

**RISK ALLOCATION IN PPP TOLLROADS:
AN EMPIRICAL STUDY INVESTIGATING RISK PERCEPTIONS OF
AUSTRALIAN STAKEHOLDER GROUPS TO PPP TOLLROADS**

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Abstract:

This paper presents a qualitative assessment of the risk perceptions of key stakeholder groups in the context of tollroads operated under the Public Private Partnerships (PPPs) model. This study is the first phase of ongoing research that examines quantitatively, in the context of road infrastructure, the multidimensional nature of risk. The findings confirm that experience accumulated in recent years has contributed toward the betterment of risk sharing optimisation amongst the relevant parties. The knowledge acquired through in-depth interviews with stakeholders engaged in PPP tollroads has enabled a deeper understanding of the contexts in which risks are negotiated and assigned prior to financial close. Contracting parties share a common view that equitable risk-sharing is the vital ingredient of value for money. The arguments herein support the proposition that the private sector is better equipped to manage commercial risks involving economic decision making, while risks that have embedded unquantifiable social and public values and those in the domain of public governance are best left with government. Public perception is a malleable concept and should be managed by both sectors.

Keywords: Public Private Partnerships, tollroad, risk perception, risk transfer, risk management, value for money, interview

1 BACKGROUND

Public-Private-Partnership (PPP) tollroads are growing in popularity throughout the world. This is by large a response to the need to invest in road infrastructure as well as being due to the constraints on public budgets that are increasingly focussing on sectors such as education, law and welfare where the private market is more ambivalent about its potential role. Roads in contrast have clear market returns and have attracted growing interest from the private sector at a time when governments are stretched in their ability and willingness to raise public debt. Hence PPPs have been broadly adopted by governments as a financial means to procure, including but not limited to, infrastructure-based road services (Partnership Victoria 2000; HM Treasury 2006; WWG, 2006). A specific rationale of such a procurement policy is that greater value for money (vfm) to the public interest can be obtained through transferring risk to the party that is least risk averse (Arndt, 2000) and that is best positioned to manage it (cf., NSW Treasury, 2005).

Numerous studies (cf., Ball *et al.*, 2003; Grimsey and Lewis, 2005; Corner, 2006) have asserted that risk sharing is the *raison d' être* for vfm and risk transfer from the public sector to the private sector is prominent in PPPs (Li *et al.*, 2005a). On the other hand, the common concern shared amongst market players is that the ethos of optimal risk allocation that risk should be assigned to the party that is best able to manage it, has not been adhered to (see for example two studies that surveyed participants of PPPs: NAO, 2001; Grimsey and Lewis, 2005).

Road infrastructure is one of the most active markets for PPPs (cf., Ernst and Young, 2007), possibly because of its high levels of capital consumption and its low political sensitivity¹. Private capital is primarily explored as a financial means to solve a transport network problem, be it putting in a missing link or upgrading a vital arterial route. PPP concessions resemble the nature of a sale-and-lease-back finance lease whereby a government sells to a private consortium a *usus fructus*, the right to generate income from ownership (Buitelaar *et al.*, 2007), normally for a price named “upfront payment”, to finance, construct and operate an infrastructure asset and profit from the sale of ancillary services generated from the asset. The private operator is given the power to charge users directly², but has no financial recourse to government. In this light, tollroads are unique in the way that financial risk is transferred to the private sector with the cost of risk transfer borne by road users, and in the way in which government separates the financier and provider roles from its roles as the central planner and regulator.

The PPP concession bundles the finance, creation, operation and maintenance of the asset into one single package. The bundling concept incentivises the private entity to apply innovation in the financing package and in design and construction, thus facilitating cost savings over the asset's whole-of-life operation and maintenance. The concession period ranges from 30 to 99 years in order to enable the private concessionaire to recoup the cost of capital and earn a required rate of return (Chung, 2008a). Theoretically, these transport concessions should shield government from financial risk, demand risk, and operation and maintenance risk, and hence deliver better *financial* vfm.

¹ Roads are subject to political visibility at a much lesser degree compared to other modes of transport such as rail, bus and ferry where there is a strong presence of labour unions, and other public services like schools, public health services and prisons where service deliveries are mainly subsidised by taxpayers. This conception may have contributed to the mismanagement of public perception in various tollroad projects.

² With the exception of shadow tollroads in the UK regarding which the Highways Agency pays the private operator(s) a fee based on the vehicle kilometres driven on these private roads (NAO, 1998).

The extant literature suggests that the public sector and the private sector do not share a monolithic set of interests and objectives (cf., Meyer and Miller, 2001; Li *et al.*, 2005a), with the implication being that different parties have different perceptions of risk and their capabilities of risk management differ. Many market participants perceive the conflicting objectives inherent in a PPP project are one of the important barriers yet to be overcome (Li *et al.*, 2005b). Despite criticisms of the equitable risk sharing between the public and the private sectors (cf., Shaoul *et al.*, 2006; Pollock *et al.*, 2007), PPPs are here to stay. Not only do they provide an additional source of funding, but they also extend efficiency gains from market competition to infrastructure-based public service deliveries. Therefore, if risks and expectations are managed properly with a true risk-sharing partnership spirit, the betterment of risk allocation is likely to eventuate.

Our interest in investigating people's perceptions to risk are inspired by the Cumulative Prospect Theory (CPT), which predicts that decision makers consistently make choices based on their assessment of risks and uncertainties and that they often overweigh outcomes that are perceived as losses relative to outcomes that are perceived as gains, and overweigh moderate to high uncertainties relative to low uncertainties (Tversky and Kahneman, 1992). Anecdotal evidence indicates that distorted risk perceptions have in the past tended to undermine the success of PPP projects. Arndt (2000) found that most private firms failed to value potential upside risks as highly as they feared potential losses due to downside risks. Ball *et al.* (2003) supported the assertion that government officials have a propensity to overestimate overall risks.

The prediction of CPT has powerful inferences in the field of PPPs. Blanc-Brude and Strange (2007) analysed a large sample of credit spreads on debt extended to PPP projects in Europe over the past 15 years, and concluded that the debt market did price the project risks of PPPs consistently with the lenders' perceptions with respect to the size of the risks faced. A focus group study (Ball *et al.*, 2003) recruited a group of decision-makers who were essential to a number of PPP projects in various areas. The results postulated the overestimation of risks by subjective judgement. Weihe (2008) interviewed actors of PPPs from both the private and the public sector. A strong theme arising from these interviews was that an *a priori* assumption that these actors held about the motives and behaviours of their opposing partners may have inhibited effective co-operation. A similar interview study (Asenova and Beck, 2003) focused its attention on financial companies engaging in PPPs. It discovered that in the formulation of an initial judgement about a project's risks, risk perceptions of financial services providers overrode strong empirical evidence. A possible explanation of this discovery is that risk assessment is not a precise science, and that it requires a degree of speculation and intuition. There was a consensus amongst the interviewees that differences in the risk perceptions of different parties could create significant complications. The complications eventuated by contrasting perceptions were further attested to in an opinion survey by Li *et al.* (2005b) that tested the positive and negative factors surrounding PPP procurements against the perceptions of project participants in the UK. One more implication that arises from their factor analysis is that a sustainable PPP program must avoid a situation where private profit motives are seen as paramount, and accountability and social responsibility for public end-users are neglected.

Two as yet unanswered questions within the literature are: i) which party holds what perceptions to risk, particularly in the context of tollroads; and ii) to what extent do these perceptions have an influence on decision making with respect to risk allocation. The aim of

this paper is to address the first research question. The findings herein will form the basis of the research design in tackling the second research question, which will be investigated in the following stage of this ongoing research. The first research question is explored in five sections. The next section discusses the extent to which vfm has been gained through PPPs and examines some of the empirical findings in the extant literature. Section three explains the research methodology. Section four investigates the capability of risk management and the willingness to undertake risks by different sectors as perceived by the stakeholders being interviewed. Section five concludes the findings and sets the scene for future research.

2 VFM THROUGH RISK TRANSFER: AN EMPIRICAL VIEW

Discourses on achievement of vfm through risk transfer in PPPs are largely unsettled. Many empirical studies in Australia and the UK show that vfm gains from risk transfer are manifested in a number of dimensions, including cost savings to the public sector agency (Hall, 1998; NAO, 1999; AALSE, 2000; Ball *et al.*, 2003; Pollitt, 2005; Allen Consulting, 2007), project on-time delivery (Lay and Daley, 2002; MacDonald, 2002; NAO, 2003; Fitzgerald, 2004), and bringing forward planned capital expenditure to enable the community to have access to the infrastructure facility sooner (Malone, 2005; Allen Consulting, 2007).

It is arguable that savings arising from transferring the risk of *optimism bias* i.e., cost and time-overruns (Flyvbjerg, 2005) are unique to PPPs, since a fixed price construction contract yields the same benefit. The novelty of PPPs is premised on the surrender of the rights to control the asset to the private sector partner and the bundling of whole-of-life cycle costs. They create incentives for the private partner to use innovative financial packages and to undertake high quality investments at the design and construction stages in order to lower operation and maintenance cost (Li *et al.*, 2005a).

Fitzgerald (2004) empirically examined a number of PPP projects in the state of Victoria, Australia. He found ownership promoted innovation in design and technology used during the creation of the asset. These innovations, together with the whole-of-life approach to maintenance, have translated into significant vfm. Blanc-Brude *et al.* (2006) reached a similar conclusion in their testing of 304 PPP roads in Europe. They argued that ownership provided a spur to better risk management and hence greater cost efficiency and productivity.

