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The conference covers a wide range of topics related to traffic and transport engineering, with the aim of representing the importance of all modes of traffic and transport, especially the importance of improving these industries, and their compliance to one of the most significant principles nowadays, sustainable development. ICTTE Belgrade 2014 gathers researchers, scientists and engineers whose fields of interest are traffic and transport engineering, and should provide them a good platform for discussion, interactions and exchange of information and ideas. ICTTE Proceedings have been indexed within Thomson Reuters's CPCI – Conference Proceedings Citation Index accessed via Web of Science.

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PREFACE - ICTTE Belgrade 2014
Why do we need a new transportation philosophy of history?

Ladies and gentlemen, distinguished guests and speakers, dear colleagues and readers,

I am delighted to welcome you to Belgrade and to the International Conference on Traffic and Transport Engineering (ICTTE Belgrade 2014).

ICTTE Belgrade 2014 presents state of art in the field of traffic and transport engineering. The conference is major conference in the region with the participation of researchers from more than 50 countries worldwide. Our research comprehensive network of people, research institutions and industry rapidly enlarge within ICTTE community.

The contributions to ICTTE 2014 have been high, with more than 120 papers divided into 18 sessions. Proceedings will be indexed within Thomson Reuters's CPCI – Conference Proceedings Citation Index accessed via Web of Science. After the conference, I have truly hope, that new research groups will find opportunities in some of Horizon 2020 perspectives, Danube Transnational Programme 2014-2020 strategic partnerships, Adriatic and Ionian Initiative, etc.

After the conference, a selection of papers will be edited to make a series of thematic volumes, covering broad topics of interest for the scientific community and end users. These volumes will be published by International Journal for Traffic and Transport Engineering (IJTTE) special edition by the end of 2015.

I am delighted to welcome you to Belgrade, the hart of Serbia, and I hope you will enjoy your work as much as social networking activities organized by our team. I hope old participants and new comers will join us in 2016 and fill history with their cooperation.

ICTTE 2014 Director

Olja Čokorilo

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KEY INDICATORS FOR THE FINANCIAL ASSESSMENT OF AVAILABILITY PAYMENT PPP PROJECTS

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Abstract: As a consequence of renewed interest in attracting private financing for big infrastructure investments, public-private partnership (PPP) arrangements are mostly seen as a suitable mechanism for ensuring sound and quicker delivery of transport infrastructure projects. Unlike conventional delivery methods, when correctly implemented, PPPs are expected to deliver projects more effectively with an efficient transfer of risk and better management of assets. However, a general concern is that expectations of mobilising private sector funds have been overestimated in a number of cases. Some pitfalls of PPP arrangements can be overcome by proper financial assessment of the project and by carrying out an appropriate value for money (VfM) analysis which is often a rationale for using PPPs.
Not all PPP models are suitable for all projects. Public sector agencies in different countries are increasingly using availability payment contract models of PPPs, for projects with uncertain revenue streams, to undertake critical infrastructure investments. Moreover, turning to availability payment projects where demand risk is retained by the government can significantly improve the attractiveness of transport investments to the private sector. An appropriate financial analysis and estimation of the minimum Annual Availability Payments that a potential concessionaire requires from the public sector to undertake the project is a key element of a successful availability payment PPP project. This paper reflects on critical indicators relevant for the financial assessment of availability payment PPP projects.

Keywords: PPPs, public private partnership, financial assessment, Annual Availability Payments

1. Introduction

An increasing tendency to implement public-private partnership (PPP) policies and projects in the transport sector can be noticed in the past few decades (Dewulf et al., 2011; Grimsey & Lewis, 2007; G. A. Hodge & Greve, 2007). As an illustration, between 1990 and 2013, 80% of European Investment Bank (EIB) loans directed to PPP schemes were absorbed by transport sector projects. In 2013, the aggregate PPP European market amounted to EUR 16.3 billion, with the UK being the most active market both by number of projects and its value (EPEC, 2014a, 2014b). Although there is no consensus on the definition of PPP, it can be defined as a "risk-sharing relationship based on a shared aspiration between the public sector and one or more partners from the private and/or voluntary sectors to deliver a publicly agreed outcome and/or public service" (Grimsey & Lewis, 2007). While PPP projects are based on the same principles, by their structure, complexness, uncertainty and the existence of numerous endogenous and exogenous variables, they can substantially differ from one another.

