The Privatisation of Queensland Motorways
An Economic Briefing Paper
Prepared for the RACQ
By Prof Ross Guest

Executive summary

This paper evaluates the proposed long term lease to the private sector of the tolling rights on Queensland Motorways (QM) from an economic welfare perspective.

Invalid arguments have been put on both sides of the debate. In justifying its proposed asset sales (or leases), the Queensland Government has significantly understated the return on the assets (including QM), overstated the saving in capital expenditure and interest expenditure, and overstated the potential for asset sales to restore its AAA credit rating. On the other hand, it is invalid to support government provision of services on the basis that government has a lower cost of capital, or that community service obligations can only be met through government provision of services.

On balance, this report recommends that the QM tolling rights should **not** be transferred to the private sector mainly because:

(i) The Government is in a better position than the private sector to manage the revenue risks to a brownfields toll road project such as QM; and

(ii) A private operator cannot recover the network externalities of the motorway through a direct user charge. This means that, in order to break even without government assistance, a private operator would charge a toll price that is too high leading to traffic volumes that are too low relative to the economically efficient level.

These are allocative efficiency arguments, meaning that resources are allocated more efficiently if the tolling rights are retained under full public control.
The case for private control of tolling rights would therefore have to rest on productive efficiency – i.e. that the private sector will manage the asset at lower cost than the public sector, for which there is some international evidence. Yet the Government has curiously not made this argument.

However, the costs to allocative efficiency from private control are likely to be greater and harder to reduce than the costs to productive efficiency from public ownership. This assessment weighs in favour of public ownership.

Privatisation also raises questions about private monopoly power over key infrastructure assets within the road network over a period as long as fifty years; and the delivery of community service obligations, although these could be handled in principle.

The sale price is another issue. The value of QM appears to be at least $4.5 billion. A sale at $3 billion or even $4 billion would therefore transfer net worth from Queensland taxpayers to private investors.
1. Introduction

Most private equity investments in roads in Australia are in the form of Public Private Partnerships (PPPs) of the build-own-operate-transfer (BOOT) type. Examples in Sydney include the Sydney Harbour Tunnel, the M2, M4 and M5 Motorways, the Cross City Tunnel and the Lane Cove Tunnel. Other examples include CityLink and EastLink in Melbourne and the Clem7 tunnel and the Airport Link in Brisbane. BOOT investments such as these are also the most common form of private financing of road infrastructure in the U.S. and Europe.

The above Australian examples are all greenfield PPPs. However, the proposed long term lease of the tolling rights on the Queensland Motorways (QM) is essentially a brownfield PPP. This is an important distinction. In a brownfield project the private sector entity purchases an existing asset, agreeing to operate and maintain it which may involve some capital expenditure. The difference in a greenfield project is that the private sector also designs, finances and constructs the infrastructure. The private sector may be well-placed to manage the risks associated with these greenfield functions, which would justify private sector equity. With brownfield projects, the primary risk is revenue risk from variable traffic volumes which is likely to be better managed by the public sector than by the private sector – a point explored in more detail in this report.

Another distinction relates to the methods of privatisation as they have different social welfare implications. The tolling rights on the QM will be leased via a franchise for up to 50 years from mid 2011 by competitive tender. This is a common privatisation method, although the first time it has been employed for a toll road within Australia. Compared with other methods, the financial risk to the taxpayer is that the sale price may be too low and that excessive private market power may result. ¹ Similarly, the Port of Brisbane and Abbott coal terminal will be transferred to the private sector through a long term lease (99 years). The coal and freight businesses of Queensland Rail on the other hand will be sold by an initial public offering (IPO) which is a public float of shares at a fixed price, underwritten by financial

¹ The Government has indicated that the toll price will be regulated and not be allowed to rise faster than the inflation rate. This will limit the ability of the private operator to exercise monopoly power although concerns remain (discussed further below).
institutions. A different form of IPO, using partly paid securities, was used for Eastlink in Melbourne, the Clem7 Tunnel in Brisbane and the Airport Link in Brisbane. IPOs have the advantage of dispersing market power, although there are significant problems with partly paid securities (exemplified by the recent Airport Link controversy). Other methods for transferring assets to the private sector (not currently considered by the Queensland Government) include giving away shares free to citizens or a sale and lease back.