The market principle depicts a propensity that the cost of finance is in part influenced by how the risks are negotiated between the public and private parties and the resultant risks assumed by the private parties. This is confirmed by Blanc-Brude and Strange (2007) that there was effective pricing of unallocated risks in PPPs. It is therefore expected that the private sector would profit from the risks offloaded by the public sector through risk premiums.

Critics question the likelihood of vfm after government has been charged an excessive premium by the private sector. The expensive premium represents the large profit margin added by the private sector to cover unfamiliar risks. For instance, the Highways Agency who let the first tranche of shadow tollroads in the UK was charged with an excessive premium for the new financial risk created under the predicted traffic volume (NAO, 1998). As noted previously, PPP projects tend to shield governments from the risk of *optimism bias*, yet it is ambiguous that the risk transfer has yielded any vfm. Using a large sample of PPP road projects in Europe procured between 1990 and 2005, Blanc-Brude *et al.* (2006) reported that although PPP roads were generally delivered on time and under budget, they were on

average 24 per cent more expensive than traditionally procured roads, suggesting that the public sector was paying more to transfer out the risk of *optimism bias*.

An inherent risk of PPPs lies in their risk allocation mechanism. Risk allocations are the outcome of negotiation between direct participants – the private proponent and the public sector agency, where the latter also negotiates on behalf of the end users (Li *et al.*, 2005a). End users have a significant stake in any PPP projects, therefore both government agencies and private consortia need to understand the desire of this major stakeholder group and determine what level of service at what cost is more desirable (Arndt, 2000, p.39). But concerns arise in regards to governance risk and risk of failing to assume social responsibility and to take into account the welfare of end users by the public sector. Hodge (2004) argued that the real risk issues within PPPs are governance risks which are hard to quantify. Based on empirical observations of risks associated with Melbourne Citylink (MCL), he contested that while commercial risks that had been transferred to the private sector were well managed, the governance risks were poorly handled by the government. He wrote that the lack of transparency on the MCL's concept and clarity about the financial arrangements, together with insufficient consideration for the public interest, led to the downfall of a *Good Governance Charter* platform. From the MCL case it can be seen that the government's confusion of its commercial and governance roles could potentially expose taxpayers to commercial and political tradeoffs. Moreover, governments often found themselves underestimating the risks of failing to assume social responsibility and taking into account the matter of public interest. English (2005) documented the failure of the Latrobe Regional Hospital case in the state of Victoria. A 20 year project failed only two years into the contract. Not only does it represent a commercial failure of the private hospital, but also signals a governance failure by government. Chung (2008b) investigated the public resentment over the Cross City Tunnel in Sydney (CCT), a tunnel that went into receivership a year after its opening because motorists refused to use the highly-priced facility. Both incidents demonstrate that while governments have successfully transferred out the financial risk, they failed to recognise that they were unable, in reality, to transfer the social responsibility and public accountability.

Overall, the mixed evidence in the literature has implicated that the extent to which risk transfers in PPPs offer vfm remains a subject of discursive debate. Ostensibly, the concern goes beyond the allocation of commercial risk and project risk to the terrain of governance, public interest and social responsibility. It is important, therefore, that the successful allocation of risks is also based on the knowledge of not only technical matters (e.g., travel demand estimates and cost of borrowing), but also the contextual environment that underlines the public perception with regard to private participation in public infrastructure.

3 RESEARCH METHODOLOGY

In-depth interviews were undertaken as a preliminary investigation for this ongoing study that examines quantitatively (using discrete choice modelling, data for which will be collected through a stated preference experiment) the perceptions of risk to PPP tollroad contracts. The intention of these in-depth interviews is to obtain a broad understanding from key players in the public sector bodies and the private sector firms, of their perceptions of risk toward PPP tollroads. The acquired knowledge will then be used to identify risk attributes and their concomitant levels for the design of a stated preference experiment. There may be other alternative methods to gather these preliminary understandings. However, to ensure realism in the collection of an overall impression of stakeholders' perspectives that helps to establish

the links between perceptions of risk and the required attributes, an unstructured in-depth interview appears to be the best alternative. It is anticipated that the knowledge arising from these interviews can provide a piece of the jigsaw to a wider study that is of quantitative focus.

To enable a balanced view, an almost equal number of interviewees were selected from the public and the private sectors who have been directly engaging in the decision-making of PPP tollroads. The remaining interviewees held current and past senior positions in State Auditor-General Offices in Australia. The majority of the participants with a public sector background but who had recently retired from the public service were quite comfortable in expressing their own opinions. Participants from the private sector are free from political influence, hence they were also fairly relaxed in discussing their views.

These in-depth interviews were conducted in an unstructured way in order to encourage participants to openly express their viewpoints based on their experience in dealing, negotiating and auditing PPP tollroad projects. A number of specific areas were covered in each interview. These areas were primarily based on participants' perceptions of: a) the public/private sector's capacity to manage risk; b) considerations driving each party entering into a PPP tollway contract; c) perceived benefits and gains arising from PPP tollroads; and d) the process for setting the levels of toll. A number of these areas were initially identified in a literature and empirical study by Chung (2008a). All interviews lasted between 60 to 100 minutes, and were tape-recorded (with permission) to ensure accuracy and to facilitate analysis.

This research is the first interview study, to our knowledge, that investigates the risk perceptions of PPP participants with a focus on tollroads. A similar methodology was employed in two recent studies. Malone (2005) examined the uptake of PPP projects by various Australian governments and discusses the explicit as well as implicit objectives and general views about PPPs. She commented that the expansion of PPPs in Australia has been primarily driven by governments' perceptions that value for money can be obtained from the use of whole-of-life costing, from the private sector's efficiencies in design, management and asset utilisation, and from efficient risk allocation (p.422). Weihe (2008) reflected on the extent to which PPPs in the UK deliver public values. The author contended that, *inter alia*, there may be a contradiction between achieving *financial* vfm and safeguarding traditional values of public administration such as equality, transparency, democratic accountability and governance by rule. While offering insightful material, neither study investigates the perceptions of risk nor do they make inferences about the extent to which actual risk allocation is a subject of these perceptions.

Two other interview studies focus on only a single stakeholder group in a PPP environment, the construction industry (Ezulike *et al.*, 1997) and the financial services providers (Asenova and Beck, 2003) respectively. Ezulike *et al.* (1997) interviewed nine construction firms of different sizes, and found that the high risk nature of PPPs was a significant barrier to entry. Asenova and Beck (2003) utilised data from interviews with experts of PPP project finance in the UK to describe the risks faced by this stakeholder group and the strategies they undertook to cope with these risks. Interestingly, the study shows overwhelming evidence that past experience and intuition were the most frequently used preliminary risk identification techniques, even in situations where there was strong empirical evidence indicating the otherwise. This suggests that perceptions of risk play an overriding role in forming the initial judgement about project risks. The paper concludes that there was inadequate consideration

given to political and reputational risks in the current financial risk management practices, therefore the current practices were insufficient for mutual learning between public and private sectors.

An Australian study (Arndt, 2000) interviewed and surveyed various stakeholder groups from the private sector who partook in Australian public infrastructure projects, and conducted seven case studies of Australian PPPs. There are a number of findings of this study that are of direct relevance to our investigation. First, the ways by which the various parties perceived risk varies depending on the aims and drivers of those parties and their ability to control those risks (p.43). Second, the manner and form of the risk allocation for a PPP project were the key drivers of the financial and contractual structure of the project (p.58). Third, the size of the private firm did not seem to affect the way in which that firm views risks and related issues (p.309). Fourth, the level of risk aversion responded weakly to the firm's accumulated experience in PPPs but responded strongly and negatively to the intensity of market competition (p.310, p.325). Fifth, competitive pressure was the driving force for the evolution of the PPP market, with the danger that governments would use this market force to transfer risks to the private sector that are beyond their capacity to manage (p.325). Sixth, different types of stakeholders, i.e. debt providers, equity investors and contractors, held markedly different views regarding the importance of various factors in influencing the final risk allocation for a project, and regarding the most misunderstood risk category (p.310). Remarkably, the evidence failed to support the proposition that a party's ability to bear a risk is a significant influence on its approach to the risk allocation negotiations (p.325). The overall result led to a conclusion that stakeholders of the private sector did not value potential gains as highly as they feared potential losses and hence risk premiums were not reduced as much as they could be (p.306). If this misperception about risks persists, it will be difficult for governments to push for symmetrical risk allocation.

Arndt's study is the first to investigate risk allocation in Australian PPPs. It hypothesised a number of propositions that are highly relevant to the present study. It is therefore interesting to find out whether the practice of risk allocation in Australian PPPs has changed over the past decade and whether perceptions of risk remain a strong factor influencing final risk allocation.

The following section presents the findings of the in-depth interviews in relation to risk perceptions of various stakeholders of PPPs, and the influences these perceptions had on their actions of risk taking and management.

4 RISK ALLOCATION AND MANAGEMENT

All participants were candid about their views on risk allocation as well as the respective capacities of risk management of both their own party and the opposite party. Noticeable disparities over which party should bear certain risks reveal the chronic tension between the public and private sectors in a number of areas. Interviewees agreed that risk assignment and management are important and unresolved issues in PPPs. They felt that the understanding of risk has evolved over time and across projects, and that governments are certainly becoming more sophisticated. Perceptions of risks definitely play a decisive role in risk allocation. This common view explains the international phenomenon that at the time when a private tollway was a fairly new concept and people had difficulties in perceiving associated risks, risk undertakings by the private sector were guaranteed by governments (Chung, 2008a). Recently, risk allocation has changed markedly in government's favour to the point where it

has gone past being a reasonable allocation of risks to becoming a risk dumping approach. Neither extreme represents optimality in risk assignment, nor will they deliver an equal partnership in risk-sharing.

