fastest of any of the five bundles that have been procured to date by the NDFA and was in line with their recent target of a maximum 18-month tendering period for a PPP project. However, it is important to note that the design element of PPP bundles 4 and 5 differ significantly from the first three PPP bundles that were procured by the NDFA.

For bundles 1 to 3, bidders for each project submitted their own designs as part of the competition for the contract, whereas for bundles 4 and 5 detailed specimen designs were provided at the contract notice stage and only minimal alterations were allowed thereafter. In order to develop detailed specimen designs for bundles 4 and 5, the NDFA had to issue a separate tender for architectural services.

<< Insert Table 3 here >>

Table 3 compares the tendering periods for the five PPP schools bundles procured to date along with the TP project analysed in this paper. When the tendering period for the architectural services required to produce the specimen designs is added to the PPP tendering time, it is clear that the speed of tendering for the PPP bundle analysed in this project is no longer superior to previous bundles. The tendering for architectural services to produce specimen designs was also used prior to the procurement of the TP project. Table 3 shows that when the tendering period for architectural services is added to the TP tendering time, it is much closer to the PPP tendering times. However, in the case of the TP, the architectural services were procured using a much larger panel framework which included non-TP schools with the contract awarded only two months before the TP contract notice. On balance, therefore, the evidence indicates that the PPP tendering process was no more time efficient than previous PPP bundles and was relatively long compared to the tendering period for the TP project.

Duration of construction

Table 4 provides information on the construction times for the four new schools that were included in the PPP project along with the five new schools in the TP project (we ignore the refurbishment and extension projects included in the TP project for ease of comparison). PPP schools took an average of 14.75 months to be completed whereas TP schools took 16.6 months on average. In order to provide a more meaningful comparison, we compared the construction time per 1000m² since the different school projects varied widely in terms of the size of schools. Although this is a crude measure of construction time performance, it nonetheless indicates that PPP construction times were clearly superior to TP, taking 1.77 months to construct 1000m² compared to 4.59 months per 1000m² under TP.

<< Insert Table 4 here >>

In summary, our analysis shows that TP procurement times are relatively superior to PPP whereas construction times are comparatively faster under PPP. The fact that PPP tendering periods are longer is to be expected given the long-term, complex contract involved which requires considerable negotiation to reach financial close. The faster delivery time expected under PPP only takes hold once the contract is signed and construction commences. In this case, PPP was two and a half times more time efficient at constructing schools (on a per m² basis) than TP, thereby supporting the claims of the PPP project company and the NDFA that PPP incentivises firms to deliver infrastructure more efficiently. One PPP project company manager elaborated on this point, stating, *“it is in our interest to open the school on time, and that is driven by the financial partners’ need to retrieve their investment.”*

Overall however, when the procurement and construction times are taken together, the aggregate speed of delivery under both the PPP and TP is the same, with both projects taking exactly 34 months from the initial design phase to completion. Although our analysis is confined to two different projects and our results are not generalisable, the analysis still points to the importance of examining the entire process of delivering an infrastructure asset. Much of the empirical literature which proposes that PPP leads to speedier delivery of infrastructure ignores the importance of the pre-construction design and procurement phases. Our analysis points to the need for a more thorough assessment of the entire procurement process that incorporates a comparative analysis of alternative forms of procurement such as TP when attempting to judge the relative superiority of PPP delivery times.

5.2 Competition for contracts:

Competitive tendering is a crucial driver of VfM. Comparing the level of competition for contracts under both procurement models is complicated by differences between the formats of the tendering process used in both models. In the case of the PPP contract, the tendering process consisted of two stages. First, a contract notice was issued seeking expressions of interest. This was followed by a shortlisting process and submission of detailed bids by those shortlisted bidders.

The TP process was more complicated. Under this model, a three-stage process commenced with the issuance of a contract notice seeking expressions of interest for inclusion on a framework panel of construction companies. Following the selection of a framework panel of contractors, the second stage of the procurement process involved the submission of expressions of interest from panel members for the construction of three separate bundles of schools. A smaller shortlist was then established before the third stage, which involved three separate 'call-off' competitions for each TP Bundle.

