

## **RISK MANAGEMENT, GOVERNANCE AND FINANCING ISSUES IN PUBLIC-PRIVATE PARTNERSHIP TRANSPORTATION PROJECTS**

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### **ABSTRACT**

This paper discusses issues related to risk management, governance, and financing of public-private partnerships transportation projects. The allocation of risks and the requirements for ownership and equity provision were examined through analysis of a range of contracts. Lessons learnt from a series of Australia's public-private partnerships transportation projects are also presented. The results showed that from the perspective of risk allocation, the arrangements were consistent among the projects. Some fluctuations, however, were observed in terms of equity provision. Initially, the contracts were developed based on the private sector taking full traffic demand risk and promising outcomes led to revenue sharing clauses being introduced. Consequently, overoptimistic demand forecasts resulted in the market rejecting the acceptance of traffic demand risk. The paper also presents the variation between the case study projects in terms of excess revenue sharing. The analysis also suggests that, in arranging these types of projects, traffic demand issue would be prominent and should be given major concern since it would be closely related with the revenue of the projects, which in turn would affect the equity of the projects.

**Keywords:** Risk Management, Governance, Financing, Public-Private Partnership, Transportation Projects.

### **INTRODUCTION**

Public Private Partnerships (PPPs) are now an accepted mechanism for infrastructure provision in most countries. The system of contracting was pioneered in France by using a Concession Model and this was widely implemented in the UK through Private Financing Initiative (PFI) (Grimsey & Lewis, 2005). Following the UK, Australia, and then South Africa, Canada, Europe and now USA, this type of contract has been developed to suit the local conditions. It is considered a mature delivery option in Australia (Eggers & Startup, 2007). The market maturity level is measured through the perspective of the public sector by how the PPPs contract are organized, commencing from the development of regulatory regime and the establishment of special agency to the refinement of the arrangement.

This paper focuses on early Australia's PPPs transportation sector projects prior to the Global Financial Crisis (GFC) 2007-2008, taking into consideration that this market sector is deemed to be the most mature market in Australia and accounted for 25% of the total number of PPPs projects in Australia (Eggers & Startup, 2007). The discussions in this paper are based on the substance of the contracts acquired from the official government websites and related company websites. However, these discussions are limited to most of the contracts in the form of contract summaries, not the original contracts. The main topics in this paper are categorized into three major parts: risk allocation, equity arrangements, and revenue or payment arrangements. This paper uses critical appraisal and constructive dialogue techniques to analyze the contractual arrangement of the case study projects. The objectives are to identify the consistency of the arrangement and the most crucial risk in PPP transportation projects, and based on the latest development, to reflect on the materialization of the risk and the current condition of the case study projects.

## **LITERATURE REVIEW**

### **Governance of PPP Projects**

Governance issues in PPP projects are influenced by many factors. Grimsey and Lewis (2004) suggest that PPPs use contract management and reporting systems as a basis for governance. Their framework focuses on risk management and the specific involvement of government. Meanwhile, Devapriya (2006) discusses the influence of the financing arrangements on governance of PPP projects and explains that this in turn would influence the effectiveness of the performance of parties involved in the concession. In addition, Reijnders (1994) through his investigation on PPP projects in Netherlands has found that the governance structure should be sophisticated enough to accommodate the conflicting interest of parties involved in order to avoid a breakdown of the trust that is necessary in PPPs.

Another issue that closely relates to the governance of PPPs is that of the incomplete contract. This issue was also highlighted by Sarmiento and Renneboog (2016) in their theoretical and empirical research on the impact of incomplete contract to PPP projects. This issue along with the nature of long term duration of the PPP contracts have forced the parties involved in projects to conduct renegotiations which in the worst case could substantially change the contracts. In this case, the flexibility of the government is the pivotal factor. Contractual dispute could be experienced due this ambiguity and the incomplete nature of the contract which require involvement of third party mediation or an arbitration process, or in a worse case, a judgment by law courts (Sclar 2015).

The complexity of these long-term contracts means that it is generally impossible to specify all potential outcomes in the contract documents and specification. Consequently, not all of the performance obligation of parties involved in the arrangement can be specifically defined in the contract that would eventually add the complexity of the contractual relationships which requires ongoing management of change and adjustment events. A typical governance structure is presented in the following figure (see Figure 1). In Malaysia, the general form of a PPP project follows the structure as presented in Figure 2.

The basic foundation of PPPs is an optimal allocation of the risks between public and private sectors (HM Treasury UK, 2007; Partnerships Victoria, 2007). Different parties have different perspectives and interests on risks. This has been clearly shown by a study conducted by Grimsey and Lewis (2002) on the waste water treatment facility in Scotland that sound management of the conflicting issues or interests of parties on risks played an important role in the success of the project. However, such arrangements are hard to replicate. Not only may the risk allocation be confronted with complexity and unpredictability in terms of financial consequences, but it also has to be in line with the demands of important stakeholders and the community (Ng & Loosemore, 2006). The willingness of parties to bear the risks should they materialize is a key factor in optimization of the original risk allocation and is reflected in the amount of rate charged by doing so (Ward et al., 1991). And this, according to Ward et al. (1991), can only be achieved through robust and reliable risk management process.

In terms of financing arrangement of the PPPs, the issue of bundling or unbundling a range of sub-projects in the contract is also highlighted as a complexity in governance arrangements. Devapriya (2006) has strongly argued that the governance of PPP is highly influenced by the debt and equity structure. Further, when it is closely linked with the management of the project, it would likely bring about a negative effect to the success of the project. This argument supports the previous findings by Trujillo et al. (1998) through their analysis of Build-Operate-Transfer (BOT) projects that the unbundling between the financing process through a ‘neutral’ Special Purpose Vehicle (SPV) and other aspects of project such as construction and operation will likely produce a better end result.

