



Better Regulation of Public-Private Partnerships for Transport Infrastructure



Roundtable Report

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FOREWORD

This report is based on discussions at an International Transport Forum Roundtable convened in September 2012 to review experience with the regulation of public private partnerships (PPPs) in the transport sector. Conclusions from the debate are developed with reference to the literature, particularly in relation to managing the risks associated with forecasting traffic. The report focuses on actuarial, structural and behavioural approaches to improving the regulation of PPPs and containing liabilities created by PPPs for public finance. It also examines the potential for private financing of infrastructure by treating packages of transport projects as regulated utilities. The report aims to clarify the objectives of PPPs, their impact on public finance and the different types of risk that need to be managed.

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EXECUTIVE SUMMARY

The financial crisis has spurred interest in new sources of private finance for transport infrastructure at the same time as exposing the scale of liabilities that off-balance sheet financing mechanisms can create for taxpayers. Many governments seek to attract private finance from a broader spectrum of investors through new models of partnership in order to maintain investment at the same time as limiting public spending. Others are struggling to make payments due for roads delivered under existing public private partnership (PPP) contracts, agreed when the economy was growing more rapidly.

Finance

PPPs concede construction, operation and finance of a public project under a single contract. They involve several distinct phases of finance. A project first has to be designed and appraised, which involves expenditure with no guarantee of return. To close the agreement, some equity is required together with short term bank loans. In some cases bonds or shares are offered to the market before construction starts. In many cases the project is refinanced on completion, paying-off short term loans by issuing bonds. This is the stage at which pension funds and other long term investors usually invest in PPPs. Long term investment funds seek predictable returns and are generally averse to the risks associated with the early stages of the PPP finance cycle.

Private finance is typically more expensive than public finance. This reflects commercial borrowing rates that are higher than public borrowing rates, although the difference may be small. It is also a reflection of project risk. This is borne by the taxpayer under public financing but allocated to private investors under PPPs and priced explicitly. Risks not backed by government guarantee have to be covered by the purchase of insurance, hedging and other financial instruments. The fees for appraising projects and establishing contracts are also substantial.

Bank recapitalisation in the wake of the financial crisis means that investment banks have less capital available for providing short term finance for PPPs than before the crisis. This has reduced the share of PPPs in project finance in recent years. Constraints on public spending to control deficits limit the ability of governments not only to invest directly in infrastructure but also to service PPP agreements where these involve availability payments rather than user tolls. These factors have led governments to reassess PPPs to see if risks can be managed in ways that might attract a broader range of private investors and at the same time limit contingent liabilities.

Efficiency

PPPs are usually promoted on the grounds that they can deliver infrastructure more efficiently than conventional public procurement and that they relieve strained public budgets. Experience with PPPs has, however, been mixed. This applies across countries at all stages of development and regulatory sophistication. Some transport PPP projects have delivered major cost savings but many more have resulted in renegotiation at the expense of taxpayers. Projects most often get into difficulty because of uncertainty in projecting traffic demand and the way this is addressed, or overlooked, in PPP contracts.

PPPs can potentially improve efficiency relative to pure public procurement in three ways. They bundle operation and construction under a single contract creating incentives to minimise costs over the lifetime of the concession. They bundle construction contracts together under the responsibility of a single company, in principle transferring coordination risks out of government and benefiting from the project management expertise of a private sector developer with a good track record. And PPPs protect maintenance budgets by making payments conditional on service quality and availability.

PPPs can sometimes achieve major cost savings through innovation involving radical redesign of projects and changes in construction techniques. For this to happen developers have to be freed of the detailed specification typical of public procurement, and indeed typical of many PPP projects. In some cases project costs have been reduced by a third through innovation although in many projects the scope for innovation is actually very small.

Costs and risks

The costs of many PPPs have been inflated by renegotiation of contracts. Renegotiation can result from a range of factors:

- Weaker than expected economic growth undermining traffic levels and toll revenues or undermining the ability of government to make availability payments.
- Revision of over-optimistic revenue forecasts afflicted by optimism bias as a result of incentives to get the project launched.
- Strategic misrepresentation, where over-optimistic revenue forecasts are used by creditors to launch a project with the expectation that more favourable terms can be extracted from government under the pressure of the political costs of cancellation or delay and the financial costs of re-letting the contract.
- Ministries avoiding funding limits or legislative approval for spending by negotiating contract extensions for work that could have been foreseen under initial contracts.

Such cost inflation needs to be factored into tests of the affordability of PPP programs, on the basis of historical monitoring of PPP contracts. For this, systematic records of PPP projects need to be kept from cradle to grave as some ultimately successful contracts delivered on time and to budget are, on closer inspection, renegotiated contracts for projects that became distressed because of initially over-optimistic traffic forecasts. Optimism bias can be countered by the use of reference class forecasts although they are of only limited use in countering strategic misrepresentation. Reference class forecasts are derived from historical experience with similar projects and need to be undertaken independently from any party directly involved in the PPP.

Some types of project bear lower revenue risks than others. At one extreme, the risk is relatively low for new capacity in a currently congested network and for which there are no direct alternatives. Tolled bridge and tunnel crossings forming essential links in busy trunk road networks are one example. The public liabilities associated with such tolled PPPs can be small. In some jurisdictions, notably the USA, there appears to be a large potential for establishing relatively low risk tolled PPPs. At the other extreme, traffic can be very uncertain on infrastructure in networks with little congestion and ample alternatives. In general projects subject to lower demand risk are more suited to PPP finance. There is a spectrum of PPPs that differ according to project characteristics, revenue stream, shares of equity and

debt finance and share of grant funding. These differences affect the distribution of risks and the impact of PPPs on public finances.

Liabilities

Remuneration of investment under PPPs can be provided through tolls on users or annuities paid to the PPP company by government, usually in the form of availability payments that specify the condition of the infrastructure to be maintained. Availability payment based PPPs delay public spending for the period of construction, thereafter spreading payment in much the same way as a loan. This type of PPP thus defers public spending rather than replacing it. In contrast, toll-based PPPs shift payments from the taxpayer to users but, by conceding the right to collect tolls, the government loses revenue it would have collected if the project had been financed traditionally.

The impact of availability payment-based PPPs on public finance resembles public procurement much more closely than privatisation and almost all PPP programs create liabilities for future taxpayers. It is prudent therefore to treat the public finance flows associated with PPPs as on-balance sheet public finance in budget decisions and public accounts. Typically, governments record spending on publicly financed projects as and when they are invoiced by contractors building the infrastructure. Spending on PPPs is usually recorded only once construction is complete, and spread over the period of the concession. This encourages a government under pressure to reduce its deficit or debt in the short term to prefer PPPs over public financing, even if in the long run the PPP costs more. The bias resulting from accounting conventions creates a risk of accumulating financial commitments that prove unaffordable.