The most mentioned risks are traffic risk, network risk, financial risk, risk associated with ownership, risk management within the Special Purpose Vehicle (SPV), risk of adverse industrial relations, *force majeure*, risk of competition, sovereign risk, risk of ill-defined project objectives, political and reputational risk, social dimensional risks, media risk and risk of negative public perception. Figure 1 synthesises the risk apportionment position supported by the majority of individuals interviewed. The private sector is seen as better equipped to manage commercial risks involving economic decision making because it is more acquainted with market discipline. Risks that have embedded unquantifiable social and public values and those in the public governance domain are best left with government. Fundamentally, a successful partnership requires the long-term commitment of all partners to a sustainable venture.

Some of the risk issues in the following discussion may not be unique to the road sector, with their manifestation in other areas offering a deeper insight for understanding risk management.

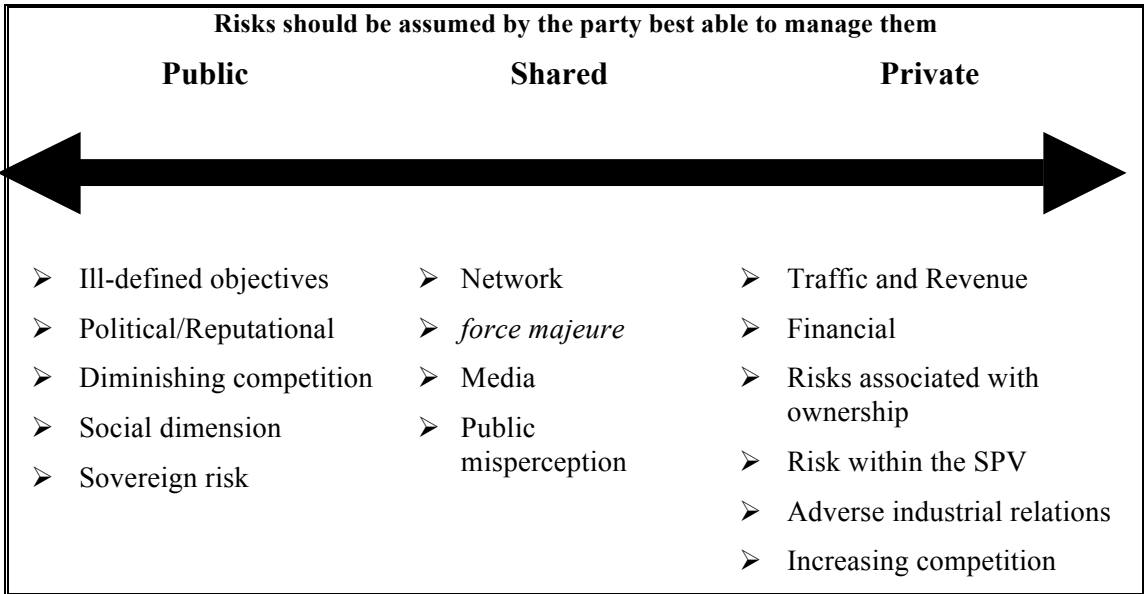


Figure 1: Base Line of Principles on Risk Allocation

4.1 Traffic risk

PPPs in the road sector work well in certain roads. These are typically urban or inter-urban roads with high volumes of traffic so operations are economically sustainable. All participants agreed that traffic risk is the greatest risk in tollroads. Many risks, such as revenue risk, risk of incurring high operating costs and risk of violating environmental standards are contingent on traffic volume. Traffic risk is the risk that governments want to divest the most.

Participants from the private sector believed that the private sector has superior traffic modelling techniques since they have better access to information and expertise. They can call on their partners who run tollroads overseas and who have done extensive market research. Most respondents considered that private firms are better able to manage traffic risk and did not regard transferring traffic risk by government as an excessive risk transfer. They were of the view that traffic risk is a great concern only during the ramp up period. Another critical domain is finding the starting point where traffic starts to grow rapidly. They were confident that the growing pattern would eventuate when users get used to the new piece of infrastructure and start changing their travel patterns. Volume of patronage will continue to climb up to a point where traffic reaches a steady state of growth. Past experience has demonstrated that traffic flow shows a steady pattern after the ramp up period.

Nevertheless, the private sector generally takes a less cautious approach in estimating traffic forecasts during ramp-up. Evidence suggests (the most recent cases are the CCT and the Melbourne Eastlink) that private firms have done poorly in predicting the periods of time it takes for traffic to get over the ramp-up hurdle and become stabilised. There are a wide range of parameters contribute to the source of forecasting error. These include demand elasticity of tolls, expected economic growth, population growth in the corridor, employment growth, growth in different types of trips, changes in trip patterns, strength of ongoing growth and the average length of trips. The difficulty in estimating long-term impacts is one of the greatest forecasting challenges. The reason being it generally takes a considerable number of years to make people: a) change their travel patterns; b) develop lower demand elasticity; and c) change land use, especially in a new route context where no other routes previously existed, like the Melbourne Eastlink. A problematic domain lies with the prediction of short trips. This may be due to the fact that the gain in travel time savings for short trips is insufficient to cover the toll cost. Unpredictable short trips were the main reason attributable to the overestimation of traffic on Sydney's M7 motorway, where the forecast during the ramp up period was seen as over optimistic in terms of the number of vehicles even though actual long trips have been better than forecast.

We asked for the reason why over-optimistic traffic forecast was so common, many respondents explained that increasing market competition has been the main contributor. Some episodes are documented in the literature. Fierce competition and market scepticism in regards to the commercial viability of a project would often pressure the private bidder to use optimistic traffic forecasts in order to win the lucrative contract, as in the case of the Eastern Harbour Crossing in Hong Kong (Tiong, 1995), CCT (NSWAGO, 2006) and Melbourne Eastlink (MEL) (VAGO, 2005). A further explanation is that the volume of predicted traffic has a decisive effect on the project's ability to raise finance, since project financiers are interested in the project's cash flows (Akbiyikli *et al.*, 2006), which come from user tolls. Being the main source of revenue, the traffic demand is a vital element in establishing the financial viability of a tollway. It is therefore also an important input in a project's financial model that is used to calculate the returns on assets. This might have motivated project companies to produce optimistic forecasts to enhance the investment's attractiveness to financiers and equity investors.

Toll saturation is a looming issue in Sydney. For example, a motorist travelling from the east to the west in Sydney will need to go through a number of tollways (the CCT, Lane Cove Tunnel, M2 and M7) with an accumulated toll outlay of A\$18-A\$19 one way. The respondents from the private firms did not consider that toll saturation was a threat to traffic demand because the benefit of travel time savings would outweigh the cost, especially for

freight. All participants made a similar remark that car owners typically have a low income elasticity of demand with respect to tolls (in the inelastic range). With the rising cost of living, in particular led by higher petrol prices, tolls are becoming a smaller cost of the overall trip. Tollways are inflation-neutral investments given that toll rates are generally linked to the Consumer Price Index (CPI)³. Such indexation further offers assurance to demand growth. In Australia, the Average Weekly Earning Index rises at a rate faster than CPI because wage earners share in the productivity or real growth of the economy, as well as being compensated for nominal price increases (NSWAGO, 1997, p.26). Effectively, the real cost of tolls goes down thus becoming more affordable to motorists.

Another key issue in traffic forecasting is the demand elasticity of toll pricing, particularly in areas where routes used to be free. This was of particular concern to the MCL which is the first private tollway in Melbourne. The private operator Transurban predicted that travellers would value their comfort of driving on a higher quality and less congested facility. This turned out to be a main appeal to commercial vehicles as manifested in the heavy truck use of the tollway (Lay and Daley, 2002).

Respondents agreed on freight traffic being a big revenue ticket. Therefore proper pricing and accurate forecasts of freight growth are important considerations in the forecasting model. However, freight trips are constantly underestimated and they are seen as a high user who receives excessive value over the price it pays for using tollways. Currently, freight distribution activity is being charged the same price as small trucks, so effectively heavy weight vehicles are being subsidised by other means of freight. For political reasons, governments are reluctant to allow greater toll differentiation. In the past respondents witnessed the trucking industry lobbying some government heavily to prevent the imposition of higher toll rates on heavy freight vehicles.

The greatest threat to traffic demand is, however, the institutional environment in which the PPP tollway is proposed, which generally escapes forecasters' attention. Public perception, the role of government and local resident support are the major elements that make up the institutional environment, which can be conducive or detrimental to the proposed PPP road. The CCT lesson, for example, shows for the first time that traffic modellers need to take into account the community's perceived resentment about a facility. It is important to realise that how a project is managed in the public realm is an important driver of resentment or support.

To reduce traffic risk, the risk-averse private proponent will seek protection not in a direct financial component but in terms of the scope of the project and in the way that it integrates with other parts of the network. It will seek to maximise the flow of traffic onto the tollroad by arguing for road closures or arguing against the reopening of closed roads as occurred in the case of the CCT. This has given rise to a host of network risks.

4.2 Network risk

Network risk is defined as access to the existing government road network and the feasibility of connecting to the existing infrastructure (Arndt, 1998). It affects the profitability of a private tollroad as well as traffic management for the entire road network.

³ With one exception: the Eastern Distributor (ED). To fund the modifications arising out of the Environmental Impact Statement process, the future increase in tolls of ED captures 37.5 percent of the CPI and 62.5 percent of the Average Weekly Earning Index whichever is the greater for each quarter. The indexation applied to the ED resulted in higher tolls and therefore greater cash flows to the private proponent (NSWAGO, 1997, p.26).