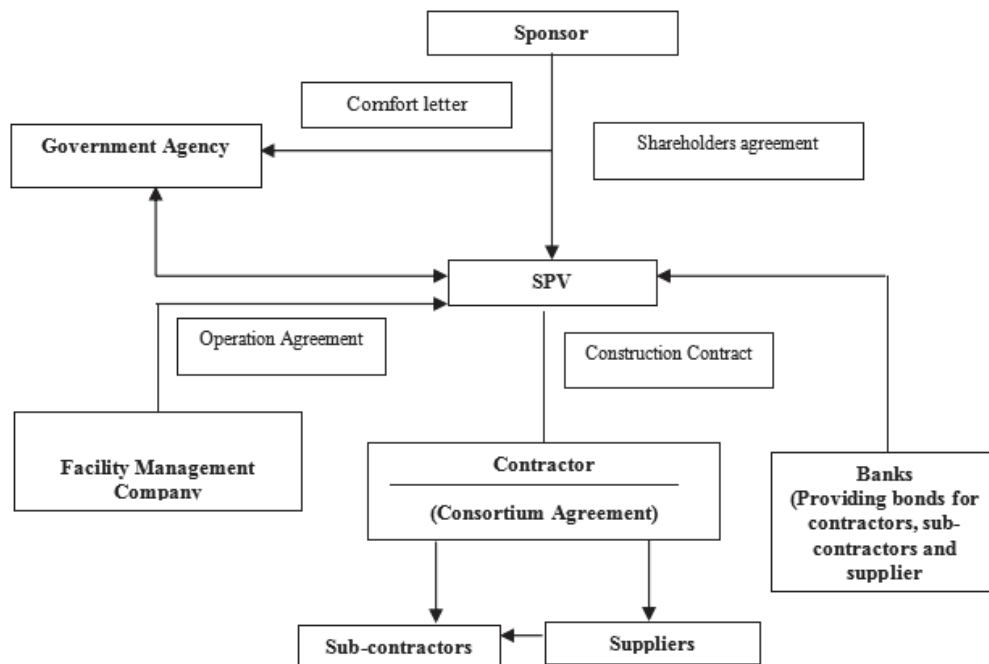


Figure 1. Typical PPP Structure

Source: Akintoye, 2003

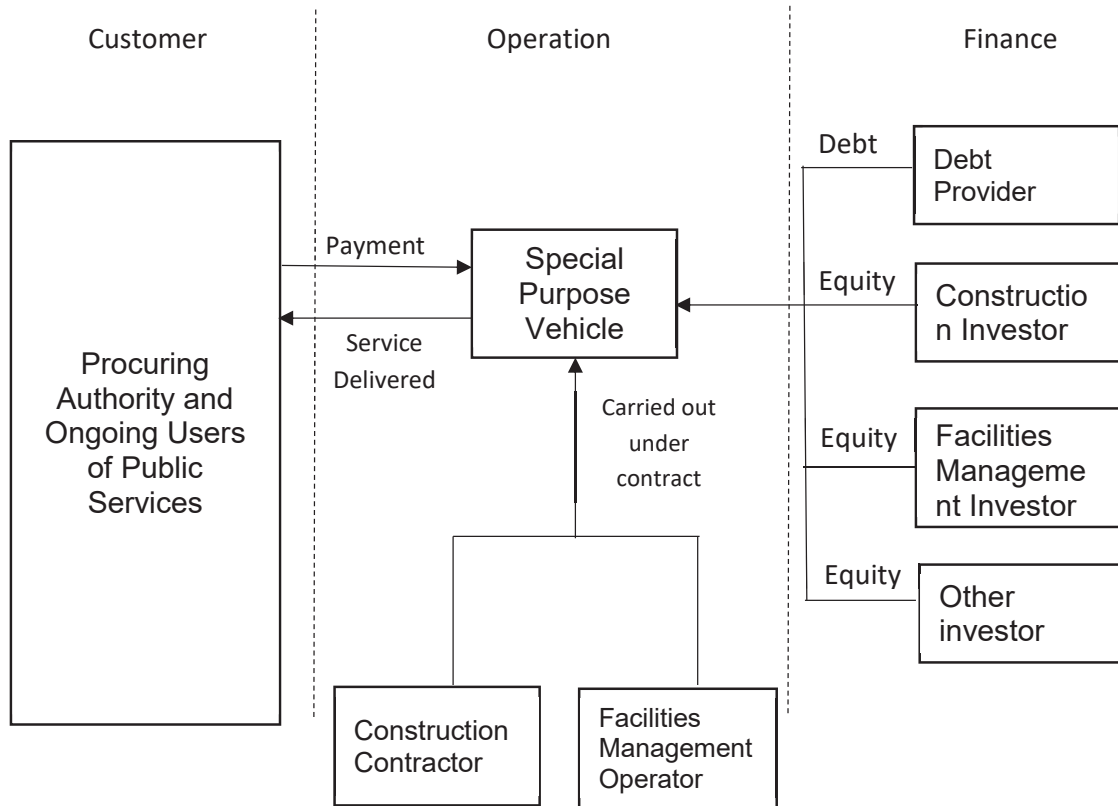


Figure 2. Typical PPP Structure adopted in Malaysia

Source: Public Private Partnership (PPP) Guideline p. 9, Ukas, 2009

Another issue with regard to governance of PPP projects is which type of governance should the projects follow: project governance or corporate governance. Wilson et al. (2010) who had conducted an investigation on the Australia’s PPP found that the nature between the management of traditional projects and that of the PPPs would be significantly different due to the involvement of many parties in the project arrangement. They further argued that the term project governance, which could be seen as a merger between project management and corporate governance, would be more suitable for the arrangement. However, considering the long lifespan of projects, multiple-party involvement and social responsibility as consequence of longer contracting period, PPP governance is closer to that of the corporate governance type (Wilson et al., 2010).

