



FINANCING OF PUBLIC PRIVATE PARTNERSHIPS: SIX AUSTRALIAN MOTORWAY CASE STUDY PROJECTS

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Abstract: In the past fifteen years, Public Private Partnerships (PPPs) have emerged as the preferred procurement method for toll road construction and management in developed economies. In Australia, seven of eight new toll roads implemented since 2003 were commissioned as PPP projects. Unlike traditional procurement methods, PPPs involve higher levels of risk for private firms, who rely on bank loans for up to 85% of development funding. This study undertakes a comparative review of the financing of six of these projects of which two were financed after the global financial crisis of 2008. This paper seeks to identify differences between the projects and the bearing that these differences may have had on project outcomes. The review considers matters such as capital formation and structure, risk allocation, loan tenors, and the organisation of equity. Common characteristics are also identified including the use of short-term bank debt, reform of State PPP policy, forecasting error and the financial failure of projects, and changes in risk allocation over the 10 years of the survey. With one exception, projects were delivered on time and within budget. However, two projects experienced financial failure and substantial loss of asset value. Moreover, a further project traded for nine years before it was sold at less than half of its original construction cost. Lessons learnt from recent toll road experience in Australia and recent policy reforms particularly in the area of risk allocation are examined.

1 Introduction

PPPs and the preceding model of build operate transfer (BOT) procurement methods have been the major method for delivering and operating toll roads in Australian capital cities from the late 1970s including the Sydney Harbour Tunnel and Melbourne's Citylink. In 2015, 17 toll road PPPs were contracted in Australia, two contracts were cancelled, 14 are in operation and one is under construction at the present time. Only two of the projects were commissioned following the global financial crisis (GFC). Six case studies from these PPPs were reviewed. The GFC had an enduring impact on global capital markets and particularly project finance as many US and European lenders withdrew from the Asia Pacific market. This placed short-term pressure on borrowing costs, a repricing of risk and rating downgrades for major credit insurers that put existing guarantees in jeopardy and contributed to higher risk premiums for project finance. In 2007-08 infrastructure bonds were replaced by bank debt and lenders favoured projects led by long-term stakeholders (Ward, 2012; Infrastructure Australia, 2014).

A further development occurred in 2010 when the Basel Committee on Banking Supervision published a new regulatory framework for international banks (Basel III). It was designed to strengthen bank capital and

liquidity, and improve capital market stability. Phased in over eight years from 2013, the rules favour reduced leverage, increased equity capital, and limits on non-recourse lending. Under the new rules, project finance involving long-term limited recourse loans and bonds attracts additional capital charges, introduces shorter loan terms or tenors, and increases the cost of capital. Additionally, banks are required to maintain capital reserves to meet cyclical downturns and countercyclical periods of excess credit growth in national economies (Australian Prudential Regulation Authority, 2008; Chan and Worth, 2011).

With such wide-ranging changes to the structure and cost of financing PPPs of toll road projects, a review is timely. The first part of the review examines project finance and its use in financing PPPs in Australia. The second outlines the research approach, the selection of case studies, and a comparison of finance methods and risk allocation at the project level. Part three is a comparative analysis of the case studies and the role of PPP policy, the capital market, market conditions and issues affecting the capitalisation, pricing and risk profile of PPP toll roads in the Australian context. The final section draws conclusions from the study.

2 Financing PPPs in Australia

Private finance for megaprojects generally takes the form of bank loans and bonds. Finance for infrastructure investment possesses several distinctive properties; it is syndicated over a number of lenders, security is limited recourse and taken only in respect of the assets being financed, and debt servicing is matched to the anticipated cash flows of the project. Assets are generally capital-intensive, highly leveraged, and lending is syndicated to disperse risk (Yescombe, 2013). While each transaction is different, the focal point of project finance is matching cash flows to debt servicing obligations based on revenue forecasts over intervals of 20 or more years. Bank loans for infrastructure in Australia possess many of the characteristics of conventional project finance, although a point of difference is the tenor of Australian bank loans, which are generally one to five years. While concessionaires have adjusted to short-term bank loans for long-term contracts (Infrastructure Australia 2014), short-term lending reflects the short-term financing of Australian banks and creates refinancing risk for borrowers and exposure to future interest rate volatility.