A quite large amount of research has been conducted in order to understand the nature of long lasting transport PPP projects. A lot of expertise and know-how have been capitalised during the implementation of PPPs in the past decades. Previous experience with successful PPP projects is a predominant factor encouraging public sector agencies to opt for PPP arrangements. Furthermore, the current public budgetary constraints make PPPs an essential mechanism for the governments to early and efficiently deliver costly transport infrastructure projects.

However, a general concern is that expectations of mobilizing private sector funds have been overestimated in a number of cases. Many authors have tried to define which elements play a key role on the successful PPPs. Cruz and Marques (2013) argue that there are several characteristics affecting the economic value of PPP projects which make them particularly sensitive to uncertainty, namely i) large sunk investments, meaning large construction costs and large debts (public and/or private), ii) high sensitivity to demand variations/estimations, iii) great exposure to financial markets (due to the large debts), and iv) vulnerability to political instability. Rockart (1978, 1982) defines critical success factors (CSF) as "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance". Mladenovic et al (2013) analysed the use of key performances indicators (KPI) based on the analysis of critical success factors (CSF) for monitoring of PPP transport projects from the different stakeholders perspective. The main findings and the most important CSF identified are the following:

- Public Sector: Political, social, and economic environment: Stable political and social environment, Transparent and predictable legal framework, Favorable investment climate, Stable macroeconomic environment, Transportation infrastructure needs
- Project-related CSFs: Detailed project planning and evaluation, Transparent, competitive and efficient procurement process, Appropriate risk allocation, Project economic efficiency, Capable public and private partners, Professional relationship between stakeholders
- Private sector: Partnership and communication between public and private partners, Implementation of innovative technologies, Appropriate risk allocation, Faster project completion, Transparency

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Transport PPP contracts are highly exposed and dependent to exogenous risks (Nikolaidis & Roumboutsos, 2013). A high degree of volatility of the key economic variables makes long term PPP projects vulnerable to various potential risks. A basic principle is that a risk should be borne by the party who can best manage it and hence minimize that risk. It is of utmost importance to adequately assess and address those risks in case they materialize. The following risks are of concern to both parties: legal and regulatory risk, design and construction risk, operational and maintenance risk, revenue risk, financial risk, environmental and social risks and political risk. The management and risk mitigation is a very complex task. Whereas some risks - such as construction, operational or legal risk - are more controllable by some stakeholders, traffic demand risk (revenue risk) cannot be controlled by any of them (Vassallo, 2006).

Uncertain revenue streams resulting in optimism bias on traffic demand forecasting is one of the most frequent reasons for project financial distortions. Such scenario could result in renegotiations which can produce change in the level of tolls, modification of contract length, compensation costs etc. It can also lead to possible opportunistic behaviour by the concessionaire, a vicious cycle of additional transaction costs and, in the worst case scenario, a project failure. In a survey of nearly 1.000 PPP concessions in Latin America, Guasch (2004) reports that 54% of transport sector PPPs were renegotiated at the request of the PPP Company and resulted in delays in investment or increases in tolls or availability payments.

If the traffic demand risk is to be retained by the public sector, a suitable repayment method mechanism is to be established, with a proper financial assessment of all key parameters, including sensitivity analysis. Experience suggests that possible pitfalls of PPP arrangements could be overcome by proper financial assessment of the project and value for money (VfM) analysis, which is typically the rationale for using PPPs.

The paper is organised as follows: Section 2 gives an overview of PPP repayment methods and its relation to demand risks. Section 3 reflects on principal financial indicators for the availability payment PPPs. Section 4 presents the concluding remarks and topics for further research.

2. Repayment methods and traffic risk mitigation

PPP models are not suitable for all project settings. The assessment of value for money has been widely used by public authorities as a tool to compare the viability of purchasing a project as a PPP or traditional procurement (Morallos et al., 2009). A PPP project is said to achieve value for money if it costs less than the best realistic alternative public sector project developed hypothetically, that is the Public Sector Comparator.

PPPs create different cash flows compared to traditional public procurement. They enable projects to be undertaken earlier than they would under public financing. In most PPP projects, no public expenditure is required at the construction phase of the project, and compensation to the private partners is made either through direct user charges or payments from the public budget spread in periodic instalments over the lifetime of the project (availability payments). Thus, the expected cash flows are highly dependent on the remuneration scheme applied.