To counter this risk, the size of public liabilities created by PPPs should be subject to limits. A fixed budget for PPP programs is the simplest way to achieve this. At the same time, a fixed budget for a specific class of investment (e.g. transport infrastructure) can be used to create certainty that funds will be available for investment.

Governments can reinforce the fiscal sustainability of PPP programs in a number of ways:

- Supplement public finance accounts with data that counts PPP companies as part of the public sector.
- Publish forecasts of expected future spending on PPPs and incorporate these projections in fiscal forecasts and treasury debt-sustainability analysis.
- Budget for construction of the PPP assets as public spending: subjecting PPPs to standard budgetary approval including authorization by parliament for expenditure commitments over the term of the contracts; or approving PPPs first as publicly financed projects as part of medium-term expenditure plans.
- Change underlying fiscal accounting rules to treat PPPs as creating government assets and liabilities.

These rules and procedures will avoid PPPs being used essentially as presentational budgetary tools to work around spending limits. Where PPP policies are the subject of sharp party-political disagreement any budgetary rules or procedures risk being exploited for political ends (Poole 2013). Nevertheless, budget and liability limits and legislative approval procedures have been adopted in environments as different as India (Haldea, 2012) and the United Kingdom, under PF2 guidance issued in 2012 (HMT, 2012). The rules should contain the volume of availability payments and potential liabilities associated with PPP finance within prudent fiscal limits.

Reducing the cost of finance

Even within sustainable liability limits, some governments are concerned that insufficient private capital will be available for transport PPPs, partly because of competing opportunities for investment. They seek to broaden the attraction of PPPs to a wider range of investors. Relatively little investment in transport PPPs has been attracted from insurance, pension and sovereign wealth funds to date, largely because of the expertise necessary for assessing demand risk. Demand risk is retained by Government under availability payments, lowering the additional cost of debt finance and making PPPs more accessible to non-specialised investors. Their use is therefore likely to grow in relation to toll-based PPPs in many jurisdictions.

Regulated utility models offer an alternative to PPPs for private investment in transport infrastructure. They have the advantage of providing greater flexibility to adapt to changes in external circumstances whilst providing a long-term commitment that investors will recover their sunk costs. The regulator sets rates of return, usually indexed to inflation, and monitors quality standards. Periodic review of rates of return is usual with utility type regulation, providing a useful degree of flexibility in adjusting to external conditions that is lacking in PPP contracts. Investment in regulated utilities listed on the stock exchange is accessible to a broader range of investors than PPPs. Many European airports and Great Britain's rail infrastructure is financed this way, with investment remunerated at a rate of return set by an independent regulator. Road networks could be financed this way as could packages of projects that create sufficient scale to merit the costs of establishing a regulator.

A number of sovereign wealth funds have taken significant share holdings in airports that are regulated in this way, although this has usually resulted in public companies being taken off the stock exchange. The RAB model does not suit all types of "patient capital". The infrastructure funds of pensions institutions also prefer unlisted assets as the objective of this part of their portfolio is securing stable returns that are insulated from stock market cycles and inflation.

Their preferred investment is in government-guaranteed infrastructure project bonds, or bonds in PPP projects issued on completion of construction and secured by toll revenues or availability payments. This is known as securitisation. It is facilitated in some jurisdictions by simplified administrative procedures (e.g. under the 1981 Loi Dailly in France) and is perhaps the main route to broadening the range of investors in PPPs over the full project cycle. At the same time the proportion of loans to a PPP that can be sold on in this way may be subject to a maximum limit (for example 70% in Chile) in order to preserve the link between construction and operation of the facility and the incentives for long run efficiency that result.

Relatively few institutional investors have the in-house expertise needed to assess and manage the risks associated with PPPs in the early stages of the project cycle and design contracts to make revenue profiles match their needs for reliable long-term returns. Contracting these services externally is expensive and often cannot be carried by the relatively modest returns on this kind of investment. Some governments and some project developers are working with institutional investors to facilitate equity investment at reasonable cost (Ugarte, Gutierrez and Phillips 2012).

Focus on the suitability of projects for private finance

Once it is accepted that the share of PPPs in overall transport infrastructure investment will be limited it becomes clear that projects for PPPs should be selected according to the maximum efficiency gains that can be expected to be delivered. This prioritises projects susceptible to achieving major cost savings from redesign or modification of construction techniques. It also requires governments to remove the strings of detailed project specification for suitable projects.

SUMMARY AND CONCLUSIONS

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1. INTRODUCTION

This section summarises the findings of the report and focuses on actuarial, structural and behavioural approaches to improving the regulation of public-private partnerships (PPPs) and containing liabilities created by PPPs for public finance. It examines the potential for private financing of infrastructure through a range of partnership models. The report aims to clarify the objectives of PPPs, their impact on public finance and the different types of risk that need to be managed, particularly in relation to forecasting traffic and revenues.

1.1. Essential features of PPPs

Much transport infrastructure is associated with market imperfections, including natural monopoly characteristics and the external benefits that arise from being part of a network. Under-provision and over-charging would likely prevail without government intervention. Purely public provision suffers from government failures including stop-go funding cycles that undermine planning for long term investment and often results in neglect of maintenance. A mix of public and private transport infrastructure provision is the norm in market economies. Where private investment is subject to government intervention there is a risk of government confiscating the value of private assets by, for example, setting tolls too low on privately financed roads. The purpose of PPP contracts is to provide a legally enforceable framework that solves this “time inconsistency” problem, with remuneration of private investment regulated by the terms of the PPP contract.