*Good Governance of PPP Projects*

Because the issue of governance plays an important role in the success of the project, good governance principle becomes a key concern. This condition exists when two or more parties are involved and have interest in certain types of cooperation. Based on their research in the PPP projects in Indonesia, Abednego and Ogunlana (2006) have argued that governance is essential in ensuring the success of a PPP project since this type of project requires great strategic concern due to the nature of its long-term relationship. The success of the project is not only measured through short-term objectives in terms of budget, timeliness and quality but it also needs to consider the long term cost of operation

and maintenance. This will further raise issues of government support, proper project planning, good coordination between parties, trust, good tendering system, proper information dissemination and communication system, and high managerial capabilities (Abednego & Ogunlana, 2006). They have further suggested that project management should implement good corporate governance principles in the project.

The Organization for Economic Co-operation and Development (OECD) has developed Principles of Corporate Governance in their effort of building a better and reliable governance practice in OECD as well as non-OECD member countries (OECD, 2004). Even though the principles are aimed at assisting mainly publicly traded companies, however with some adjustments, the principles can also be implemented in the privately owned companies (OECD, 2004). The Principles of Corporate Governance consist of the following six main elements: (1) assurance of the basis for an effective corporate governance framework; (2) the right of shareholders and key ownerships functions; (3) equitable treatment of shareholders; (4) the role of stakeholder in corporate governance; (5) disclosure and transparency; and, (6) the responsibility of the Board (OECD, 2004).

The importance of good governance in PPP projects was also highlighted by Osei-Kyei and Chan (2016) when analyzing three PPP transportation projects in Sub-Saharan African (SSA). They asserted that some strategic aspects of the projects such as stakeholder management, transparency, stable economic and political as well sound policy and regulations implementation would be critical in order to ensure accomplishment of successful PPP transportation projects.

In summary, it can be inferred that good corporate governance mainly emphasizes on the protection and equal treatment for all stakeholders. Because the participants of the PPP projects comprise different parties with different levels of ownership and due to the long term nature of relationships in the project, it is very reasonable to include good corporate governance principles in the practice of project management in PPP projects.

### **Financing in PPP Projects**

Apart from the recourse and non-recourse issues, project financing definition is now moving towards a focus on the repayment of debt or loan by initially evaluating the cash flows and revenue of the project (Nevitt & Fabozzi, 1995). The main purpose of arranging project financing is to secure funding for the project without affecting the balance sheet of the funders or sponsors, hence completely none or as little recourse as possible. In addition to the refunds generation from the cash flow, project financing emphasizes on the separation of the project entity from the entity of companies involved in the arrangement and it is a project's asset based focus (Finnerty, 1996).

Risk phases also influence the arrangement of project financing. It is common for a *green* or new development project to have risks. There are three phases of risks which relate to the financing arrangement, namely, engineering and construction phase, start-up phase and operation phase (Nevitt & Fabozzi, 1995; Tinsley, 2000; Grimsey & Lewis, 2002). Each phase has its own unique nature which will consequently influence the involvement selection by the lenders. In many instances, different risk phases or periods have different lenders (Nevitt & Fabozzi, 1995). Therefore, the risks profile of the project will later influence the financing arrangement.

This financing arrangement is one of the prerequisites of the successful PPP projects due to the long-term arrangement of the contract in which there could be many of the macro-economic factors and fiscal conditions such as economic crisis, political

turbulence, and fuel price hike that are difficult to predict in advance. In many cases, re-financing is required in order to cover the deficit which will be commonly introduced after the construction stage is accomplished. However, Villalba-Romero and Liyanage (2016) through their analysis of PPP projects in road development, have argued that refinancing poses a substantial risk that would be unfavorable for both the public and the private sectors.

The sources of financing are mainly a combination of debt and equity. The structure of the debt and equity arrangement in PPP projects is directly associated with the governance of the project (Devapriya, 2006). The sponsor of the project will likely take the largest portion of the equity, which can be offered later to the purchaser, and the recent trend is that the equity is sold in the capital market (Finnerty, 1996). Besides functioning as a control mechanism, equity also represents a whole life ownership interest on the entity of the project. However, one feature of equity is that there is no requirement of the project to pay back the returns to the equity holders at specific time (Marks et al., 2005). These features will influence the decision of the companies involved in the PPP contracts whether or not to take part in the equity stand.

There are a few factors which determine the parties that should take an equity stand (Finnerty, 1996). First, the provider takes liability when cost overrun occurs. Second, in longer construction period, the provider must be willing to defer the payment of dividends. Finally, the equity provider must be parties which will likely benefit the most profit from the project. Taking these factors into consideration, the equity providers could be one of these parties, that is, the purchaser of products, the owner of the resources, and the suppliers of products and services. Public or commercial equity investors are likely to invest at the later stage of the project lifecycle, or at least after the construction period has passed (Finnerty, 1996).

In PPP projects, equity rarely covers all of the investment in the project. In fact, the biggest portion comes from debts. Debts can be acquired from commercial banks in the form of long term loans or can be from other sources such as from bilateral agencies or export credit agencies (ECAs) and multilateral agencies (MLAs) (e.g., The World Bank, IBRD, ADB, and IFC) and the also from the capital markets (Tinsley, 2000).

Another option for investment in PPP projects is from a financing device which has both the features of debt and equity or in other words, debt-equity hybrid. Debt-equity hybrid can be described as a capital raising device which has both the features of debt and equity (HM Treasury, 2007). Some examples of hybrid mechanism are certain classes preference shares, convertible notes, capital protected equity loans, profit participating loans, perpetual debt, endowment warrants and equity swaps. The mechanisms are highly influenced by the taxation regime which affect the choice and financial arrangement of the financing scheme of the PPP projects.