On the other hand, traffic risk mitigation remains a challenging aspect of highway concessions. Bain et al.(2009) analysed the ratios of actual traffic to those forecast in more than 100 road, bridge and tunnel concessions. They found out that such average ratio for the first year of operation is 0.77 (i.e., the actual traffic is 23% below forecast), as indicated in Figure 1, with no significant improvement after year one (0.77 to 0.80 between years 1 and 5). Such optimism bias of the traffic forecast may cause the private sector to require a too high risk premium to take on the demand risk.

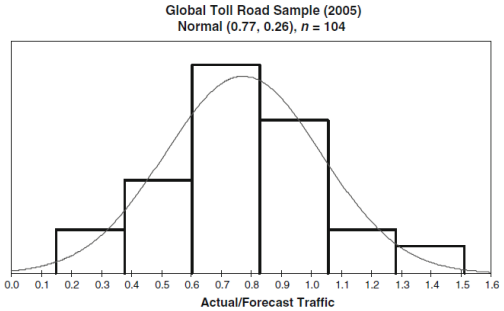

Fig. 1.
Forecast performance distribution.
Source: Bain (2009)

The payment mechanism is one of the principal means for allocating risks and providing incentives in the PPP contract. In practice, there are several types of payment mechanisms:

- **Revenue-based PPPs** are based on the user-pays principle and the remuneration is realised through user charges (e.g. conventional motorway tolls). Revenue-based PPPs are very specific and require examining the capacity and willingness of users to pay, in particular to ensure that tariffs are affordable during the lifecycle of the project. In several cases, toll funding can make the PPP project financially self-sustainable. Under revenue-based PPPs the financial burden is shifted from taxpayers to users. While in traditionally financed toll road projects, the government would collect the toll revenue, under a toll road PPP, usually the private sector is exposed to the traffic revenue risk.
- In contrast, under an **annuity-based PPP,** the public agency makes periodic payments to (i.e. availability payments) to the private partner throughout the operating period of the concession, thus postponing the public spending from the construction period to the operating period. The private party bears no traffic revenue risk, as it receives the fixed periodic payments as long as the road is available for use, under acceptable conditions.
- **Combination of the above** – such models combine relatively low user charges together with public support, such as: construction subsidies, minimum income guarantee models, revenue-sharing bands with thresholds for sharing traffic revenue risk (maximum and minimum targets), and flexible-term contracts with the "least present value of revenue" approach. Some of these forms of public support are widely used as a traffic risk mitigation mechanism. In EU countries, where EU funds are available for co-financing PPP projects, a number of, so called, hybrid PPP models have been developed. In recent practice, mixed payment mechanisms of an availability payment and user charge are very common.

For projects with uncertain revenue streams, the public sector is increasingly using availability payment contract models of PPP to undertake critical transport infrastructure investments. The main advantages associated with availability payments mechanisms are as follows:

- Payments should not commence until the full service is available at the agreed standard of service (availability-based principle).
- Projects are bankable – the private partner should be able to forecast cost and revenue flows with reasonable certainty.
- Payments are defined during a competitive bidding process.
- Payments are spread over the life of the contract.
- Lower return on equity (RoE) in comparison to usage payments, due to the fact that the demand risk is not borne by the private partner.
- No private sector control of toll rates (for tolled facility projects).

Moreover, turning to availability payment projects, where the demand risk is retained by the public sector, can significantly improve the attractiveness of transport investments. Proper financial analysis and estimation of the minimum Annual Availability Payments that a potential concessionaire requires from the public sector to undertake the project is a key element of a successful realisation of the project.

3. Key indicators in financial assessment of Availability Payment Projects

This section reflects on major indicators and critical variables relevant for the financial assessment of availability payment PPP projects and the estimation of the minimum Annual Availability Payments from the public sector with an aim to understand the likelihood of the project to be attractive to private capital.

One of the most important indicators is the Project Financial Internal Rate of Return (**Project IRR**). Basically, it represents the internal rate of return considering only the project cash flows without taking account of its financial structure (the proportion of subsidies, debt and equity). The project is considered to be financially viable when the Project Financial IRR is above a benchmark rate of return with respect to the country, sector and project characteristics. It usually should be 8% or more in real terms (Mladenovic and Queiroz, 2014). The Project IRR must be able to cover the weighted average cost of capital (WACC) of the project. WACC is equal to the average return expected from all sources of financing (including common stock, preferred stock, bonds and any other long-term debt). The WACC is higher for a higher equity-to-debt ratio.