Focusing on the actual level of competition involved in both competitions, in the PPP case, a total of three bidders were shortlisted following the submission of six initial expressions of interests, each of whom submitted detailed bids to the NDFA. Under the TP model, there were eleven expressions of interest in being included on the framework panel for the programme. Five companies were included on the panel and a separate competition for the three bundles was then held with just two companies shortlisted for the submission of detailed bids. Although shortlisting under the TP model followed two separate stages where expressions of interest were submitted, the level of competition can realistically be assessed in terms of the number of detailed bids.

Given the significant differences between the two procurement processes, it is difficult to draw a definitive conclusion in relation to the comparative levels of competition. Nevertheless, our examination of both procurements suggests that the PPP contract was characterised by a higher level of competition compared to TP. This conclusion is based on the higher number of detailed bids submitted under PPP. Moreover, as tenders under the TP approach were mainly related to construction, the bundled nature of PPP contracts required higher levels of detail in relation to elements such as operation, maintenance and especially finance. This generally leads to the submission of bids from an international pool of companies and investors with the resources required to assemble detailed PPP bids (e.g. BAM, Balfour Beatty). In the case of the TP model, all of the shortlisted bidders were domestic construction companies that submitted less detailed bids.

5.3 Risk transfer:

As risk sharing is an integral part of infrastructure procurement under PPP, the identification, allocation and valuation of project risks were part of the *ex-ante* stage of procurement in this case. Interviews with officials from the procuring agency (NDFA), the sponsoring government department (DES), and the PPP project company revealed a strong consensus that project risks were allocated to the most suitable parties. In addition, one project company manager asserted that “all risks transferred were appropriate and adequately compensated, as the private finance partner would not agree to the contract otherwise”.

Notwithstanding these responses, it must be noted that details regarding the allocation of risks in the case of the PPP project are not publicly available. In order to gather as much information as possible, we covered the issue of risk sharing in semi-structured interviews with the principal stakeholders including the project company and the NDFA. We also conducted an extensive search and analysis of websites and official documents regarding the procurement of the PPP project. This enabled us to determine a basic breakdown of how risks were allocated (shown in table 5). Whereas risk sharing is not a central feature of TP, we did cover this issue in interviews with the NDFA, DES, private contractors and school principals. The relevant information around allocation of risks in the TP project is also provided in table 5.

The public sector takes full responsibility for demand (attendance numbers) and political/regulatory risks (changes in government, regulations, etc.) under both forms of procurement. A key finding is that design and construction risks are assumed by the private sector under both PPP and TP approaches. Precise details about the nature of design and construction risks were not made available. However, the interviewee from the national procurement agency (NDFA) confirmed that there was little substantive difference in the nature of design and construction risks transferred under TP and PPP since financial penalties applied in the event of late delivery in both cases.

As design and construction risks are among the most important of overall project risks (Siemiatycki and Farooqi, 2012; Khadaroo, 2014), the comparative advantage of PPP in terms of risk transfer is curtailed in this regard. Any relatively positive incentive effects of risk

transfer under PPP that remain in our comparative case study relate only to the financial, operating, availability and lifecycle risks assumed by the PPP project company over the contract period.

<< Insert Table 5 here >>

Notwithstanding the potential benefits associated with the transfer of these risks, it is worth noting that interviews with school principals and the DES highlighted that the transfer of operating and lifecycle risks under PPP created more contractual rigidity compared to TP. Both of the PPP schools' principals that were interviewed expressed dissatisfaction with the constraints they faced when seeking to make alterations to facilities and the considerable time and resources required to make desired changes.

For example, one school principal sought to install new computers in a classroom for students with special needs but was prevented from doing so as this was not provided for in the PPP contract. In this case, it took almost ten months of negotiations before the issue was resolved. The alterations required by the schools were only agreed after the project company transferred responsibility for the relevant classroom to the school. The school principal also expressed the view that such a change would have taken one week in a TP school. Another PPP school principal expressed frustration about their request for an extension to the facility to add a special needs unit. They reported that this change was actively discouraged by the NDFA and the DES, due to fears that renegotiations could result in the public sector being overcharged by the project company, which was in a strong bargaining position. Such issues did not arise in TP schools where principals have full discretion over any changes made to the school facility.