### **Project Risks Allocation Principles**

Appropriate risks allocation plays an important role in the success of the PPP projects and it is considered to be the impediment in the PPP arrangement due to the varying and uncertain risks faced by the PPP projects. Apart from the risks of technical nature, risks that arise from the stakeholders are more complex and difficult to control (Ng & Loosemore, 2007). Hence, the risks allocation is a major concern in the arrangement of PPP contracts.

In terms of risks, the toll road or transport projects have a greater risk than those in other sectors, leading to the modest growth of the private financing involvement in the



transportation sector (Fisher & Babbar, 2000). Apart from the economic, construction and operation risks, the risks resulting from the issue of co-ordination with the regional government or planning agencies is also crucial in transport projects (Haley, 1992). Therefore, these risks require a systematic risk allocation between the public and its private counterpart through an active involvement of the public, government agencies, and private parties.

In enabling the transfer of risks effectively, the arrangement should implement the ideal risks allocation principles; the bearers should be able to manage the risk outcome and the risks are allocated to the parties which would best be able to manage those risks at the lowest expenses (Medda, 2006). The complex arrangement in PPP projects revolves especially around two main partners, namely, the SPV and the procurer, which adds to the complexity of risk allocations. Based on their research in Scotland, Demirag et al. (2010) have argued that due to this complexity, in some cases, the risks may be transferred to parties that are not able to control or are not willing to bear them, and eventually will seek other mechanisms as compensation or attempt to avoid greater loss by using hedges, swaps and insurance.

Hovy (2015) has also noted that the risk allocation is the main challenge in arranging the PPP projects. Two practices are commonly opted, which are transferring risks to private sector leads to higher premium cost and leaving the risks to the public sector that is better to cope the risks. However, these could cause reduction in value for money objectives and are in contradiction to the optimal risks allocation principles. He further makes a claim that unforeseen risks have also hindered the success of PPP projects. This is because the long term nature of PPP projects which could reach 30-40 years of contract duration. It is difficult to forecast risks in advance and during the contract period due to the dynamic changes caused by many factors such as those related to economic and political aspects.

### **Revenue and Payment Arrangements**

One of ultimate risks in PPP transportation projects is the surety of revenue stream in compensating the investment (Grimsey & Lewis, 2002) which closely related with an accurate traffic demand forecasting (Eggers & Startup, 2007). The inaccuracy of this forecasting at the initial phase will result in numerous re-negotiations during the contract period that may hinder and undermine the benefit of the private financing in involvements in the transportation projects (Guash, 2004). Hence, the contract should clearly stipulate this risk which also incorporates the sharing arrangement of potential excess of the revenue from the materialization of traffic that is higher than the base case scenario.

Developing the legal and structured concession environment is one of the prerequisites when attempting to implement this financing arrangement (Fisher & Babbar, 2000). As matter of fact, the concessionaire is likely required to pay more attention to this matter particularly at the project initiation stage to ensure that the contract would accommodate future uncertainty due to its long term nature and to minimize the re-negotiation. One of the solutions is to conduct intense and detailed discussions with the counterpart, which in this case, is the government or the related agency at the initial stage of the project.

There have been arguments in support of the importance of pre-negotiation of this aspect in the literature. For a project which has higher uncertainty in forecasting in the revenue stream at the initial stage, the public sector (government) should bear most of the risks or alternatively be willing to compensate the private counterpart when there is a non-

materialization of the forecasted revenue (Ng & Loosemore, 2007; Eggers & Startup, 2007). The main reason is because the certainty of long term revenue stream is essential for the achievement of value for money as one of the attributes of successful PPP projects (Grimsey & Lewis, 2002). Another alternative is by choosing a revenue mechanism whether it is market-tied or contract-tied mechanism (Haley, 1992). This can be then related to the nature of the service provided by the project whether or not it is directly affecting the users.

## **METHODOLOGY**

The methodology used in this paper is a desktop study of a theoretical examination through contract analysis. The contract data were acquired from the electronic resources of the official government agencies or departments and the companies involved in the PPP schemes. The limitation of this research is that even though the contract data were obtained from the official websites, most of the contracts were in the form of contract summary published by the government agencies or companies. Five sets of contract data were analyzed from the perspective of equity arrangement, risk allocation and revenue or payment arrangement. The case study focused on the transport PPPs projects in Australia consisting of Eastlink project (Victoria), Southern Cross Station (Victoria), Chatswood Transport Interchange (New South Wales), Sydney Cross City Tunnel (New South Wales), Westlink M7/ Western Sydney Orbital (New South Wales), and Lane Cove Tunnel (New South Wales). Data were analyzed using the theoretical framework as discussed in the review of the literature section of this paper. The analysis focused on the equity or investment arrangement, risks allocation, and reward or concession arrangement, especially regarding the arrangement of excess revenue. The expected outcomes were identification of sensitive issues underlying the early PPPs transport project in Australia pre-GFC and measurement of the consistency level of the contractual arrangement in the transportation sector.

## **FINDINGS AND DISCUSSIONS**

### **Risks Allocation in Australia's PPPs Transportation Projects**

The common list of risks in infrastructure project developed by Grimsey and Lewis (2002) is used as a platform in analyzing the risks allocation in this paper. The aims were: to examine the allocation of major risks in Australia's PPPs transportation projects; to determine whether the allocation is consistent from project to project; and, to identify specific risks that require special attention. Table 1 presents the risks allocation of the case study projects which were investigated.



