# PPP Procurement in the United Kingdom: An Analysis of Tendering Periods

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## Abstract

Procurement of PPP projects is often characterised by lengthy tendering periods (between contract notice and financial close). This has implications for the efficiency of investment under PPP by deterring bidders and reducing competition for contracts. This paper examines tendering periods in the case of PPP procurement in the United Kingdom. We adopt a Duration Analysis model and use data on 670 PPP projects to identify the factors that have a significant effect on the length of the tendering periods. Our results show that there is significant variation across sectors and regions. Interestingly, we find that when we control for other variables, project size (measured by capital value of PPP projects) is associated with longer tendering periods especially when capital value exceeds £16.9 million. We examine the impact of the introduction of the competitive dialogue approach to procurement and fail to find evidence of shorter tendering periods (on average) since this form of procurement was introduced. There has however been a significant reduction in the duration of the period between appointment of preferred bidder and financial close. This finding is in line with expectations and indicates that the competitive dialogue has proved effective in reducing the scope for negotiations by preferred bidders that hold quasi-monopoly advantages.

**Introduction**

Governments are confronted by a multitude of challenges around the replacement and renovation of physical infrastructure. At a global level, recent estimates indicate the enormous scale of investment required if infrastructure is to meet the demands placed by economic growth and increasing population size. For example, the *McKinsey Global Institute* (2013) estimates that US$57 trillion of investment is required between 2013-2030 if global infrastructure is to keep up with projected growth in national incomes. The OECD (2015) estimates that US$71 trillion (about 3.5 per cent of the annual World GDP from 2007 to 2030) is required if total global infrastructure investment requirements are to be met in sectors such as transport, electricity generation, transmission and distribution, water and telecommunications. In the transport sector alone, the International Energy Agency (2013) estimates that cumulative global expenditure on transport infrastructure investment, reconstruction and upgrading costs, and annual operation and maintenance spending is expected to each approximately $120 trillion by 2050.

The pressure on public budgets which has intensified since the global financial crisis (2008 onwards) has encouraged governments to seek policy innovations that will reduce the fiscal burden of infrastructure requirements and improve the efficiency of public investment.[1] The IMF (2014: 105) notes that:

> *Efficiency entails not only the proper allocation of investment to sectors, but also the production of public assets at the lowest possible cost. When public investment is inefficient, higher levels of spending may simply lead to larger budget deficits, without increasing the quantity or quality of roads, schools, and other public assets that can help support economic growth*.

The expanded use of private sector participation in the delivery, operation and finance of public infrastructure is one of the prominent policy innovations that governments are adopting to improve the efficiency of public investment. In the last two decades, many governments have increased their reliance on public private partnerships (PPPs) to finance the construction of infrastructure assets and the operation of their facilities. Various models of PPP (e.g. concession contracts; design, build, operate and finance contracts) have been used to deliver transport infrastructure such as highways, tunnels, airports, ports, hospitals and schools. Governments have also frequently used PPPs to finance projects in power generation, water supply, dams, irrigation, sewerage and drainage, and to a lesser extent, solid waste management and telecommunications infrastructure (Auriol and Picard, 2013).

[1] McKinsey (2013) claim that significant cost savings can be made from improvements to aspects of infrastructure policy such as project selection, the processes of project approval and land acquisition, demand management and asset maintenance. They estimate that the adoption of proven best practice methods of infrastructure management could increase the productivity of investment and achieve savings of 40 per cent.

Governments frequently justify the use of PPP in terms of the scope for achieving value for money (compared to traditional procurement models) and the potential to deliver projects on time and within budget. The expectation is that PPP can overcome inefficiencies associated with the procurement of public infrastructure by traditional methods. Evidence of such inefficiencies is provided by Flyvbjerg *et al.* (2002; 2003a,b; 2004; 2011) who gathered data on 258 large-scale infrastructure projects (i.e. those costing $100 million or more). These studies showed that procurement (mainly by traditional methods) was characterised by cost overruns (in nine out of ten cases), benefit shortfalls and time delays.

Flyvbjerg *et al.* do not recommend PPP as a solution for the problems of time and cost overruns. However, there is empirical evidence which demonstrates superior performance by PPP (compared to traditional procurement) in terms of lower construction costs and shorter completion times (NAO, 2003; Mott MacDonald, 2002: Lammam *et al.,* 2013). For the purpose of this paper we must stress that the aforementioned studies focus on the interval between contract award and the completion of construction and they largely ignore the tendering period (i.e. the interval between advertisement of the tender and contract award). This paper focuses on the latter and analyses the tendering period and their determinants in the case of PPP contracts in the UK.

It is widely recognised that PPP projects are characterised by features that lead to longer tendering periods compared to other forms of procurement (Owen and Merma, 1999; Ahadzi and Bowles, 2004). This is attributable to factors including the long term nature of PPP contracts which normally cover periods exceeding twenty years. Moreover, PPP contracts include different elements of the project life cycle (i.e. design, build, financing and operation of new assets) which necessarily increases the relative complexity of the procurement process and has the potential to increase uncertainty around the project.

Longer tendering periods can have important implications for the efficiency of public investment. In the UK, the NAO (2007) notes that the perception of lengthy tendering periods can deter bidders thereby reducing competition for contracts while HM Treasury (2010: 5) notes that:

> *Badly delivered procurements deliver badly executed projects which are more likely to be subject to escalating costs and delays, increasing the cost to the public purse and reducing the value for money achieved.*

Ultimately, protracted procurement periods impose social costs as citizens cannot access infrastructure sooner. This paper is framed in the context of these issues. Specifically, it examines the question of tendering periods and examines the factors that influence the duration of tendering periods for PPP projects. Empirical data is drawn from the case of the UK which is recognised as the world-leader in procurement by PPP.