Arndt (2000) observed, back in the year of 2000, that network risk was the most contentious issue to resolve. He articulated that the private sector recognised the government had to retain the right to operate and manage the transport network including freeways and public transport at the same time the private sector had to have enough certainty to justify the traffic predictions and the project's financing on a non-recourse basis (p.198). At present, network risk remains the issue that has the most divergent views albeit all participants felt that a tollroad, by definition, especially in the urban environment, is beholden to the network around it which the operator does not control. In line with Arndt's observation, the dilemma lies with the conflicting objectives of managing the network risk by both sectors.

From the private sector's perspective, network risk management should provide assurance of the tollroad's profitability and it is best handled by government for the following reasons: only government has the power to acquire land compulsorily, to enact policies to put in/eliminate competing routes and to facilitate access to the tollway. From the government's perspective, who is concerned with the connectivity of the transport network, the mobility of the community being affected, and congestion problems at network bottlenecks, any tollway ought to be a vital part of urban planning.

There is a tendency for private operators to minimise the options for competing free routes in order to increase the prospects of patronage. Public policies on traffic demand management, often as the result of the private operator's persuasive effort, are typically implemented to mitigate against network risk. For example, private operators of urban tunnels would negotiate with government to impose road changes in order to enable the private tunnel to capture surface traffic. It is arguable whether these actions will deliver greater vfm to the whole community; indeed some of them are more likely to create an adverse effect. Road changes to surface roads above the Lane Cove Tunnel (LCT) in Sydney received a positive response from the local community. Lane Cove Road is the major arterial road connecting North West Sydney to the centre of Sydney and there is a high proportion of the working population living in North West Sydney which relies on public transport. Funnelling private cars into the tunnel offers significant time savings to users of high occupancy vehicles like public buses. On the other hand, changes made to surface roads above the CCT connecting from the eastern suburbs to the central business district produced political backlash. Given that the use of public transport by eastern suburb residents is relatively low, there were serious doubts about the vfm brought about by expanding bus lanes and channelling private cars into the tunnel. It represents a demographic attribute that was not accounted for in the traffic modelling and the subsequent construction of the tunnel.

The fragmented network in Sydney is partially attributable to the fact that interconnecting tollways are operated by different firms. This condition has created some serious bottleneck issues around joint points that have seen the operators of the M2 and M7 denying responsibility for this problem. These issues would have remained had Transurban, who is also the main owner of the M7, not purchased the M2. Another bottleneck issue is associated with cost savings on labour by private operators. Efficiency of mass movements of traffic on certain roads may place constraints on the rest of the transport network, especially around bottlenecks. It is equivocal from a network point of view that savings from reduced staff in a single part of the network would generate efficiency gains for the whole network. Some private operators are seen by other market participants being unwilling to bear the bottleneck risk.

Although PPP tollroads are only pieces of a jigsaw in an integrated road network, private ownership restricts government's ability to improve network efficiency. Three examples in Victoria are in line with what Froud (2003) named as an inherent risk of PPPs: that these complex contractual arrangements deprive partners of some degree of flexibility. One is the tram and train franchise in Melbourne. There was a considerable increase in patronage and yet the government's hands are tied under the contract – it was unable to step in and take measures to solve the over-crowding problem. Another is the redevelopment of the Dockland areas. The redevelopment by the Victorian government triggered A\$37 million Material Adverse Effect (MAE) claims built-in in the MCL concession because there were roads running through Docklands that competed with the private road (Hodge and Bowman, 2004; Brown, 2005). The third example is the moribund regional freight network that was privatised by the Kennett government. The private ownership became an obstacle for the current Labor government preventing it from improving the regions and developing transport links, which was only resolved through the state's buy-back of the privately owned network.

Clearly, divergences in objectives are a barricade to a mutually desirable network risk solution. The willingness of government and private operators to work collaboratively in reconciling these differences is the only way to mitigate this risk. Although the power of network planning rests with government, there is a substantial amount of contribution that the private operator can make toward upgrading the network to make it more conducive to the profitability of the tollroad. Empirically, such willingness seems to bear fruit. The A\$150 million upgrade to the arterial feeding into Sydney's M7 initiated by the RTA was made up of financial contributions from the Australian Federal Government as well as the private consortium. The upgrade not only has had the effect of improving patronage for the M7 but also benefits the local community. The philosophy of Transurban, an active PPP proponent, is to work with government to improve the road network for the benefit of both. In 2005, the company invested A\$151 million to upgrade the bottleneck at the Tullamarine-Calder Freeway interchange near Essendon in Melbourne (VAGO, 2007). Currently, it is investing a billion dollar upgrade on the West Gate Freeway. Both free links feed into the MCL. The upgrades relieve traffic congestion and reduce pollution as well as having the effect of improving traffic flows into the MCL.

4.3 Financial risk

Financial risk refers to the variability in returns that an asset is expected to earn. It is typically affected by market confidence, public perceptions, consumer attitudes, environmental threats and perceptions of misconduct (Asenova and Beck, 2003). The allure of PPPs has been captured by the discipline of project finance. PPPs force a project to service any financial debt from the revenue streams derived from the project itself without recourse to public funding (cf., Debande, 2002; Li *et al.*, 2005b). One apparent benefit of transferring project finance risk to the private sector is risks are subject to the ruthless scrutiny of commercial practice and extensive due diligence related to the quantification and allocation of risks that private sector risk-takers carry out on projects (Corner, 2006). Further, the private sector has access to a wider range of financial products in the international market. These resources have facilitated the formulation of the best financial packages. Having private finance at risk supposedly harnesses the private sector's risk management skills. Many respondents believed that the way that the project finance is packaged is where the real competitive advantage should be.

To private consortia, because finance cost is the most expensive item, they are motivated to find better ways to drive cost down. The decision rule to enter into a concession depends on

whether the project yields a positive risk-adjusted net present value. This condition is contingent on the degree to which commercial risks can be mitigated contractually upfront. Sophisticated financial instruments such as infrastructure bonds, stapled securities, fixed-rate loans, mezzanine loans, hedging, and insurance have been developed to mitigate against financial risk.

A rule of thumb is that private equity normally bears the risks that cannot be or are too costly to be mitigated against because equity has greater risk tolerance since it shares the project's upside gains – a benefit that is not open to debt providers. Identifying the best financial package is one of the comparative advantages that the private sector possesses. The simple logic entails that lenders are more conservative and thus require a much narrower band for risk errors, particularly so in new roads. This requirement inevitably drives up the cost of finance, and hence equity is preferred. Asenova and Beck (2003) reported that finance companies preferred that risks that were difficult to mitigate but remained with the consortia to be supported by equity rather than debt.

Despite the recent financial turmoils with the CCT and the LCT (cf. Chung 2008a), market participants remain sanguine about the future of PPP tollroads. They are all cognisant of the fact that motorists value the comfort of driving in private cars, and hence the demand for tollways is likely to remain strong providing they deliver genuine time savings including reliability gains. Further, tollroad investment has strong appeal to superannuation fund managers because it offers investment opportunities that have the similar term to maturity (Malone, 2005). With the concept of user-pays starting to gain greater acceptance, if risk allocation is managed equitably, there will be a growing market for PPP tollways.

4.4 Risks associated with ownership

Passing over the risks associated with ownership, mainly design and construction, operation and maintenance risks, is one of the advantages of PPPs as it allows government to exploit the private sector's expertise. Underpinning the idea of private ownership is that the greater the autonomy and flexibility in investment decisions, the higher the productivity efficiency. It is expected that ownership right would motivate a private firm to employ cost efficient means that are beyond what is possible under traditional procurement methods to maximise commercial returns. This expectation corresponds to incomplete contracting, which suggests that the assignment of ownership rights of the relation-specific asset (an asset that has no alternative use except for those specified in the contract) would alleviate underinvestment problems (Williamson, 1979; Hensher and Stanley 2009).

4.4.1 Design and construction risk

Ball *et al.* (2003) has established that decision makers' perceived risk transfer was dominated by the design quality and construction cost risks. In like manner, Shen *et al.* (2006) has verified that compared with traditional procurement, PPPs have done better in mitigating design and construction risks because they encourage a long-term view of the design and construction with the focus of minimising life cycle cost. But the transfer of design and construction risk *per se* does not deliver vfm. First, the cost of assuming *optimism bias* is priced into the private firm's financial model and will be recouped from user tolls. Second, it does not need a PPP to transfer construction risk as a fixed-price contract can yield the same benefit. The *hard* vfm is associated with efficiency gains from the private sector's expertise, who possesses 'learning efficiency' from actively engaging in the construction of urban motorways. Such superior efficiency is manifested in a number of PPP roads (e.g. MCL and MEL) that exhibit notable innovative design and construction techniques (Chung, 2008a). On

the other hand, governments do not normally have the speciality in construction and is less likely to have access to international expertise like the private sector does.

Transferring the design and construction risk offers certainty in government budgeting and further passes on performance risk to the private party. Commercially-driven private firms have more flexibility in implementing the means to derive a desired outcome. A private sector participant informed us that his firm awarded the constructor a A\$50 million bonus for finishing the project eight months ahead of the schedule⁴. Government does not have sufficient incentives to drive outcomes forward because it is mandated to adhere to process-orientated performance outcomes. Since construction companies can accelerate return by early completion, it explains why PPP projects generally show promising performance in on-schedule delivery⁵.

