Financing Ireland's Transport Infrastructure During a Fiscal Crisis: the Viability of the Public-Private Partnership (PPP) Mechanism

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In the face of fiscal tightening by the Irish government, Síofra Moriarty undertakes a thorough, topical analysis of the Public-Private Partnership mechanism, as it applies to the Irish transport sector. The paper concludes that the PPP option may not be so attractive when one assesses it through transaction cost economics and game theory.

Introduction

It has been over a decade since the first systematic programme of Public-Private Partnerships (PPPs) was introduced in Ireland, and until the financial crisis penetrated the Irish economy, Ireland pursued an extensive PPP strategy, ranking third in the world in terms of the maturity of its PPP markets in 2007 (Deloitte, 2007). The PPP mechanism has been particularly effective in the Irish transport sector, with all of the road schemes within the National Roads Authority's first PPP roads programme being delivered ahead of schedule and on budget (KMPG, 2011). Today, it is argued that because of Ireland's current fiscal pressures and the urgent need to regain competitiveness, there has never been a better time to utilise PPPs for the development of Irish infrastructure (KPMG, 2011).

However, since the advent of the financial crisis three years ago, no major PPP project has secured funding in Ireland (Irish Times, 2011). This trend seems likely to continue, reflected in Minister for Transport, Leo Varadkar's recent (2011) announcement of the "deferral" of both the Metro North and DART Underground projects. The fact that the official database used by the government to monitor PPP projects, ppp.gov.ie, has not been

updated since March 2010 further illustrates the current inactive state of the PPP mechanism in Ireland.

Up until now, little or no objective economic research has been in conducted in an Irish context in terms of gauging the viability of pursuing PPPs in the transport sector (Connolly, 2009). Using a combination of economic theory and global empirical evidence, this paper seeks to redress this void. Section I begins with a brief description of the PPP concept. Section II applies economic theory to examine the proposed advantages of PPPs. In Section III, consideration is given to existing empirical evidence. The issue of the transaction costs that arise under PPP projects is considered in Section IV and a model for mitigating the risks that result from the strategic behaviour of the PPP parties is developed in Section V.

PPP Concept- The Basics

According to the Department of Finance (2003: 4):

> "A PPP is a contractual arrangement between the public and private sectors whereby the delivery of public infrastructure is carried out by the private sector as opposed to being provided through traditional public-sector procurement."

There may exist different categories of PPP projects, depending on the degree of private and public sector ownership and commitments related to the projects. The model that has been adopted in most Irish cases, however, is the Built-Operate-Transfer (BOT) agreement, whereby the private sector builds and operates an infrastructural transport project and following completion, transfers ownership to the State (Reeves, 2011).

Proposed Objectives of PPP Projects

The Department of Finance (2001) asserts that the PPP mechanism delivers value for money by establishing: (i) contestability in the bidding market, (ii) bundling of project elements (iii) relief of budgetary pressures and (iv) risk transfer. I will now apply economic theory to explain such reasoning in a wider context.

Contestability and Efficiency

Much of the salutary effect of PPP schemes derives from the belief that the State's pursuit of multiple objectives (e.g. economic, financial, social and environmental) when delivering transport projects is likely to impede the levels of

efficiency achieved (Engel, 2009). On the other hand, the tendering process inherent to the PPP mechanism introduces an element of competition, ex-ante, in the form of a contestable bidding market for PPP projects (Demsetz, 1968). This, coupled with the contractor's one objective of making profits, ensures that the selected bidder proposal will be the one that is (i) the most productively efficient, ensuring outputs will be produced at the lowest possible cost (Demsetz, 1968) and (ii) the most dynamically efficient, ensuring that optimal investments in process improvements are made so that firms can more efficiently address consumers' needs in the future (Hodge et al, 2011).

Bundling

PPP projects typically encompass a wide range of activities - design, construction, operation and maintenance. The PPP mechanism bundles the activities of the construction and operational phases, so that the same agent undertakes them, thereby engaging in life-cycle costing (Engel, 2009).

Such bundling has both quality enhancing and cost minimisation implications for the infrastructural project. For instance, high quality infrastructure generally gives rise to reduced operation and maintenance costs[1]. This positive externality induces the contractor to internalise costs, to prioritise quality concerns and to choose the efficient level of quality that minimises all operational, maintenance and construction costs. The private party may also be enticed to introduce innovation in service delivery, further enhancing quality (OECD, 2010). Bundling also makes the firm maintaining a transport project more accountable to users than it would be with the traditional approach, where separate activities are carried out by various different agents (Engel, et al. 2011). In addition, if activities are held together, the prevailing internalisation of life-cycle costs enhances the opportunity to exploit economies of scale. The lower unit costs that then ensue shift the private firm's average cost curve downwards, resulting in lower overall project costs (OECD, 2010).