The paper is structured as follows: the procurement process under PPP and relevant theoretical perspectives are discussed before a brief review of the extent of PPP procurement in the UK is provided. We then move on to describe the data which forms the basis for our analysis of tendering periods for PPP in the UK. Following the presentation of results we provide case study analysis of one PPP project which was characterised by a protracted tendering period. Our objective is to use the details in the case study to shed light on some of the complexities of PPP procurement that lie beneath the data used in our quantitative analysis of tendering periods.

**PPP Procurement: Theory and Practice**

The PPP label has been used to describe a range of different collaborative arrangements between the public and private sectors (Hodge and Greve, 2007). This paper however, focuses on PPP in the form of long-term infrastructure contracts. Such arrangements are described by McQuaid and Scherrer (2010: 27) as "projects involving private provision, but continued public funding, of services formally provided by the public sector, whereby the private sector partner assumes substantial financial, technological and operation risks in the finance, design, build and/or operation of the project".

The *ex-ante* or (pre-contract) phase of the PPP procurement process typically consists of a number of stages. An illustration is provided by the NAO (2007) which identifies a number of distinct steps prior to contract award. These include: (i) option appraisal and project preparation; (ii) the tendering process (inviting bidders to submit and develop tenders, choosing a preferred bidder, negotiating a final agreement); (iii) construction; and (iv) service delivery. The focus of this paper is on the second step – the tendering process.

Although the PPP approach to procuring infrastructure continues to appeal to policy makers around the globe, experience has shown that the *ex-ante* stage of the procurement process can be characterised by time overruns and significant costs incurred when organising competitions for contracts, crafting agreements and executing deals (HM Treasury, 2012; KPMG, 2010). Transaction cost economics (Williamson, 1975, 1985) illuminates the sources of such costs and how they impact on the efficiency of the PPP model of procurement.

At the *ex-ante* stage of a PPP, transaction costs refer to information, search, bargaining and contract conclusion costs incurred by both the public and private sectors (Obermann, 2007). More specifically, these include costs of organising the initial tendering process and negotiating the final contract between the public sector and the winning bidder. At a theoretical level the magnitude of transaction costs is determined by the characteristics of the transaction (Williamson, 1975, 1985). These include: uncertainty and complexity; asset specificity; opportunism; and frequency.

In conceptual terms complexity and uncertainty are separate. Complexity refers to the extent to which the conditions of the contract are clearly specified and measured (Boardman and Hewitt, 2004) whereas uncertainty refers to the extent to which the outcomes of certain decisions can be predicted. Complexity and uncertainty are often present at the same time and can give rise to significant transaction costs especially under conditions of bilateral dependency and incomplete contracting (Obermann, 2007).

Asset specificity refers to the investment by one or more parties in assets that have little or no use outside of the relevant transaction. In other words the investment has zero opportunity cost. Opportunistic behaviour by either party can lead to the problem of hold-up. The frequency of a transaction can also be important in determining the significance of transactions costs. Where transactions are recurrent the investment in specific assets can be more easily justified. Frequency is therefore likely to be associated with lower transaction costs.

The hazard of opportunism can also have a significant bearing on transaction costs, particularly in public contracting for infrastructure. Spiller (2011) makes a distinction between different types of opportunism. 'Vanilla opportunism' arises where contracting parties seek to exercise unfair advantage. The likelihood of such behaviour is increased where there are large amounts of sunk cost investments and special governance is required to limit such conduct. 'Governmental opportunism' arises where one of the contracting parties is a government which enforces unilateral changes to the rules of the game thereby threatening the value of the investment made by the private contracting party. The risk of 'third party opportunism' arises under public contracting because interested third parties may be incentivised to "challenge the 'probity' of the public agent involved in the transaction even if the transaction is being undertaken in an honest way" (Spiller, 2011: 12).

Although scarce, the available evidence indicates that the magnitude of transaction costs under PPP is appreciable.[2] For example, Dudkin and Välilä (2005) estimate the magnitude of transaction costs under PPP. Using data on 55 contracts across five sectors in the UK they conclude that *ex-ante* transaction costs incurred by both the public sector and the winning bidder amount to a total of some 7 per cent of the project's capital value. In addition, the aggregate costs incurred by failed bidders are estimated at some 5 per cent, bringing the total procurement phase transaction costs to 12 per cent. This suggests that high transaction costs can have a significant bearing on the overall efficiency of PPP and improving the efficiency of the procurement process is an important aspect of PPP management.

[2] See Obermann (2007) for a detailed review.

**Background: PPP Procurement in the UK**

The UK is a recognised leader in the use of PPP for the provision of public infrastructure and related services. Launched in 1992, the private finance initiative (PFI) has become the form of PPP most often used in the UK.[3] Data provided by HM Treasury (2014) shows that at the end of March 2014 there were 728 current PFI projects with a total capital value of £56.6 billion and whole life unitary charge payments totalling over £305 billion.[4] This data excludes projects that have already expired or have been terminated, including three London Underground projects worth over £15bn that collapsed in 2010.[5] According to EPEC (2014) which monitors the PPP market in Europe, the UK remains the largest PPP market in Europe with 24 transactions closed in 2014 (compared to 31 in 2013) for a value of about €6.6 billion (€6 billion in 2013).

**Data Collection and Methodology**

We collected data concerning tendering periods and other relevant factors for 667 PFI projects. The data was sourced from HM Treasury (2014) data on current PFI projects which had reached financial close as of March 2014.[6] This included information on 728 current PFI projects, however, information on the dates for contract notice and/or financial close were not included for 61 of these projects and were thus omitted from our sample. We measure the tendering period as the number of months between the date of OJEU contract notice and financial close. The data covers the period October 1993 (first contract notice) to October 2011 (latest contract notice for a project that has reached financial close). The data indicates that the average tendering period for all projects included in our sample was 34.8 months, which is consistent with the average of 35 months calculated by the NAO for tendering periods of PFI projects during the years 1997-2007 (NAO, 2007). The breakdown of our sample projects in terms of sector, capital value and procurement period is given in table 1. Table 2 provides a similar breakdown on a regional basis.