Table 1. Major risks allocation

Risks	Risk arrangement for PPP Projects				
	Southern Cross Station Redevelopment	Sydney Cross City Tunnel	Westlink M7 Motorways	Lane Cove Tunnel	Eastlink
<ul style="list-style-type: none"> <li>• Technical/ Design Risk</li> <li>• Construction risk</li> <li>• Operating Risk</li> <li>• Financial risk</li> <li>• Regulatory/ Political risks</li> </ul>			Private		
<ul style="list-style-type: none"> <li>• Revenue Risk</li> </ul>	Private	Private*	Private*	Private*	Private
<ul style="list-style-type: none"> <li>• Force majeure risk</li> <li>• Environmental risk</li> </ul>			Shared		
<ul style="list-style-type: none"> <li>• Project Default risk</li> </ul>	Public	Shared	Shared	Shared	Shared

\* Public sector has an obligation to support inflow traffic; different project has different arrangements.

In terms of major risks allocation, the contracts showed that there had been a consistent type of major risks allocation in the early PPP transportation projects in Australia. Most of the projects' risks were transferred to the private sector (i.e., technical/design risk, construction risk, operating risk, revenue risk, financial risk, and regulatory/political risk). Other risks were shared between the private and public sector (i.e., force majeure risk, environmental risk, and project default risk). Thus, this means that the transportation sector was considered to be a mature market of PPPs in terms of risks allocation.

In Australia, both parties (public and private sectors) would generally have a right to terminate the contract if one of them was found to breach the contract. However, in some cases, the concessionaire could be granted extension of time to rectify their 'default' under special discretion.

In regard to the revenue risk of toll and tunnel PPP projects, even though a risk would be borne by the private sector, there would be a special clause requiring the public sector to support the private counterpart, especially if this is related to the input traffic. Table 2 shows the special involvement of the public sector in the input traffic arrangement.

Table 2. Traffic risk arrangement

Project	Traffic risk arrangement
<p><b>Sydney Cross City Tunnel</b> (June 2003)</p>	<ul style="list-style-type: none"> <li>• The traffic risk is transferred to the private sector.</li> <li>• “Clause 3.3.8 Traffic management and road network change”. The contract/project deed requires the Road and Traffic Authorities (RTA), the trustee and the company to build traffic arrangement which must be acquainted with the Cross City Tunnel’s “importance in the traffic system”. This means that both parties have an obligation to ensure that the minimum the traffic inflow to the tunnel as required by the economic base model is achieved. An alternative in accordance with this clause is to close and merge some of the existing traffic network.</li> <li>• The project deed also introduces clause 3.5 (Renegotiation provision) in regard to closing or reduction in traffic inflow to the tunnel.</li> </ul> <p>(Source: NSW Treasury<sup>a</sup>, 2007)</p>
<p><b>Westlink M7 Motorways</b> (August 2003)</p>	<ul style="list-style-type: none"> <li>• The traffic risk is transferred to the private sector.</li> <li>• “Clause 3.3.8 RTA and Government road network, public transport and utility service development right and restriction”.</li> <li>• Even though that the traffic risk is transferred to the private sector and the RTA or New South Wales (NSW) government has a right to build any type of road network, the project deed stipulates that 50 traffic connections to the M7 Motorway will not be diminished nor lessen.</li> <li>• The project deed also introduces a clause 3.5 (Renegotiation provision) in regard to the “competing road project”)</li> </ul> <p>(Source: NSW Treasury<sup>b</sup>, 2007)</p>
<p><b>Lane Cove Tunnel</b> (July 2004)</p>	<ul style="list-style-type: none"> <li>• The traffic risk is transferred to the private sector</li> <li>• “Clause 3.3.8 RTA and Government road network, public transport and utility service development right and restriction”.</li> <li>• The RTA and NSW government has a right to “develop, operate, maintain, and extend” the NSW roads/networks. This including the existing tollways or freeways. However, the project deed stipulates that 12 traffic connections to the motorway will not be diminished nor lessen.</li> <li>• The project deed also introduces a clause 3.5 (Renegotiation provision) in regard to the specific road sections.</li> </ul> <p>(Source: NSW Treasury<sup>c</sup>, 2007)</p>
<p><b>Eastlink</b> (November 2004)</p>	<ul style="list-style-type: none"> <li>• In general, the traffic risk is transferred to the private sector. However, the state has an obligation under the contract to provide “transport network support” in regard to the Principal Road Interface”.</li> <li>• A failure to provide this support is considered to be a breach to the contract. In regard to this failure, the contract introduces clause 45 (Key Risk Management Regime). According to this clause, there are two options for this failure, which are “Obligation to negotiate” and pursuance to expert determination (Clause 73 Expert Determination).</li> </ul> <p>(Source: Victoria Treasury and Finance, 2007)</p>

### Equity Arrangement

The equity distribution of the PPP transportation projects in Australia is presented in the following figure:

