Toward the Betterment of Risk Allocation: Investigating Risk Perceptions of Australian Stakeholder Groups to Public-Private-Partnership Tollroad Projects

Demi Chung*
David A. Hensher
John M. Rose

*Corresponding author, School of Accounting, The Australian School of Business, University of New South Wales, NSW 2052 Australia; PhD candidate of the Institute of Transport and Logistics Studies, Faculty of Economics and Business, the University of Sydney, NSW 2006 Australia (email: demi.chung@unsw.edu.au; ph: +612 9385 5836; fax: +612 9385 5819)

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Abstract:

This paper presents a qualitative assessment of the risk perceptions held by key Australian stakeholder groups in the context of tollroads operated under the Public-Private-Partnership model. The findings confirm that experience accumulated in recent years has contributed toward the betterment of risk sharing optimisation amongst the contracting parties. The knowledge acquired through in-depth interviews supports the common view that equitable risk-sharing is the vital ingredient of value for money. The proposition that the private sector is better equipped to manage commercial risks involving economic decision making whilst risks that have embedded unquantifiable social and public values and those in the domain of public governance are best left with government alone, appears to be replete with refutable implications. Public perception is a malleable concept and should be managed by both sectors.

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

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BACKGROUND

Public-Private-Partnership (PPP) tollroads are growing in popularity throughout the world. This is a response to the need to invest in road infrastructure as well as 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. A specific rationale of such a procurement policy is that greater value for money (vfm) in the public interest can be obtained through transferring risk to the party that is least risk averse (Partnership Victoria, 2000; HM Treasury, 2006; WWG, 2006) 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 of PPPs in Australia (cf., Ernst and Young, 2007), possibly because of its high levels of capital consumption and its relatively low political sensitivity[i]. The tollroads in Sydney and Melbourne are shown in Figures 1 and 2. Private capital is primarily explored as a funding mechanism to solve a transport network problem, be it putting in a missing link or upgrading a vital arterial route. PPP road concessions resemble the nature of a sale-and-lease-back finance lease whereby a government sells to a private consortium[ii] a *usus fructus*, i.e. 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 that asset. The private operator is given the power to charge users directly[iii], but (generally) 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, 2008). In theory, these transport concessions should shield government from traffic risk, financial risk, and operation and maintenance risk, hence better *financial* vfm.

The extant literature suggests that the public sector and the private sector do not share a monolithic set of interests (Meyer and Miller, 2001), objectives (Li *et al.*, 2005a), and expectations (Demirag and Khadaroo, 2008), with the implication being that different parties have different perceptions of risk and their capabilities of risk management differ. These (mis)perceptions can strongly influence the manner in which partners take on risks and price these risks (Ball et al., 2003; Blanc-Strange, 2007). A number of empirical studies confirmed that perceptions held by different partners about risks, about the motives and behaviours of their opposing partners create significant complication in the negotiations of risk allocation which would undermine the success of PPP projects (Arndt,

2000; Asenova and Beck, 2003; Li *et al.*, 2005b, Weihe, 2008). These observations raise an interesting question about the eventuality of equitable risk sharing between public and private sector partners. Despite the criticisms of the inequitable risk sharing outcomes (cf., NSWAGO, 1994; NSWAGO, 1997; NSWAGO, 2000; 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.

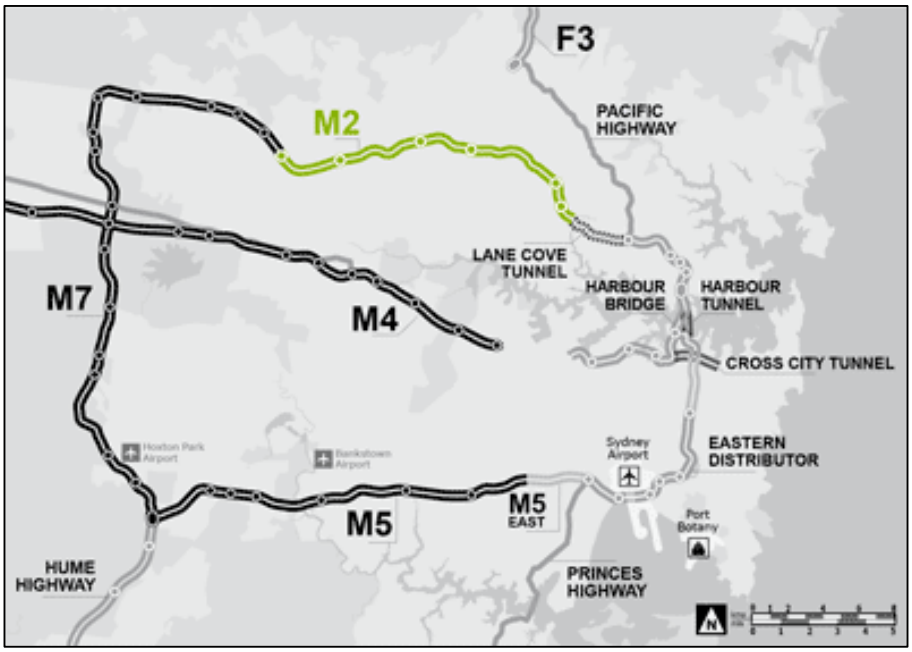

Figure 1: PPP Tollroads in Sydney

Two as yet unanswered questions within the literature are: i) in PPP tollroad contracts, what are the risk attributes that concern the public sector the most and, the private sector the most? and, ii) to what extent is the outcome of risk allocation between the public and private sectors influenced by risk perceptions of different stakeholder groups? The findings herein are the outcomes of a series of unstructured in-depth interviews with stakeholders in Australia who have been either directly or indirectly engaging in PPP road projects. In this paper, the two research questions are explored in five sections. The next section discusses the extent to which value for money can be materialised through risk sharing in PPPs by examining the empirical findings in the extant literature. Section three explains the research methodology. Section four investigates the two sectors' capability of risk management and the role risk perceptions plays in allocating risks as perceived by the stakeholders being interviewed. Section five concludes with the findings and sets the scene for future inquiry.