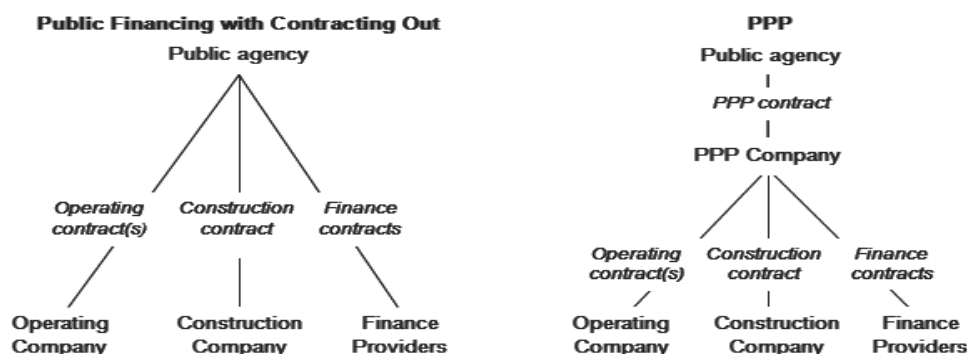
Public private partnerships involve temporary private ownership of public assets through concessions to build, operate and then transfer infrastructure to the government. Experience shows that upfront public sector commitment to land acquisition and planning procedures including compensation is essential. PPPs vary in structure but can be characterized by two key factors (Funke, Irwin and Rial 2012). First, PPPs create different cash flows to direct public procurement. They require little or no public expenditure at the outset of construction, with compensation to the private partners paid either through direct tolls on users of the infrastructure or payments from the public purse spread in periodic instalments (annuities or availability payments) over the lifetime of the concession. Compared to public loans, repayments are delayed until construction is complete. A combination of direct tolls and availability payments is sometimes employed. In all cases the drain on public cash flow is delayed in comparison to public financing but ultimately the cost of finance is higher.

Secondly, a single contract with a PPP company or “special purpose vehicle” replaces direct contracts between the government agency sponsoring the project and the multiple suppliers involved in delivering a traditional publicly financed project. The “SPV” is a consortium of construction and finance companies that work together to deliver the project under the leadership of the project developer.

The risks related to coordinating activities and incentives between suppliers are transferred from the government to the SPV (Figure 1). Responsibility for both construction and operation of the project are also bundled together, which creates incentives to optimize resource allocation over the whole lifetime of the concession with the potential to reduce overall costs. However, this incentive may not always operate

in practice because, as Figure 1 shows, the construction and operating companies are separate and possibly competing companies seeking to maximise their individual returns.

Figure 1. **Project bundling under PPPs**



Source: Irwin, Funke and Rial, 2012.

Terminology varies over time and between countries. P3 and public private venture are both employed for PPP in the USA. Private Finance Initiative (PFI) is used in Australia and the UK interchangeably with PPP. In the UK, PFI initially referred to a policy to increase the scope for private financing of capital projects, launched in 1992 and followed by successive governments. What distinguishes PFI projects from other forms of partnership in the UK is that the private sector contractor arranges finance for the project as well as construction and operation (Allen, 2001). Special purpose vehicles are also known as special purpose entities, special purpose companies and bankruptcy-remote entities. They are usually a subsidiary of the project developer or one of the construction companies or banks involved in the project. They enable the parent company to finance a large investment without putting the rest of the company at risk. Conversely the SPV's obligations are protected from creditors of the parent company should the parent company go bankrupt.

The structure of PPP finance varies with the composition of the SPV and the way in which investment is remunerated. Different models create different incentives and tend to be associated with different allocations of risk. Discussions at the Roundtable concluded that rather than seeking an ideal template, or even aligning different categories of PPP along a spectrum between direct public procurement and outright privatization, it is more useful to consider whether different forms of PPP are appropriate for different economic circumstances and for meeting different policy objectives. These objectives are discussed in section 4. It should be noted that it is difficult to make direct comparisons of the merits of alternative forms of PPP, or compare PPPs with publicly procured projects, because the counterfactual case cannot be assessed *ex-post*.

1.2. Cost drivers

Design guidelines and freedom to innovate

Public administrations use design guidelines to manage design and construction risks. Public procurement contracts typically specify the number of tons of concrete and asphalt to be poured. The level of specification is typically extremely detailed (Nilsson, 2012).

This removes risk from the contracting companies, facilitating competition and removing a risk premium from pricing. For the administration, close project specification reduces the risk of a project

falling short of standard. But rigid specification also prevents project managers from taking straightforward measures for economy and may thus tend to inflate costs overall. By specifying outputs (quality of infrastructure and availability) rather than inputs, PPPs provide some flexibility to cut costs, assigning some construction and design risks to the SPV rather than the administration.

However, most PPPs are also subject to standard design guidelines, limiting their potential to achieve cost reductions in this way. Detailed specification of inputs should not be necessary for PPPs. If it is unavoidable PPP financing is probably not suitable for the project.

The largest potential cost savings arise from the freedom to fundamentally redesign projects. In a report prepared for the Roundtable, Ugarte, Gutierrez and Phillips (2012) report examples of major savings on the costs of multi-billion dollar road projects specified by public administrations through innovation in design under PPP contracts. Cintra's redesign of the LBJ Expressway managed lanes project in Dallas, Texas reportedly reduced construction costs by USD 970 million from an initial estimate of USD 2.875 billion. Clearly this is the type of project that brings the biggest benefits from PPP contracting but, by number, such schemes represent a small proportion of the transport sector PPP projects contracted around the world to date.

Cost of finance

PPPs often enable projects to be undertaken earlier than they would under public financing. But the advantage of relieving or, more often, delaying public expenditure comes at a cost. Special purpose vehicles use a combination of debt and equity finance. Many projects are highly leveraged and Governments can usually raise debt finance more cheaply than the private sector. Private debt finance also always involves expenditure on secondary financing instruments to hedge and insure risk. Legal and consulting fees for establishing PPPs are also substantial. For example, advisors' fees amounted to £500 million for the three PPP contracts with Metronet and Tube Lines, covering investments of £17 billion and £5.4 billion respectively over 30 years (Shaoul, Stafford and Stapleton, 2012). Given these added costs, governments generally require PPP projects to undergo a comparison of value for taxpayer money with a theoretical equivalent project procured directly with public finance. Such comparisons are not simple to make and depend critically on assumptions about the cost of public capital that are implicit in the social discount rate employed.

Government loans can be made available to PPP projects, for example TIFIA loans in the USA and Viability Gap Funding capital grants in India. Government loans and grants have to be factored into comparisons of value for money.

Value for money in relation to public financing depends on the balance of a number of factors. On the positive side for PPPs are potential cost savings from bundling construction contracts and combining responsibilities for design, construction, maintenance and operation.

On the negative side are certain differences in interest payments, returns on equity, the cost of hedging risk and other "credit enhancement" guarantees and the legal and consultancy fees associated with setting up special purpose vehicles and tendering for the PPP.

Cost overruns, delays and renegotiation

The margins that determine comparisons of projected value for money can be swamped when projects get into trouble, by the impact of cost over-runs and project completion delays under direct public procurement and by refinancing of PPPs when contracts are found to have been based on over-optimistic traffic forecasts. Shaoul, Stafford and Stapleton (2012) report that a large share of UK transport sector PPPs have been subject to renegotiation under distress, concerning projects with a book value of £35 billion out of a total portfolio of £91 billion. Guasch (2004) reports that 54% of transport sector PPPs were renegotiated, an average of three years after award, in a survey of nearly 1 000 PPP concessions in Latin America. Most renegotiations were at the request of the PPP company and resulted in delays in investment or increases in tolls or availability payments.