Innovation in design has become a commercially sustainable factor in the case of MCL. At the time the MCL concept was formulated, two short tunnels were proposed, but they soon became a serious concern to the government and the local community (Lay and Daley, 2002). Transurban proposed an innovative design that involved a longer tunnel in place of the short eastbound tunnel in order to minimise the impact on the local environment. Although the new concept adversely affects Transurban's revenue, it indicates Transurban's awareness of the broader community, which has earned it significant community respect and support.

4.4.2 Operation and Maintenance risks

These are risks during the operational phase which may affect the profitability of the operator, such as changes in technologies, variations in input costs or components for maintaining and repairing the facility (Shen *et al.*, 2006). In tollroads, they further include the ability to penalise non-paying motorists, and risks associated with meeting safety and environmental standards (Arndt, 1998).

One of the notable benefits brought about by PPPs is the tolling technology. The electronic free flow tolling used in the MCL was the first in Australia. Since there was no real field experience at that time, reference to the impact on consumer take up and use was not possible. This constituted a significant risk to the private operator. But MCL has proven that the market accepts cashless tollways because any increase in toll charges is outweighed by savings in travel time⁶. The revenue risk of a fully electronically tolled way will be amplified in the absence of a disciplined enforcement system because it is difficult to stop a motorist driving on an electronically tolled road who has not made payment arrangements with the operator. The enforcement system relies on government's policing and legislative powers to ensure that non-payment for use of the road will be financially sanctioned. Arguably, this is a shared risk between the operator and government.

⁴ This is not to say that there exists any prohibition limiting governments from making such payments to encourage early completion. A participant informed us that, at the time when the Australian Federal Government was the owner of the Sydney airport, the government paid a bonus of a similar nature for the early completion of the second runway at the airport.

⁵ Three recent tollroads in Sydney and Melbourne were completed 4-6 months ahead of the contract completion date (cf. Chung, 2008a).

⁶ Unpublished research by Hensher and Rose has shown that making tollroads cashless, in situations where the tollroad previously had some cash payment booths, actually reduced revenue in the short run. This is due to the reluctance of specific segments such as the elderly and infrequent travellers, to obtain and use an electronic tag facility with direct debit or other credit card payment mechanisms. This constraint will disappear in the long run.

Ideally, the bundling concept will maximise efficiency in the operation and maintenance phase to give the best whole of life outcome. Combining the designer, the builder and the operator into one entity incentivises the designer to deliver a concept that is suitable to build and the builder to construct a facility that is suitable to operate and maintain in a manner that is cost effective. In contrast, government quite often is disconnected in this respect. One participant revealed that facilities delivered under the traditional method are structured along asset divisions and operations, and that the asset division would build the facility without giving sufficient thought to how it will be operated or how it will be maintained. All these ideas of bundling responsibilities and ownership seem to fit well in the theory of incomplete contracting (Hensher and Stanley 2009). Empirically though, incomplete contracting theory fails the PPP roads for two most noted reasons: a) many private consortia do not intend to hold on to the asset for long; and b) during the operational phase, the private operator will do the minimum to save operating costs. An example is the operation of ventilation stacks in tunnels. They are being run only to the extent that is barely sufficient to pass the key performance indicators linked to environmental standards.

4.5 Risk management within the SPV

Public private partnerships bundle a host of complex contractual obligations within multiple private sector partners. These intermingling interfaces are managed through the SPV, a separate legal entity organised by members of the private consortium for each stand-alone project (Kozarovski, 2006). Its main purpose is to isolate the project’s specific risk from contaminating members’ main business. In order to manage the project risks, the SPV enters into a number of additional contracts with different parties (see Figure 2).

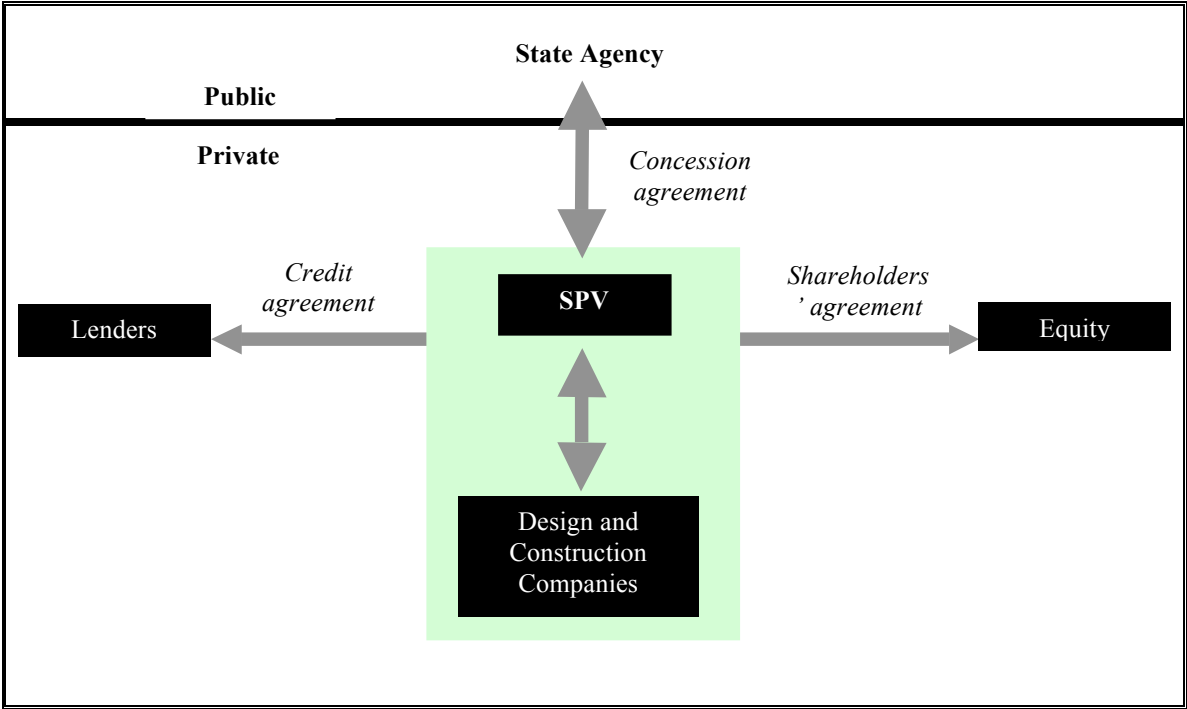


Figure 2: Contractualisation within the SPV

The interface between the various parties within the SPV can at times have negative effects on the delivery of PPP tollways. Construction companies are more interested in building the

asset and making a quick fare, and generally have a poor track record of operating tollroads for the full length of the concession period as they are not normally structured or funded for long-term capital commitment (Forward, 2006). Merchant banks generally approach PPP tollways as a financial deal rather than as a construction strategy, and the operator is more interested in long-term returns. Arndt (2000, p.310) has established that different parties within the SPV held markedly different views to various risk components, depending on their roles in the project. Because of these divergent interests, it is not surprising to see comments from SPV partners about the difficulty of reaching agreement on risk assessments within the group (cf., Asenova and Beck, 2003). These concerns materialised in a couple of tollways. The MCL experienced a series of legal disputes between the private parties which delayed its opening (Hodge, 2004). The several false openings of the CCT were clearly the result of a poorly managed internal process.

Some bystanders felt that the successful management of strained relationships between the parties due to their different expectations is critical for a successful project, with enhanced public reputation. This aspect will be further explored in Section 4.14.

4.6 Risk of adverse industrial relations

This risk is interpreted as the risk of strike action by employees carrying out various duties or business activities during the development and the operating stages (Shen *et al.*, 2006). An opinion survey of risk allocation preferences in PPP construction projects in the UK suggested that this risk should be primarily allocated to the private sector (Li *et al.*, 2005a). Many respondents we interviewed concurred with this view.

The transfer of risk associated with industrial relations has compelling appeal to service sectors where a strong unionised labour force is present. By having the workforce at arms length rather than as government employees, this risk becomes a management issue within a business organisation. The private sector can, within limits, structure industrial relations in such a way that it can afford the same level of service at a lower cost.

4.7 *force majeure*

This includes events of natural calamities such as an earthquake and wars that are beyond the control of either party (Arndt, 1998; Shen *et al.*, 2006). Of these uncontrollable events, insurable risks are generally borne by the private sector, those that are uninsurable or too expensive to insure should be shared between the two parties.

Through insurance, the SPV allocates the risks to an insurer and passes through the premium costs in its bid price. Uninsurable *force majeure* events are covered under the MAE clause. The MAE approach seeks to define certain risk events which will be borne by the government, or shared, and defines a mechanism for redress of the aggrieved party if one of those events crystallises and causes a MAE to the project. Mechanisms may include reference to an agreed financial model in order to determine objectively any effects on the project. Alternatively, analysis may be limited to an independent, open book audit of the project (Arndt, 2000, p.280).

A survey study showed that the MAE approach was well supported by private equity, financial advisers, sponsors and contractors but not debt providers (Arndt, 2000, p.303). The same study also revealed that the private sector realised it was unlike that they would obtain a direct financial contribution from government in the event of risk of *force majeure* occurring. They were inclined to a tariff increase and an extension of the concession as a redress (p.304).

In our study, the private sector participants expressed that they regarded the category of *force majeure* was too restrictive. Recently, after extensive lobbying, the Victorian government has considered broadening the events to include utility services interruption during the operational phase, floods, ionising radiation, and contamination by radioactivity. The private sector also preferred a more transparent approach to renegotiate with government if a MAE risk eventuates.

4.8 Risk of competition

Some respondents felt strongly that a key dimension of PPPs is the competition to provide the asset and the associated services through the market tender. A market tender does two things. It allows government to search for a suitable provider from a menu of proponents and therefore creates scope for innovation⁷. Further, it is the very nature of the competition itself that creates value because it can actually force bidders to improve the quality at a reduced price.