Figure 2: PPP Tollroads in Melbourne

VALUE FOR MONEY THROUGH RISK TRANSFER: AN EMPIRICAL VIEW

Discourses on achievement of vfm through risk transfer in PPPs are largely unsettled. Many empirical investigations in Australia and the UK show that vfm gains from risk transfer are concentrated in the following dimensions: 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, thus enabling the community to have access to the 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, as 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).

Innovations in design and technology promoted by ownership were cited in Fitzgerald (2004) who examined a number of PPP projects in the state of Victoria, Australia. These innovations, together with the whole-of-life approach to maintenance, have translated into significant vfm. A similar conclusion was reached by Blanc-Brude *et al.* (2006). In testing 304 PPP roads in Europe, they argued that ownership provided a spur to better risk management and hence greater cost efficiency and productivity.

However, questions rose regarding the likelihood of vfm after governments have been charged excessive premiums. Critics disputed that the market discipline depicts a propensity that the cost of finance is in part influenced by how risks are negotiated and allocated between the public and private sectors; and that any unallocated risks will be effectively priced. It is therefore expected that the private sector would profit from the risks offloaded by the public sector through risk premiums (Blanc-Brude and Strange, 2007), and these premiums represent the excessive 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. Blanc-Brude *et al*. (2006) reported that, based on a large sample of PPP road projects in Europe procured between 1990 and 2005, 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 expensive premiums to transfer out the risk of *optimism bias*.

An inherent risk of PPPs lies in their risk allocation process. Risk allocations are the outcome of negotiations 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). It has long been recognised that 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 be accountable for the welfare of end users by government (cf. Demirag and Khadaroo, 2008). 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 the 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. 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. The MCL case explicates 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. Johnston and Gudergan (2007) 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. The incident demonstrates that while the government has successfully transferred out the financial risk, it failed to recognise that it was unable, in reality, to transfer the social responsibility and public accountability. This failure further led to a breakdown in the social contract within the PPP relationship compromising the long-term contractual sustainability between the two sectors.

In summary, the mixed evidence in the literature has implicated that the extent to which risk transfers in PPPs deliver 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 based on the knowledge of not only technical rationality (e.g., travel demand and cost of borrowing), but also public expectations and acceptance that underlines the public perception of private participation in public infrastructure.

RESEARCH METHODOLOGY

Unstructured in-depth interviews were adopted as a means of investigation for this study. The aim is to qualitatively examine risk perceptions of different stakeholder groups to PPP tollroads. The acquired knowledge will then be used to establish the links between perceptions of risk and the required attributes and their concomitant levels – these are summarised in the risk attribute matrix in the Appendix. We favour the unstructured in-depth interview approach because of its powers to achieve honest and robust responses (Whitehead, 2002) and to ensure realism in the collection of an overall impression of stakeholders' perspectives. The unstructured approach encourages participants to openly express their viewpoints based on their experience in dealing, negotiating and auditing PPP tollroad projects.

To enable a balanced view, an almost equal number of interviewees were selected from the public and the private sectors who have been in/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. All interviews lasted between 60 to 100 minutes, and were tape-recorded (with permission) to ensure accuracy and to facilitate analysis.

A few studies in the field of perceptions of PPPs employed a similar research methodology but none makes inferences about the extent to which that actual risk allocation is a subject of these perceptions. Nevertheless, these studies provide a useful benchmark for the current investigation. It is to the pointers established by these studies that we now turn.

At the aggregate level, governments' perceptions that vfm can be realised by bundling life-cycle responsibilities into one package, by exploring private sector's efficiency in design and management, and by transferring out risks have fast tracked the expansion of PPPs in Australia (Malone, 2005). There are doubts about whether the vfm concept is compatible with hard-to-quantify public values (Demirag and Khadaroo, 2008) due to the inherent contradiction between achieving *financial* vfm and safeguarding traditional values of public administration in terms of equality, transparency, democratic accountability and governance by rule (Weihe, 2008).

At the microscope level, the high risk nature of PPPs constitutes a barrier to entry for market participants (Ezulike *et al.*, 1997). For those who are able to afford competing in this highly risky business, risk assessments were chiefly based on past experience and intuition with little attention given to political and reputational risks (Asenova and Beck, 2003; Johnston and Gudergan, 2007).

Arndt's (2000) study is the first to investigate risk allocation in Australian PPPs through in-depth interviews. The richness in the outcomes of his study merits some discussion in detail. First, the ways by which parties perceived risk varied 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 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). Fourth, 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 to the private sector risks that are beyond their capacity to manage (p.325). Fifth, 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 risks is a significant influence on its approach to the risk allocation negotiations (p.325). Rather, the approach was dominated by parties' loss aversion in which potential gains were not valued as highly as fears of potential losses (p.326). If this misperception about risks persists, risk premiums would not be reduced as much as they could be, and it would be difficult for governments to push for symmetrical risk allocation.

Follow these pointers, in each interview, we tackled the research questions in four dimensions that are primarily based on participants' perceptions of: a) benefits and gains arising from PPP tollroads; b) the public/private sector's capacity to manage risks; c) considerations that drive each party entering into a PPP tollway contract, and the extent to which these considerations influence their approach to negotiating risk allocation; and d) the process in which levels of tolls are determined. The present study contributes to the literature in the following ways. It is the first interview study, to our knowledge, that investigates the risk perceptions of PPP stakeholders with a focus on tollroads. Although there exist other studies investigating risk perceptions, this is the first one that delves into the subject that the influence of risk perceptions held by different stakeholder groups may have on final risk allocation.

RISK ALLOCATION AND MANAGEMENT

All participants were candid about their views on risk allocation as well as the respective capability of risk management of their own party and of the opposing party. All interviewees agreed that risk assignment and management are important and unresolved issues in PPPs. They concurred that perceptions of risks definitely play a decisive role in final risk allocation. Many felt that the understanding of risk has evolved over time and across projects, and that governments are becoming more sophisticated. 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 allocation, nor will they deliver an equal partnership in risk-sharing.