Traditional project finance was difficult to obtain for PPPs in the aftermath of the financial crisis. This is attributed to the closure of the bond market as a financing option, an increase in risk spreads, and the failure of a large number of toll road projects. The appointment of administrators to three toll road companies financed before 2008, the Lane Cove Tunnel in Sydney, and the Clem 7 and Airport Link projects in Brisbane did shake lender confidence in the toll road market. Two of the case studies that reached financial close after 2008 were designed in a manner that mitigated demand risk for investors and financiers. Moody's Investor Services rated 53 infrastructure finance issues with outstanding debt over A\$65 billion in October 2012; 89% were in the range Baa2 and A1 (Standard and Poor's BBB to A-) or investment grade (Musiker, 2012). Historically, credit-rated toll roads were given underlying investment grade credit ratings (Standard and Poor's BBB- and above), which, with AAA credit-guarantees, lowered debt costs. The demise of the credit insurers in 2007 removed this cost of capital advantage for borrowers.

Even though the standard rating given to PPP projects is 'investment grade' which is on a par with Standard and Poor's BBB rating, the default rate on these PPPs is better (7.94% over 15 years compared to 9% for BBB rated loans) (Standard and Poor's, 2012). The data confirm the strong correlation between default rates and credit quality, the attractive risk-yield ratio of this asset class and its long-term attractiveness to institutional investors over sovereign and corporate bonds (Weber and Alfen, 2010).

Australian PPP policy does not provide for *ex post* sharing of interest rate risk between the state and the concessionaire. In the case of the *Partnerships Victoria's* policy, for example, the State will generally indemnify concessionaires for an increase in the interest rate between the closing date for bids and financial close. The state may assume the role of lender of last resort to establish capital market confidence during the bidding process and may use quarterly interest rate service payment adjustments to mitigate refinancing risk (Department of Treasury and Finance, 2012). Victorian State PPP policy reforms announced in November 2012 and May 2013 permit financial assistance to PPP projects using capital contributions to meet all or part of the construction costs, and loans to the concession company in periods of capital market illiquidity (Department of Treasury and Finance, 2012; 2013).

3 The Research Approach

The study uses a cross-sectional analysis of PPP financing for six toll roads in Australia. The approach adopted is a form of observational study that involved data collection from a representative subset of mega-project PPPs before and following commissioning. Studies of this nature are descriptive and in this instance, commonalities and lessons derived from multiple published reports produced by the private and public sectors in conjunction with the normative literature are examined. This aided the process and assisted internal validity, which are necessary functions of case study research. While multiple sources are required to confirm internal validity, it can be further strengthened when data is collected over a period of time (Taylor *et al.*, 2011).

Case studies, which are cross-sectional, can be used to build theory and develop hypothesis or propositions to be tested in future studies, though inferences of the longitudinal processes associated with PPPs should be treated with caution (Kraemer *et al.*, 2000). The cases identify differences in the funding methods of the PPPs focusing on: (1) debt modality, leverage, and capital structure, (2) cost of funds and risk spreads, (3) loan maturity (tenor); (4) source of equity investment; (5) primary risk allocation arrangements; and (6) lender performance criteria. The commonalities that are derived can be used to raise research questions about PPP mega-projects as well as aid the development of future policy.

3.1 Case Study Selection

Eleven toll road projects and one freeway (classified by the Victorian Government as a PPP and in receipt of a state availability payment) were commissioned in Australia between 2004 and 2014 of which three were financed by the state, one was an extension of an existing outsourcing project and seven were commissioned as PPPs. One project was cancelled, and the remaining six are the subject of this case study. One case study is yet to be commissioned, the NorthConnex project in Sydney and construction is currently underway (2016). Nevertheless, NorthConnex provides insights to the market response to risks associated with toll road projects, particularly recent changes with the PPP model, the role of institutional investors, and the economics of the transaction which relies on feeder toll road traffic to support the new motorway's viability. These projects were the only PPP motorway projects commissioned over the past 10 years which should eliminate selection bias. The qualifying projects were the Eastlink Motorway and Peninsula Link Freeway in Melbourne, the Airport Link and Clem 7 Toll Roads in Brisbane, and the Lane Cove Tunnel and NorthConnex Toll Roads in Sydney. The Victorian projects were commissioned under the Partnerships Victoria PPP policy framework between 2004 and 2009, the two Brisbane toll road projects were contracted under Queensland PPP policy in 2006 and 2008. The Lane Cove Tunnel was delivered under the original New South Wales Government's Privately Financed Projects policy in 2003 and NorthConnex negotiated under the revised PPP Policy in 2014.