The ex-post bargaining evident in these cases is well documented within the existing PPP literature. For example, in their analysis of PPP projects in the UK, Edwards *et al.* (2004) found that significant transaction costs arose as a result of the long-term nature of the contract. These costs can arise due to the lack of flexibility in long-term PPP contracts, which the National Audit Office (2018) illuminated in its review of the PPP experience in the UK. Their report highlighted how various government departments that procured infrastructure

through PPP reported that operational inflexibility was a drawback and that modifications to contracts can be costly with lenders and investors charging administrative and management fees (NAO, 2018: 23).

The importance of risk transfer in terms of driving VfM under PPP is widely recognised in the PPP literature (for example, Audit Commission, 2003; Heald, 2003; Ball *et al.*, 2007). In terms of our comparison of risk allocation under both procurement methods, our analysis fails to provide unequivocal evidence that PPP delivered a superior allocation of risks compared to TP. Instead, we find that the scope for greater efficiency (VfM) under PPP depends on the trade-off between the benefits derived from transferring availability and operating risks with the increased transaction costs arising from inflexibility related to long-term contracts.

5.4 Innovation:

The potential for improved private sector innovation under PPP is mainly attributed to the use of output specifications instead of more prescriptive input specifications that are typically used under TP. However, the procurement of PPPs by the NDFA has recently shifted away from the use of output specifications, and the PPP project that we examine in this paper involved the NDFA providing bidders with detailed specimen designs for schools included in the PPP bundle. Moreover, the NDFA secured planning permission for the schools before procurement commenced. Bidders were allowed limited scope for enhancing the specimen designs that were provided, and in interviews, the NDFA, the project company and the DES provided a consensus view that the use of specimen designs placed strict limits on the scope for bidders to provide innovative designs and features. As the schools procured under TP were also constructed on the basis of specimen designs provided by the NDFA, there was no clear difference between both procurement methods in terms of scope for better innovation.

Although interviewees could not identify clear examples of design innovations under either procurement method, they tended to be more positive about overall innovation under PPP due to some features that were added to reduce energy consumption and improve the overall environmental sustainability of the PPP schools. Some interviewees drew attention to innovations that were relevant to the operational stage of the PPP project. These included aspects such as the integration of building information management software with the

schools' helpdesk function which enables more efficient management of the facilities. The PPP project company also highlighted the use of new technologies aimed at reducing costs, including the use of automated technology such as robotic cleaners and robotic lawnmowers. One interviewee asserted that such innovations are unlikely to occur under TP, where following hand-back to school management, the upfront costs of such technology may be prohibitive. On the other hand, cost-saving innovations under longer-term PPP contracts are achievable, but as one SPV interviewee stated "we want to avoid innovations for the sake of it, we're a private company, if it will reduce costs or benefit us in the long run, we're happy to invest at the start of the project".

Overall, our comparison provides insufficient evidence of greater innovation under PPP relative to TP. Our findings do, however, raise two questions about innovations under PPP. Firstly, can a feature that is specified by a procurement agency be considered an innovation? Secondly, who benefits from the innovation under PPP? Incentives to cost-save drive these operational innovations which are internalised by the PPP project company. Whether these innovations contribute to VfM for the state relies entirely on the assumption that the resulting cost-savings are passed on in the form of lower availability payments or bid prices.

6. Discussion and conclusions:

In economic terms, the popularity of PPPs as a model for procuring infrastructure and related services can be attributed to several factors. At the broadest level, these include the belief, held by some, that private sector involvement in public service delivery brings inherent benefits. In addition, governments have been attracted to PPPs for fiscal reasons, especially where borrowing limitations encourage off-balance sheet financing of infrastructure investment. Economists have also provided theoretical support for the adoption of PPPs. Features of the PPP approach such as the bundling of activities and superior risk transfer (Hart 2003; Iossa and Saussier 2018), competition for contracts (Engel *et al.* 2014; Saussier and Tirole 2015) and the privatisation of the finance function (Grimsey and Lewis 2004; de Bettignies and Ross 2010) are shown to provide incentives for the efficient provision of assets and services.