The most mentioned risks are traffic risk, network risk, financial risk, risks associated with ownership, *force majeure*, sovereign risk, risk of unclear project objectives, political and reputational risks, media risk and risk of public misperception. Figure 1 synthesises the risk apportionment position supported by the individuals interviewed. All participants concurred with the view that the private sector is better equipped to manage commercial risks involving economic decision making, whilst risks that have embedded unquantifiable social and public values and those in the public governance domain are best left with government. It is intriguing though, that all parties held reservations about the opposing party's willingness to undertake risks and to exert effort in managing the allocated risks. The public sector participants acknowledged that the private sector is more acquainted with market discipline, but were disappointed that the private sector's willingness to invest in understanding risks is handicapped by its myopic focus on cost minimisation. On the other hand, the public sector is perceived to be keen on transferring out (not necessarily to the private sector) as much risk as possible. On a promising note, there is cited evidence suggesting that the public sector's capability to manage risks that fall in the public governance domain can be enhanced with the private sector's commitment to a sustainable partnership. A risk attribute matrix in the Appendix summaries these findings. Each risk attribute is attached with three levels. The "high" represents the most risky concerns to each party whereas the "low" indicates possible ways of mitigation. As illustrated in the matrix, contracting parties have vastly divergent perceptions about risks.

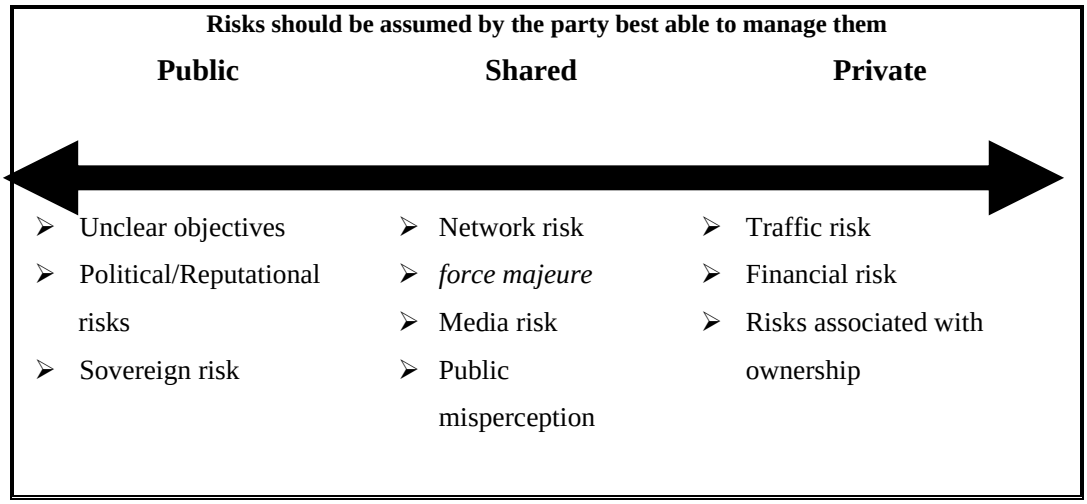

Figure 3: Base Line of Principles on Risk Allocation

Traffic risk

This is the risk that traffic volume is lower than forecast, which results in total revenue derived from the project over the concession term varying from initial expectations. PPPs in the road sector work well in certain road contexts. These are typically urban or inter-urban roads with high volumes of traffic where operations are economically sustainable. All participants agreed that traffic risk is the greatest risk in tollroads and is the risk that governments want to divest the most.

When traffic risk is retained by the public sector, governments may be forced to top up revenue shortfalls. This can translate into unlimited financial risk as in the case of the Sydney Harbour Tunnel (SHT). From its opening to traffic in 1992, the SHT has cost the New South Wales (NSW) government over A$235 million dollars due to declining traffic volume (NSWAGO, 2007; 2008). Even in cases where traffic risk has been transferred to the private sector, it is inevitable that government will bear some of the adverse consequences. Sydney's M2 and Melbourne's Citylink are examples for illustration. The concessionaires are contracted to pay land rent to the public authority. But rents are payable in concession notes and their redemption can only be triggered when actual toll receipts are sufficient to meet the hurdle rate of return on private equity (Chung, 2008). Furthermore, recent tollroad concessions, e.g., the Eastern Distributor (ED), the Cross City Tunnel (CCT), the Lane Cove Tunnel (LCT) in Sydney, and the Melbourne Eastlink (MEL), provide provisions for governments to share upside gains on the condition that actual traffic volume is greater than the pre-specified threshold (Chung, 2008). No evidence proves that these upside gains have materialised.

Participants from the private sector believed that private tollroad companies have superior traffic modelling techniques because they have better access to information and expertise. They considered that private firms are better able to manage traffic risk and did not regard transferring this risk by government as an excessive risk transfer. They admitted that traffic risk is a great concern during the ramp up period. A critical domain is finding the starting point where traffic starts to grow rapidly. They were confident that the growing pattern would eventuate after users realise the benefits of travel time savings and the comfort of driving on a high quality and less

congested facility. This turned out to be the main appeal to commercial vehicles, as manifested in the heavy truck use of the MCL-the first private tollway in Victoria (Lay and Daley, 2002).

However, in the opinion of participants from the public sector, the private sector generally takes a less cautious approach in estimating traffic volumes during ramp-up. Recent cases (the CCT, the LCT and the MEL) confirmed that private firms have performed poorly in predicting the periods of time it takes for traffic to get over the ramp-up hurdle. There are three possible explanations of these erroneous forecasts.