The six toll roads in this comparison are all located in three of Australia's largest cities in eastern Australia (Brisbane, Melbourne, Sydney). Eastlink is a 39km electronically tolled motorway that connects the Eastern Distributor Motorway from Port Melbourne to the medium-density outer suburbs of Melbourne's east and the city of Frankston in the city's southeast. The toll road also has a connection to the growth industrial centre of Dandenong. It was put to the market in 2004 and commissioned in 2008. Peninsula Link is a more recent addition to the south east Melbourne road network and connects Frankston to Mornington Peninsula on Port Phillip Bay. The project was put to the market in 2008 at the height of the global financial crisis and is the only untolled motorway in the case studies.

The Lane Cove Tunnel project is a 3.6km dual tunnel connecting the Warringah Expressway in Sydney's lower north shore to Lane Cove, a junction of the Pacific Highway and Epping Road in Sydney's northeastern suburbs. NorthConnex is a new motorway linking existing motorways in Sydney's northeast and providing an important connection to the busy Pacific Highway. The project was an unsolicited bid in 2012 and is expected to be commissioned in 2019. The Clem 7 was Brisbane's first inner urban toll road commissioned in 2010 and which provides a 4.8km tunnel by-pass to the Brisbane business district and the city's congested inner northern suburbs. Airport Link commissioned in 2012 is a 6.7km multi-lane electronic free-flow toll road with a 5.7km tunnel running from the inner city to Brisbane International Airport and the busy Gateway Arterial Road.

4 Case Study Analysis

4.1 Risk and Toll Road PPPs

From the mid-1990s, PPPs became a favoured option for new toll roads with good market interest although most projects are high risk undertakings. In Australia, nearly all toll road PPPs allocated construction and operating risk to concessionaires including site conditions, the design and construction risk, operational risk and in many cases, life cycle costs, and tunnelling work with associated ventilation systems. Other risks for the concessionaire were those of improvements to toll-free travel alternatives and demand risk. The six case studies share many risk allocation similarities which is to be expected under a uniform national PPP policy. Risks concerning approvals, energy usage, insurance and pre-existing contamination were shared and *force majeure* risk was shared although specific arrangements were different for each transaction. With the exception of Peninsula Link, each project carried demand risk.

4.2 Demand Risk

For PPP toll roads, demand risk materialises when projects fail to generate sufficient revenue to meet operating costs and debt servicing obligations. Australian toll roads in the past have seen demand risk directly borne by concessionaires and indirectly by project financiers. Inaccurate traffic forecasting has been a major problem with all types of transport projects for over 40 years (Flyvbjerg, *et al.*, 2003). Toll roads are particularly vulnerable to forecasting error because of their high levels of debt, short-term debt service reserves and the need to meet debt-servicing obligations over the term of the contract.

4.3 Forecasting Error

The rollout of a large number of PPP toll roads in Australia and the high incidence of financial failure has made traffic forecasting central to the credit analysis of this group of projects. Bain (2002) examined the credit implications of traffic risk in an international sample of 32 start-up toll roads and identified optimistic forecasting in 28 cases with an average overestimation of traffic by 27%. A study by Bain (2004) using data for 87 international toll roads found that on average, forecasts overestimated first year traffic by 20-30% with a standard deviation of 0.26 and research of non-tolled roads by Flyvbjerg (reported in Bain 2004) found the error rate for 183 toll-free motorways to be similar for tolled roads. Flyvbjerg, *et al.*, (2005) used a sample of 210 demand forecasts to identify systemic inaccuracy with half of all road projects showing a difference between actual and forecast traffic of more than +/- 20%. Analysis of the results identified a lower error rate for studies commissioned by bankers than those commissioned by bidders suggesting that bidders are willing to create more flexible terms of reference to consultants that are framed to win the bid rather than take a risk-based approach (Li and Hensher 2010: 559; Bain 2009).