Relief of Government Budgets

The Department of Finance (2001) also postulates that the PPP mechanism relieves strained budgets by allowing the Exchequer to spread the cost of transport infrastructure over a long time-frame, as opposed to being subject to large upfront payments on project delivery. This frees up government resources, which can then be spent on other projects with high social returns (Engel, et al. 2011). Also, when both construction risk and demand/avail-

1 Winston (1991) reports that small increases in road surface thickness can dramatically lengthen the life of a road and reduce maintenance costs.

ability risk are transferred to the private partner, the European Commission permits that related expenditures do not count as part of government borrowing[2]. In this way, the respective year's budget deficit is reduced (Eurostat, 2004). Such arguments are gaining particular momentum in the current economic climate, due to the Irish government's ever intensifying borrowing requirements, coupled with the Exchequer's commitment to keeping within the fiscal constraints imposed by the European Union (KPMG, 2011).

Risk Transfer

It is also argued that PPPs achieve optimal risk management in that they provide an opportunity to exploit the parties' relevant competencies and optimally apportion the project risk accordingly. They therefore supposedly achieve increased value for public services and result in more informed, efficient investment decisions (OECD, 2010). In the literature[3], there is a general consensus that because of superior project-management expertise, private firms are better equipped than the public sector to manage construction, timing, market and demand risk. On the other hand, the public sector is deemed to be more proficient at managing systematic risks, which are non-specific and result in broad economic conditions (Alexandersson & Hultén, 2007).

Empirical Evidence

The consideration of the available empirical evidence, however, raises questions as to whether the proposed advantages provide a valid basis for pursuing a PPP strategy in the Irish transport sector.

Contestability and Efficiency

For example, a prerequisite for reaping the potential benefits from Demsetz's (1968) auctions of PPPs is that there is real competition for the contract. Barriers to entry and outright collusion often indicate the contrary (Engel, 2009). For instance, in 2005, the three main public transport operators in France were condemned by the French Competition Commission to pay 12 million euro for collusive strategies during the PPP bidding process (Amaral, 2008). In Ireland, given the large size and nature of PPP road projects, coupled with the fact that competition for PPP contracts is limited to a small number of bidders, the risk of collusion and barriers to entry dilutes the competition argument put forward by the Department.

2 The NRA's PPP Roads Programme did not count as government borrowing, resulting in a €2.1billion reduction in the government deficit (KPMG, 2011).

3 See (Engel, et al. 2011), (Engel, 2009), (Alexandersson & Hultén, 2007), (OECD, 2010).

Bundling

The bundling argument also seems to be lacking. The European Investment Bank, for instance, in their (2005:8) study on large-scale European PPP projects, found that an emphasis on cost-minimisation resulted in, a "lower quality of public service" and "reduced safety of service". A report, made by the French Court of Auditors following the 2005 Roissy Airport Terminal crash, found that Aeroport de Paris was "wearing too many hats", acting as promoter, builder and owner of airport assets. Such bundling was deemed to be the primary cause for the suboptimal quality of airport infrastructure (Amaral, M, 2008). In addition, the London train collision of October 1999 was cited as being a direct result of the maintenance and expenditure of Railtrack (the private party) being much lower than agreed (EIB, 2005).

Relief of Government Budgets

The budgetary argument is also diluted when one considers the inter-temporal nature of the government budget, where initial savings of government under a PPP are found to be equal, in present value, to the amount it surrenders in tolls that could have been collected under the traditional approach (Engel, 2009). Also, spreading the costs of the transport infrastructural investment over time merely converts a present budget deficit into future budget deficits.

In addition, we have to be aware that realistically, capital is not free. From the perspective of financial markets, there is no safer borrower than the State - their monopolistic powers of taxation enable them to secure the best interest rate available, implying that overall borrowing costs are less when funds are acquired by a public agent (Clements and O'Mahony, 2005).

Finally, it has been found that PPPs have been initiated as a means of evading expenditure controls and hiding budget deficits. In Hungary, for example, PPPs for motorways were wrongly recorded off budget in 2005 and 2006; the reconciliation of these costs boosted the country's deficit by almost one percent of GDP that year (OECD, 2010).