It should be noted straightaway that refinancing and renegotiation are to be expected and allowed for under PPPs because the length of contracts inevitably means they cannot be fully closed. For comparisons of cost, however, the average cost overrun for PPPs (the long run outcome of renegotiations and defaults) should probably be factored into assessments of affordability. This requires monitoring of PPP performance from cradle-to-grave and a reporting system to be established by the agency awarding contracts.

Empirical data on the incidence of cost overruns according to project ownership model is sparse. Flyvberg, Skamris Holm and Buhl (2003, 2004) have compiled the largest set of financial data, controlled for comparability, to date. They report great difficulty in getting accurate and unbiased financial data, particularly from private sector projects and PPPs. Their data covers 258 rail, road and fixed link projects in Europe, North America and Japan worth \$90 billion. Information on the ownership of projects was available for just 183 of these projects. The authors compared the incidence of cost escalation for three types of ownership: private, state-owned enterprise and other public ownership. They included the whole range of public private partnership models under the third category, mixed in with pure public procurement. They were unable to compare publicly procured projects with PPPs but their results are nevertheless of interest. They found that state-owned enterprises performed far worse on average than the other types of project, with an average cost overrun of 110%. There was little difference in the average performance of private projects (34% overrun) compared to public procurement and other forms of public ownership (23% overrun). The authors attributed the poor performance of state owned enterprises to weak governance as a result of “falling between two stools”, escaping the normal reporting standards of public spending whilst not subject to shareholder pressure to minimise costs. The study concluded that “in planning and decision-making for (transport infrastructure) projects, the conventional wisdom, which holds that public ownership is problematic whereas private ownership is a main source of efficiency in curbing cost escalation, is dubious.”

De Brux finds that not only is renegotiation to be expected and anticipated with contracts that are inevitably not fully closed but that in some cases renegotiation creates surpluses for all parties – public, private and users. She cites an example of a tolled tunnel concession in Marseille, renegotiated at the instigation of the public partner to include a new feeder tunnel to relieve congestion on surface feeder routes. This was untolled and built entirely at the cost of the concession holder. The increase in revenues generated by extra users on the tolled part of the tunnel was sufficient to cover the extra costs and users benefited from congestion relief. The extent of such beneficial renegotiation is little researched.

Renegotiation is to be expected with long term projects typical of the transport sector and should be planned for. Contracts that apply over very long periods will inevitably be incomplete. Macro-economic conditions on which revenue flows depend, for example, cannot be forecast with any certainty ten years

into the future. Inflexibility is one of the drawbacks of PPP contracts and part of the appeal of discretionary regulation (section 5) lies in its broader flexibility (ITF, 2011).

Re-negotiation of PPPs can be planned for to an extent. Conditions that can be renegotiated and an ex-ante framework for holding such negotiations can be included in PPP contracts. Care has to be taken to avoid effectively underwriting the SPV's income and as with any risk sharing arrangement it may create new opportunities for strategic behaviour and gaming. The view of most roundtable participants was that such arrangements should be included in PPP contracts and are as important as the conditions for the initial award of the contract.

1.3. Tolls and availability payments – incentives and innovation

PPPs can be designed so that investment is remunerated directly from tolls (revenue-based PPPs) or through periodic availability payments (annuities) from government. Toll funding can make the PPP self-standing financially but a number of hybrid models also exist. With “pass-through tolls” government takes the toll revenue and passes on some of it to the SPV. Where direct toll revenues are expected to be insufficient to recover costs, service-related availability payments can be used to top up direct toll revenues. Governments often subject tolls to limits. Reasons include standardizing toll rates nationally for regional equity or public acceptance and relating tolls to marginal costs or to average costs across the network. Such policies can result in toll revenues falling short of costs on specific projects or on all tolled parts of the network. In these cases tolled PPPs can be supported by grants from government, such as India's Viability Gap Funding grants, which are available to cover up to 20% of project costs (Haldea, 2012).

On most road networks there are likely to be projects assessed to have high benefit-cost ratios but where the full toll rate would be well above short run marginal costs, e.g. the much delayed A14 project to serve the UK's main container port. Viability gap type support could be used more widely to introduce tolls at publicly acceptable levels on traditionally toll-free networks.

Service-based availability payments and “shadow tolls” have also been used on roads where the network is traditionally toll-free, such as in the UK. With shadow tolls payments to the SPV are determined on the basis of traffic counts. However, UK shadow tolls have tended to be structured to allow full payment to be made at relatively low levels of usage, turning them effectively into availability payments.

The UK's use of shadow toll and availability payments has evolved through series of phases, with different arrangements developed for different circumstances. Availability tolls are, for example, better suited to urban roads with specific local economic development objectives than a linear shadow toll.

Availability payments are made conditional on maintaining service levels in terms of road surface quality, lane availability and timing of maintenance works. Tolled infrastructure is also usually regulated for quality of service but the link to revenues is less direct.

This difference can incentivize a degree of over-engineering or “gold plating” of infrastructure under availability payment financing in order to reduce the risk of penalties for failing to meet availability criteria. Other things being equal this tends to inflate costs compared to the tolled alternative or to public procurement¹. Several Roundtable participants argued that this has been the case in practice. However, cost inflation may instead have more to do with over-specification of projects by the government agency in its contract with the SPV inadvertently eliminating the potential for innovation in project design.

Pure availability contracts have become increasingly prevalent in parallel with a maturing, or proliferation of government guidance on PPP project design. It is not clear whether these trends are purely coincidental or if governments are willing to leave more freedom to project developers in scoping projects when direct tolls are levied. The latter might be the case because projects most suited to tolls are also least sensitive with regard to design criteria. For example, highways between major cities through areas of low population may be better suited to tolling than urban roads as they have fewer connections to the rest of the road network, with fewer charging points and less potential for diversion of traffic to un-tolled parts of the network. Such environments are less risky (see Table 1) and may also require less specification, with more scope for redesigning projects to cut costs where land availability and alignments are less constrained.