First, there are a wide range of parameters feeding into the traffic model. These include demand elasticity of tolls, expected population and economic growth in the corridor, changes in trip patterns, strength of ongoing growth and the average length of trips. These estimates are generally provided in the project's Environmental Impact Statement (EIS) prepared by governments. The private participants complained that these estimates are often not robust enough, causing errors in their traffic forecast, whereas the public participants were discontented with the private sector's unwillingness to invest sufficient effort to understand the demographic composition of the affected corridor (see examples of the CCT and the LCT in the next section).

Second, a problematic domain lies with the prediction of short trips. This may be due to the fact that users perceive that gains in travel time savings for short trips are insufficient to justify the toll cost. Unpredictable short trips were the main reason attributable to the overestimation of traffic on Sydney's M7, 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.

Third, many respondents asserted that increasing market competition has been the main contribution to over-optimistic traffic forecasts. This opinion is supported by a number of episodes documented in the literature. Fierce competition and market scepticism in regards to the commercial viability of a project pressured the private bidder to inflate traffic numbers in order to win the lucrative contract, as in the case of the Eastern Harbour Crossing in Hong Kong (Tiong, 1995), the Sydney CCT (NSWAGO, 2006) and the MEL (VAGO, 2005). Further, 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). This might have motivated project companies to produce optimistic forecasts in order to enhance the investment's attractiveness to financiers and equity investors.

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

Network risk

Network risk arises when the contracted services or method of delivery of those services are linked to, rely on, or are otherwise affected by certain infrastructure and other services or methods of delivering the contracted services. Road projects are particularly concerned with the access to the existing road network and the feasibility of connecting to future infrastructure (Arndt, 1998).

Network issues affect the profitability of a private tollroad as well as traffic management for the entire transport network. 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

that considers the whole of the transport network. Arndt (2000) commented, a decade later, 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 at the same time that 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 private operator does not control. The dilemma lies with the conflicting objectives of network risk management.

From the private sector's perspective, network risk management should provide assurance for 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 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.

Private operators will seek 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 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 value for money to the whole community; indeed some of them are more likely to create an adverse effect. Road changes to surface roads above the LCT in Sydney generated a positive social impact. Lane Cove Road is the major arterial route 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 (up to 20 minutes) 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 created political backlash. Given that the use of public transport by eastern suburb residents is relatively low, there were serious doubts about the value for money 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.

From the central planner's perspective, the public sector regrets that private operators only care about the profitability of their road, without giving sufficient considerations to network integration. The problem of disintegration in Sydney is the fragmented network caused by different private ownerships of interconnecting tollways. This condition has created serious bottleneck issues around joint points that have seen the operators of the M2 and M7 in the north west denying responsibility for the problem. These issues would have remained had Transurban, who is also the main owner of the M7, not purchased the M2.

Although PPP tollroads are only pieces of a jigsaw in an integrated road network, private ownership restricts government's ability to improve network efficiency. Two 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 example is the redevelopment of the Dockland areas. The redevelopment by the Victorian government triggered A$37 million Material Adverse Effect (MAE) claims built-in to the Melbourne Citylink concession because there are roads running through Docklands that compete with the private road (Hodge and Bowman,

2004; Brown, 2005). Another case is the moribund regional freight network that was privatised by the Kennett government in the 1990s. The private ownership became an obstacle for the current Labor government preventing it from 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 private consortium and the Australian Federal Government. 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. It is currently investing a billion dollar upgrade on the West Gate Freeway that feeds into the MCL. The upgrade will relieve traffic congestion and reduce pollution as well as having the effect of improving traffic flows to the private road.

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 attributes, environmental threats and perceptions of misconduct (Asenova and Beck, 2003). The allure of PPPs has been captured by the discipline of project finance in that 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 financial risk to the private sector is that 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). Having private finance at risk will harness the private sector's risk management skills. Because finance cost is the most expensive item, the private consortia 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. 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 with the benefit that the capital market has on offer various sophisticated financial instruments such as infrastructure bonds, stapled securities, fixed-rate loans, mezzanine loans, hedging, and insurance to cope with financial risk. Many respondents believed that the way the project finance is packaged is where the real competitive advantage should be.

As cited before in Arndt (2000, p.58), the manner and form of the risk allocation for a PPP project are the key drivers of the financial and contractual structure of the project. A rule of thumb is that private equity normally bears the risks that cannot be, or are too costly to be mitigated because equity has greater risk tolerance as it shares the project's upside gains – a benefit that is not open to debt financiers. The 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) noted that finance companies preferred that risks that were difficult to mitigate, but remained with the consortia, to be supported by equity rather than debt. The public sector also prefers a proponent with a strong

balance sheet who is able to lower the cost of capital as well as sustain the investment in the long haul. But the private sector is wary of government's approach to evaluate private proposals in which focuses are only attended to capital costs, without giving adequate consideration to life cycle cost savings. Such an approach pressures the private sector not to price the risk premium into project cost[iv], and may threaten the project's long-term financial viability.

Despite the recent financial turmoils with the CCT and the LCT in Sydney (cf. Chung 2008), 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. Further, tollroad investment has strong appeal to superannuation fund managers because it offers investment opportunities that have a 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.

Risks associated with ownership

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, in order 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). The main risks associated with ownership are design and construction risks (D&C), and operation and maintenance risks (O&M).

Design and construction risks These are the risks that design, construction or commissioning of the facility are carried out in a way that results in adverse on cost and/or service delivery; examples are time and cost overruns; in particular, design risk represents the inability of either party to fully understand design concepts, specifications may be expensive to change after construction is complete and the project is not delivered on time. Since most PPPs pass these risks along with ownership to the private sector, these risks are mainly the responsibilities of the private consortium.

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 D&C risks because they encourage a long-term view of the D&C with the focus on minimising life cycle cost. But the transfer of D&C risks *per se* does not deliver value for money. 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* value for money 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., Sydney M7 and MEL) that exhibit notable innovative D&C techniques.

Innovation in design has become a commercially as well as socially sustainable factor in 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 a design concept 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 created greater

uncertainty in terms of traffic revenue, it indicated Transurban's awareness of the broader community, which has earned it significant community respect and support.