We can thus conclude that, financially speaking, PPPs are simply a case of hire-purchase and in the long run: they do not provide the budgetary gains that the theoretical arguments propose. In the UK, Chantry Vellacott (2005), estimates that a typical PPP contract has an inherent cost of some 5% per year higher than if the Treasury borrowed the money directly.

Risk Transfer

Much of the empirical evidence relating to the risk transfer argument has also shown that instead of efficiently transferring risk from the private to public

sector, most PPP contracts include different forms of insurance against construction, maintenance and demand risk (Engel, 2009) For instance, in 2010, the National Roads Authority was obliged to pay the operators of the M3 motorway and the N18 Limerick tunnel €1.79 million as traffic volumes failed to meet "traffic-related guarantees" (Irish Times, 2011). The lack of data on the risk transfer argument raises further questions about its credibility. A study by Pollock (2005) found that of 622 PPP deals signed in the UK by October 2007, the National Audit Office had examined the relationship of risk transfer in only three; two of these studies were uninterpretable because of small sample size and selection bias.

Transaction Cost Economics

Following a consideration of the above complications illustrated by empirical evidence, one can view the problems posed by the PPP design as really being a special case of the famous principal-agent problem, whereby the principal wishes to procure services for the public, by using the services of private agents whose objective is to maximise profit. PPPs present an asymmetry of information in that both private and public partners are more informed about their respective areas of specialisation (e.g. government policy, construction sector practices). In addition, PPPs include transaction costs, which arise from organising a competitive tendering process as well as from writing, monitoring and enforcing contracts (EIB, 2011).

The shortcoming of the Department's case for the pursuit of PPP strategies can thus be seen to lie in the non-consideration of such agency problems, informational asymmetries and transaction costs. In theoretical terms, by merely evaluating the above four criteria, their assessment is broadly in accordance with neoclassical economics, which considers only those markets with perfect information and focuses only on production costs (Reeves, 2008). A wider perspective on economic efficiency, embracing transaction cost economics[4] (including the consideration of renegotiation, opportunism and adverse selection) is thus an important contribution to understanding the issues embodied in the PPP mechanism (Coase, 1937).

For instance, the recessionary environment has meant that project costs, market demand and other market conditions relating to PPPs have become significantly unfavourable. This volatility has triggered cases of financial renegotiation, whereby after PPP commencement, the private party is forced to renegotiate with the government for subsidies, in order to ensure project continuation and completion. The government is often tempted to accept the

4 Transaction cost economics are the economics of the costs incurred in making an economic exchange (Williamson, 1996).

renegotiation because of the gigantic transaction costs associated with re-tendering and because of its interest in guaranteeing service provision (Ping, 2005). In a situation exacerbated by the economic crisis, demand over-estimates of about 50,000 users a day for the Kilcullen-Waterford motorway have resulted in €1.5 billion of excess costs and over-investment by PPPs (Barrett, 2006). The Irish taxpayer is currently paying the price for such inaccuracy.

The very expectation that the Irish government will renegotiate if relevant market conditions deteriorate may cause opportunistic bidding on behalf of prospective private partners. Developers, anticipating government rescue if adverse risks prevail, may intentionally understate the possible risks involved in their PPP proposals in order to outperform other bidders and secure the PPP contract. This may result in cases of adverse selection, whereby "bad" parties are selected to engage in a PPP and the "good" ones are driven out of the contestable bidding market (Ping, 2005). Engel (2009) for example, shows that a 'renegotiation frontier' emerges, which trades off renegotiation ability with technical prowess, attracting firms that are more skilled at lobbying rather than those who are technically efficient.

Game Theory and the Renegotiation Problem

I propose, however, that the use of game theory could offer researchers a framework and a methodology to understand and analyse the behavioural dynamics of the parties in a PPP. The study of such analysis could aid government in formulating effective management policy to solve the renegotiation problem.

Consider the basic dynamic game illustrated below. Following the prevalence of adverse market conditions, strategic behaviour carried out by both parties of the transport project under a PPP arrangement results in an identification of 3 Nash equiliria:

- The developer chooses "project bankruptcy", a no rescue equilibrium. The government will restructure the project and will face a political cost of restructuring, $-b(G+\pi)$, where G is the least required government funds for restructuring a project and π is the opportunity cost of replacing developers including the costs of retendering and interruption.
- The developer will "request a subsidy", such as a debt guarantee, and the government will "reject", a no rescue equilibrium, whereby the payoff will be the same as for bankruptcy, $(0, -b(G+\pi))$.
- The developer will "request a subsidy", and the government will "negotiate a subsidy", by offering gU, where g is a "rescuing subsidy"- a ratio between 0 and 1 – representing bargaining. This is a rescue equilibri-

um. The payoff to the developer here is gU. The payoff to government is [-b(gU) – r(gU)], which relates to the political cost of restructuring, where b is the function of political cost of budget overspending and r is the political cost of over-subsidisation (including a loss of public trust and resource misallocation) (Ping, 2006).