The case for PPP has also been based on the poor track record of traditional public procurement methods that is frequently highlighted by the media but which has also received systematic empirical support (Flyvbjerg *et al.*, 2003). Escalating costs and time overruns have bedevilled many traditionally procured infrastructure projects across the world and have made arguments in favour of PPP more persuasive. Traditional procurement, therefore, provides the counterfactual for any analysis of the performance of PPP. However, it is striking that very few studies explicitly compare the performance of PPP relative to traditional procurement.

This paper seeks to address this gap in the literature and provide evidence on the relative performance of PPP in the case of Ireland where it has been used extensively since the early 2000s. Specifically, we examine the case of schools procurement which has constituted a major element of overall PPP investment in Ireland since the commencement of the programme. The projects that we examine possess three basic characteristics that validated our comparative analysis and provided advantages vis-à-vis previous studies in the international literature. First, in both cases, the infrastructure procured is broadly similar. Second, both projects were procured over a similar time period (2013-2015). Third, the sponsoring government department (Education) and responsible procurement agency (NDFA) were the same for both projects, thereby ensuring that the representatives we interviewed had direct involvement with both forms of procurement.

Our analysis examines performance in terms of two principal criteria: delivery time performance and value for money. Essentially, we test the hypothesis that PPP outperforms traditional procurement under both criteria. We find no evidence to support the claim that PPP delivers infrastructure faster than traditional procurement. Unlike previous studies, our analysis covers the entire period between contract notice (advertisement) and the completion of construction. One of the key findings of our study is that it demonstrates the importance of considering the entire procurement process instead of focusing on the construction period only as most other studies do.

Compared to earlier studies that examine financial performance in terms of construction costs, our study is relatively novel in that it focuses on VfM, which is a more appropriate

criterion given the whole-life cost emphasis under PPP. Also, whereas previous studies have mainly compared construction cost outturns with budgeted costs, we compare PPP with its counterfactual in terms of the potential for achieving VfM. Given the unavailability of VfM assessments conducted by the NDFA, we adopt an indirect approach that focuses on the drivers of VfM under PPP. Overall, we fail to find convincing evidence that PPP will deliver VfM compared to traditional procurement. The evidence suggests that the tendering process under PPP is marginally more competitive, but we failed to find strong evidence of superior risk-sharing under PPP. In relation to the question of innovation (which is part of the VfM rubric), there was no evidence that PPP encouraged better performance. While the long-term PPP contract we examine is still in the early stages of asset operation and it is too early to reach definitive conclusions we find only limited evidence that PPP will deliver greater VfM compared to traditional procurement.

An interesting finding from our analysis is the fact that the traditionally procured project in this study was procured in a more 'marketised' way (for example, construction risk is transferred), while the PPP project in our study was procured in a more 'bureaucratised' (for example, detailed specimen designs were provided to bidders). An interviewee from the NDFA highlighted this convergence between the two forms of procurement by stating that "for us, it is not PPP versus traditional procurement, but instead about centralised and specialised teams who deliver projects. There is no reason why traditional procurement projects can't be procured successfully if the correct expertise is there".

The main contribution of this paper is that it conducts an analysis of PPP performance compared to its relevant counterfactual of traditional public procurement. It is surprising that so few studies have adopted a comparative approach to date, but such studies are critical if policymakers are to make informed decisions about procurement and the potential downsides of PPP are to be avoided. For example, our study highlighted how considerations such as operational stage flexibility can impact significantly on school officials and should perhaps be considered as a procurement selection criterion.

Our study has clear limitations since it is based on a comparison of two cases of procurement that have limited generalisability. On the flip-side, however, it must be recognised that until

detailed datasets based on a large number of observations that enable statistical analysis become available, it is necessary to address questions about the comparative efficiency of different procurement approaches using an in-depth case-based approach. The research conducted in this paper demonstrates that this approach uncovers unexpected complexities and nuances (for example, those around the level of competition and time-performance). These revelations are less likely to emerge when alternative methodologies, based on larger sample sizes, are adopted.