Transferring the D&C risks offers government certainty in project's timely commission. 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 schedule[v]. In contrast, governments do not have sufficient incentives to drive outcomes forward and are often mandated to follow rigid process-adherence procedures which may have created unnecessary delay[vi].

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). Poor handling of the O&M risks by the private operator will also adversely impact on the residual value of the project – a risk to government who will inherit many of these facilities at the concession's conclusion.

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 time[vii]. 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 will be financially sanctioned.

Ideally, the bundling concept will maximise efficiency in the O&M 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. 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.

force majeure

Force majeure recognises the need to provide contracting parties protections for highly unanticipated events that will impair the project's functionality and profitability. It refers to the risk that events may occur which will have a catastrophic effect on either party's ability to perform its obligations under the contract, and includes events of natural calamities such as an earthquake, and an uninsurable event like war, 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.

Uninsurable *force majeure* events are covered under the MAE clause (Arndt, 2000). The MAE approach seeks to define certain risk events which will be borne by government, or shared, and defines a mechanism of redress for the aggrieved parity if one of those events crystallises. 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).

On occasions, the private proponents threatened to use MAE clauses to demand financial compensation when governments redeveloped the transport network which may impair the profitability of the private road (e.g., the Sydney M2 and MCL). The private sector is also inclined to a tariff increase and an extension of the concession as a redress (Arndt, 200, p.304). In our study, the private participants indicated that they regarded the category of *force majeure* as too restrictive. 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.

Sovereign risk

Sovereign risk is the uncertainty in legislation and government policy that may adversely affect the project's profitability and the possibility of a new government abandoning or changing PPP schemes. It is particularly relevant to PPPs because they are characterised by a 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 encourage 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 polices, 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 the Australian PPP market, the private sector has been supportive of research that would facilitate the development of a consistent and coherent policy framework to risk allocation (Arndt, 2000, p.281), indicating the importance of a stable political structure to the market. Private proponents are frustrated with policy fragmentation among government agencies with respect to PPPs and toll pricing, which often result in lengthy and costly negotiation to close the deal. Typically, the average participation cost of these mega projects ranges from A$10 to A$20 million; thus the private sector has a strong desire to have open dialogue with governments and to push for a single, simplified procurement approach.

The UK is seen to have a more consistent PPP policy structure, as all the PPPs are coordinated by a centralised unit – the HM Treasury. This structure has enabled the standardisation of documentation and a single framework for bidders to operate in, with obvious efficiencies in the tendering process – much shorter bidding periods and reduced tendering costs.

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 New South Wales. There exist 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. 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 are undertaken on an irregular basis. In addition there remains 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.

Statutory differences also frustrate governments. Most PPP projects were entered into between the private sector and state governments, but the power to determine or influence certain key variables, like the tax rate and exchange rate, is outside state governments' judiciary. The uncertainty in regards to how the federal government would decide on the tax deductibility of the SHT priced the NSW government a $A24 million bill (NSWAGO, 2003, p.209).

Nonetheless, international investors have confidence with the Australian market because Australia is a stable democratic country with state governments seen as gradually evolving and improving in their dealings with the private sector for a better partnership. There leaves significant scope for a uniform, national approach to PPPs in Australia. 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 a strong commitment by the federal government to a greater and wider private provision of public infrastructure. It is hopeful that under the leadership of the *Infrastructure Australia,* there will be a more coordinated approach to PPPs across various levels of government.

Risk of unclear 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 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 EIS which must be publicly exhibited in order to obtain community approval (Chung, 2008). 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. The 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. But the government soon found itself in confrontation with the community's rejection. Since the government had chosen the preferred proponent in the absence of community consultation, 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 a poorly defined project. It originally started as a road project 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. The then Lord Mayor of Sydney had a grand vision for the city precinct in which William Street, Oxford Street, Broadway and Taylor Square would become key boulevards after the major upgrade. When the Roads and Traffic Authority of NSW (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 design 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. Subsequently, the consortium produced a highly unrealistic traffic forecast which enabled it to obtain the 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 a user charge? If they are financed out of user charge, it is debatable whether motorists are being charged an equitable toll that is commensurate with the benefit they derive from the facility. Although the CCT project was deemed successful in terms of transferring out *financial risk,* and having a longer-term potential in improving urban amenity, it failed on the grounds that government was unable to deliver value for money in the public interest[viii].

Tollways have discernable impacts on land use decisions. Over time, urban planning has broadened the scope of tollways beyond a simple transport task. During this transformation, private provision is being captured by urban planners rather traffic engineers, worsening the 'fuzziness' of project objectives. 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: is the tollway going to be part of urban planning or traffic demand management; and how to make risk sharing equitable so to enable private capital 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 the objective is to manage traffic demand, the contract should specify the outcome parameters and permit the proponent the freedom to set tolling levels that satisfy these targets. Being in charge of daily operations, the operator has superior knowledge in terms of varying the levels of toll to manage traffic flows. The High Occupancy Toll (HOT) lanes in Virginia for example, gives the private operator the flexibility 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.

Clearly, there is a need for better communication with the private proponent as well as the community being affected in articulating project objectives and the way these objectives are tied to the broader transport vision and other economic and social benefits. Governments, as well as the private sector, should employ the EIS mechanism to bridge communications with the public. Positive evidence shows that the fulfilment of promised objectives by government has created welcome impact on the public acceptance of government policy (Whitehead, 2002). We argue that this concept should also extend to public infrastructure projects.

Political and reputational risks

These are social-dimension risks. It has been widely recognised that PPPs are not just about infrastructure, they are essentially about long-term service provision (Forward, 2006). 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.

Road 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. Realistically, 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.

In the road sector, economic instruments such as road pricing and government subsidies as well as engineering instruments related to transport network integration are used to mitigate political risk, but they are usually attached to reputational risk. Road pricing has long been a politically sensitive subject (cf. Verhoef *et al*., 1997; Viegas, 2001, Jou *et al*., in press). This is the main reason many governments are generally inexorable regarding the limits it imposes on how high a toll a private operator is permitted 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.