Table 1. **Demand risk characterisation for roads**

	Less Risk	More Risk
Charging Regime	<ul style="list-style-type: none"> Availability payments Tolls well established, data on actual use established Toll rates in line with tolls on existing facilities Simple toll structure Flexible toll rate - revision without government approval 	<ul style="list-style-type: none"> User tolls Toll roads absent or unusual Tolls higher than the norm Complex structure (local discounts, frequent users, variable pricing) All tariff rises require regulatory approval
Forecast horizon	Near term	Long term – 30 years plus
Infrastructure	<ul style="list-style-type: none"> Facility already open Extension of existing road Estuarine crossings Radial corridors in urban area Highly trafficked corridor Good, high capacity connectors Standalone facility 	<ul style="list-style-type: none"> Early planning stage Greenfield development Dense road networks Ring roads, beltways Absence of congestion Congested links to network Dependent on connections to other proposed improvements
Route	<ul style="list-style-type: none"> No competing alternative route Competition protection e.g. truck bans on alternative routes Alignment with clear rationale Alignment with strong economic rationale Clear plan for future network extension No competition from other modes 	<ul style="list-style-type: none"> Many alternative roads Local authorities free to change rules Confused road objectives (not where people want to go) Alignment with political rationale Many options open for future network extensions Competition on route from air, rail or ferries.

Users	Few key origins and destinations Clear market segments Dominated by single purpose journeys (commuting, airport...) High income, time sensitive market Flat demand profile	Multiple origins and destinations Unclear market segments Multiple journey purposes Average/low income market Highly seasonal or peaky demand
Commercial users	Fleet operators pay toll Clear operating cost/time savings Simple route choice decisions Strong compliance with weight limits	Owner/drivers pay toll Unclear competitive advantage Complicated decision making Overloading common
Data	Legal basis for collection Experienced surveyors Locally calibrated parameters Zoning framework established	Difficult/dangerous to collect No culture of data collection Parameters transferred from elsewhere Zoning framework to develop from scratch
Macroeconomics	Strong, stable, diversified local economy Strict land-use planning Stable, predictable population growth	Weak/transitional local or national economy Weak planning controls Population growth dependent on many exogenous factors
Traffic growth	Driven by established and predictable factors High car ownership	Reliance on future factors, new land use developments or structural changes. Low car ownership

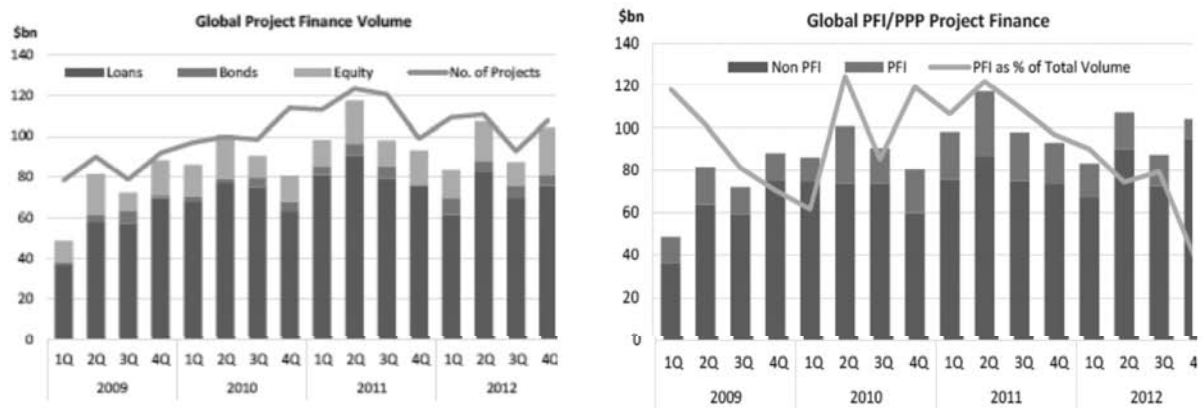
Source: Based on Bain (2002).

The choice between tolls and availability payments also has some influence on the way demand risk is allocated between the government and the private partners, that is risks related to the number of users of the infrastructure. This is discussed in section 3.

2. FINANCING STRUCTURES – DEBT, EQUITY AND RISK

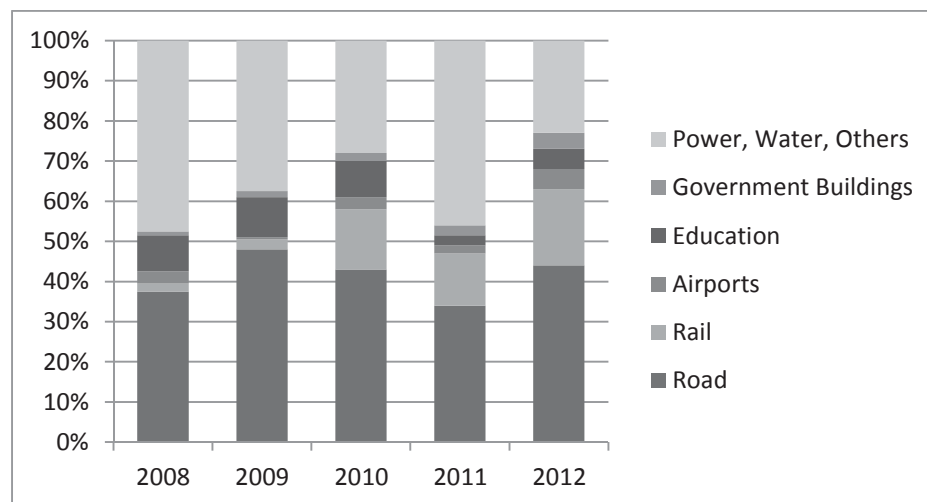
PPPs have accounted for around 20% of overall project finance globally in the years since the financial crisis (Figure 2). Project finance overall is split roughly 30% each to oil and gas; power; and transport and water infrastructure taken together. The split of PPP investment between infrastructure sectors is shown in Figure 3). Transport dominates and roads account for the largest share.

Figure 2. **Global project finance volume and share PPPs in project finance**



Source: Dealogic Project Finance Review, Full Year 2012.