4.4 Financial Structure

While the Australian PPP financing landscape was not significantly affected by the financial crisis, there were changes to Australian bank lending practices under Basel III. The demise of credit insurers during this time closed the market for 'credit insured' AAA bond issues and ensured future project debt would be priced on transaction fundamentals (Infrastructure Australia, 2014). Bonds are generally designed with longer tenors than bank debt and may be structured in various pricing and currency configurations with tenors in the range 11.5 to 30 years. For example, the only bond-financed PPP in this review, the Lane Cove Tunnel project, was financed with credit-insured bonds with tenors in the range 9-25 years. As a comparison of the six projects shows, most bank debt takes the form of interest-only multi-tranche term loans during the early years of the project and tranches are generally refinanced every five to seven years. Australian banks with some international lender participation have financed most toll roads since 2008, although the new capital adequacy rules introduced under Basel III impose higher weightings for limited recourse and long-term project finance.

4.5 Equity Capital

Equity capital for toll road PPPs is mainly drawn from sponsors although institutional investors may participate once the project has a stabilised revenue and is substantially de-risked. As noted, three of the toll roads reviewed were placed under administration within 20 months of commissioning. All projects incurred losses to equity and debt and assets were sold at significant discount to development cost. Clem 7 was recently sold for less than half the 2004 construction cost and Eastlink, while not under administration, was sold at a similar discount. Institutional investor support for PPP equity remains around 5-7% of capital raised, nearly twice the rate for the OECD and developing nations (Inderst, 2014). However, it remains low compared with other asset classes in Australia.

The case studies are now compared in the following Tables. Table 1 provides a summary of the finance arrangements for the six projects and Table 2 a comparison of finance costs for early years' operation. Table 3 provides a schedule of the risk allocation for the case studies. The final Table 4 provides information on traffic forecasts v actual levels of traffic.

Table 1: Comparison of Australian Toll Road Projects: Finance

	Eastlink	Peninsula Link	Airport Link	Clem 7	Lane Cove Tunnel	North Connex
Project Size (mill.)	3,795	900	4,889	2,837	1,100	3,000
Distance (Km)	39.0	27.0	6.7	4.8	3.6	9.0
PPP Policy Framework	Victoria	Victoria	Queensland	Queensland	NSW	NSW
Scheduling: Financial Close	2004	2010	2008	2006	2003	2014
Completion	2008	2013	2012	2010	2007	Est. 2019
Concession Term	39 years	25 years	45 years	45 years	33 years	34 years
DEBT FINANCE:						
Debt (\$mill.)	2,088 (2,649)	775	3,055 (3,616)	2,116 (2,416)	1,140	2,095 est.
Deferred Shareholder Equity	✓		✓	✓		
Syndicated Loan	✓	✓	✓	✓		✓
Bonds					✓	
Equity	IPO	Sponsor	Sponsor/ IPO	Sponsor/ IPO	Sponsor	Sponsor
Debt Tenors	6-8 years	5 years	6 years	8-10 years	9-25 years	n.a.
State Contribution		Capital		Loan		Capital
Credit Insurance					✓	

Source: IPO Documents, Project Reports, Standard and Poor's (2006). Debt in parenthesis indicates loans including deferred equity contributions.

Table 2: Comparison of Australian Toll Road Projects: Finance Costs

	Eastlink	Peninsula Link	Airport Link	Clem 7	Lane Cove Tunnel	North Connex
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DEBT PRICING:						
Reference Indicators	5 year BBSW	BBSW	n.a	BBSW	10 year Bond 10 year, 90 day BBSW	Various
Deferred equity	✓	✓	✓	✓		
Spread Range bp:						
Construction	150-190	125	190	150	58-83	147*
Investment	145 av.	120 est.	175-190	140-160	58-83	<100
Interest/Currency Hedge	✓	✓	✓	✓		Internal

Notes n.a indicates information unavailable. BBSW denotes bank bill swap rate.