We 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. Such decisions are often understood as generating windfall gains to the operator at 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, the Roads and Traffic Authority agreed to defer the construction of these ramps until the tollroad is paid for (NSWAGO, 1994, p.370). Soon after, 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,[ix] 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 produce a significant windfall to the private proponent,[x] 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.

Another similar case is 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, and which has generated a minimum A$11 million profit windfall to the private operator. 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 gates. For example, the M4 motorway in Sydney fills the gaps between two existing freeways (NSWAGO, 1994, p.353). During the negotiation, the private proponent persuaded the government to move the toll gate eastward in order to maximise the M4's financial viability (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 for the cost of servicing and repaying the capital of constructing the entire M4 (NSWAGO, 1994, p.358-359). The relocation of the toll plaza has produced a substantial increase in the value of the private equity (NSWAGO, 1994, p.363).

Reputational risk arises when adverse public perception is formed. The worst scenario is when governments are seen to be offloading public accountability. With private ownership, governments brush off the need to make the business economically sustainable, because financial risk has been transferred to the private operator. Surrendering the "control"[xi] of toll adjustments to private ownership allows governments to distance themselves from congestion problems (Hensher and Chung, 2010). Participants who act in the role of public sector performance evaluators are wary of governments' narrow view about PPPs. Governments often do not know how to measure these risks, and do not realise optimal risk sharing requires that these risks to be retained in hand and internalised within the public sector. 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. The government's ignorance of public values has significantly undermined its reputation within the community.

Media risk

PPPs create contractual liabilities and obligations among the contracting parties to deliver public services in order to meet the expectations of multiple stakeholders including the public (Demirag and Khadaroo, 2008). Public perception is a malleable object, and the media, which is regarded as the representative of many key stakeholders in a democracy, serves as an effective channel through which public perception is shaped. The impact of media coverage can be instant and can extend beyond immediate users. Second to the State Parliament, the media is also a highly influential vehicle through which criticism raised in the Auditor-General's report is heard and attended to by politicians and bureaucrats. Especially in the PPP domain, media's 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 highlighted 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".

Slowly, the PPP parties are devoting more efforts to managing the powerful media. A proactive approach of keeping the media informed fast tracked the completion of the LCT. A dedicated media relation unit inside the public agency helped to maintain an open dialogue with the public about the progress of the Brisbane North-South Bypass Tunnel. Transurban devotes substantial human resources to communicate project benefits to the media, who in return conveys these benefits to the public. All participants wished that these efforts will gain media's support and hence translating into positive public perceptions of the PPP scheme.

Risk of public misperception

Public perception can be conducive or detrimental to the proposed PPP road. Unfortunately it generally escapes forecasters' attention. 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. Adverse public perception is manifested in the lack of public support resulting in delays in project approval and contract variations. The most debatable issue is who should be responsible for the risk of adverse public perception (cf., Li *et al.*, 2005a).

To investigate this risk, differences between public perception towards road pricing and towards private ownership of tollroads need to be carefully distinguished. There have been studies investigating users' attitude towards road pricing (Odeck and Bråthen, 2002; Whitehead 2002). These studies report that road pricing can be made more publicly acceptable insofar as users are confident that revenues so generated are hypothecated to public road and transport investments. This sort of confidence may not eventuate with PPP tollways, since toll revenues are the source of return on private capital, and it is rare that these revenues are available for government apportionment[xii].

We are unaware of any study of the public's attitude towards private ownership of tollroads. Anecdotally, labouring under the perception that they own the roads through their tax contributions, the public has been finding it difficult to accept the concept of private ownership and private operation of the roads. Many early PPP roads ran into this problem, experiencing the public's refusal to use these facilities (Chung, 2008).

Governments have a vested interest in reducing public aversion and are 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* (EEA VIC, 1978; EP&A Act NSW, 1979; EP&A Regulation NSW, 2000). The VFMS is a government-endorsed public document through which the project procurer communicates to the community about how the procurement can get value for money. The idea underlying VFMS is to pressure governments 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 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 (Verhoef *et al.*, 1997), 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 perceptions, 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. They adopt 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 take 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 to the 'Drive for Charity' day. Communities value these corporate inputs and public perception is slowly becoming supportive.

The overall impression signals that the risk of public misperceptions about PPP tollroads can be corrected by involving the public early in the EIS process. The EIS should promote the pros and convey the cons the project will generate as well as demonstrate how the public values will be considered and improved. Given the difficulty to hypothecate toll revenues to public reinvestment, there is a significant scope for private initiatives to enhance public confidence with respect to the derived benefits of tollroads.

SUMMARY OF FINDINGS AND FUTURE RESEARCH AGENDA

This paper has investigated risk perceptions of PPP tollroads in the following dimensions: a) benefits and gains arising from PPP tollroads; b) the public/private sector's capacity to manage risks; c) considerations that drive each party entering into a PPP tollway contract, and the extent to which these considerations influence their approach to negotiating risk allocation; and d) the process in which the levels of toll are determined.

All participants felt strongly that significant value for money that is translated into commercial and social benefits has been generated by partnerships. Experience accumulated over time and across projects has contributed to the betterment of risk sharing optimisation amongst PPP parties. Yet many PPP tollroads have experienced teething problems between the contracting parties as the result of misconceptions, and hence the misallocation of risks. Noticeable disparities over which a party should bear certain risks reveal the chronic tension between the public and private sectors in a number of areas. The matter of concern lies with the perception that certain risks are best left alone to the party that is understood to be 'best able' to manage those risks. Our investigations suggest

that most risks should be best shared by both sectors even though they may be perceived to be in the domain of respective sector's field of expertise

All participants confirmed that risk perceptions about which party is best able to manage certain risks bear a powerful influence on final risk allocation. Both sectors perceive that the private sector has developed sophisticated approaches to manage commercial risks, partly due to accumulated experience, and partly due to the increasing market competition. The most prominent commercial risks in tollroads are identified as traffic risk, financial risk and risks associated with ownership. The private sector's capacity to cope with these risks is reflected in that: i) it is better equipped with traffic modelling expertise; ii) it has wider access to financial instruments to package the best deal to handle financial distress; and iii) it has greater incentive and operational flexibility to drive outcomes forward and achieve cost efficiency over the asset's whole-of-life cycle.