The relative merits of privatisation also depend very much on the nature of the asset. Roads, airports, prisons, telecommunications, banks, airlines, waste disposal services, employment services have all been subject to privatisation in Australia since the 1980s. The arguments for private or public ownership ought to be made on a case-by-case basis in order to take account of unique characteristics of the management of the asset. Some aspects of toll road privatisation for example are rather unique. The possibility of rent-seeking behaviour by private owners of a toll road with the aim of diverting traffic away from competing public roads onto the toll road is a potential social cost of private ownership. Similarly the existence of significant network externalities is a much more important issue in road privatisation than in other cases such as prisons, employment services or waste disposal services. These aspects are discussed further below.

2. Misleading claims about Queensland asset sales

Some of the claimed benefits of privatising public assets in Queensland are either misleading because they are half-truths, or simply false. Examples are three claims made on the Queensland Government’s website promoting the benefits of selling five government assets of which QM is one.

(i) “The total return from all five businesses in 2008-09 was approximately $320 million.”

2 Updated details on the sale of several Queensland Government assets were announced by Premier Bligh on 8 December 2009.
3 This method was used in British Columbia in privatizing forest products and natural gas companies; and also in the Czech Republic in privatising various SOE’s (Pagano, 2009).
4 An example of the sale and lease back arrangement is the Eraring power station in NSW.
5 King and Pitchford (2008) discuss this example in developing a framework for comparing private and public ownership. In their model, whether public or private ownership is optimal depends on a complex interaction between incentives facing managers, external costs and benefits of managerial action, and the ability of governments to proscribe managerial action.
This number refers to the distribution to the Government after the businesses have paid interest and tax (or tax-equivalent payments) and set aside retained earnings for future capital expenditure and the like. This figure is certainly not “the total return” from these businesses. The best measure of “total return” is return on assets (ROA) which is the ratio of earnings before interest and tax (EBIT) to total assets. In the case of QM, EBIT in 2009 was $55.2m and the ROA was 3.1% in 2009, down from 5.7% in 2008 and 7.6% in 2007. The reason for the big drop in ROA since 2007 was the 140% increase in total assets, mostly infrastructure assets (“property plant and equipment”) due mainly to the Gateway Upgrade Project. These are assets under construction and are therefore not yet fully operational. The 2007 ROA of 7.6%, for example, is above the weighted average interest rate on borrowings from Queensland Treasury Corporation which, for the 2008-09 financial year, ranged from 5.5% to 6.5%. If we assume a normal rate of return on the QM’s assets under construction, the ROA could be expected to exceed borrowing costs. It is unclear whether the ROA can be expected to cover a weighted average cost of capital (WACC) which is typically several percentage points above the cost of borrowings. However, a full social ROA may well exceed the ROA based only on direct financial flows reported in QM’s Annual Report. A full social ROA would need to include network externalities and community service obligations which are discussed further below.

(ii) “The sale of these assets will deliver…$12 billion saved in future borrowings for these businesses”. This is misleading because it implies that the $12 billion, which would be spent on upgrading infrastructure in these businesses, would have a zero return. The right question is whether the $12 billion would have a higher return if spent on upgrading existing infrastructure than it would if spent on the next best alternative use, whether that is schools, hospitals, police or whatever. The answer to that question would require a full social cost-benefit analysis, taking account not just financial flows but equity considerations and externalities. Such an analysis has not been undertaken – or at least not disclosed - for any of the businesses up for sale.

7 Although Queensland Motorways has negative equity, this is the result of past losses. If its current EBIT and positive cash flow from operations were to continue the value of equity would become positive over time.
8 Other assets under construction in 2008 include the Free-Flow Tolling Project and the Logan Motorway Resurfacing Project.
9 QM Annual Report 2008-09, page 70.
(iii) Although not on the Government’s “Facts and Myths” webpage, the Government has claimed that it needs to sell assets to repair its balance sheet in order to restore its AAA credit rating. The Queensland Government’s AAA credit rating was downgraded in early 2009 by both Standard and Poor’s (to AA+) and Moody’s (to AA1), based on its projected budget balance and net financial liabilities. This will increase interest costs by around 30 basis points which Treasurer Andrew Fraser claims will cost the Government’s budget $200m per annum.  