Another important indicator is the Equity Internal Rate of Return (**Equity IRR**). Namely, stakeholders' equity represents the amount of the construction cost contributed by the owners in the project financial structure. It is typically 10% to 30% of a PPP's capital cost. The balance is funded from external debt finance which may be provided by IFIs, commercial banks or, in some cases, by the bond market. Equity IRR represents the yield of the project through the remuneration of shareholders´ investment with dividends. The project is profitable for the shareholders when Equity IRR is high. Generally, a minimum expected real rate of return (real return) is 10% (Shadow Toll) or 17% (Toll Roads) (Queiroz, 2010). This minimum Equity IRR is called Hurdle Rate.

The required equity IRR usually serves as a reference for bidders to estimate the required annual availability payment. While the Project IRR is independent from the project financial structure, the Equity IRR is related to it.

Before committing to a project, lenders will perform an in-depth review of the project viability to assure that the project is bankable. Any interruption of the project revenue stream could jeopardise the ability to make debt service payments. Next we describe ratios that are used to check the project capacity to repay debt in different scenarios, including if revenues are below forecasted levels.

To assess the project capacity to repay debt, the Annual Debt Service Cover Ratio (**ADSCR**) is normally calculated. This ratio is determined as follows:

$$ADSCRi = \frac{CBDSi}{DSi}$$

where:

- *CBDSi* - the net cash flow before debt service in year *i* (i.e., the amount of cash remaining in the project company after operating costs and taxes have been paid)
- *DSi* - the debt service to be paid in year i (principal and interests)

The project is considered viable for the lenders when the ADSCR is greater than 1. The higher the ADSCR, the more attractive the project will be to lenders because it leaves the reserve for undesirable circumstances that may occur during the project's life. Generally, for low-risk PPP projects involving availability payments the minimum required ADSCR is 1.15 to 1.2, while for high risk projects, such as toll-based concessions, it ranges between 1.5 and 2.0 (World Bank, 2009).

Another ratio that assesses the creditworthiness of the project is the Loan Life Cover Ratio (LLCR). The LLCR indicates the capacity for the project company to bear a sporadic shortfall of cash due to discrepancies in the assumptions in the model while maintaining its debt service to the end of the debt. This ratio is calculated as follows:

$$LLCRi = \frac{NPV(CBDSi \rightarrow end)}{DSi \rightarrow end}$$

where:

- *NPV (CBDSi → end)* is the present value of the net cash flow before debt service from year i to the end of the debt repayment period.
- *DSi → end* is the total of debt service remaining at year i (principal and interests).

The project is considered viable for the lenders when the LLCR is higher than 1 for every year of the project life (Mladenovic and Queiroz, 2014). The minimum initial LLCR requirement in lenders projections for PPP projects is typically about 10 percent higher than the required ADSCR.

The principal objective is to minimise the Annual Availability Payment that the concessionaire will expect from the government in the first year of project operation (the initial revenue year). The estimation of minimum Annual Availability Payment is subject to constraints that are to be met for the project to be able to attract private investors. As mentioned before, these constraints are related to minimum required thresholds for the three indicators considered critical for the project: Project IRR, Equity IRR and ADSCR. Annual Availability Payments in subsequent years are adjusted according to the specified inflation rate.

4. Conclusions

PPP financing structures are complex and often project-specific. These structures should ensure that financial and other related risks are well shared among all stakeholders. PPPs should be attractive enough to ensure the viability of project against downside scenarios. Key financial indicators presented in the paper represent the basic mechanism for the assessment of the investments, both by private and public parties. On the other hand, when designing the payment mechanism, comparable projects should be used as a useful benchmark considering features that may later give rise to disputes. Despite different pros and cons, availability payments projects, where demand risk is retained by the public sector, can significantly improve the attractiveness of the transport investments.

Assuming that previous studies have shown that one PPP transport project is economically justified, and socially and environmentally sound, the financial model estimate the minimum Annual Availability Payment that a potential concessionaire will require from the government to undertake the project. This estimated value should ensure that all targets are met for the project to be able to attract private investors.

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