Figure 3. **Breakdown of global infrastructure PPP/PFI investment by value**

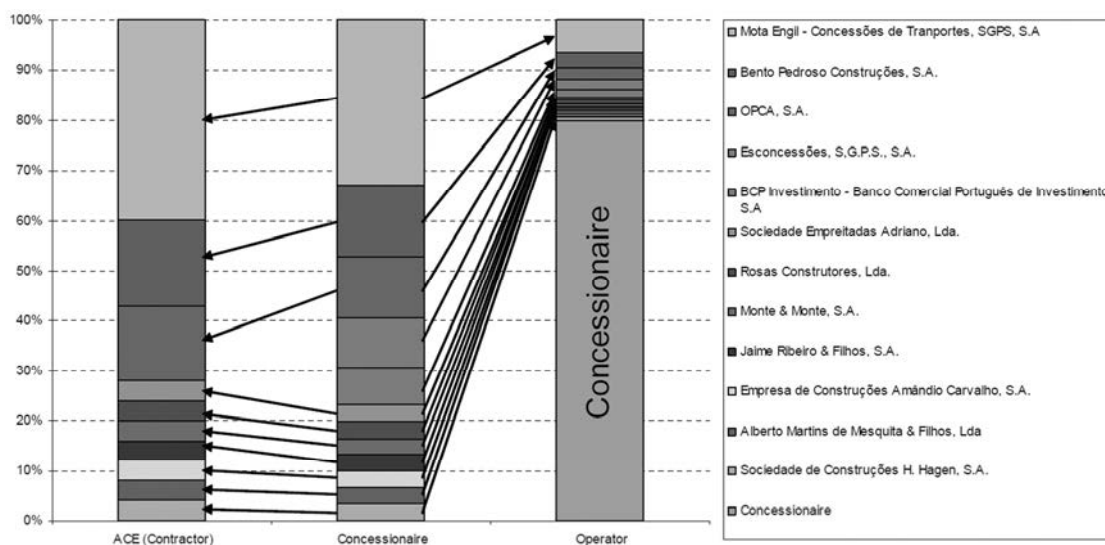


Source: Dealogic Project Finance Review, Full Year 2012.

The financing of a PPP project consists of debt and equity, typically up to 70-80% debt and no more than 20-30% equity (EIB 2012). Equity is contributed by the project developer and construction companies in the SPV. There are different types of equity investor. There are construction companies who make equity investments and are well placed to understand and manage certain types of risk. There are facility management companies that make equity investments and understand long term operating risks but may or may not understand construction risks. And there are sometime private equity firms that may not have a detailed understanding of either construction or operating risks. The SPV has little risk carrying capacity (ability to control construction and operating risks) and therefore risks allocated to it by contract will not rest in the SPV but are passed to a construction or facility management company, which may not wish to hold the risk and will therefore hedge and insure, adding cost.

The banks in the SPV issue and syndicate the loans that make up the balance of finance. This “top tier” of finance, facilitating the project, is known as senior debt as these lenders have priority access to the cash flows of the PPP in case of distress². Top tier finance also includes contributions from capital market investors (private equity funds, sovereign wealth funds and the equity funds in the portfolios of pension and insurance funds) who typically have little detailed information on project specific risks. Many PPPs involve only “pinpoint equity”, often accounting for less than 1% of finance. This is typical of availability payment based contracts in the UK, as discussed in the paper prepared for the Roundtable by Shaoul, Stafford and Stapleton (2012). Lenders require that, should a project suffer cash flow shortfalls because of poor performance by one of the project subcontractors, the costs are borne in the first place by the subcontractor to prevent impairment of the SPV’s ability to service debt. An example of the way equity is structured in a PPP is illustrated in Figure 4. With around 70-80% gearing the sponsor’s 30% equity stake in this SPV accounts for no more than 10% of total project finance.

Figure 4. Shareholdings in the SPV (concessionaire), contractor and operating company of Portugal’s a25 motorway PPP



Source: Carola, 2004.

Most of the finance in a PPP is extremely risk averse. Only the facility operator and construction companies are willing to take on risk. In the facility operator’s case this is its core business. For the construction companies the interest is in generating cash flow from construction activity and their objective is to sell their equity as soon as possible.

Incentives differ between SPV members according to whether they invest equity or debt. Incentives also differ because some of the banks will receive consulting and financial service fees on the award of a PPP contract. More generally, project finance is far from the most profitable part of the business of an integrated bank. The bank's interest in providing short term finance for a PPP often lies principally in maintaining a relationship with a client that generates more profitable business elsewhere. The balance of equity and loan finance in a PPP is also determined by the nature of the project and whether investment is remunerated by tolls or availability payments.

From a pure finance perspective and other things being equal, the higher the gearing of a project the more affordable it will be for the public sector because senior debt is less expensive than equity. The level of gearing banks are prepared to accept is determined largely by the variability of the project's cash flow. Availability payments carry less risk than direct tolls as they are not dependent on actual traffic flows. They are therefore preferred by banks and permit higher gearing, or at least this was the case until the financial crisis. Institutional equity investors also prefer lower risk, favouring availability payment-based investments. In the current economic climate this preference is probably less important than the relationship between the principle project developer (construction or facility operating company) and the banks.

Tolled PPPs require a relatively larger share of equity. It was argued in the Roundtable that more equity at stake, or "skin in the game", reduces insolvency risk in tolled PPPs compared to availability payment schemes. As loans have the first call on cash in case of liquidation, equity contributors have the strongest incentives to control costs. Some of the equity investors are also best placed to manage construction cost risks. The core benefit the private sector should bring to a PPP is the project management experience of one of the equity investors. Their experience is crucial in managing technological risks in major civil engineering works and avoiding the major sources of error in complex projects identified by Brooks (1975); the tendency for mission creep and the hidden overheads of coordination and management. For example, when manpower is added to speed up delivery, "Brooks law" rules that adding personnel to accelerate a late project adds further delay. In principle equity investors also have strong incentives to ensure that revenue targets are feasible and should be averse to strategic misrepresentation in bidding for PPP contracts, although Section 3.1 below suggests this incentive does not necessarily operate effectively in practice.

It was suggested that minimum limits for the share of equity finance in PPPs might be used to reduce risks related to costs and demand, or that tolls should systematically be preferred to availability payments. The downside of setting minimum equity limits would be to drive up the cost of finance, as equity normally requires higher returns, reflecting the higher risk. Equity floors would limit the scale of private finance available for PPPs. How counter-productive this would be depends on the main purpose of policies towards PPPs, discussed in Section 4, but a majority of participants saw a continuing, indeed a growing role for availability payment-based PPPs as these have a lower headline cost of finance.

PPP finance often progresses to a second stage once construction of the infrastructure is complete. At this point the concessionaire can issue bonds backed by toll revenues. This kind of refinancing is known as "securitisation".

These bonds are often bought by pension funds and insurance funds. The risks at this stage of the project are reduced and securitisation broadens the access of PPPs to capital markets. Securitisation is facilitated in some jurisdictions by simplified administrative procedures, such as the 1981 Loi Dailly in France and is the main route to broadening the range of potential investors in PPPs over the full project life-cycle.

Some jurisdictions limit securitisation to preserve incentives for coordination of design and operation to maximise efficiency over the lifetime of the concession. In Chile, for example, concessionaires cannot securitize more than 70% of the debt raised to finance the project (Engel, Fischer and Galetovic, 2008).