First, the $200m dollar is a significant over-estimate because it assumes that the 30 basis point increase applies immediately to all the Government’s borrowings. This is not the case – the higher interest rate only applies when borrowings are due to be rolled over which happens progressively over a number of years.

Second, the Government’s claim about the effect of the asset sales on its budget balance is also overstated. The interest saving to the Government’s budget is certainly not $1.8 billion as claimed by the Government on its “Myths and Facts” webpage. That figure must have been calculated by either including interest on existing borrowings (which is invalid because interest on existing borrowings is already covered by revenue from these businesses); or it assumes that the $12b “saved” in upgrading the assets is borrowed all in one year (which would contradict its own projections of a 5 year horizon). Rather, the interest saving is roughly $150m assuming an interest rate of 6.25% and accepting the government’s projection that the $12b will occur over 5 years. That is less than the dividends from these businesses of $320m. So selling these assets seems likely to actually worsen the Government’s budget bottom line.

It is true that selling assets to reduce debt will lower the Government’s gearing and for this reason it could lead to a credit rating upgrade. It is also true that the Queensland Government’s commitment to spend some $18 billion on new public infrastructure over the next few years will require funding that would place pressure on its credit rating without offsetting measures. However selling public assets simply to improve a government’s credit rating is poor public management.

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10 As reported by ABC News online: http://www.abc.net.au/news/stories/2009/02/21/2497607.htm
policy. The case for asset sales depends on the full social cost-benefit implications of the asset sale on a case by case basis, which may include the effect of the sale on the credit rating but this will be only one component of the analysis. It is quite possible that privatisation could increase the government’s net worth but reduce the social welfare of society through sub-optimal risk transfer, failure to account for network externalities, creation of private monopoly power, and/or failure to deliver community service obligations. These issues are discussed in the next section.

3. Privatisation, risk sharing and economic efficiency

Whether privatisation promotes social welfare depends on whether it promotes economic efficiency and equity (we consider equity below). There are two types of economic efficiency: allocative efficiency\(^{13}\) and productive efficiency\(^{14}\). Privatisation can affect allocative efficiency for better or worse through risk sharing, the existence of network externalities and the potential for exercising monopoly power; and it can affect productive efficiency for better or worse through incentives, competition, clarity of objectives and management expertise.

**Allocative efficiency**

**(i) Risk sharing**

Take risk sharing first. What are the risks in brownfields road infrastructure such as the QM and how should they be allocated? A useful place to start is a risk matrix for public sector and private sector infrastructure investments such as that provided in Grimsey and Lewis (2004) and reproduced here in Appendix A. (See also Prieto, 2009, for a useful schema.) Some of these risks can be ignored here because they do not apply to a brownfields privatisation – for example, construction risks and some site risks and technical risks. The main risks facing a brownfield privatisation such as the QM are operating risks consisting of cost overruns and operational delays, and revenue risks consisting mainly of traffic volumes. Although traffic

\(^{13}\) Allocative efficiency means that resources are allocated to the goods and services that society wants such that it would be impossible to make society better off by reallocating resources without making someone else worse off.

\(^{14}\) Productive efficiency means that any particular good or service is produced at least possible cost.
volumes can be projected with more accuracy than in greenfields projects, they are still subject to considerable long term risk due in particular to urban planning decisions including land zoning, decisions regarding the public transport system and the surrounding road network, and macroeconomic factors.

In deciding how these risks should be allocated between public and private sectors the overarching objective is to ensure that parties weigh up the full social costs and benefits of their actions. This leads to actions that yield net social benefits. A necessary condition is that parties have control over the full costs of their actions and they bear the full social consequences of their actions. This is hard to achieve, but the following well-established rules for optimal risk sharing are a guide (Ng and Loosemoor, 2006). A risk should only be given to a party who: (i) has been made fully aware of the risks they are taking; (ii) has the greatest capacity (expertise and authority) to manage the risk effectively and efficiently (and thus charge the lowest risk premium); (iii) has the capability and resources to cope with the risk eventuating (iv) has the necessary risk appetite to want to take the risk; and (v) has been given the chance to charge an appropriate premium for taking it.