Ideally, the deeper the market competitiveness the greater should be the vfm. However, with only a few market players in the mega-scaled transport sector, competition is unlikely to be present. In the late 1990s, Ezulike (1997) pointed out that high project values, high participation costs and the complexity of PPPs would act as a catalyst to the consolidation of market participants. Li *et al.* (2005b) extended this notion and confirmed that the complexity of PPPs and high participation costs remained barriers that have weakened the vaunted competitiveness that PPPs propose to deliver. Moreover, the added-on reserve imposed by Treasury⁸ increases the premium for risk bearing. This added-on condition further consolidates the market in which only a few big firms that have strong balance sheet can afford to undertake PPP businesses.

Albeit globally there is resurgent interest in tollroads, which appear to have greater support by governments than generalised road pricing, governments are increasingly faced with a diminishing number of proponents (although this appears not to be the case for tollroads in Australia). To this extent, it is fair to say that governments do not have real bargaining power if they go down the PPP route.

The discussion on competition reveals another interesting concern of the public sector comparator (PSC). Supposedly, the PSC acts like an independent bidder that holds the public sector's reserve price. The idea is that it offers government a walk-away position especially when facing only a few bidders. But on many occasions, governments, for better or worse, have decided to have no walk-away reserve. The decision has limited the competitive role a PSC could serve. In the case of the MEL, since the government publicly made a decision that the project was going to be a PPP, no matter how many resources were spent delving into a PSC, it would not have made a difference, because public procurement had been excluded as an option. More intriguingly, no respondent could identify a situation where a PSC had won over the private option in Australia's history of PPPs. This poses the question as to whether

⁷ This process has escalated in cost over the years. It is not uncommon to have three consortia bidding and spending up to \$20m on their bid documents. Since only one wins, the losers have to try and recoup the loss in subsequent project bids. In Australia there appears to have been a relatively even spread of success amongst the main construction and financial participants.

⁸ The added-on reserve was revealed to us by one of the participants. In one country which by far is the most active in PPPs, the treasury will impose a typical 40% mark-up on whatever cost is budgeted by the public agency for roads.

the PSC is a worthwhile exercise or merely a political fabrication to legitimise the private option.

As explained in Section 4.1, market participants felt that competition, to a very large extent, can tip the scale of bargaining against a particular party's favour. On occasions competition drove private bidders to compete on levels of risk that they were prepared to accept. It seems that the danger warned by Arndt (2000) that government would use competitive pressure to over-transfer risks has materialised. Recently, increasing market competition has strengthened governments' bargaining power and has seen risks that are beyond the private sector's capacity to manage were dumped to market participants.

4.9 Sovereign risk

Under increasing market competition, the private sector, especially financial institutions, would require assurance that their agreements would continue to be enforceable during the life of the PPP project (Asenova and Beck, 2003). The uncertainty in legislation and government policy that may adversely affect the project's profitability has given rise to sovereign risk (Arndt, 1998). It is particularly relevant to PPPs because of the long duration of contractual obligations.

Sovereign risk management is primarily the responsibility of governments. It is important that governments maintain a stable, coherent and transparent political structure to facilitate private participation. In this regard, Norton de Matos wrote:

Private development of infrastructure projects can only happen against a background of political stability, coherent and consistent industrial, investment and economic policies, clear and transparent legislation allowing for the involvement of the private sector in specific areas of the economy, and available of foreign exchange for the repayment of offshore debt, if applicable, and the repatriation of profits (1996, p.11; cited in Arndt, 2000, p.30).

In Australian PPP market, the private sector has been supportive to research that would facilitate the development of a consistent and coherent policy to risk allocation by government (Arndt, 2000, p.281), indicating the importance of a stable political structure to the market. Policy fragmentations among government agencies with respect to PPPs and tolls would have inflationary pressure on participation costs. Typically, the average participation cost of these mega projects ranges from A\$10 to A\$20 million. The private sector strongly advocates a single simplified approach in the procurement process to be followed by all government agencies.

The HM Treasury in the UK is a centralised unit responsible for coordinating all PPP projects, hence the UK is seen to have a more consistent PPP policy structure. It has allowed the development of a set of standard documentations and a single framework for bidders to operate in, with obvious efficiencies in the tendering process and much shorter bidding periods. Dealing with one central agency and complying with only a single set of consistent guidelines has significantly reduced tendering costs for the private sector.

In private participants' view, the Australian market involves different approaches to the procurement of infrastructure by different government entities, with no single model or policy framework in place. The situation is even more problematic in NSW. There exist some inconsistencies in PPP policy at different levels of government. In the early days, Treasury's

role in PPPs was limited to offering advice to the government and taking part in the Budget Committee of Cabinet (all capital works require the approval of this committee, see for example, WWG, 2006). Early deals were mostly closed by public agencies without consultation with the Treasury. Project reviews by the government and the office of State Auditor-General were undertaken on an irregular basis. In addition there is still an absence of guidelines and budget appropriations for *ex post* evaluation on PPPs in order to provide taxpayers and investors with information regarding the rises and falls of these projects. Victoria on the other hand has a better-defined regulatory framework called *Partnerships Victoria* to countenance PPPs, which assures international investors with a degree of confidence in partnering with the state government.

Overall, however, international investors have confidence with the Australian market. Australia is a stable democratic country with state governments that are seen as gradually evolving and improving in their dealings with the private sector to build a better partnership. Nevertheless there is scope for a uniform, national approach to PPPs in Australia. It is hoped that under the leadership of the recently established *Infrastructure Australia*, a federal agency established by the Rudd Government, there will be a more coordinated approach to PPPs across various levels of government.

4.10 Risk of ill-defined project objectives

It is easy to lose sight of the tradeoffs between invited private innovative ideas and clearly defined project objectives. Literature praises PPPs for the allure of better-defined and controlled services through tight contracts (Hodge and Greve, 2007). On the other hand, unclear and poorly-defined objectives will expose government to a series of new risks including weakening bargaining power and adverse equity impact. The standard public procurement process requires project objectives to be laid out in an Environmental Impact Statement (EIS) which must be publicly exhibited in order to obtain community approval (Chung, 2008a). Therefore, where the EIS sits in the process is important as to who assumes the related risks.

Offering an uncertain project to market tendering opens unlimited scope for negotiation which can be lengthy and costly. The Eastern Distributor (ED) in Sydney was initially put to the market with a set of vague objectives. The tender document only mentioned that the government wanted a road built and invited the private sector to scope out the design, the levels of toll charge, the overall cost and financial arrangements. After selecting the 'best' proposal, the government then undertook the environmental assessment on the best project. This approach would have worked, assuming that the community had accepted the proposal. But the community rejected the proposal. Since the government had chosen the preferred proponent in the absence of community approval, this left the government in a very difficult position to renegotiate. Effectively the government took the risk on the EIS not being acceptable by the community and then had to negotiate with only one proponent on changes requested by the community. The ED took many years of intense negotiation to reach the final close. During the long period of time, project scope had changed considerably and all the intellectual property belonged to the tenderer. The situation hamstrung the government's ability to reopen the tender to the market. In the end, an extra A\$140 million worth of construction work was added to the original proposal and the private ownership was extended from 38 to 48 years to cover the increased cost.

The CCT in inner Sydney is a classic example of an ill-defined project. It originally started as a road solution but soon became an urban design solution to improve the surrounding

neighbourhood. The initial idea was to remove traffic out of the centre of Sydney. A short tunnel would have been sufficient, and would have cost a lot less, but it would not have provided the advantage on improving the design of the major surface street involved (William Street). The then Lord Mayor of Sydney had a grand vision for William Street in which Oxford Street, William Street, Broadway and Taylor Square would become key boulevards after the major upgrade. When the Roads and Traffic Authority of New South Wales (RTA) approved the EIS for a short tunnel design, the then Mayor who had become the NSW Planning Minister lobbied the government to actually have it widened. The government subsequently accepted a non-compliant private proposal that would satisfy the broader, more ambitious vision of urban redevelopment. As a consequence, a modified EIS had to be prepared. The private proponent foresaw that the new EIS would increase the project cost to government and at the same time expose the government to extra funding risks. Unless the new proposal could demonstrate sufficient traffic volume to cover these new risks, it would be unlikely that the government would accept its proposal. The consortium subsequently produced a highly unreasonable traffic forecast to ensure the project proposal obtained its approval (JSCCT, 2006a).

Under the new project all pedestrian pavements were widened, road lanes were reduced and bus priority measures were put in place. This converted the tollroad project into an urban design solution with motorists in effect subsidising the costs of the urban improvement. More than half of the benefits from the tunnel were designated to accrue to non-motorists. This resulted in a serious inequity because motorists were being charged a fee to cover the cost of the tunnel and to provide a subsidy towards the cost of urban redevelopment.

The CCT has generated significant debate about whether tollroads are equitable investments. Should they be paid for by taxpayers who may never need to use the facility, or financed out of user charges? If they are financed out of user charges it is debatable whether motorists are being charged at an equitable price that is commensurate with the benefit they derive from the facility. Although the CCT project was deemed successful in terms of allocating *financial risk* and having a longer-term potential in improving urban amenity, it failed on the grounds that government was unable to deliver vfm in the public interest⁹.