To robustly identify the factors that have a significant effect on the length of tendering period we utilized a Duration Analysis (DA) model. DA is a hazard-based duration model and represents a class of analytical methods which are appropriate for modelling data that have as their focus, an end-of-duration occurrence, given that the duration has lasted to some specified time (Henser and Mannering, 1994). This method has been used previously in empirical models of unemployment duration (Arulampalam and Stewart, 1995), self-employment duration (Taylor, 1999), the adoption of PPP enabling legislation within U.S. states (Geddes and Wagner, 2013) and local government tenure length (Castro and Martins,

[3] A detailed overview of the UK's experience with PFI is beyond the scope of this paper. For useful reviews of the PFI experience in the UK, see Allen (2003) and HM Treasury (2012).

[4] Authors' calculation based on HM Treasury (2014) data. Note that the total unitary charge payments will rise along with inflation and may also increase as a result of future contractual changes.

[5] See Butcher (2012) for a detailed analysis of the collapse of the London Underground PFI contracts.

[6] Available at: https://www.gov.uk/government/publications/private-finance-initiative-projects-2014-summary-data

2013). Specifically, in this study DA facilitates analysis of the time (in months) between a project contract notice and financial close.

In the DA, the transition probability to a new state is defined as the Hazard, and is the conditional probability that a contract that is not yet signed is closed in the short period of time *dt* after *t*. The Hazard Function is defined as formally:

$$H(t) = Lim_{dt\to 0} \frac{\Pr(t \le T \prec t + dt \mid T \ge t)}{dt} = Lim_{dt\to 0} \frac{F(t + dt \mid -F(t))}{dt(1 - F(t))} = \frac{f(t)}{S(t)} \qquad (1)$$

where *S(t)* is the Survival function, *f(t)* is the continuous density function of the random variable *T* and *F(t)* its corresponding cumulative density function. These three functions are specified as:

$$F(t) = \int_o^t f(s)ds = \Pr(T \le t) \qquad (2)$$

$$f(t) = H(t)\exp\{-\int_o^t H(s)ds \qquad (3)$$

$$S(t) = \exp\{-\int_o^t H(s)ds\} = 1 - F(t) = \Pr(T \ge t) \qquad (4)$$

From these, we can state that the rate of occurrence of the event at duration *t* equals the density of events at *t*, divided by the probability of surviving to that duration without experiencing the event. For our analysis we specifically utilised the proportional hazard specification, which decomposes the hazard into a baseline component, and a component dependent on individual covariates. Here, the hazard function reflects the effects of the explanatory variables (x) and the baseline hazard function and can be specified as

$$h_i\{(t; x_i(t)\} = h_0(t)\exp\{(\beta x_i(t)\} \qquad (5)$$

where $x_i$ is the vector of covariates and $h_0(t)$ the baseline hazard function. The baseline hazard function $h_0(t)$ in equation 5 is specified as $h_0(t) = pt^{p-1}$ to give the Weibull proportional hazards model.

**Choice of variables**

The dependent variable in our DA model is specified as the number of months from the date of issuance of contract notice to the date of financial close (i.e. the tendering period). The independent variables (specified in table 3) include the capital value of the project broken into quintile ranges, time period dummy variables and the number of equity holders within the project. In addition, the model includes regional dummies. The choice of independent

variables is informed by theoretical perspectives and the extant literature on procurement under PPP, as outlined below.

Developing a private infrastructure project is a complex task. PPP contracts typically bundle the construction, operation and financing of infrastructure projects and their procurement therefore needs to address all of these elements during the tendering process (HM Treasury, 2012; Klein *et al*., 1996). Yescombe (2007) maintains that large projects tend to be more complex in structure leading to higher bidding and development costs. In order to examine whether the complexity of PPP procurement is associated with longer tendering periods we include the capital value of the project (as a proxy for project size and complexity) which is broken into quintile ranges.

Transaction cost economics highlights how the precise features of transactions (or projects) impact on governance aspects such as procurement costs and times. The model therefore incudes dummy variables to account for differences across sectors (e.g. health, education, military). We also include dummy variables for the main regions in the UK in order to examine whether there is any variation in tendering periods by the various procuring authorities across the UK.

Finally, time period dummy variables are included to account for two principal factors. First, as PPP is a relatively recent phenomenon it can be expected that those engaged in PPP procurement climb a 'learning curve' and that procurement practices improve over time. In this context we expect tendering periods to decrease over time. Second, the competitive dialogue approach to procurement which was introduced in 2006 can also be expected to impact on tendering periods. In 2004 the European Union published a directive on the coordination of procedures for the award of contracts covering public works.[7] The directive which was transposed into UK law on January 31st 2006 provides for the use of a new procurement procedure - competitive dialogue - for complex projects, such as PPP deals. The NAO in the UK explains that the new procedure lessens the scope to make changes to a project after a preferred bidder has been selected. The procedure does maintain flexibility for bidders and the procuring authority to discuss how the output specification will be met but once the competitive phase has closed, bidders can only be requested to "fine tune, specify and clarify their bids" (NAO, 2007: 10).

Whether or not the change to competitive dialogue is associated with longer tendering periods is open to question. It can be expected that the sub-period between contract notice and the appointment of a preferred bidder is longer under competitive dialogue compared to the negotiated procedure model of procurement. However the subsequent sub-period (between appointment of preferred bidder and financial close) can be expected to be

[7] Directive 2004/18/EC of the European Parliament and the Council, of 31 March 2004

shorter under competitive dialogue as this approach significantly curtails the scope for negotiation at this stage.