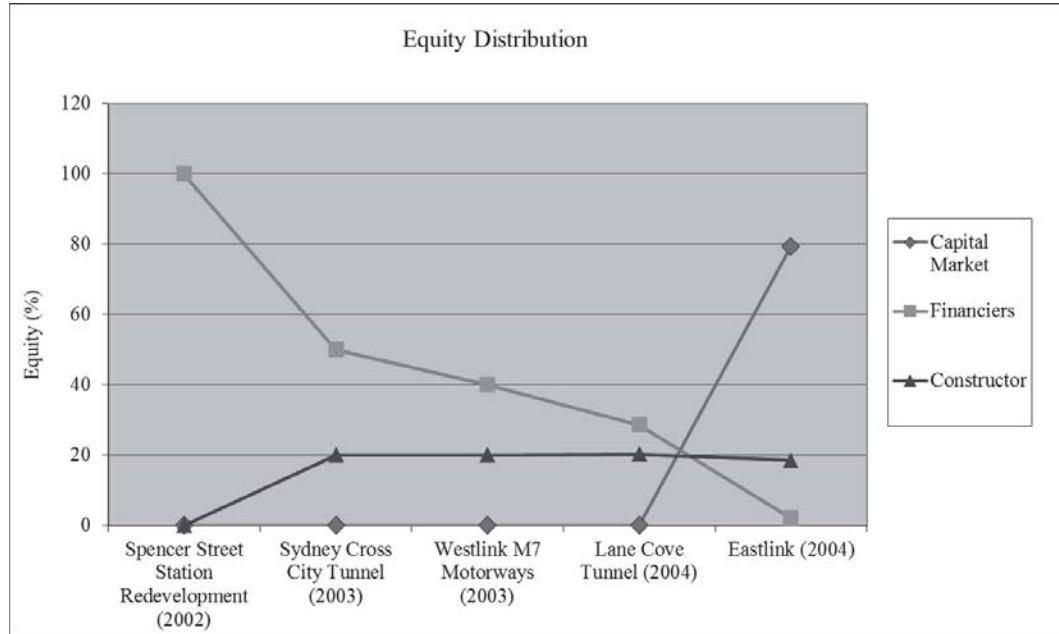


Figure 3. Equity Distribution of PPP Transportation Projects.

Figure 3 shows the fluctuation of equity stake by the parties involved in PPP transportation projects under study that the financial closing (awards) of the contracts between 2002 and 2004. Initially, the financiers took the lead by accepting 100% of the equity. Following that, role of the financiers was reduced because other equity providers were starting to play their role in providing equity. These included superannuation and financial firms. At the later stage, the equity provision was totally transferred to the public via the capital market. At this stage, the financiers' role was only as the Initial Public Offering (IPO) underwriter of the shares and accepted only a minor sum of deferred equity, for example, in the Eastlink project. However, the role of the financiers as a leader of the PPPs transport arrangement remained unchanged.

The constructor's role in the equity stake was relatively constant at the level of  $\pm 20\%$ . In some cases, the equity,  $\pm 20\%$ , was shared by two companies, either from one parent company or divided equally by two separate constructors such as in the Westlink M7 project.

There were two forms of contractors' involvement in the equity provision of Australia's transport PPP projects: initial equity investors (i.e., Sydney Cross City Tunnel and Westlink M7 Motorways) and deferred equity investors (i.e., in Lane Cove Tunnel and Eastlink). The shows that the type of contractor's investment also changed from initial equity investor to the deferred equity provider. Even though that the type of involvement changed from initial equity provider to deferred equity provider, the total investment of contractor remained constant at the level of  $\pm 20\%$  of equity.

### Revenue and Payment Arrangement

In general, there were two types of revenue arrangement in the PPPs transportation projects in Australia, namely, service payment and tolling system. The difference was due to the nature of the service provided. Service payment was applied in terminal building provision (Southern Cross station redevelopment) while the tolling system was applied in the toll road or tunneling projects. The summary of the revenue and payment arrangement of the PPP transportation projects in Australia is presented in Table 3.

Table 3. Revenue and payment arrangement

No	Projects	Revenue	Re-payment to the Government	
			Land Lease	Excess Revenue
1.	Southern Cross Station Redevelopment (July 2002)	Service payment paid quarterly of a year	None	None
2.	Sydney Cross City Tunnel (June 2003)	Toll	<ul style="list-style-type: none"> <li>• \$1, plus</li> <li>• 35% share of Gross revenue from no-toll business</li> </ul>	Progressive increased share for excess more than 10% of the 'base case financial model' every period
3.	Westlink M7 Motorways (August 2003)	Toll	<ul style="list-style-type: none"> <li>• \$1, plus</li> <li>• A share of Gross revenue from no-toll business.</li> </ul>	Progressive increased share for excess more than 5% of the 'base case financial model' after six years of completion stage 1 of the project.
4.	Lane Cove Tunnel (July 2004)	Toll	<ul style="list-style-type: none"> <li>• \$1, plus</li> <li>• A share of Gross revenue from no-toll business.</li> </ul>	Progressive increased share for excess more than 10% of the base case financial model every period.
5.	Eastlink (November 2004)	Toll	\$ 20 Million Freeway leases and land licenses	Progressive increase in share of excess revenue varied periods.

Several findings could be derived from Table 3. Firstly, for the all the toll road projects, the revenues were collected from the users by using electronic tolling system. Generally, the subscriber users' vehicles would be equipped with the transponder. Some contracts would require the system to be able to recognize the vehicles not equipped with the transponder.

Second, some differences were observed in terms of their excess revenue arrangement. If the revenue exceeded the 'economic base case model' proposed by the company or trustee in the project deed, the government would have a right for a share of the exceeding revenue. For tunnel project (i.e., Sydney Cross City Tunnel and Lane Cove Tunnel), the arrangements were similar (see Figure 5). For toll road projects, each of them would have its own specific arrangement. In M7 Motorway project, the excess sharing was similar throughout the contract period (see Figure 4) while for the Eastlink project, the contract period was divided into some periods with its own excess sharing arrangement (see Figure 6). This would imply that there was an optimistic projection that revenue from the PPPs transport project would exceed the base economic model proposed by the company/trustee. That could also be seen as opportunity from the perspective of the public sector to be actively involved in arranging the transport network to ensure the traffic inflow would exceed the proposed model.

Third, because the biggest risk in a PPP transportation project is revenue risk; the private sector will likely become cautious in regard to the surety of traffic inflow. The public sector/government involvement is still required to ensure that the traffic network is properly arranged.

Fourth, another important issue in regard to the traffic arrangement was the main stakeholder interest, that is, the public or the users. Prior to the implementation of certain traffic network arrangement (such as merging, closing, and widening) in the contract, both parties would have to consider the resistance from the public towards the arrangement. This resistance would significantly influence the revenue for the private sector and the image of the project which in turn would give a bad impression of the project success.

Finally, because the duration of the PPP contracts would normally be more than 20-25 years, it is imperative that the arrangement should be discussed thoroughly before the contract would be effected in order to avoid dispute and prolonged renegotiation.