Applying these risk allocation rules to the toll road privatisation, it becomes clear that the principal risks – the revenue risks associated with urban planning, land zoning, the public transport system and surrounding road network - ought to be allocated to government, because government has greater capacity than the private sector to manage these risks. A private operator would have an incentive to lobby against any urban planning and transport decisions that put its revenue at risk even though these decisions may be in the best interests of the community. This occurred with Sydney’s cross-city tunnel, for example, where efforts by the private owner resulted in the shutting down of substitute roads in order to increase demand for the tunnel (King and Pitchford, 2008).

Other efforts to transfer risk back to the government have been common. Under the “Ensured Revenue Stream Agreement” regarding the Sydney Harbour Tunnel, top up payments are made by the NSW Government if toll revenues fall below a certain level. This effectively gives the private operator a free put option on the revenues of the toll road – at the expense of the taxpayer. In the case of the M4 and M5 in Sydney, the government gave in to

15 A put option is insurance against downside risk from falling value of an asset.
community pressure and introduced the “Cashback” scheme, effective from March 1 2009, whereby drivers of private vehicles registered in NSW could claim a rebate for tolls paid on the M4 and M5 motorways. This amounts to a shadow toll scheme whereby the government effectively pays the toll to the operator on behalf of the motorists.

The experience has been similar in Europe and the US – road infrastructure concession contracts tend to be renegotiated at the instigation of the private partner due typically to revenue shortfalls (Engel, Fischer and Galetovic, 2002; Harris et al., 2003)\(^\text{16}\). The key point is that these renegotiations negate the advantages of private participation in the first place: “The renegotiations thus void the public benefits of private highways by limiting investors’ risk of loss, diminishing franchisees’ incentives to be efficient and cautious in assessing project profitability and advantaging firms with political connections” (Engel et al, 2002, p. 19).

Rent seeking leads to allocative inefficiency in two ways: directly through the resources it uses up, but more importantly by distorting resource allocation away from what is socially optimal. This is a strong prima facie argument against privatising brownfields toll roads.

**(ii) Network externalities**

Traffic volumes will tend to be too low on a private toll road because the private operator will not take account of network externalities. This implies allocative inefficiency and a deadweight social loss. See Appendix B for a diagrammatic analysis.

When a vehicle uses the toll road instead of the surrounding network it confers a benefit to users of the surrounding network due to less congestion and less wear and tear on the roads. This benefit is a network externality. Yet the private operator has no way of charging drivers on the surrounding network. It can only charge what drivers on the toll road are willing to pay for their private benefits. This leads to a toll price that is too high and traffic volumes that are too low relative to the economically efficient level.\(^\text{17}\)

\(^{16}\) The latter is a World Bank publication based on an extensive survey of hundreds of transport concessions world wide.

\(^{17}\) A qualification concerns congestion costs – lost time of motorists and pollution which rises more than proportionately with congestion. Neither the private operator nor the toll road motorists bear the full social costs of pollution or lost time to other motorists. This tends to lead to an under-pricing of the toll which may offset the overpricing discussed here.
A government operator could rectify this by lowering the price to increase traffic volumes on the toll road; thereby better managing outcomes across the entire road network and conferring the maximum benefit to all users. The government could top up any revenue shortfall through other charges that fall on all users of the entire road network.

Alternatively the government could subsidise the private operator, but that would raise problems of rent-seeking leading to excessive subsidies.

(iii) Private monopoly power

The exploitation of monopoly power is another potential source of allocative inefficiency. Monopolies tend to over-price and under-supply goods and services. Privatising tolling rights is a transfer of monopoly power from the public to the private sector.

In the case of QM, the potential for monopoly power will be constrained if, as the Government has claimed, the toll price is set by the Government at the time of sale and cannot increase faster than the inflation rate. However concerns remain. First, there is the risk that the initial toll price may be set too high (or the sale price for the tolling rights be too low – see below). More importantly though, there is the risk of contract renegotiations over such a long lease (up to 50 years) in which either the restrictions on toll increases could be relaxed or subsidies and revenue guarantees of various kinds could be introduced. As noted above, contract renegotiations on private toll road concessions have been common in Australia and overseas.

In summary, it is unlikely that toll road privatisation contributes positively to allocative efficiency: risk sharing is unlikely to be optimal, network externalities are not accounted for, and, although less important, there is a risk of abuse of private monopoly power.