To explore this issue further we run a series of duration models on a sub-sample of our data where the dates of the preferred bidder announcement were available. This sub-sample included 322 of our original 670 PFI projects (see table A1 in the appendix for summary statistics). The first model estimated on this sub-sample used the number of months from the date of issuance of contract notice to the date the preferred bidder was announced as the dependent variable. The second model specified used the number of months from the date the preferred bidder was announced to the date of financial close as the dependent variable.

**Empirical Results**

Table 4 presents the DA estimates for the overall tendering period based upon our full sample of 670 projects. For ease of interpretation they are presented in the form of time ratios (Jenkins, 2005). The results show that tendering periods vary significantly across sectors, with projects within the health, housing, military and waste sectors experiencing significantly longer tendering periods relative to PFI projects procured in the base sector (education). The coefficient of 1.40 on our health dummy variable can specifically be interpreted as finding that when we control for the capital value of the project and the time period involved, a project tendering period within this sector took 40 per cent longer to complete relative to projects within the education sector.

We also find evidence that the capital value of a project has a significant impact on the time to complete the tendering process. Our estimates show that projects with capital values above £16.9 million took longer to complete. Specifically we see that projects with a capital value of £96 million or more took 29% longer to complete compared to those with a value of less than £16.9 million. The estimates indicate that the time period in which a project was advertised made no statistical difference to the length of tendering period. While the coefficients on our time period dummies indicate that the tendering period may have fallen across time, neither present as statistically significant at the 10% level. However, it is noteworthy to draw attention to the fact that the dummy variable for projects advertised in the 1993-1999 period (with a coefficient of 1.1) is only marginally outside this 10% significance level.

Finally, our results also show significant regional variation in the length of tendering periods. Specifically, we see that relative to Scotland, PFI projects that occurred in a number of regions within the UK such as the East Midlands, Northern Ireland/Wales have significantly longer tendering periods.

As discussed previously, in order to examine the potential impact of the move from negotiated procedure to competitive dialogue we ran three separate models on a sub-sample of our dataset where the dates of the preferred bidder announcement were available. Table 5 presents the DA results (in the form of time ratios) for the first model estimated using the number of months from contract notice to preferred bidder announcement as the dependant variable. As with our full-sample DA model, the capital value variable had a statistically significant effect, with projects that had a capital value over £17 million taking longer to reach the preferred bidder stage. In addition, projects procured in the health and housing sectors took longer to reach preferred bidder stage than in the base sector (education). The magnitude of this effect in the health sector (71% longer) and housing sector (95% longer) is greater than that seen for overall tendering periods in table 4. Our results also indicate that the date a project was advertised had no impact on the gap between date of contract notice and announcement of preferred bidder.

Table 6 provides the DA estimates for the second model estimated on our sample and used the number of months from the announcement of preferred bidder to the date of financial close as the dependant variable. The results show that the number of months between choice of preferred bidder and close of contract was largely unaffected by the capital value of the project but significantly affected by the sector in which the project took place. Importantly, our results indicate that projects advertised in the post-2006 period took 48% less time to move from preferred bidder announcement to financial close than for projects advertised between the year 2000 and 2005. This would be expected given the change to the competitive dialogue approach from 2006 onwards. Focusing on regional factors we find that relative to Scotland, PFI projects procured in most other regions in the UK had significantly longer gaps between preferred bidder announcement and financial close.

These preliminary findings shed light on the efficiency of the procurement process under PPP. In comparative terms, the duration of tendering periods for PPP projects in the UK - the world leader in usage of PPP – has been lengthy. The average tendering period of 34.8 months is well in excess of average tendering periods recorded in Canada which amounted to 19 months. The results show that when we control for other variables, tendering periods are positively associated with project size (measured by capital value). This finding is at odds with the finding of the NAO (2007) which found no relationship between these variables. It shows there is considerable variation in tendering periods across regions in the UK with the lowest tendering periods recorded in Scotland. It is noteworthy that the time period between preferred bidder and financial close has decreased over time. One possible explanation is that the observed reduction is associated with the introduction of the competitive dialogue approach to procurement in 2007.

In order to further examine the question of tendering periods and the factors that determine their duration it is instructive to use a case-study approach. The following

section examines one case of procurement in the defence sector where average tendering periods have exceeded those in the education sector (our reference sector) by 30 per cent.

**Case Study: Future Strategic Tanker Aircraft (Ministry of Defence)**

The case of the procurement of the Royal Airforce's (RAF) Future Strategic Tanker Aircraft represents one of the most protracted procurement's since the PFI was officially launched in 1992. When the contract was originally advertised in December 1998 the Ministry of Defence (MoD) was planning to award the contract by October 2002. It transpired that the contract was finally awarded in March 2008, more than nine years after the original advertisement.

The contract involves the Ministry of Defence (MoD) paying for the availability and usage of air tanker capability (up to 14 Airbus A330-200 aircraft) and services, with a leasing contract for services replacing the traditional solution whereby the RAF owns, operates and services its fleet of tanker aircraft. The new air-to-air refuelling and passenger air transport service replaced the 24 Tristar and VC10 aircraft.

Following the original advertisement, six companies were short-listed to enter the competition. Although' Invitations to Negotiate' were released to four consortia just two proposals were received in July 2001. Following assessment, the MOD deemed both submissions weak and bidders were given more time to develop their proposals (NAO, 2010: 15). Revised bids were received in August 2003 and the higher bid (which was 19 per cent higher than the rival bid) was de-selected in January 2004. The procurement process therefore proceeded as a non-competitive negotiation. In subsequent months there were increased concerns about the viability of the bid. These included questions about the degree of risk transfer and the likelihood that the deal would remain 'on-balance sheet'. In addition, projected costs increased during negotiations raising concerns about value for money. The gravity of these concerns were such that the project team recommended abandoning the PFI approach and reverting to traditional procurement. This recommendation was not however acted upon and AirTanker was given a final chance to submit a satisfactory bid. The consortium was appointed preferred bidder in February 2005 – more than six years after the contract was advertised.