⁹ Two State Government inquiry reports concluded (JSCCT, 2006a; 2006b): 1) that there was an insufficient evaluation of the public interest before the decision was taken to open the project to the private sector. The reports also concluded that the current public interest evaluation contained in the *Working With Government Guidelines* was not clear; 2) While the project may have resulted in no net cost to government, it has resulted in significant cost to the community, through higher than anticipated tolls and added inconvenience for the users of local roads in the area between the East and West tunnel portals, leading to considerable frustration and anger and potentially leading to a political cost to government; 3) A separate, more detailed, policy on privately financed projects should be developed solely for government agencies. The policy should provide clear and unequivocal processes and procedures to be followed by agencies entering into privately financed projects, and provide avenues for escalation of issues where these may require variation from the standard processes and procedures; 4) There was concern that the secondary objective of 'minimisation of the financial cost to government', which the Committee inquiring into the project understood to effectively mean 'no cost to government', was the overriding concern at the time of the preparation and assessment of the supplementary EIS; 5) Subsequent alterations to tolls, traffic levels and traffic management measures were made both during and following the supplementary environmental assessment process. These changes appear to have occurred without the depth of analysis or assessment that was undertaken for the initial EIS; 6) Not enough attention was given to strategic planning at an early stage of the project, despite agencies that gave evidence to the Inquiry indicating that they followed Government policy in the consideration, planning and assessment of the CCT project; 7) A clear message from the CCT experience was that the community living in the area affected by the surface road changes associated with the tunnel felt that they had been ignored, misinformed, and treated with indifference or even contempt; 8) The apparent degree of animosity between community groups with opposing views on the status of Bourke Street was regrettable, and may have severely impacted on the success of

Tollways have discernable influences on land use decisions. Over time, urban planning has broadened the scope of PPP tollways beyond a simple transport task. During this evolutionary transformation, private provision is being captured by urban planning and planners rather than traffic engineers, worsening the ‘fuzziness’ of project objectives.

Beesley and Hensher (1990) noted almost two decades ago that for private provision in roads to be socially sustainable, they need to be part of the broader planning process. Albeit it is two decades old, the problem of disintegration remains a highly controversial issue in PPP tollways. The dilemma has been how to use private capital effectively to fulfil the objectives of an integrated transport network plan. Careful considerations need to be given to a number of parameters: the objectives of a specific tollway, is it going to be part of urban planning or traffic demand management; and how to make risk sharing equitable to enable private capital to service the underlying objectives in the public interest. If the objective is urban planning to encourage usage, a toll should be set at a sufficiently low level to induce usage. This may require subsidies from government to entice the participation of return-driven private investors. If it is traffic demand management, the contract should specify the outcome parameters and allow the proponent the freedom to set their own tolling levels that satisfy these targets. Being in charge of daily operations, the operator has superior knowledge in terms of the varying levels of toll to manage traffic flows. The High Occupancy Toll (HOT) lanes in Virginia for example, allow the private operator to set the tolls based on the level of service it is required to maintain. Tolls would go up in periods of high congestion to ensure that the HOT lanes continue to flow as required. The power to vary tolls has facilitated the delivery of required targets by the private operator.

4.11 Political and Reputational risks

Public service delivery generally has greater exposure to political and reputational risks. Political risk relates to questions about the continuing commitment of key political parties to the project and is closely associated with reputational risk (Asenova and Beck, 2003). These risks are common to virtually all PPPs in every area, but governments often do not know how to measure these risks, and do not realise optimal risk sharing requires that these risks be retained in hand and internalised within the public sector. In the road sector, economic instruments such as toll pricing and government subsidies as well as engineering instruments such as matters related to road network integration are used as mitigators against political risk, but they are usually attached to reputational risk.

Toll pricing is a politically sensitive subject. This is the main reason governments are generally inexorable regarding the limits it imposes on how high a toll a private operator is allowed to charge. To make the tollway economically sound with a minimum level of toll, private operators are compensated with degrees of freedom in negotiating the scope of the project, i.e. where the road starts and ends, toll escalation and the length of the concession. Some jurisdictions like Victoria in Australia give the private sector the opportunity to bid for the risk allocation as well. Essentially these changes, especially when the scope is extended, will create wider and longer lasting impacts for a greater community. If not managed transparently, the reputation of government is at risk.

consultation; 9) Notwithstanding the high toll levels and traffic congestion on surface streets, the CCT is an impressive feat of engineering excellence that will be considered an essential part of Sydney’s road infrastructure for decades to come.

As noted before, tollroads are part of the transport network and governments inevitably have to improve the roads flowing in and out of the tollway by way of providing scope for alteration or additional lanes to these roads. Such decisions often result in a windfall gain to the operator at a public cost. The initial design of the M5 motorway in the South West of Sydney scoped for a number of ramps connecting the motorway with existing free roads. To prevent traffic by-passing the toll plaza and to improve traffic flow to the privately tolled section of the M5, the RTA agreed to defer the construction of these ramps until the tollroad is paid for (NSWAGO, 1994, p.370). In 1993, when the M5 was struggling financially, the government accepted the private proponent's proposal to allow the current operator to construct and operate a toll-free extension that would have the effect of delivering increased traffic to its tollway (NSWAGO, 1994, p.374). Subsequently, with little financial assistance from the private proponent,¹⁰ the government extended both ends of the M5 eastward and westward respectively. The two free extensions attract a considerable amount of users onto the tollway and provide a significant windfall to the private proponent¹¹. These changes to the scope of the tollway have produced excessive profits to the private owners but disadvantageous costs to users and government. Later the Labor Government introduced the "cashback" scheme for privately registered vehicles to reimburse users travelling on the M4 and M5, spreading out the financial burden to the state's taxpayers.

In like manner, the A\$151 million upgrade of a public road – the Tullamarine-Calder intersection in Melbourne, which includes a new ramp that separates traffic travelling towards the city, has generated a minimum A\$11 million profit windfall to the private operator Transurban. Although the Victorian government is entitled to an equal share of the windfall gain (which makes the total estimated minimum gain of A\$22M, see Transurban, 2005; VAGO, 2007, p.46), this event shows that government can exercise its power as a central planner to shift the revenue risk to motorists.

In addition to network alteration, government can decide where to situate the toll gate. For example, the M4 motorway in Sydney fills the gaps between two existing freeways – the western section replaces the missing link between Mays Hill and Prospect; the eastern section widens an existing roadway from four to six lanes between James Ruse Drive and Silverwater Road east of Parramatta (NSWAGO, 1994, p.353). During the negotiation, the private proponent persuaded the government to move the toll gate eastward in order to maximise the financial viability of the M4 (NSWAGO, 1994, p.358). The placement of the toll plaza captures people travelling between Sydney and Parramatta such that at least 40 percent of motorists who have no need to use the western section of the facility have to pay the toll, which is the main source of servicing and repaying the capital cost of constructing the entire M4 (NSWAGO, 1994, p.358-359). The relocation of the toll plaza has resulted in a 153 percent increase (from under A\$500,000 to approximately A\$77 million) in the value of the shareholders' interests in the private operator (NSWAGO, 1994, p.363).

A different dimension of reputational risk was raised in both Shen *et al.* (2006) and Li *et al.* (2005b). This dimension relates to the government's choice of the private proponent who

¹⁰ The total cost of stage 2 was A\$65 million (1993 price) of which A\$15 million was funded by Interlink (the private operator of M5). In the opinion of the state audit office, through its A\$50 million low interest loan, the RTA funded the majority (77 percent) of the construction cost and bore the credit risk of repayment (NSWAGO, 1994, p.379).

¹¹ It is estimated that the stage 2 work of replacing the missing link between the Moorebank and Prestons would generate an additional 3,000 vehicles per day at a day toll of A\$2.00 indexed for 10 years (NSWAGO, 1994, p.406).

may be inexperienced, not suitable, incompetent or has financial difficulties. Government often concerns itself with transferring financial and traffic risk to the private sector, but it forgets that it can never transfer the onus of public accountability. As reflected in the CCT fiasco, the reputation of the RTA suffered as a result of accepting the private proponent's unrealistic proposal on traffic forecasts hence rendering the CCT a *financially* unsustainable venture. The tunnel went into receivership only a year after its opening in 2005. Original investors of the CCT only received 20 percent of their original investment when the concession was sold to another consortium in 2007 (Clegg and Poljack, 2007).

Reputational risk arises when adverse public perception is formed. The worst scenario occurs when governments are seen to be offloading public accountability. With private ownership, governments brush off the need to make the business economically sustainable, because toll adjustments are no longer within the 'control' of government but are the sole decision of the private operator. Furthermore, private ownership allows governments to distance themselves from congestion problems. Seemingly, the private sector appears to be far better at using pricing mechanisms to solve problems, but the ignorance of public perception by government has led to adverse repercussions and has significantly undermined its reputation within the community.

Unclear communication with the community about what the project could or could not achieve and what the project is meant to do can worsen a government's reputation. An example of this was the Convention Centre and the Crown Casino in Melbourne. The procurement model for the Convention Centre involved a core bid that the government was procuring, but also allowed for other developments on that site. The government gave the private concessionaire the development right to the whole site on the condition that the Convention Centre meet the particular output space, which was value creating for the government. But the government did not communicate to the community the specifics of the whole package. When changes were made to the non-convention centre part of the site, the community perceived that the private sector had reneged on the deal. In the Crown Casino case, there was a delay in relation to one of the hotels which was not an issue in terms of what the government was procuring and what the operator was allowed to do. The community however had the misconception that it was part of the whole package.

4.12 Social dimensional risks

It is worth reiterating that PPP procurements are not just about infrastructure; they are essentially about service provision (Forward, 2006). Participants who act in the role of public sector performance evaluators are wary of governments' narrow view about PPPs. Public procurers only see the economic and engineering aspects of these projects whilst neglecting the social dimension embedded in the essential public services these projects are designated to provide.