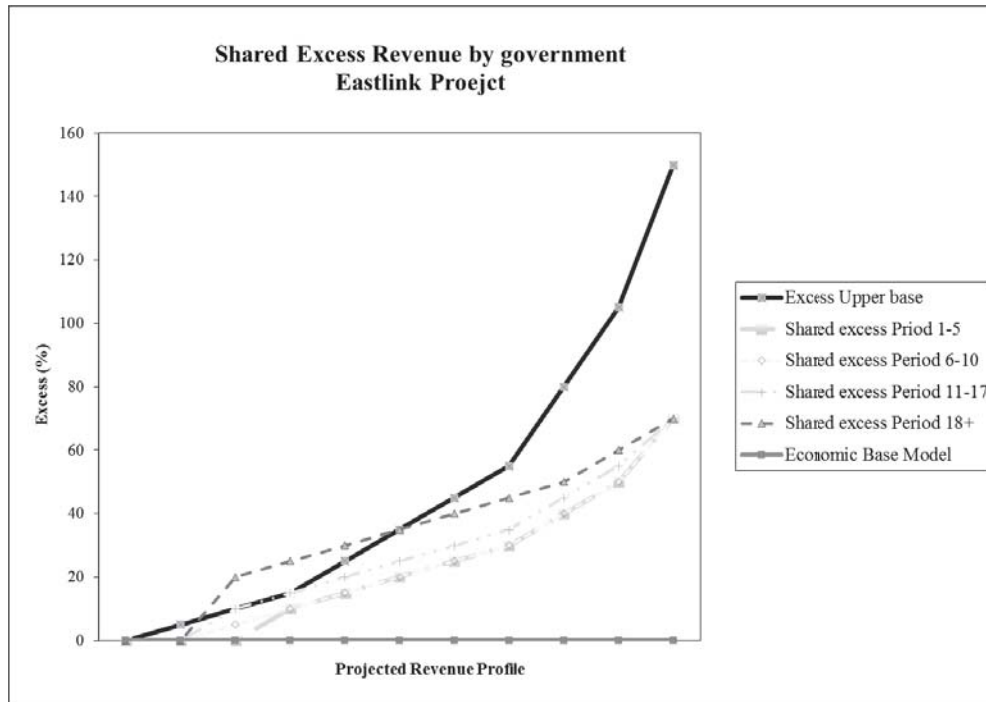


Figure 4. Shared Excess Revenue for Eastlink

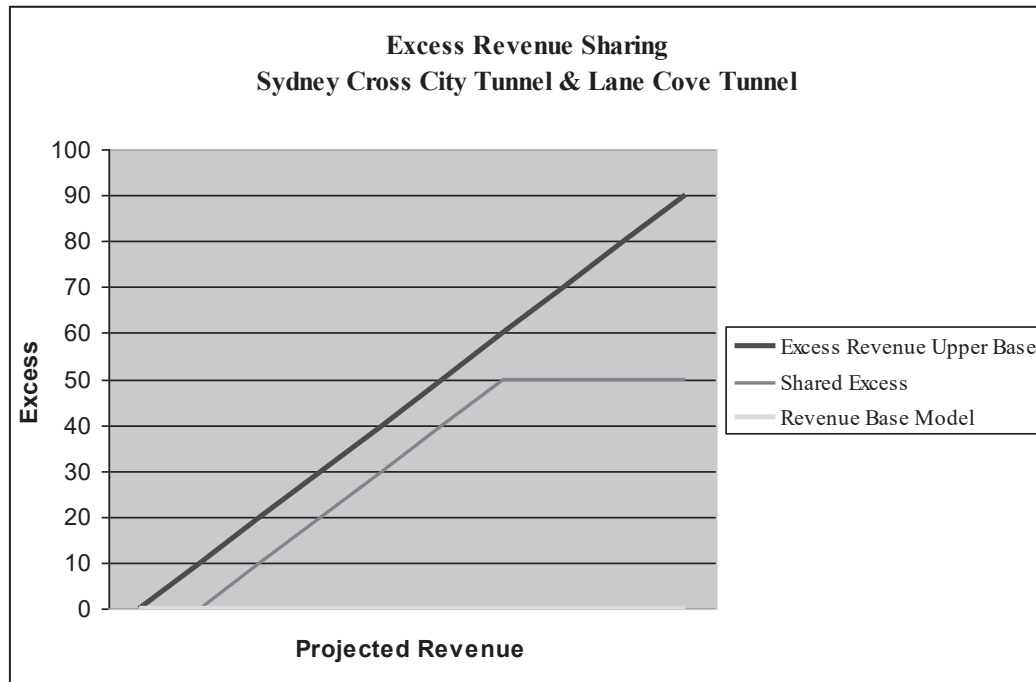


Figure 5. Shared Excess Revenue for Cross City Tunnel & Lane Cove Tunnel



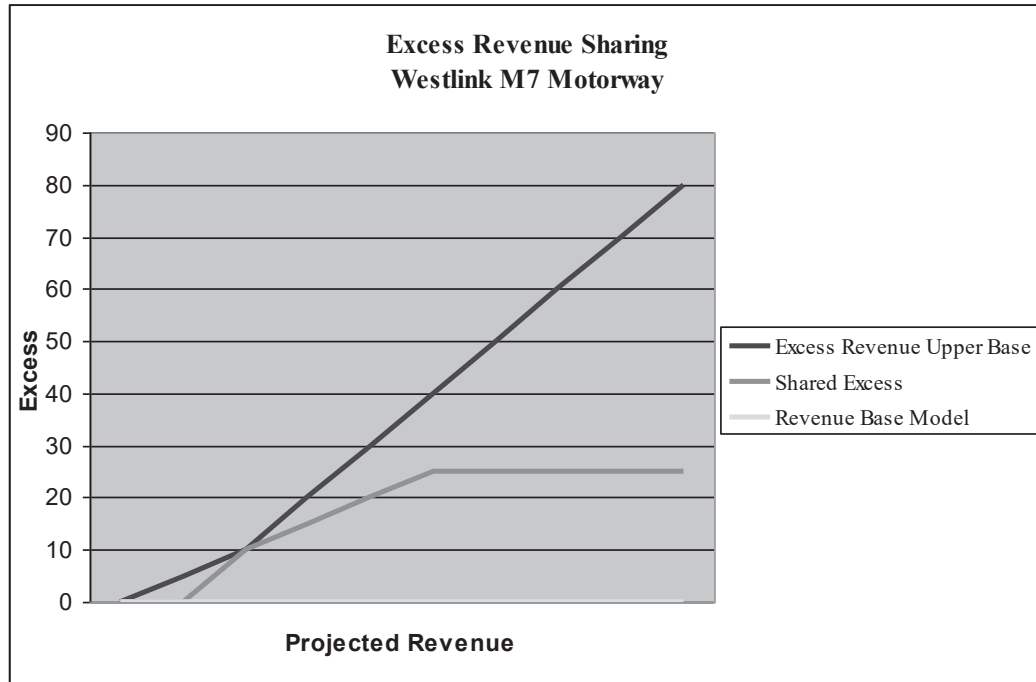


Figure 6. Sharing Excess Revenue for Westlink M7 Motorway

### Latest Progress and Information on the Case Study Projects

From the five case study projects, three of them, namely, Sydney Cross City Tunnel, Lane Cove Tunnel, and Eastlink, had faced commercial burden. The main reason was because the highest risks, which was the demand risk, would be materialized that in all cases the projected traffic demand was not achieved. The worst case had been experienced by the Sydney Cross City Tunnel which had asset that had to be sold to other investors. It was clearly evident that traffic demand would be a crucial risk; failing to meet the projected traffic flow would affect the revenue which would eventually influence the equity.

The findings of case study analyses of several PPP transportation projects in Europe by Roumboutsos and Pantelias (2015) have also suggested that revenue risk is crucial in transportation projects. Another issue raised in this analysis is the issue of integration of the project(s) into the greater transportation network which could influence the flow of traffics as the main source of revenue for the transportation project and could undermine the projects' success especially after the commencement of operation phase.

The latest analysis on Australia's PPP transportation projects was presented by Hodge and Duffield (2010) in which two projects were highlighted: the CityLink and Southern Cross Station projects (both in the state of Victoria). In the CityLink Project, most risks including construction, design, operation, financing and market risk, were transferred to the private sector. In this CityLink project, a bank, that is, Macquarie Bank, took the lead in the financial and project arrangement via its Infrastructure Investment Group. The Southern Cross Station Project was an upgrading project of an existing railway station. A similar risks arrangement was observed. The biggest risk in this project was borne by the private sector operating the existing station which the private sector must ensure that the station remained operational during upgrading work. In terms of financing, ABN Amro led the arrangement by contracting Leighton Contractors, Honeywell and Delaware North Australia to deliver and operate the development, via

SPV named Civic Nexus (DTF Victoria 2016). These two transportation projects again highlighted the major involvement of banks (the financial sector) as the leaders or the biggest equity takers in the arrangement.

A recent study by Carbonara et al. (2015) in the study of motorway PPP projects in Europe had identified five major risks: construction risks, revenue, financial risks, force majeure risks, and regulatory or political risks. The findings of this past study by Carbonara et al. (2015) had been similar to that of the current study presented in this paper which also indicated that the most critical risks in PPP motorway projects demand or usage risk corresponded to the revenue risks that had occurred during the operation phase. Further, Carbonara et al. (2015) also suggested a kind of risk sharing between private and public sector with regards to this risk through revenue sharing mechanism and revenue distribution mechanism.