Preparations for a funding competition commenced in November 2006 but the collapse of the bond markets in late 2007 meant that the original plan for a largely bond funded deal unviable. At this stage the MoD and AirTanker agreed to switch to a bank-funded solution (NAO, 2010: 22). The final contract was signed in March 2008 – 111 months after the original advertisement.

**Case study discussion**

The drawn-out saga of the FTSA contract represents one of the longest PPP/PFI procurements in the UK to date. With over nine years lapsing between advertisement and the signing of the contract significant transaction costs were borne by all parties. The lengthy tendering period meant that the MoD had to rely on existing ageing aircraft in the interim period. As a consequence the costs of providing the required capability have been rising. The MOD estimates that the costs of maintaining the existing fleets will amount to over £500 million before they are withdrawn. These costs include direct support costs paid through various contracts and the costs of upgrades to support current operations. Other costs include those incurred due to the use of the charter market which is necessary as the existing aircraft cannot fulfil tasks required on the Defence Exercise Programme and between the UK and operational theatres (NAO, 2010: 26). The NAO estimates that annual charter costs amounted to £175 million over the period 2006-07 and 2008-09 (increasing by 80 per cent over this period). Less quantifiable costs attributable to increased reliance on charter flights include increased journey times into operational theatres (e.g. Afghanistan) and troop fatigue.

It is possible to identify a number of factors which characterise PPP procurement in general and explain the delays observed in the FSTA case. It is widely recognised that procurement under PPP is complex due to aspects such as the long term and detailed nature of contracts, the integrated nature of PPP which embraces design, build and operational phases of the project life-cycle, the challenges of identifying and allocating risk between parties as well as those related to financing projects (raising bank finance, bonds, and equity).

In the FSTA case it is evident that the specification of the service was a complex task and the relevant actors encountered difficulties around imperfect information and bounded rationality (Williamson, 1975). In their audit of the procurement the NAO found that at the time AirTanker became the sole bidder, both parties' understanding of how the service would be delivered was immature (emphasis added). As a result, the requirement could not be finalised to provide a firm foundation for negotiations, with the RAF still identifying issues and additional requirements late in the process. Each change required discussions between AirTanker and its partner companies and sub-contractors, adding cost, complexity and delays to negotiations. The June 2007 review identified the need to define the service specification requirements more firmly, and earlier, as a lesson-learned. (NAO, 2010: 20).

A related factor was the limited level of expertise and resourcing of the project team on the public sector side. By 2004 (five years after advertisement) only two members of the team had PFI/PPP experience. Moreover, it took over a year to appoint the first project leader which changed three times in the first four years of the procurement period.

In economic terms the critical deficiency in this case of procurement was the lack of competitive tension throughout the process. The economic case for market-led initiatives such as PPP rests heavily on competition for the monopoly right to provide the specified service (Demsetz, 1968; Sappington and Stiglitz, 1987). Just two of the four invited consortia submitted bids for the FSTA contract. The initial bids were considered weak and the MoD was required to take measures to maintain the already limited level of competitive tension. These included allowing bidders more time to improve their bids and the offer to pay the losing bidder up to £10 million in compensation. Once the losing bid was de-selected the procurement continued as a non-competitive negotiation. The creation of a bi-monopoly structure raises a number of hazards such as opportunism and hold-up (Walsh, 1995; Williamson, 1985). In this case, concerns about the bi-monopoly structure led to calls from the project team to abandon the PFI option. The MOD however decided against this course of action and the bi-monopoly structure continued for over four years until the contract was signed.

The lack of competition was to some degree related to political factors which are an important feature of public contracting and regulation (Spiller, 2013). Political commitment to the use of PFI/PPP has been identified as an important driver of how PPP procurement is governed and the relevant literature demonstrates that in the UK, the PPP option has often been the 'only game in town' (Commission on PPPs, 2001; Connolly and Wall, 2009). The evidence from the FSTA case indicates that the decision to adopt the PPP/PFI option was largely driven by the potential to keep this option off-balance sheet. This meant that the project costs could be spread over a longer period thereby making the project more 'affordable'. The importance attached to the 'affordability' criterion had implications insofar as any subsequent decision to revert back to traditional procurement had the potential to undermine the affordability of the project. In this context, it is noteworthy that the NAO (2010: 21) found that the MoD never developed a mature "Plan B". Although some work was completed on a fallback option this analysis was not very well developed. Without a realistic alternative to PFI the scope for negotiation with the preferred bidder was limited.

**Conclusions**

Given the scale of the global infrastructure deficit it is important that governments strive to improve the efficiency of infrastructure procurement. PPPs represent a prominent example of measures adopted by governments to achieve this objective but the growing international evidence on PPP demonstrates that this model of infrastructure procurement does not necessarily provide the complete solution to the objectives of governments.

Among the challenges faced by those involved in PPP procurement is the need to improve the efficiency of the tendering process and accelerate the delivery of infrastructure. Although there is evidence to support claims that PPP leads to relatively shorter

construction times there are challenges around expediting projects through the PPP tendering process which is often characterised by complexity and uncertainty. Ensuring best practice in the tendering process is therefore important as the alternative runs the risk of undermining competition for contracts as potential bidders are likely to be deterred from submitting full bids. Moreover, it is reasonable to assume that inefficient procurement will lead to increases in overall project costs and reduce value for money under PPP.