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Table 1: Comparative Studies

Study	Sector	Country	Years Examined	Study Type	No. of Projects Examined	Measurement Metrics	Stage of Examination	Results
Mott MacDonald (2002)	Building & Civil Engineering Works	United Kingdom	1981-2001	Consulting Report	50	Time and Cost	Ex-ante Commercial Operation	Compared 11 PPP projects against 39 TP projects. Found that TP more likely to exhibit optimism bias and underestimate construction time and costs. Validity questioned by Pollock et al. (2007)
Pollock et al. (2007)	Building & Civil Engineering Works	United Kingdom	1981-2001	Academic	50	Time and Cost	Re-examination of MacDonald (2002)	No evidence to support the claims of Mott MacDonald (2002) that PPP performs better than traditional procurement on time and cost. Estimates were not evidence based.
Audit Commission (2003)	Schools	United Kingdom	1997-2003	Audit Report	18	Time, Cost & Quality	Commercial Operation	No evidence that PPP delivered schools quicker or better designed than traditional procurement. No improvement in cost savings or facilities management quality.
Blanc- Brude et al. (2006)	Road Sector	European Union	1990-2005	Academic	227	Cost	Ex-ante Commercial Operation	Ex-ante PPP costs 24% higher than traditional procurement. This difference, however, tends to match the cost overruns of traditional procurement
Raisbeck et al. (2010)	Transport, Water, IT, Social Infrastructure	Australia	2000-2007	Academic	54	Time and Cost	Ex-ante Commercial Operation	PPPs between 11.4% - 30.8% cheaper than TP. PPPs 3.4% ahead of time on average, while traditional procurement completed 23.5% behind time
Whittington (2012)	Transport	United States	1995-2005	Academic	2	Time and Cost	Ex-ante Commercial Operation	PPP was faster to completion, however there was no evidence that it was more cost effective than the TP.
Atmo et al. (2017)	Energy	Indonesia	2000-2014	Academic	56	Time, Cost and Quality	Commercial Operation	PPP power plants had superior time and availability performance than traditional procurement, however no difference in cost performance identified.

Table 2: Education PPPs in Ireland as of December 2016

Project Name	Completed	Year of Final payment	Capital Value (€m)	No. of Schools
Pilot Schools Project	2003	2027	63.7	5
National Maritime College	2004	2029	51.4	1
Cork School of Music	2007	2032	49.3	1
Schools Bundle 1	2010	2035	59.9	4
Schools Bundle 2	2011	2036	81.7	6
Schools Bundle 3	2013	2039	100	8
Schools Bundle 4	2016	2042	61.3	4
Schools Bundle 5	2018	2042	90.9	6
Total			558.2	35

Note: The completion of Schools Bundle 5 has been delayed due to the collapse of Carillion in the UK (which was a partner in the consortium that won the contract) but is expected to be completed by the end of 2018.

Table 3: Procurement time periods

Project	Years	Contract Tendering Period	Design Tender Period	Tendering Period plus Design Tender
PPP Bundle 1	2006-2009	29 months	N/A	29 months
PPP Bundle 2	2008-2010	24 months	N/A	24 months
PPP Bundle 3	2010-2012	27 months	N/A	27 months
PPP Bundle 4	2013-2015	18 months	10 months	28 months
PPP Bundle 5	2013-2015	21 months	10 months	31 months
TP Bundles	2014-2015	13 months	11 months	25 months

Note: In the TP Bundles and PPP Bundles 4 and 5, separate tenders for the design of the schools included in each bundle were held. These specimen designs were then included in the tender documents for each bundle when contract notices were issued. This contrasts with PPP Bundles 1-3 where the design element was incorporated into the overall tendering process. Column 4, therefore, shows the duration of the separate design phase that preceded the contract notice for the TP and PPP Bundles 4 and 5.