In practice, toll-financed PPPs have not proved immune from overbidding. Empirical evidence discussed in Section 3 suggests toll-based PPPs may actually be subject to a greater degree of optimism bias than availability payment-based projects. One of the reasons for this may lie in the dispersed holding of equity typical of PPPs (Figure 4). Shareholders who provide less than 5 per cent of the capital of a business are not effective equity participants (Kay 2012). In some of the toll projects discussed in Ugarte, Gutierrez and Phillips (2012) equity provided as much as 50% of finance. At these levels equity may indeed provide the discipline necessary to limit risks. Minimum equity limits at this level would significantly restrict the finance available for PPPs. Equity limits may not therefore be generally relevant to injecting realism into PPP project proposals although they might have the effect of selecting only the projects most suited to private finance.

3. DEMAND RISK

Demand (revenue) risk has proved more difficult to manage under PPP contracts than construction and project coordination risks. It is made manifest in bids for projects that turn out to over-estimate revenue. Overbidding can arise for a number of reasons including inadequate data and forecasting models and incentive structures that drive optimism bias and strategic misrepresentation. More broadly contracts are awarded on the basis of a bidding process that is inevitably susceptible to the “winners curse” (Thaler, 1988), that is the tendency for the party that most overestimates the intrinsic value of the contract to bid the most. This can be addressed, for example by awarding the bid to the second highest bidder, but such techniques have rarely been employed.

Incentives are addressed in section 3.2 below. On the more technical factors, knowledge of the distribution of values of time is crucial in modelling usage, and especially the likely split of the traffic between tolled roads and free alternative routes (Hensher and Goodwin, 2004). The information on which assumptions are made for values of time as well as differentiation between different types of users is often inadequate.

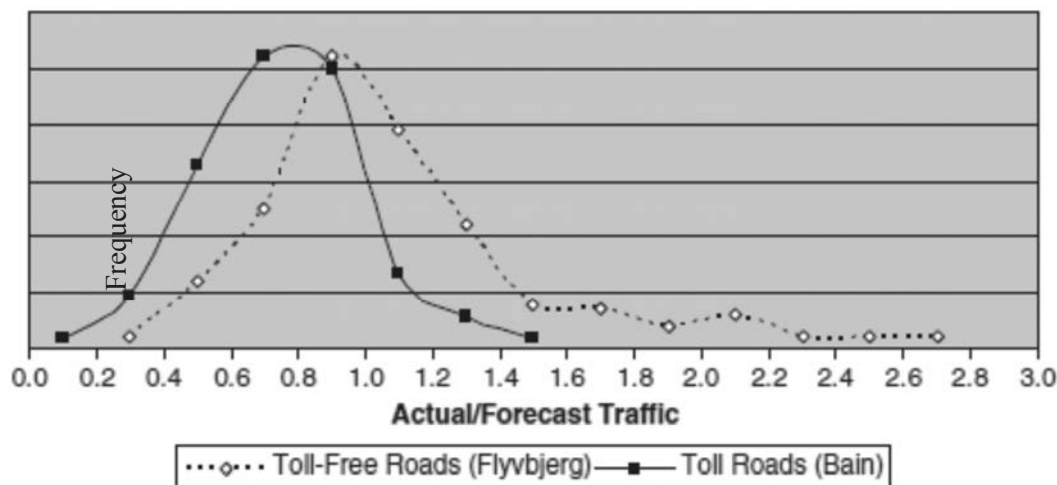
Another reason for overbidding in toll projects may be that there is some room to raise tolls in response to demand falling short of projections and investors are therefore willing to take a more bullish view. Their ability to respond to demand risks is, however, much more limited than government, which might for example adjust fuel tax policy in economic downturns to counter falling demand.

Where the private partner is able to influence demand, by adjusting tolls, or where its costs are related to demand it is efficient to allocate demand risk to it. In many cases, however, demand will be largely exogenous and most of the costs of the project (the investment) unrelated to demand. In these circumstances requiring the private partner to bear demand risk will lead to higher financing costs rather than improving value for money (Vickerman and Evenhuis, 2010).

3.1. Traffic forecasts – tolled and un-tolled roads

The Australian Department of Infrastructure and Transport recently reviewed traffic forecasting performance for toll roads (RBConsult and Oxera, 2011), finding that in general it has been poorer than for toll-free roads. The review drew particularly on empirical work by Rob Bain on Standard and Poor’s database of PPP projects and work led by Bent Flyvbjerg. Standard and Poor’s has released a series of reports on traffic forecasting risk in new toll road projects. Their 2005 survey (Bain and Polakovic, 2005) covered 104 roads, bridges and tunnels in Europe, the Americas, Asia and Australia. It found that on average toll road traffic forecasts over-estimate first year traffic by 20% to 30%, confirming results obtained in earlier years on smaller samples. The variability was large with outcomes ranging from just 15% of forecast traffic to 50% above the forecast (Figure 5). Li and Hensher (2010) surveyed 14 Australian toll roads, most of which were PPPs, finding average traffic volumes in the first year of operation to be only 55% of forecast levels.

Figure 5. Traffic forecasting performance: toll-free versus toll roads



Source: Bain (2009).

The original Standard and Poor's survey (Bain 2002) separately identified user paid and shadow toll projects. Only 4 of the 32 projects surveyed that year used shadow tolls but all of these employed reasonably accurate traffic forecasts, averaging 102% and ranging from 90% to 119% (the two low estimates accounted for half of the under-estimates in the entire sample). This suggests that optimism bias is less prevalent in availability payment based PPPs than in tolled PPPs, although the sample size was too small for the results to be statistically significant. This runs counter to the discussion in Section 2 that suggested tolled projects with relatively high shares of equity finance should be less subject to bias and may reflect weaker optimism bias where there is greater certainty over revenues. The study also examined the reliability of forecasts commissioned by banks compared with forecasts made by project sponsors. Half the sample forecasts were by banks, half by sponsors. The sponsors did considerably worse, with an average over-estimate of 34%. The banks averaged 18% with a narrower range of error.

Flyvbjerg, Holm and Buhl (2005) surveyed 183 road projects around the world, 90% of which were toll-free and most publicly financed. The sample covers projects completed between 1969 and 1998 in 14 countries on 5 continents. The study found a similar spread of results to Bain but a much lower average figure for over-estimation. Bain (2004 and 2009) compared the results (Figure 5) finding that the toll road distribution is shifted 20 percentage points to the left. The inaccuracy in forecasting is similar for both types of road, indicated by the spread of results and the shape of the curve, but un-tolled projects are free of the systematic over-estimation that characterises toll roads.