Productive efficiency

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Monopoly power is the ability of a seller to increase revenue by raising price because it is sufficiently insulated from competition. The inefficiency arises because prices are too high and sales are too low relative to the competitive outcome. When sales are too low there are unrealised gains from trade, meaning that additional output would lead to net social gains in that the benefit to consumers would be greater than the costs of the output.
Netter and Megginson (2001) conclude that privatisation does tend to improve the productive performance (i.e. lower average costs) of the business. They based this conclusion on a wide international survey of the many empirical studies in industrialised countries across a range of industries. However they offer qualifications: (i) performance improvements could be due to greater exploitation of monopoly power; (ii) there is a selection bias in studies because governments tend to sell the easiest firms first – those that are healthy to start with and attract ready buyers.

The reasons for improved performance are less clear – the evidence is sketchy. Ng and Loosemoor (2006) suggest a range of possible factors: ‘shareholder pressures for performance and accountability, greater clarity of objectives, higher management expertise and autonomy, lower levels of regulation and control, a competitive environment, continuous improvement against clear key performance indicators…and managerial incentives and rewards for innovations.’

With respect to toll roads, Johnson et al (2007) argue, in the context of the Indiana toll road concession signed in 2006, that ‘the private sector may also be more flexible in reacting to changing conditions and managing operation and maintenance (O&M) costs mainly because it is not constrained by government labor contracts with union pay scales and restrictive work rules. Though O&M efficiencies can generate some savings, the bigger benefits from the private sector may come from timely reinvestment in the facility that lowers overall life cycle costs and eliminates the issue of deferred maintenance.’

Queensland Motorways will already have completed a significant program of road upgrades on much of its network as well as the installation of electronic tolling technology, prior to the government taking it to market.

In summary, on the criterion of productive efficiency the empirical evidence and theoretical arguments do tend to support privatisation. The question then is: which is more important, the likely costs to allocative efficiency or the likely gains in productive efficiency? That would require a full social cost-benefit analysis taking account of all of the above factors (plus the effects on community service obligations considered briefly below). Yet such analyses for toll road privatisations cannot be found. It can however be argued that the costs to allocative efficiency from private ownership are greater and harder to control than the costs to productive efficiency from public ownership.
Curiously, the Government has not yet advanced the case for privatisation on the grounds of productive efficiency, preferring to rest its case exclusively on the purported fiscal benefits of privatisation.

4. Other issues: community service obligations, cost of capital, and sale price

Equity and community service obligations

Community service obligations (CSOs) provided through public infrastructure – such as public transport, telecommunications and postal services - are a form of income redistribution. They are justified on equity grounds. For example, public transport provides access to employment and social activities for people who are disadvantaged either financially, physically, intellectually or geographically. Providing affordable transport for these people is regarded as a CSO (Queensland Transport, 2001).

CSOs are by definition non-commercial activities and as such would not be provided by a private firm without explicit compensation by government. This is not in itself an obstacle to the provision of CSOs. In fact outsourcing to the private sector could provide transparency and accountability. Queensland Treasury for example seeks to have CSOs “administered with a high degree of transparency and accountability” (Queensland Treasury, 1999, p.3). Similarly the Productivity Commission (2008) recommends that CSOs be properly costed and treated as a fee for service rather than a subsidy.

With respect to the services of QM, CSOs might relate to environmental management, road access management and infrastructure upgrades that are integrated with the rest of the transport network, and perhaps price concessions to certain disadvantaged groups of people.

If these CSOs are to be outsourced to the private sector through privatisation then explicit contractual obligations need to be put in place, as is currently done for example with bus and rail service agreements between the government and private sector operators. The value of the CSOs should be explicitly accounted for in the sale. Mechanisms for regulatory oversight to ensure that the CSOs are being met should also be documented in the contract.
No detail has been provided (publicly at least) on any of these matters in connection with the privatisation of QM.

**Public versus private cost of capital**

It is sometimes argued that the government has a cost advantage in constructing and managing public infrastructure through its lower cost of capital. This is not however a good argument for public ownership of assets or provision of services. The main reason the government cost of capital is lower is because government can raise taxes which means that the risk inherent in the project, for which the funds are borrowed, is transferred to taxpayers who potentially face higher future tax payments or a lower level of services. Taxpayers are forced to accept a contingent liability without compensation (Grimsey and Lewis, 2004, p.133).