The history of PPP procurement in the UK suggests that since the early days of the PFI efforts have been made to improve the execution of the tendering process. Official reports on the PFI (HM Treasury (2003), NAO (2007), HM Treasury (2012)) have, over time, emphasised the objective of strengthening the procurement process. For example, the recent report by HM Treasury (2012) which launched PF2 (the latest version of PFI) devoted a full chapter to this issue. This chapter titled *Strengthening the Procurement Process* outlines the government's commitment to "ensuring PF2 procurement is faster and cheaper than PFI procurement has been in the past, without sacrificing quality and competitiveness" (2012:36). It details a number of reforms designed to improve the procurement process including the establishment of a target of 18 months for the competitive tendering phase of PF2 projects. Where projects take longer than 18 months (between date of contract notice and appointment of a preferred bidder) they will be withdrawn unless an exemption is agreed by the 'Chief Secretary'.

The analysis presented in this paper focuses on tendering periods for PPP projects in the UK and shows that tendering periods have averaged 34.7 months to date. Interestingly, we cannot conclude that tendering periods are getting shorter over time. Significant improvements are therefore required if the 18 months target is to be met in the short to medium term.

Our findings show that there is significant variation across sectors and regions. Interestingly, we find that when we control for other variables, project size (measured by capital value of PPP projects) is associated with longer tendering periods especially when capital value exceeds £16.9 million. The introduction of the competitive dialogue approach to procurement has been an important development in relation to the procurement of PPP projects in the UK. Our analysis does not provide evidence of shorter tendering periods (on average) since competitive dialogue was introduced. There has however been a significant reduction in the duration of the period between appointment of preferred bidder and financial close. This finding is in line with expectations and indicates that the competitive dialogue has proved effective in reducing the scope for negotiations by preferred bidders that hold bilateral-monopoly advantages.

Whereas our analysis sheds light on questions such as how tendering periods vary across PPP models and sectors we do not make comparisons with tendering periods under

traditional procurement methods. A comparative analysis along these lines offers a potentially fruitful line of inquiry which can build on the initial contribution presented in this paper.

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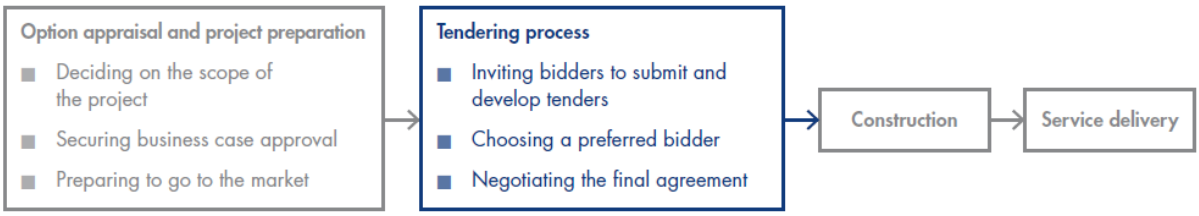
**Appendix 1: The Position the Tendering Process in the PPP within a PPP Project**




*Source: National Audit Office*

Source: National Audit Office (2007)

**Table 1: PFI projects by sector, capital value and tendering period**

| Sector | # projects | % of total | Capital Value (£m) | | | | Tendering Period (months) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Average | Min | Max | Average | Min | Max |
| **Education** | 218 | 32.5% | 10,968.2 | 50.3 | 3.0 | 318.9 | 29.7 | 9 | 91 |
| **Emergency Services** | 39 | 5.8% | 1,120.0 | 28.7 | 1.5 | 118.0 | 33.7 | 11 | 86 |
| **Health** | 134 | 20.0% | 13,343.6 | 99.6 | 2.3 | 1,149.0 | 41.1 | 8 | 127 |
| **Housing** | 33 | 4.9% | 2,035.1 | 61.7 | 1.8 | 153.0 | 49.8 | 10 | 80 |
| **Justice** | 23 | 3.4% | 833.1 | 36.2 | 5.0 | 102.0 | 32.4 | 14 | 59 |
| **Military** | 29 | 4.3% | 6,184.4 | 124.9 | 5.0 | 2,687.6 | 39.9 | 18 | 84 |
| **Offices** | 32 | 4.8% | 3,504.2 | 109.5 | 1.4 | 990.0 | 34.0 | 12 | 68 |
| **Other** | 51 | 7.6% | 1,543.1 | 30.3 | 3.0 | 281.0 | 28.1 | 10 | 55 |
| **Street Lighting** | 32 | 4.8% | 1,439.0 | 45.0 | 9.4 | 126.0 | 34.4 | 18 | 57 |
| **Transport** | 35 | 5.2% | 6,596.6 | 188.5 | 9.0 | 988.1 | 33.0 | 11 | 99 |
| **Waste** | 44 | 6.6% | 4,989.8 | 111.8 | 12.0 | 644.0 | 37.2 | 11 | 121 |
| | | | | | | | | | |
| **Total** | **670** | **100%** | **52,557.1** | **78.4** | **1.4** | **2,687.6** | **34.8** | **8** | **127** |

Source: Authors' calculations from HM Treasury (2014) data. Notes: (1) 'Education' includes 208 schools projects and 6 higher education projects and 1 civil service college project; (2) 'Health' includes hospital and acute health projects; (3) 'Justice' includes 9 courts projects, 9 prison projects, 4 secure training facilities projects and 1 police force training centre; (4) 'Other' includes projects in the following sectors: ITC (11 projects), social care (18 projects, libraries (7 projects), leisure facilities (17 projects) and cultural (1 project); (5) 'Transport' includes 3 rail projects and 32 roads projects.