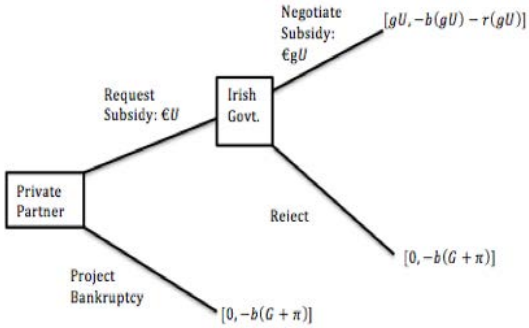

Figure 1: Game Theory Application of the Renegotiation Game
Source: Adaptation of Ping's (2005) Renegotiation Game's Equilibrium Path

What policy implications can be obtained from the above game theory analysis? As illustrated in Figure 2, when G is less than or equal to S (the intersection of the curves b(gU)+r(gU) and b(G + π), the "rescue equilibrium" will be obtained. Hence, the most important policy implication here is that the Department's policies relating to PPPs should try to reduce the magnitude of S so as to decrease the possibility of opportunism from developers.

How can this be achieved? As shown in Figure 3, policy makers could firstly attempt to increase the political cost of over-subsidisation, r, as when this function becomes steeper, the magnitude of S will be reduced significantly. For instance, laws may regulate the renegotiation and negotiated subsidy, and such laws will increase the political cost when the subsidy offered is not considered to be justifiable. Similarly, the probability of reaching the "rescue equilibrium" could be reduced by introducing strategies that reduce π, the cost of replacing the developer. This could be achieved for instance, through the introduction of a good monitoring or 'early warning' system, administered by third party experts, that would give government more lead time to replace the developer with minimal impact.

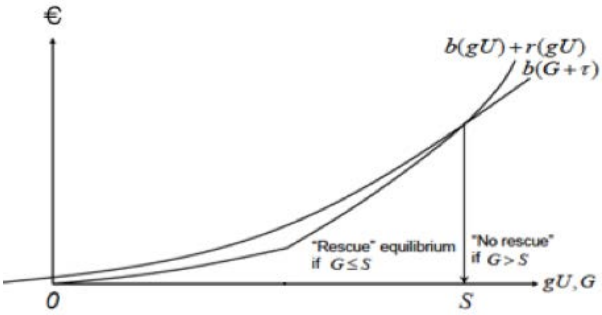

Figure 2: Conditions for "rescue" equilibrium and "no rescue" equilibrium

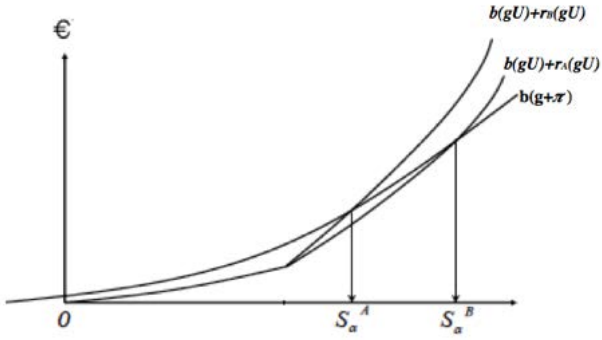

Figure 3: Impacts of the change of r on the equilibriums

Conclusion

This paper goes some way towards addressing the lack of existing published economic analysis on the PPP mechanism in the Irish transport sector. Using economic theory, it has provided possible economic explanations as to why the Irish government has used the mechanism extensively in the transport sector. A consideration of the existing empirical evidence surrounding this issue however, suggests that that the Department of Finance's current case for the support of PPPs is suboptimal. The paper argues that the problems posed by the PPP design are really due to a non-consideration of transaction cost economics. When one considers this essential perspective, it becomes clear that further issues relating to renegotiation, opportunism and adverse selection are embodied in the PPP mechanism and need to be addressed and corrected before PPP strategies should be put into place. I propose that game

theory provides a useful framework for understanding such issues and have referenced a simple model, to describe the dynamic strategic behaviour of both parties, which may aid government in formulating effective management policy to solve the renegotiation problem.

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