Table 3: Comparison of Australian Toll Road Projects: Risk Allocation

	Eastlink	Peninsula Link	Airport Link	Clem 7	Lane Cove Tunnel	North Connex
Financial Close	2004	2010	2008	2006	2003	2014
Project Risks:						
Construction	✓	✓	✓	✓	✓	✓
Demand	✓	x	✓	✓	✓	✓
Lifecycle Costs	✓	✓	✓	✓	✓	✓
Finance	✓	✓	✓	✓	✓	✓
VFM Determination	✓	✓	✓	✓	✓	x
Commercial Outcome	Sale	No Change	Adm/Sale	Adm/Sale	Adm/Sale	Under Construction

5 Conclusion

The case studies confirm the rigidities of bank debt with limited flexibility to structure finance for long-term projects with debt of different currencies, tenors and coupons that better match project cash flows with debt servicing requirements. Prior to the financial crisis bonds were used to finance PPP projects and were designed to meet the investment risk appetite of foreign and domestic investors including fund managers.

At the project level, the review shows that the Clem 7, Eastlink, Peninsula Link and Lane Cove projects were delivered ahead of schedule. In the case of Clem 7, this is remarkable given the technical challenges of the complex tunnelling task. Airport Link also required extensive tunnelling, but ran into technical problems causing time and cost overruns. Forecasting error was the main reason why three of the toll roads were placed in administration and another sold at a very significant discount to cost price. Forecasting error is the weakness of toll road PPPs and it will require radical reappraisal of the science or future policy changes to share or mitigate demand risk.

Three further observations can be made from a comparison of the case studies, depth in bid markets and short-termism that underpins the economics of PPP projects in Australia.

Table 4: Traffic Forecasts for Case Study projects and Others

Project	Location	Traffic Forecast	Actual
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		First Year Av.	Year 5 Av.	2016
		<i>a</i>	<i>b</i>	<i>c</i>
Lane Cove Tunnel	Suburban Arterial link to city	175,000	187,000	87,180
Eastlink	Links port to outer suburbs	175,000	225,000	194,000
Peninsula Link	Destination motorway	-	71,400	69,500
Rivercity Motorway	By-pass to inner city	91,000	114,000	27,230
Airport Link	Destination motorway	135,000	190,000	26,000
NorthConnex <i>d</i>	Connects two major toll roads	-	150,000	n.a.
Comparative Projects				
Gateway Arterial	Existing arterial road	-	-	114,000
Legacy Way	Suburban by-pass road	24,000	-	18,000
Cross City Tunnel	By-pass to inner city	65,000	77,000	37,000
City Link <i>e</i>	Major city by-pass connecting	-	-	820,000
M5 Sydney	Distributor to outer suburbs	-	-	148,000

NOTES:

a Average first 12 months including a "ramping up" phase

b Average annual

c As reported by state agency and media

d Under construction. Estimate based on feeder Hills Motorway of 126,000 vpd

e Data December 2015.

SOURCES:

Initial Public Offer documents for relevant projects, reports disclosed in legal action.

Charting Transport <https://chartingtransport.com/>

Governments have acted to ensure that the lending market for PPPs remains deep and competitive. Typical toll road expressions of interest attract around eight submissions, of which three are invited to respond to the request to tender. The practice has permitted government to maintain depth in the bid market, reduce the cost of bidding, and maintain competition while providing each bidder with a reasonable 33% chance of success. The conversion of the Peninsula Link project to an availability-based payment model in 2010 ensured a bid field of five for the expression of interest stage reducing to three for the request for proposal stage with one withdrawal. Considering concerns about future capital market conditions at the time and bidder reluctance to accept toll road demand risk, the changes to the project brief were designed to support bid market interest and the bankability of the transaction. A significant change in PPP policy has occurred in the treatment of bid costs, which in the past were a marketing cost borne by bidders. In 2013, the Victorian Government foreshadowed part or full reimbursement of bid costs for future PPP projects even for losing syndicates responding to invitations for a request for tender (Department of Treasury and Finance, 2013).