At the national level there is also the risk that governments could be tempted to monetise their debts thereby imposing inflation risks on taxpayers (although this argument would not apply at the state government level).

It is possible that the private sector could attempt to extract excess returns for taking on the ownership or management of public assets. This would be an income transfer from taxpayers to the private sector equity holders and therefore not in the general interests of taxpayers. Pricewaterhouse Coopers (2002), conducted a study reported in Grimsey and Lewis (2004, pp.146-147), to investigate whether excess returns were being earned by the private sector. They found average excess returns of 2.4 percent. However 1 percent of this, they argued, could be accounted for by bid costs which are higher for public projects. The remainder could be at least partly accounted for by an allowance for uncertainty (as opposed to risk) which is argued to be higher for long term PPPs than for private projects. This leaves a negligible remainder to be attributed to genuine excess returns from private sector investments in public projects.

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19 They compared the expected returns on 64 PFI projects with the weighted average cost of capital that should be expected from a project by a diversified investor (using the CAPM).
20 Risk is where the probabilities of a set of outcomes are known and uncertainty is where the probabilities are not known. Ignorance is where the possible outcomes themselves are unknown.
The sale price for the asset

The Government estimates the value of the existing QM business at $3 billion or $4 billion if the new Port of Brisbane Motorway, yet to be constructed, is included.\textsuperscript{21} If we assume away network externalities and CSOs,\textsuperscript{22} the figure of $3 billion can be evaluated against the value of projected discounted cash flows (DCF). If the government realises more than the DCF then net worth is transferred from investors to Queensland taxpayers or vice versa if the sale price is less than the DCF.

The details of the DCF calculation are given in Appendix C where the results are summarised in Table 1. There are a range of scenarios for the revenue projections, discount rate and lease periods. Under the baseline (or most likely) scenario QM is valued at $4.6 billion which is $1.6 billion more than the $3 billion price tag suggested by the Government. To get a value of as low as $3 billion would imply either significantly lower revenue growth – less than 2% which would be well below the likely real growth rate of the Queensland economy – or a substantially higher discount rate (above 5% real), or a much shorter projection period (less than 30 years), or naturally some combination of these (not reported). These calculations suggest that the Government is under-valuing QM which would imply a transfer of net worth from Queensland taxpayers to private investors.

5. Recommendations

On balance, this report recommends that the QM tolling rights should not be transferred to the private sector. The two most important reasons, neither of which has been addressed adequately by the Government, are:

(i) Optimal risk allocation: the revenue risks, which are the main risks to the operator of a brownfields toll road project such as QM, ought to be allocated to government because government has greater capacity than the private sector to manage these risks. A private operator would have an incentive to lobby against any urban planning decision that might be


\textsuperscript{22} Assuming network externalities are zero here implies an undervaluation of the asset from a social viewpoint.
against its interests (but in the public interest), or to transfer risk back to government through
revenue guarantees. Either way there is resource misallocation.

(ii) Network externalities: a private operator cannot recover the full social benefits of the
motorway through a direct user charge because it cannot charge users of the surrounding
network for the externalities they receive. For the private operator to break even it would have
to charge a toll price that is too high, leading to traffic volumes that are too low, relative to the
economically efficient level. Again there is resource misallocation.

In both instances road users and/or taxpayers are penalised in an effort to maximise the
commercial returns of a private operator.

The case for privatisation would therefore have to rest on productive efficiency – i.e. that the
private sector will manage the asset at lower cost than the public sector, for which there is
some international evidence. However it is curious that the Government has not put forward
this argument.

Weighing up gains from productive efficiency against losses from allocative inefficiency is
ultimately a judgement call. However, the costs to allocative efficiency from private
ownership are likely to be greater and harder to control than the costs to productive efficiency
from public ownership. This assessment weighs in favour of public ownership.

Again, the Government has simply not addressed the question of allocative inefficiencies,
preferring to rest its case on purported fiscal gains from the asset sale.

Privatisation also raises questions about monopoly power and community service obligations
although these could in principle be handled. The sale price is another issue. The value of QM
appears to be at least $4.5 billion. A sale at $3 billion or even $4 billion would therefore
transfer net worth from Queensland taxpayers to private investors.