**Table 2: PFI projects by region, capital value and tendering period**

| Region | # projects | % of total | Capital Value (£m) | | | | Tendering Period (months) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Average | Min | Max | Average | Min | Max |
| **England East** | 35 | 5.2% | 2,997.1 | 85.6 | 1.4 | 563.7 | 34.5 | 16 | 84 |
| **England East Midlands** | 40 | 6.0% | 2,589.5 | 64.7 | 1.8 | 536.0 | 38.8 | 10 | 85 |
| **England London** | 93 | 13.9% | 7,640.8 | 82.2 | 3.5 | 1,149.0 | 34.3 | 11 | 76 |
| **England North East** | 41 | 6.1% | 2,261.0 | 55.1 | 1.5 | 298.6 | 34.1 | 9 | 106 |
| **England North West** | 76 | 11.3% | 6,186.2 | 81.4 | 2.8 | 644.0 | 35.1 | 13 | 76 |
| **England South East** | 57 | 8.5% | 6,006.1 | 105.4 | 6.7 | 2,687.6 | 36.0 | 11 | 111 |
| **England South West** | 47 | 7.0% | 2,946.9 | 62.7 | 3.0 | 430.0 | 30.0 | 11 | 67 |
| **England West Midlands** | 46 | 6.9% | 3,637.5 | 79.1 | 4.0 | 625.0 | 37.1 | 11 | 80 |
| **England Yorkshire/Humber** | 60 | 9.0% | 4,373.6 | 72.9 | 3.3 | 369.0 | 35.9 | 11 | 99 |
| **National / >1 region** | 26 | 3.9% | 5,468.1 | 210.3 | 8.3 | 1,298.4 | 38.5 | 12 | 73 |
| **N. Ireland / Wales** | 62 | 9.3% | 2,595.2 | 41.9 | 2.9 | 250.6 | 36.7 | 10 | 121 |
| **Scotland** | 87 | 13.0% | 5,855.0 | 67.3 | 2.3 | 320.0 | 31.0 | 8 | 127 |
| | | | | | | | | | |
| **Total** | **670** | **100%** | **52,557.1** | **78.4** | **1.4** | **2,687.6** | **34.8** | **8** | **127** |

Source: Authors' calculations from HM Treasury (2014) data.

**Table 3: Variable descriptions**

| Variable | Type | Description |
|---|---|---|
| ***Capital Value 1*** | Indicator | Value of the project is less than £16.9 million |
| ***Capital Value 2*** | Indicator | Value of the project is between £17 and £29 million |
| ***Capital Value 3*** | Indicator | Value of the project is between £29.1 and £52.5 million |
| ***Capital Value 4*** | Indicator | Value of the project is between £52.6 and £96 million |
| ***Capital value 5*** | Indicator | Value of the project is greater than £96 million |
| ***Time Period 1993-1999*** | Indicator | 1= Project tendered during the period 1993-1999; 0 = Not tendered during the period 1993-1999 |
| ***Time Period 2000-2005*** | Indicator | 1= Project tendered during the period 2000-2005; 0 = Not tendered during the period 2000-2005 |
| ***Time Period 2006-*** | Indicator | 1= Project tendered in or post 2006; 0 = Not tendered in or post 2006 |
| ***Regional dummies*** | Indicator | 12 Regional dummies across the UK |
| ***Sector dummies*** | Indicator | 11 sectoral dummies |

**Table 4: DA results for overall tendering periods**

| Variable | Time Ratio | z |
|---|---|---|
| **Capital Value 2** | 1.25*** | 4.18 |
| **Capital Value 3** | 1.16*** | 2.57 |
| **Capital Value 4** | 1.22*** | 3.31 |
| **Capital Value 5** | 1.29*** | 4.10 |
| **Time period dummy 2000-2005** | 1.10 | 1.60 |
| **Time period dummy 2006-** | 1.00 | 0.01 |
| **Emergency Services** | 1.16 | 1.98 |
| **Health** | 1.40*** | 6.78 |
| **Housing** | 1.68*** | 6.59 |
| **Justice** | 1.01 | 0.14 |
| **Military** | 1.46*** | 3.94 |
| **Offices** | 1.16 | 1.77 |
| **Roads and Rail** | 1.08 | 0.97 |
| **Street Lighting** | 1.17** | 1.89 |
| **Waste** | 1.23*** | 2.97 |
| **Other** | 1.10 | 1.00 |
| **England_East** | 1.13 | 1.45 |
| **England _East Midlands** | 1.36*** | 3.81 |
| **England _London** | 1.10 | 1.45 |
| **England _North East** | 1.11 | 1.29 |
| **England _North West** | 1.13* | 1.75 |
| **England _South East** | 1.10 | 1.37 |
| **England _South West** | 0.99 | -0.15 |
| **England _West Midlands** | 1.23*** | 2.78 |
| **England _Yorkshire/Humber** | 1.26*** | 3.24 |
| **Northern Ireland/Wales** | 1.46*** | 5.38 |
| **National/More than one region** | 1.10 | 0.94 |
| | | |
| **Observations:** 670 | **Ln/p:** .90*** | 31.77 |

Notes: (1) The dependent variable (*months*) is a count variable indicting the number of months from the time a PPP project was advertised to the date the contract was signed; (2) Absolute values of z statistics are presented in parentheses: (3) *** denotes significant at 1%, ** denotes significant at 5%, and * denotes significant at 10%; (4) The base category for the capital value dummies is having a capital value less than £17 million. (5) The base category for the time period dummies is the 2006-onwards time period. (6) The base category for the sector dummies is the education sector. (7) The base category for the regional dummies is Scotland.