Table 4: Construction Time Periods for New Build DSBP Schools

Bundle	School Name	Project Completed	School Places (est)	Construction Time (months)	Floor Space (m²)	Time per 1000m² (months)
DSBP New Build	Duleek Boys and Girls NS*	Sep-15	400	19	4930	3.85
	Navan Education Together NS	Mar-15	400	13	2700	5.2
	Nagle Rice NS	Apr-15	300	14	1877	7.46
	Le Chéile NS	Jun-15	300	16	1930	8.29
	Presentation Secondary School	Nov-15	720	21	6643	3.16
Average Construction Period - DSBP				16.6	3616	4.59
PPP SB4	Comeragh College	Mar-16	500	14	6485	2.16
	St Joseph's Secondary	Mar-16	650	14	7379	1.90
	St. Mary's College	Apr-16	900	15	8995	1.67
	Skibbereen Community	May-16	900	16	10500	1.52
Average Construction Period - PPP SB4				14.75	8339.75	1.77

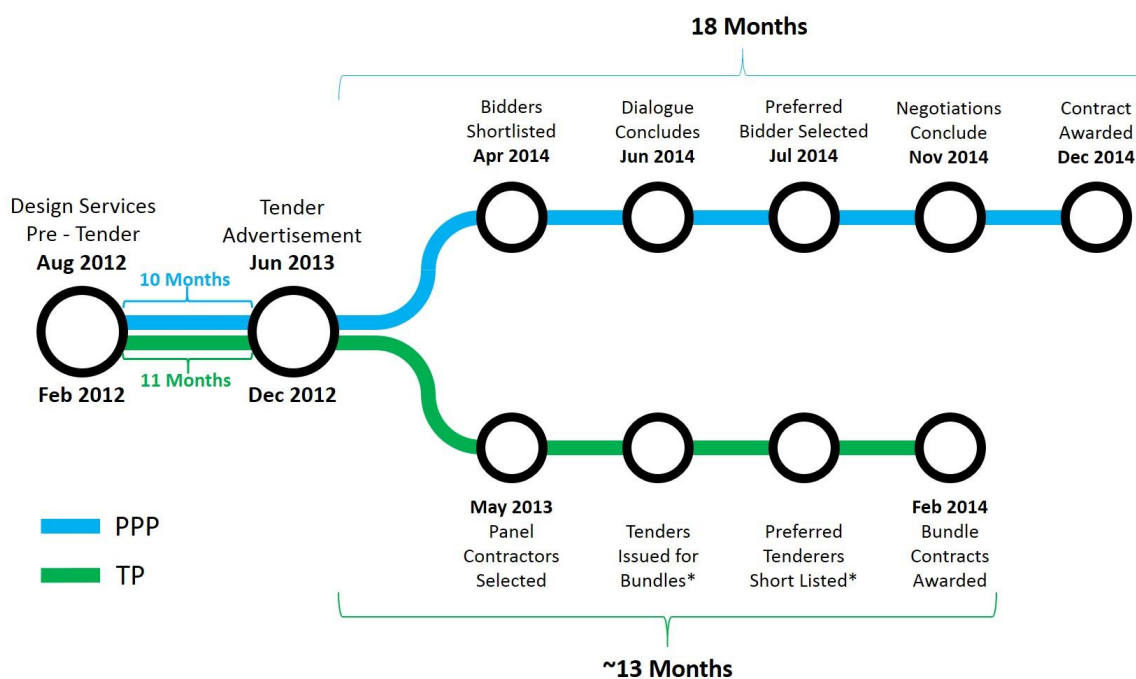
Source: Information from *ndfa.ie* (2017) * Duleek Boys and Girls NS are separate schools, however, they use the same building and site.

Table 5: Risk allocation on respective projects

Type of Risk	PPP Project	Traditional Procurement
Planning and Legislative Risk	Shared	Public
Design Risk	Private	Private
Construction Risk	Private	Private
Lifecycle and Project Risk	Private	Public
Operating Risk	Private	Public
Availability Risk	Private	Public
Demand Risk	Public	Public
Financial Risk	Private	Public
Political and Regulatory Risk	Public	Public

Source: Information acquired through documents analysis and semi-structured interviews

Figure 1: Procurement Process of the PPP and TP Schools Projects



Source: Information acquired via publicly available information and from semi-structured interviews. *Dates not available