With the impact of the Global Financial Crisis still fresh in investors minds and the financial
problems of toll roads witnessed interstate, the Queensland Government may struggle to
achieve full value for such an asset sale. The next two or three years promise to be
challenging times for selling substantial public infrastructure.
Appendix A

The following is a risk matrix for public sector and private sector infrastructure investments (Grimsey and Lewis, 2004, pp. 180-181).

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Source of risk</th>
<th>Risk taken by</th>
</tr>
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<tbody>
<tr>
<td>Site risks</td>
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<tr>
<td>Site conditions</td>
<td>Ground conditions, supporting structures</td>
<td>Construction contractor</td>
</tr>
<tr>
<td>Site preparation</td>
<td>Site redemption, tenure, pollution/discharge, obtaining permits, community</td>
<td>Operating company/project</td>
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<td></td>
<td>Pre-existing liability</td>
<td>company</td>
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<tr>
<td>Land use</td>
<td>Native title, cultural heritage</td>
<td>Government</td>
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<tr>
<td>Technical risks</td>
<td>Fault in tender specifications</td>
<td>Government</td>
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<td></td>
<td>Contractor design fault</td>
<td>Design contractor</td>
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<tr>
<td>Construction risks</td>
<td></td>
<td></td>
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<tr>
<td>Cost overrun</td>
<td>Inefficient work practices and wastage of materials</td>
<td>Construction contractor</td>
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<td></td>
<td>Changes in law, delays in approval, etc.</td>
<td>Project company/investors</td>
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<tr>
<td>Delay in completion</td>
<td>Lack of coordination of contractors, Failure to obtain standard planning</td>
<td>Construction contractor</td>
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<td></td>
<td>approvals</td>
<td>Insurer</td>
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<tr>
<td>Failure to meet</td>
<td>Quality shortfalls/defects in construction/commissioning tests failure</td>
<td>Construction contractor</td>
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<tr>
<td>performance criteria</td>
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<td>project company/project</td>
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<td>company</td>
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<tr>
<td>Operating risks</td>
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<tr>
<td>Operating cost overrun</td>
<td>Project company request or change in practice</td>
<td>Project company/investors</td>
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<td></td>
<td>Industrial relations, repairs occupational health and safety, maintenance,</td>
<td>Operator</td>
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<td></td>
<td>other costs</td>
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<td></td>
<td>Government change to output specifications</td>
<td>Government</td>
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<td>Delays or interruption</td>
<td>Operator fault</td>
<td>Operator</td>
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<td></td>
<td>in operation</td>
<td>Government</td>
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<td></td>
<td>Government delays in granting or renewing approvals providing contracted</td>
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<td></td>
<td>inputs</td>
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<tr>
<td>Shortfall in service</td>
<td>Operator fault</td>
<td>Operator</td>
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<td>quality</td>
<td>Project company fault</td>
<td>Project company/investors</td>
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<td>Revenue risks</td>
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<td>Increase in input</td>
<td>Contractual violations by government-owned support network</td>
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<td></td>
<td>Contractual violations by private supplier</td>
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Appendix B

Road tolls

The diagram above shows why traffic volume will tend to be too low on a private toll road leading to a deadweight social loss.

Average cost: total costs (fixed plus variable) divided by no. of vehicles on road. Average costs decline as fixed costs are spread over a greater volume of traffic. Fixed costs include a return on capital.

Demand: the number of vehicles on the road at each toll level. Drivers will use the toll road if the $ benefit exceeds the toll. Hence the demand curve is a private marginal benefit curve.

Social marginal benefit: the private marginal benefit plus the network externality which is the $ benefit to drivers on the surrounding network due to less congestion, and less road wear and tear, on that network. (Note the network externality gets smaller because the additional benefit to surrounding network from vehicles using the toll road is smaller the more cars that use the toll road and therefore the less congestion there is on the surrounding network.)

Social marginal cost: the cost of an additional vehicle on the road i.e. road wear & tear, congestion costs and pollution costs. These rise with higher traffic volume.

Break-even price: the price to the private operator that covers average costs including a return on capital.

Economically efficient price: the price that equates the social marginal cost to the social marginal benefit. (Note this is less than the break-even price.