A further observation concerns short-termism. Until the financial crisis, Australian PPP bids had been led by financial service providers, which was a different approach to contractor-led consortia in North America and the European Community. Early stage risk-taking members of consortia including financial service providers will generally take fees from the project during the pre-commissioning stage and as noted, will seek an early exit. Long-term institutional and portfolio investors will mainly take up equity in projects when they are substantially de-risked and achieving stabilised revenue and returns. Construction companies have also shown willingness to sell-down equity subscriptions and exit projects when risk has been reduced and improved revenue contributes to higher asset values.

Sponsor equity investment is also short-term with fund managers preferring the liquidity of listed investments and corporate investors selling down their equity positions in consortium special purpose vehicles shortly after completion of contractual obligations (Whitfield, 2014). The short-termism of private equity investment has a parallel in the short-term debt offered by Australian banks and high churn rate in the ownership of listed and unlisted infrastructure investment vehicles (Regan, 2004). Does short-termism disadvantage Australian infrastructure investment? Transactional data indicates a relatively high success rate for Australian PPP projects that do not carry demand risk. The bid market has adapted to the short-term debt provided by Australian banks following the demise of the credit insurance market and withdrawal of foreign lenders following the financial crisis (Infrastructure Australia, 2014). The way that PPPs are financed in Australia does not appear to constrain competitive bid markets or lender interest in this asset class and no project has failed to achieve refinancing over the past decade.

The short-term investment approach to PPP contracts is also understandable in contemporary capital markets: firms merge, are listed and delisted from the Australian Securities Exchange (ASX), the business cycle may affect strategic decision-making, or firms may simply need to rebalance their portfolio of investments and/or activities. Fund managers are not significant global lenders to PPP projects with portfolio allocations typically less than 1% of funds under management (Inderst and Della Croce, 2013). Following the failure of the BrisConnections (2008) Airport Link concession company on the ASX in 2013, financial service providers have not played a direct role in leading PPP bids and that equity sourcing option remains closed.

Australian PPP policy responded quickly to changed market conditions after 2008 and both Commonwealth and State Governments confirmed continued support for the PPP procurement methods for large and complex projects that deliver value for money outcomes. All Australian jurisdictions have amended PPP policy to provide viability gap funding through up-front capital contributions, subsidies, reduced bid costs and simplified bid selection criteria (Department of Treasury and Finance Victoria, 2012). In Queensland, the supported debt model was introduced in 2007 to provide state loans to the concession company in anticipation of private bank credit rationing, although only one project was financed this way (McKenzie, 2008). The Victorian Government introduced policy changes in 2009 with the Peninsula Link project by providing up-front capital contributions, substituting an availability payment regime for demand risk, creating a service payment regime for the asset management component, and commissioning the road as a freeway without tolls. The arrangement ensured that the service payment for the operations and maintenance contract included an incentive framework for sustained asset management to specification.

Formal policy changes followed in 2012 and 2013 to improve the credit and investment viability of PPPs, mitigate the effects of systemic forecasting error and address concerns of both contractors and financiers that risk allocation practices needed to change to ensure sustainability of the bid market especially for market depth and competitiveness (Department of Treasury and Finance Victoria, 2013; New South Wales Treasury, 2012). The policy responses of government were not part of a uniform national initiative but introduced progressively by State and Territory Governments. The policy interventions differed widely between jurisdictions with the effect that regional PPP policy shows greater variation than at any time since the adoption of national guidelines in 2008.

Finance market reluctance to accept demand risk has led to recent hybrid approaches to toll roads in Sydney (WestConnex) and Melbourne (Westlink) using *alliance contracting* methods with the State retaining an option to put the project to market when traffic and revenue matures (Goldsmith, 2014).

As long as PPP projects deliver value for money for government, the PPP procurement model and present financing methods are likely to remain an option. From a policy perspective, the review highlights the need for government to recognise that wholesale state allocation of demand risk to private bidders for toll roads is no longer sustainable. There is also a continuing need for further policy development informed from transactional experience. The policy reforms of 2011-13 support the PPP toll road model and have maintained depth in bid markets at the cost of value for money outcomes for government. In the Australian context, the recent policy changes developed at State and Territory level should be adopted under uniform national guidelines to reduce the risk of further policy fragmentation at regional level.

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