The private sector is most concerned with network risk, sovereign risk, *force majeure*, media risk, and risk of public misperception. They perceive that these risks are beyond their expertise and yet the public sector should have handled these risks in the manner that assures the profitability of private investments in roads. Armed with these perceptions, the private sector seeks to negotiate with government for preventive measures to minimise risk occurrences. Some of the common measures impose constraints on transport network development; others may demand financial compensation from government under the MAE approach.

The public sector is perceived to be best able to manage risks that are in the domain of public governance, including network risk, sovereign risk and risk of unclear project objectives, for the reasons that network planning matters, assurance of certainty and consistency in legislation, and the setting of project objectives and enforcement of these objectives through public policy all require government's judiciary power. Governments are most concerned with issues of transport network disintegration, projects being unwelcome by the community with the possibility of political and reputational repercussion, unpopular media coverage and public misperception. The task of balancing the conflicting objectives between the two sectors is not without difficulties. This mission is in part executed with a careful trade off between a politically sensitive object-toll pricing and other economic (e.g., subsidy) and engineering (e.g., project scope) means. We have seen that restraint on the levels of tolling a private operator is permitted to charge is a common approach of minimising political risk. But engineering and other economic means implemented at public cost to compensate private capital for the reduced unit price often place government's reputation at risk.

Both sectors hold reservations regarding the willingness of the other party to invest in understanding the risks they are managing. The private sector's capacity is handicapped by its myopic focus on cost minimisation and self profitability, notwithstanding that the financial success of any tollroad is indispensable to an integrated transport network. The problem is compounded by the different views regarding the bandwidth of risk tolerance held by various parties within the SPV which may create distortions in traffic estimates.

The subject of the public sector's capability of managing risks that are in the public governance circle is more complex. Many participants argued that the apparent lack of exercise of public accountability by government authorities indicate that governments do not know how to measure these risks; and public authorities' indifference to the financial eventualities of these tollroad projects has led to the underestimation of reputational risk. Further, 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 intricacy

of reconciling conflicting interests amongst public sector agencies obscures the clarity of project objectives.

The most vexed issue centres around risks that have been transferred to the extent that they have imposed a threat to public values for the sake of *risk transfer*. Gradually, market competition has transformed PPPs from an approach of risk guarantee by government to a paradigm of risk dumping by government (Chung, 2008). 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. A true partnership needs a continual multi-facet dialogue between all levels of government and the private sector to facilitate mutual learning of each sector's perceived ability of managing risk.

Some of the findings of the current study concur with that identified in Arndt (2000) suggesting that different parties' conflicting aims have a prolong effect on risk allocation, and the misuse of market competitive force may distort the ethos of optimal risk sharing. 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 Media is a powerful channel through which the PPP scheme is embraced or rejected by a malleable public perception. At present, it seems that transparency and coordination between the two sectors may have imparted the scheme some welcomeness, yet it remains far from clear which party is best positioned to take responsibilities for these emerging risks. 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.

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Appendix: Risk Attribute Matrix

Risk Attribute	Definition	Level	Public Sector	Private Sector
Traffic risk	This is the risk that traffic volume is lower than forecast which results in total revenue derived from the project over the concession term varying from initial expectations.	high	the private firm inflates traffic forecast in order to win the contract and raise finance; forced to bail out/subsidise the project when demand fails to meet projections	patronage is substantially lower than forecast during the ramp-up
		medium	The SPV does not invest to understand the demographic composition being affected; forced to increase subsidy; unable to redeem concession notes or share upside gains	traffic forecast and demographic changes stated in the EIS are not robust causing erroneous forecast in the traffic model; difficulty in predicting travel patterns of short trips vs long trips
		low	private operator has no recourse to government	government provides revenue assurance
Network risk	This risk arises when the contracted services or method of delivery of those services are linked to, rely on are otherwise affected by certain infrastructure and other services or methods of delivering the contracted services. Road projects are particularly concerned with the access to the existing road network and the feasibility of connecting to future infrastructure.	high	the private operator only concerns the profitability of each individual road; network disintegration	the private road is in direct competition with neighbouring public roads that are free to use
		medium	concession inhibits the flexibility of future transport network development	future transport network development will adversely affect traffic volume of the private road
		low	the private operator is willing to contribute to the cost of creating the physical connection to an existing road network and future network development that will improve the network efficiency as well as the profitability of the private tollroad	willingness of government to allow for renegotiation or financial compensation if future network development adversely affects the profitability of the private road

Financial risk	This risk primarily refers to the variability in returns that the project is expected to earn. It is affected by a number of parameters, including market confidence, public perceptions, consumer attributes, etc.	high	as most PPP tollroads are developed using non-recourse financing, the organisations involved must be reputable to raise the funds needed for each development; this risk is high when the private consortium does not have a strong balance sheet to sustain the project in the long run	project does not generate sufficient cash flows; fails to achieve required hurdle rate of return; new road represents greater risk and higher cost of capital; low acceptance of user-pays by motorist
		medium	the project mainly relies on debt financing, driving up the cost of risk premium	government's approach to evaluate the business case focuses only on capital costs without giving adequate consideration to life cycle cost savings
		low	the project is non-recourse to government; the SPV exercises due diligence in assessing the risk, and it is able to package an innovative project finance to manage the risk	funding structure has a low debt to equity ratio; the main party in the SPV has a strong balance sheet; the market exhibits greater acceptability of user-pays
Risks associated with ownership	This category includes design and construction risks (D&C) and operation and maintenance risks (O&M).	high	design is unwelcome by the community; the SPV barely delivers the project and associated services to its specifics	time and cost overruns; the facility cannot be operated within cost and within the constraints of the concession agreement
		medium	project is not delivered on time (cost overrun is passed on to the consortium); poor handling of O&M by the private operator reduces the asset's residual value; the private operator does minimum in order to save costs	the public procurer is inflexible with the output specifications; implementation of new technology (with no prior field experience) may render post construction performance inefficient
		low	the SPV possesses 'learning efficiency' and awareness of the broader community	government is flexible with the process of delivery; there exists legal enforcement for non-payment to be financially sanction