Why traffic volume tends to be too low: because the operator does not consider the positive network externality when a vehicle uses the toll road instead of the surrounding network. At the break-even price traffic volume is $Q_{\text{break-even}}$ which is less than the economically efficient volume of $Q_{\text{efficient}}$ which in turn is determined at the point where the social marginal benefit equals the social marginal cost. The deadweight social loss arises because every vehicle between $Q_{\text{break-even}}$ and $Q_{\text{efficient}}$ would generate net social benefits if those vehicles could be induced to use the toll road by lowering the price. A government operator could lower the price and cover the revenue shortfall by fixed vehicle registration charges or other charges that fall on all users of the entire road network. (Alternatively the government could subsidise the private operator, but that would raise problems of rent-seeking leading to excessive subsidies.)
Appendix C

Calculation of the sale price

The starting point is the cash flows from operating activities in 2008-09 excluding borrowing costs. This amount is $118 million.\(^{23}\) These cash flows are then projected forward over the stated maximum lease period of 40 years\(^{24}\). All dollar amounts are in real terms (i.e. after inflation). In the baseline projection cash flows are assumed to grow at the constant average growth rate of Queensland’s Gross State product of 3.7 percent, which implies growth in traffic volumes at this rate – that is, at 3.7 percent. This in turn is given by a population growth rate of 1.5 percent\(^{25}\) plus an average labour productivity growth rate of 2.2 percent.\(^{26}\) (A lower revenue growth scenario is considered below).

This growth rate of traffic volumes continues until the motorways have reached capacity which is assumed to be double the rate at the time of privatisation (i.e. year 2012). Once capacity is reached, traffic volumes and therefore revenue are constant (in real terms).

The baseline discount rate is 6.0%, which as noted above, is approximately the average cost of borrowings of QM from Queensland Treasury in 2008-09. Assuming an inflation rate of 2.5% (the midpoint of the RBA’s target band), gives a real discount rate of 3.5%. (A higher interest rate scenario is considered below). The interest rate on borrowings is the appropriate discount rate because the Government has argued that the sale of QM will allow it to reduce debt, save interest payments and help to restore its AAA credit rating. Hence the opportunity cost per dollar of keeping funds tied up in QM is the interest rate on its debt.

The net present value (NPV) of the projected net cash flows (NCF) is given by:

\[\text{NPV} = \sum_{t=1}^{T} \frac{NCF_t}{(1+r)^t}\]

\(^{23}\) Queensland Motorways Annual Report 2008-9, p.53. Consolidated receipts of $195m less payments of $77m. This is a conservative starting point because it does not take account of the revenue growth from the Gateway project when completed. These assets are currently on the books but not yet fully revenue earning.  
\(^{24}\) The Government has indicated a lease period of up to 50 years, so 40 years is a conservative baseline assumption. Longer and shorter periods are simulated (see Table 1).  
\[ NPV = \sum_{i=1}^{n} \frac{NCF_i}{(1 + i)^t} \]

where \( i \) is the (constant) discount rate and \( n \) is the lease period of 40 years. This is a back-of-the-envelope calculation. Given the uncertainties in relation to future revenue projections there is little to be gained from attempting more nuanced scenarios such as fluctuating revenue over time. Instead, the key parameters are altered (Table 1) to get a sense of the potential range of NPVs.

Take the baseline scenario. The NCF starts from a figure of $132m in 2012. This figure is the 2008 cash from operations excluding borrowing costs and grossed up by assumed revenue growth from 2008 to 2012. This NCF figure then increases by the baseline revenue growth of 3.7% per annum until the assumed capacity is reached. The discount rate, \( i \), is 3.5% for each year of the assumed 40 year lease period. The resulting NPV is $4.6 billion.

The results for all scenarios are summarised in Table 1. The baseline value of $4.6 billion is $1.6 billion more than the $3 billion price tag suggested by the Government. As Table 1 shows, a value as low as $3 billion would imply either significantly lower revenue growth – less than 2.5% which would be well below the likely real growth rate of the Queensland economy – or a substantially higher real discount rate ( above 5%), or a much shorter projection period (less than 30 years), or naturally some combination of these (not reported). These calculations suggest that the Government is under-valuing QM which would imply a transfer of net worth from Queensland taxpayers to private investors.

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References