Transport infrastructure is distinctive in the sense that users are indeed paying the cost of finance. Metaphorically, PPP tollroads are described in Hodge and Greve (2007) as private credit cards through which government purchases the infrastructure with future road users' money rather than its own resources. Logically, private provision does not reduce government's liability for providing road space. However, in this regard there is an observably insufficient exercise of public accountability by government. The public sector is often seen as indifferent to the financial eventualities because inadequate care has been invested on the *ex ante* financial analysis, either by the Treasury or by the responsible public

agencies, to understand the private tender, the capability of the private proponent to undertake the project, and to test these implications.

Another social dimensional risk is the delegation of policing power. The private operators of tram and train services in Victoria, for example, are given quasi police powers to enforce tickets. This has raised ethical issues around the powers of government – a new risk that people who procure PPPs are not necessarily equipped to manage.

4.13 Media risk

Public perception is a malleable object, and the media is an effective channel through which public perception is shaped. In a democracy, the media is the representative of many key stakeholders. The impact of media coverage of a project can be instant and can extend beyond immediate users. It can also jeopardise the project's political success. Likewise, second to the State Parliament, the media is a highly influential vehicle through which criticism raised in the Auditor-General's report is heard and attended to by governments. Especially in the PPP domain, media interest in the findings of performance audit reports exerts significant pressure on the bureaucracy.

A well-maintained relationship with the media is equally important to the private as well as the public sector, as it serves as a medium of community expectations and public perception management. The experience of the CCT entails that media risk is a sensitive and difficult issue to manage. One participant emphasised that the NSW government's poor management with the media directly contributed to the CCT issue. In his verbatim, "[the CCT issue] went from post opening wrinkles to a migraine to a catastrophe in the space of a short period of time".

4.14 Risk of negative public perception

In line with the literature (cf., Li *et al.*, 2005a), the most debatable issue is who should be responsible for the risk of adverse public perception. Adverse public perception is manifested in the lack of public support resulting in delays in project approval and contract variations. This is agreed by Li *et al.* (2005a) who stated that the mismanagement of a tollroad in the eyes of the public could become the greatest hurdle to the success or otherwise of the project.

Labouring under the perception that they own the roads through their tax contributions, the community has been finding it difficult to accept the concept of private ownership and private operation of our roads. Many early PPP roads ran into this problem, experiencing the public's refusal to use the facility or to pay for travelling on the road (Chung, 2008a).

Managing community expectations helps to reduce public aversion. Government has a vested interest and is active in this respect. Currently, public perception is managed by Australian governments in two tangible ways, the *Value for Money Statement* (VFMS) and the *Environmental Impact Statement*. The VFMS is a government-endorsed public document through which the project procurer communicates to the community about how the procurement can get vfm. The idea underlying VFMS is to pressure government to structure the deal so that the community can have confidence and assurance that the tendering competition, the way that the tolling model is structured and the approach that the procurement is offered to the market, are designed to get value extraction for the community. Many respondents were convinced that community perception should be managed early in the process, right back at the EIS stage. If the authority takes on board the community's views at that stage, public resistance can be minimised. An example of how public resistance can be

minimised at an early stage is the \$A60 million shared lane for bikes that was scoped into the design of Sydney's M7 by the RTA and was subsequently financed and built by Macquarie Infrastructure Group (MIG) together with other members of the consortium.

Most public misconceptions about tollways come from the lack of understanding of the benefits they generate. Tollways can produce significant positive externalities such as savings in travel time and fuel efficiency from reduced congestion, increased property values in the neighbourhood from higher accessibility, and greater business productivity and economic vitality from increased mobility (Munroe *et al.*, 2006). The private sector is partly responsible for inadequately conveying all these benefits to the public. In the past, private operators allocate little resources for promoting the benefits of tollways due to the myopic focus of cost minimisation. This has proven to be one of the impediments to CCT's patronage.

An often neglected issue is the market segments. An urban environment is not a homogenous market with risk perception, travelling and living habits all exhibiting strong localised patterns. Most tollway operation companies have the philosophy that if they build a tollway, people will use it, without actually understanding the market they are selling to. The private sector is gradually realising that the best mitigator of public disapproval is to make the project part of the community. Transurban positions itself at the forefront of this initiative, followed by the MIG. Transurban adopts a *good corporate citizenship* model, actively engaging with both community groups and the whole of the corridor regardless of whether they are potential users or not. Both companies took part in many community activities regardless of whether they are customer related or otherwise. Examples are tree planting initiatives, and shutting down the road to use it for "Run for the Kids" to raise money for charity. They have also donated toll money for a given period from its investments in a number of Sydney motorways – M4, M5 and ED, to the 'Drive for Charity' day. Communities value these corporate inputs and public perception is slowly on the way up.

5 SUMMARY OF FINDINGS AND FUTURE RESEARCH AGENDA

Significant vfm that is translated into commercial and social benefits has been generated through partnerships between the public and the private sectors. Yet many PPP tollroads have experienced teething problems between the contracting parties as the result of misconceptions and hence the misallocation of risks.

The discussion above entails that experience accumulated over the years and across projects has contributed to the betterment of risk sharing optimisation amongst PPP parties. Generally, the private sector has developed sophisticated approaches to manage commercial risks, partly due to accumulated experience and partly due to the increasing competition in the tollroad market. Governments are keen to transfer out all risks but unwilling to take responsibility for ensuring that prices are commensurate with risk-undertakings by the private sector. The matter of concern lies with risks that are outside the unambiguous domain of each of the public sector's and the private sector's fields of expertise. These risks are best shared by both parties.

The most vexed issue of PPPs is centred around risks that have been transferred to the extent that they have imposed a threat to public values for the sake of *financial* vfm. This is not unique to Australia (see discussion in Weihe (2008) in the UK context). Regardless of how much risk has been transferred out, government remains responsible for all public

infrastructure deliveries. Empirical evidence has shown that imposing penalties where the risk outcome goes against the private concessionaire, did little to promote a project's performance (Pollock and Price, 2008), or safeguard public values (Edwards and Shaoul, 2003). Others show that isolating government's public accountability from failing PPPs is politically unsustainable (English, 2005; Chung, 2008b). Private provision in public procurement however does not automatically mean a loss of public values, as confirmed in a recent Australian study (Furneaux *et al.*, 2008). Insofar as governments are prepared to refine institutional mechanisms to safeguard public values, a risk sharing optimum is not unattainable.

PPPs have gradually evolved from a risk guarantee to a risk dumping approach by government (Chung, 2008a). Neither extreme optimises risk allocation. A true partnership needs a continual dialogue between government departments, agencies and the private sector. It appears that there have been efforts in Australia from both sectors to refine a balancing approach to risk allocation as reflected in the *Standard Commercial Principles* released by the Partnerships Victoria in April 2008. In some respects, these principles do provide concessions in favour of the private sector which were absent in the previous 2005 PPP guidelines.

An important attribute that has been overlooked in current procurement policies is the commitment of private consortia to the sustainable provision of services. At present, PPPs are perceived as predominantly an economic partnership. This perception has overshadowed the need for building a socially sustainable partnership (Hodge and Greve, 2007). A partnership with a provider that has a strong commitment to principles of social responsibility reduces political risks for government (Forward, 2006). The MCL has established a benchmark of success in terms of its transport objectives, the technology it has delivered and most crucially its acceptance by the community, even though it was initially seen as politically and commercially risky (it replaced two existing untolled freeways). Its success is, to a large extent, attributable to the private operator's approach to social corporate responsibility in which consumer needs were given priority.

Roads are vital components of the transport network and urban development. Many portfolio ministers such as ministers for planning, transport, and roads, and even local councils, have vested interests in roads. The current problem is that these conflicting interests have resulted in poorly-defined project objectives. A central agency that oversees PPP projects will alleviate some of these tensions. A consistent and uniform partnership framework that facilitates mutual understanding of each party's business and skills, consumers' interests and willingness to undertake risk is essential to the betterment of risk allocation. The *Infrastructure Australia Act 2008* enacted by the Commonwealth Government is a response to the call that a sustainable PPP environment needs the support of a coherent and consistent political structure. The *Act* signals the strong commitment by the federal government to a greater and wider private provision of public infrastructure.

Some of the findings of the current study concur with that identified in Arndt (2000) suggesting certain aspects of risk allocation remain relatively static over the past decade, examples include that perceptions of risk vary according to aims and drivers of different parties. Nevertheless, new risks gradually emerge as the PPP market evolves. The most prominent issues are associated with social dimensional risks and public misperceptions about what a PPP project is set out to achieve. The new challenges faced by governments and

private proponents warrant further research that is aimed to simplify the complex risk allocation process in order to adapt to the continuously evolving nature of PPPs.

The findings herein have identified the key risk dimensions and the likely levels associated with each risk attribute that a range of stakeholders have suggested are the main drivers of the PPP risk allocation process. Given that Australia has been a pioneer in tollroad projects under PPPs, and that many Australian construction companies and banks are now active in this field on the international stage, the evidence herein is of global interest. This information will be used in ongoing research that develops a stated choice experiment and empirical surveys. These research instruments will enable the authors to identify the role that each dimension of risk plays in each stakeholder's approach: a) to prioritising the emphasis they give to the adopted approach in preparing the tender documents; and b) to working with the other stakeholders for the purpose of securing successful outcomes for economically and socially sustainable partnerships.

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Declaration:

I, Demi Chung, being the principal author of the present paper, do declare that I have contributed to most of the sections of the paper. My contribution to this paper represents approximately 90% of the effort required for its creation.

Demi Chung
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