force majeure	This refers to the risk that events may occur which will have a catastrophic effect on either party's ability to perform its obligations under the contract.	high	occurrences of *force majeure* event will trigger financial compensation under the MAE clause	MAE events are not adequately insured or are uninsurable
		medium	the SPV will renegotiate under the MAE clause to demand tariff increase and contract extension	mechanism of redress for the aggrieved parity is not transparent; MAE clause is too restrictive
		low	the SPV is willing to renegotiate in good faith in the event MAE occurs; MAE events are sufficiently insured by the SPV	government is willing to renegotiate in good faith in the event MAE occurs; MAE approach is transparent
Sovereign risk	Sovereign risk is the uncertainty in legislation and government policy that may adversely affect the project's profitability and the possibility of a new government abandoning or changing PPP schemes. It is particular relevant to PPPs because of the long duration of contractual obligations.	high	changes in policies at the federal government level, such as tax, that are outside the judiciary power of state/local government	the government has records of exercising its power and immunities, including but not limited to the power to legislate and determine policy in a way which disadvantages the project's profitability; introduction of new government will make policy changes that will impair the project's profitability
		medium	unstable economic environment will increase the cost of private capital	policy fragmentation with respect to PPPs and tolls at different levels of government; changes in the taxation framework may impact on the financial assumptions of the project
		low	there exists a consistent, uniform approach to PPPs	The country is a democratic economy and has a uniform approach to PPPs

Risk of unclear project objectives	Unclear and poorly-defined project objectives will expose government to a series of new risks including weakening bargaining power and adverse equity impact. Offering an uncertain project to market tender opens unlimited scope for negotiation. A properly managed EIS process can reduce this risk.	high	EIS procedures are not followed; project proposal is unsolicited; project concept comes from a uncompliant bid	after committing to the project, project scope requires significant modification due to community rejection
		medium	project development is not transparent, inadequate communication with the community	community expectations are not managed properly upfront during the EIS process
		low	project has community approval; clear communication maintained throughout the project development	project objectives and benefits are made clear to the market
Political and reputational risks	These are social-dimension risks. Political risk relates to questions about the continuing commitment of key political parties to the project and is closely associated with reputational risk. These risks are common to virtually all PPPs in every area.	high	the public perceives the government offloading public accountability through the PPP vehicle and henceforth forms adverse perception about the PPP scheme	government does not realise that these risks should be retained in hand and internalised within the public sector
		medium	changes in project scope are seen as providing windfall gains to the private operator	government is inexorable regarding the levels of toll
		low	government understands the social dimension embedded in the essential services PPP projects designated to provide	users are subsidised by government

Media risk	Media serves as the medium of community expectations and public perception management, its impact can be instant and extensive.	high	media has an adverse opinion on PPPs	bad press results in negative public perception hence reduction in demand for the service
		medium	media's interest in PPPs exerts pressure on bureaucracy	government backs down from supporting the project
		low	the media is generally supportive and the private sector is willing to work with government to promote project benefits to the media	the public agency has a public relations team dedicated to keeping media informed and managing the public relations; the agency is willing to work with the private firm to manage public relations
Risk of public mispercep-tion	This risk arises when there is a lack of public support which can be detrimental to the proposed PPP road.	high	low public acceptance of private ownership of roads; the public expects that tollroads deliver little public benefit	refusal of usage by users leads to low patronage; lack of public understanding about the benefits of tollroads
		medium	private sector's negligence of different market segments; ignorance of demography around the project locality and the impact of prospective changes on the project	community resentment not handled adequately during the EIS process
		low	the SPV is actively engaging in community activities and promoting project benefits	community concerns have been adequately handled via the EIS consultation phase

[i] 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.

[ii] The consortium is generally organised in the form of a separate legal entity called the Special Purpose Vehicle (SPV) to operate each stand-alone project (Kozarovski, 2006).

[iii] 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).

[iv] One participant revealed to us that in a 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 of roads. This add-on reserve imposes extra cost on risk premium, the inclusion of which will no doubt make the project proposal appear "too expensive".

[v] 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.

[vi] In cases that governments tried to constrain the design, a trivial variation from the specified blueprint would be considered as non-delivery. There were cases ended up with hundreds of trivial complaints which resulted in lengthy negotiation and delay in delivery notwithstanding these variations had no real effect on the ability of the facility to function. Even worse, some of the specified design was based on old technology, going down that direction will in fact mar the facility's performance efficiency.

[vii] 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.

[viii] Two State Government inquiry reports concluded that (JSCCT, 2006a; 2006b): 1) there was an insufficient evaluation of the public interest before the decision was taken to open the project to the private sector; 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 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.

[ix] 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).

[x] 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).

[xi] Inverted commas are used to hint that private operators do not have full control over the toll escalation. Toll adjustments of all Australian PPP tollroads are subject to the state government's consent.

[xii] The recent Australian PPP tollroad concessions provide provisions for governments to share upside gains. The private proponent is contracted to pay an incentive rent to government only when the actual revenue receipts

are greater than the predetermined threshold (CityLink, 1995; RTA, 1998; NSWAGO, 2000; RTA, 2003a; 2003b; 2004; EastLink, 2004). To date, no evidence suggests that any incentive rent has been received by any Australian governments.