**Table 5: DA results for period from contract notice to preferred bidder announcement**

| Variable | Time Ratio | z |
|---|---|---|
| **Capital Value 2** | 1.54*** | 4.09 |
| **Capital Value 3** | 1.73*** | 4.84 |
| **Capital Value 4** | 1.65*** | 4.48 |
| **Capital Value 5** | 1.67*** | 4.46 |
| **Time period dummy 2000-2005** | 1.13 | 1.04 |
| **Time period dummy 2006-** | 0.93 | -0.88 |
| **Emergency Services** | 1.19 | 1.36 |
| **Health** | 1.71*** | 4.46 |
| **Housing** | 1.95*** | 5.96 |
| **Justice** | 0.81 | -1.43 |
| **Military** | 1.36** | 2.01 |
| **Offices** | 0.98 | -0.08 |
| **Roads and Rail** | 1.44** | 2.44 |
| **Street Lighting** | 1.45*** | 3.01 |
| **Waste** | 1.25* | 1.95 |
| **Other** | 0.76 | -1.19 |
| **England_East** | 0.97 | -0.22 |
| **England _East Midlands** | 1.21 | 1.11 |
| **England _London** | 1.10 | 0.75 |
| **England _North East** | 1.15 | 0.96 |
| **England _North West** | 1.01 | 0.08 |
| **England _South East** | 1.42*** | 2.66 |
| **England _South West** | 1.02 | 0.12 |
| **England _West Midlands** | 1.16 | 0.87 |
| **England _Yorkshire/Humber** | 1.22 | 1.33 |
| **Northern Ireland/Wales** | 1.28*** | 2.16 |
| **National/More than one region** | 1.31 | 1.48 |
| | | |
| **Observations:** 322 | **Ln/p:** .71*** | 17.36 |

Notes: (1) The dependent variable (*months*) is a count variable indicting the number of months from the time a PPP project was advertised to the a preferred bidder was chosen; (2) Absolute values of z statistics are presented in parentheses: (3) *** denotes significant at 1%, ** denotes significant at 5%, and * denotes significant at 10%; (4) The base category for the time period dummies is the 2006-onwards time period (5) The base category for the sector dummies is the education sector. (6) The base category for the regional dummies is Scotland.

**Table 6: DA results for period from preferred bidder announcement to financial close**

| Variable | Time Ratio | z |
|---|---|---|
| **Capital Value 2** | 1.31* | 1.67 |
| **Capital Value 3** | 1.11 | 0.63 |
| **Capital Value 4** | 1.11 | 0.66 |
| **Capital Value 5** | 1.15 | 0.9 |
| **Time period dummy 2000-2005** | 1.75*** | 3.81 |
| **Time period dummy 2006-** | 1.48*** | 4.07 |
| **Emergency Services** | 0.81 | -1.36 |
| **Health** | 1.29 | 1.55 |
| **Housing** | 0.80 | -1.54 |
| **Justice** | 0.62*** | -2.42 |
| **Military** | 0.76 | -1.4 |
| **Offices** | 0.70 | -1.43 |
| **Roads and Rail** | 0.60 | -2.8 |
| **Street Lighting** | 0.40*** | -6.12 |
| **Waste** | 0.85 | -1.15 |
| **Other** | 0.69 | -1.22 |
| **England_East** | 1.85*** | 3.37 |
| **England _East Midlands** | 2.19*** | 3.74 |
| **England _London** | 1.95*** | 4.26 |
| **England _North East** | 1.39* | 1.86 |
| **England _North West** | 1.94*** | 4.53 |
| **England _South East** | 1.38* | 1.82 |
| **England _South West** | 1.62** | 2.34 |
| **England _West Midlands** | 1.75*** | 2.59 |
| **England _Yorkshire/Humber** | 1.96*** | 3.68 |
| **Northern Ireland/Wales** | 1.92**** | 4.22 |
| **National/More than one region** | 1.85*** | 2.84 |
| | | |
| **Observations:** 322 | **Ln/p:** .48*** | 11.12 |

Notes: (1) The dependent variable (*months*) is a count variable indicting the number of months from the time a preferred bidder was chosen to the date the contract was signed; (2) Absolute values of z statistics are presented in parentheses: (3) *** denotes significant at 1%, ** denotes significant at 5%, and * denotes significant at 10%; (4) The base category for the time period dummies is the 2006-onwards time period. (5) The base category for the sector dummies is the education sector. (6) The base category for the regional dummies is Scotland.

**Table A1: Sub-sample of PFI projects by sector, capital value and different stages of the tendering period**

| Sector | #projects | % of total | Total Cap Value | Average Cap Value | Average Notice to PB | Average PB to Close | Average tendering period |
|---|---|---|---|---|---|---|---|
| **Education** | 96 | 29.8% | 6,023.5 | 62.7 | 17.2 | 15.8 | 33.1 |
| **Emergency Services** | 34 | 10.6% | 1,070.0 | 31.5 | 19.2 | 15.0 | 34.3 |
| **Health** | 31 | 9.6% | 2,705.6 | 87.3 | 21.2 | 17.1 | 38.4 |
| **Housing** | 33 | 10.2% | 2,035.1 | 61.7 | 34.9 | 14.9 | 49.8 |
| **Justice** | 5 | 1.6% | 255.5 | 51.1 | 15.0 | 10.2 | 25.2 |
| **Military** | 24 | 7.5% | 6,056.7 | 252.4 | 29.0 | 15.1 | 44.1 |
| **Offices** | 10 | 3.1% | 1,451.8 | 145.2 | 19.0 | 17.6 | 36.6 |
| **Other** | 16 | 5.0% | 775.6 | 48.5 | 14.8 | 9.6 | 24.4 |
| **Street Lighting** | 27 | 8.4% | 1,290.7 | 47.8 | 27.9 | 6.8 | 34.6 |
| **Transport** | 16 | 5.0% | 4,307.3 | 269.2 | 26.1 | 11.1 | 37.1 |
| **Waste** | 30 | 9.3% | 3,882.4 | 129.4 | 24.0 | 13.3 | 37.3 |
| | | | | | | | |
| **Total** | **322** | **100%** | **29,854.2** | **92.7** | **22.4** | **14.2** | **36.5** |

Source: Authors' calculations from HM Treasury (2014) data.