The recent findings by these researchers of past studies have thus confirmed the findings of the current study presented in this paper. The highest risk is the traffic demand or revenue risk. However, other risks such as construction risks, revenue, financial risks, force majeure risks, and regulatory or political risks, must also be given thoughtfulness especially at the early phase of the procurement or starting at the business case development level.

## **CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH**

From the perspective of equity arrangement, risk allocation and revenue or payment arrangement, the PPP transportation projects in Australia had experienced a consistent arrangement which showed the maturity of this market sector. Inconsistency was observed only in the initial equity provision in which the amount of financier percentage had been reduced. However, the role of the financier as the leader of the project entity remained unchanged. In terms of the risks in transport projects, the most sensitive issue that had been given utmost concern by the contracts was the revenue or traffic arrangement risk.

Thus, the following recommendations are suggested for further research in this area:

- In regard to the PPPs transportation project, a thorough research should be conducted in order to find out the motivation of parties behind the willingness to put equity on the project. Firstly, from the contractor's point of view, that is, whether the willingness is motivated by ownership interest, controlling interest, or just an obligation to show a commitment to the success of the project. Secondly, from the point of view of the financiers, whether the focus is on the motivation to bear whole equity of the project or to be shared with others.
- Further research needs to be conducted is to find out whether the excess revenue is experienced by the PPP projects and to justify the effectiveness of the excess sharing revenue arrangement. This is important to ensure a fair arrangement is achieved, since the private sectors bear the revenue risk and whether this can be considered as an opportunity of both parties.
- Studies should also be conducted in other PPPs' sectors in order to: (1) determine whether the consistency of the arrangement has been achieved; (2) investigate the maturity of the market; and, (3) identify the unique features of PPP arrangement in other sectors compared with that of the transportation projects. Thus, the most

sensitive issue which may likely arise in creating a dispute for each sectors can be identified.

- The main objective of a PPP contract is to achieve value for money. Because the contract period of PPP is relatively long (more than 25 years), there should be an empirical method measuring whether the project has successfully delivered value for money. Thus, the lesson learnt can be immediately implemented on the foregoing project.

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