The un-tolled roads show a long tail of projects experiencing much higher levels of traffic than forecast (although they number only 7). Bain accounts for this difference by the motivation for promoters of privately financed projects to identify any upside potential, making under-estimation less likely for tolled projects.

3.2. Sources of inaccuracy and bias and potential remedies

Forecasting errors can be driven by a large range of factors including limited data, inadequate models and uncertainty about land use development along the infrastructure project and the general rate

of economic growth. These inaccuracies translate into risk factors and the list considered in the financial assessment of projects is long (Table 1).

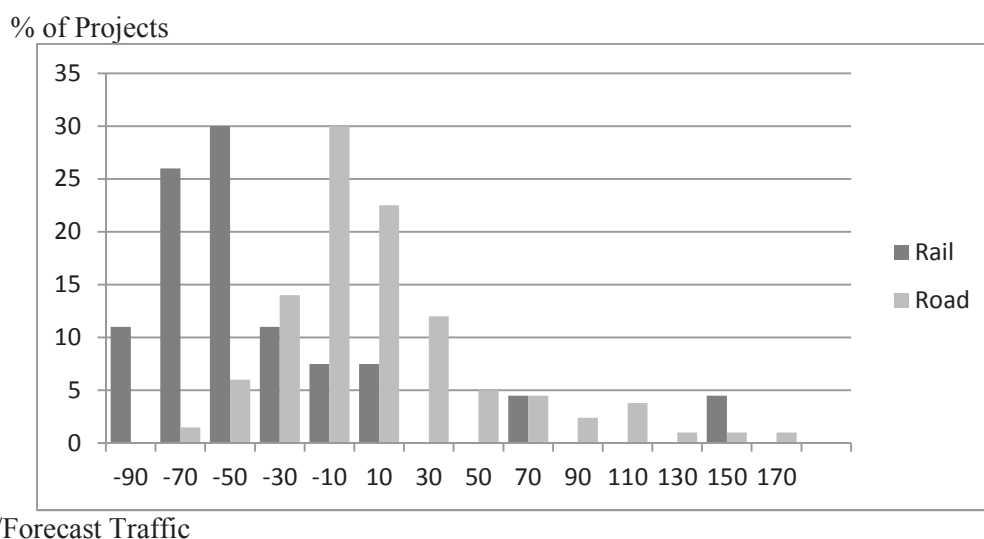
Some facilities are exposed to a larger number of demand risks than others. As discussed in section 1.3, this may make projects that mainly correspond to the lower risk column, such as isolated river crossings in a heavily used trunk road network, more suited to direct tolling than others.

Modelling demand becomes more difficult the more characteristics of the project fall in the right hand, higher risk column. For example, Bain 2002 points out some of the factors affecting the use of toll roads by commercial vehicles. Despite their relatively low number, trucks usually contribute a significant part of total toll revenues; Vinci Autoroutes, Europe's largest motorway concession operator, reports 29% of revenues from heavy vehicles in 2011. Commercial operations can have much higher values of time than even business travel by private car but who pays the toll makes a difference. Owner-drivers may have different incentives from company drivers and where low paid drivers are given cash to pay tolls they may take un-tolled detour routes and keep the cash. This can be the dominant pattern in lower income countries. Introducing company account cards can limit the effect and markets dominated by large fleet operators are less risky for toll road concessions. The presence of many convenient, low cost/relatively high quality truck stops for refreshment on alternative un-tolled routes can also influence route choice. And in countries where overloading of vehicles is poorly policed except by toll road operators that weigh vehicles to protect their assets, much commercial traffic may stick to slow detour routes because of the major operating cost advantage conferred by exceeding legal limits. Conversely, toll road operators will be inclined towards pricing truck traffic off their facility where revenues from light duty vehicles are adequate because of the disproportionate wear of the roadway caused by heavy vehicles.

The long list of factors in Table 1 explains the spread of traffic forecasts in Figure 5 but not the bias between tolled and un-tolled road traffic forecasts. Bias was also present in the survey by Flyvbjerg, Holm and Buhl, where passenger forecasts for the 27 rail projects in the survey were much more inaccurate than the road traffic forecasts (Figure 6).

The study found that 9 out of 10 rail passenger forecasts were inflated, with an average overestimation of 100%. There was no difference in the spread of results between road and rail projects, but a systematic bias towards overestimation with rail. The authors attribute this bias to three factors: competition for funds, which is typically more pronounced for rail than road; prevalence of a political or ideological desire to see passengers shift from road to rail; and, more generally, politicians using forecasts to show political intent rather than the most likely outcome.

Figure 6. Forecast accuracy for road and rail projects



Actual/Forecast Traffic

Source: Flyvbjerg, Holm and Buhl (2005).

Systematic overestimation can be attributed to two main causes: optimism bias and strategic misrepresentation. Kahneman and Tversky (1979) set out the psychological drivers for optimism bias, which they labelled the “planning fallacy”, to include a natural tendency for any analyst with an interest in the success of a project to focus on optimistic rather than pessimistic outcomes and to focus on the details of specific tasks in planning the project rather than the whole process, thereby ignoring uncertainties beyond the most identifiable tasks involved.

Kahneman and Tversky proposed the use of reference class forecasting to counter the myopia underlying optimism bias. With this technique an outside view is taken in order to add a reality check to planning forecasts by examining outcomes (time taken for completion, cost, traffic levels etc.) for similar past projects. Reference forecasting has been employed in the UK for major transport projects since 2004 following guidance issued by the Treasury in 2003. The process is outlined in Flyvbjerg (2005, 2006) with the first practical transport sector application in assessing the projected capital costs of the Edinburgh tram, although the cost over-run in this project has been large despite the use of reference class forecasting. A number of other European countries have adopted similar procedures, including Denmark, the Netherlands and Switzerland, and the American Planning Association recommends its use.

Reference class forecasting can also counter the "authorization imperative", a form of strategic behaviour likely to occur when forecasters have a stake in getting financial approval for a project and more broadly where success is measured by the approval of projects even when the forecaster has no direct financial stake. The tendency for bias towards more optimistic forecasts is natural and maybe reinforced by a perception by the analyst that the client is overly risk-averse.

Strategic misrepresentation can arise where those responsible for traffic forecasts or cost estimates have a financial stake in authorization of the project. This includes, for example, presenting over-optimistic usage and revenue projections in order to win a PPP contract, with the intention of renegotiating at a later stage when the contracting agency may be inclined to refinance rather than cancel the contract in order to avoid lengthy delays and when the contracting agency is expected to be highly averse to abandoning the project. This is renegotiation with hold-up. RBConsult and Oxera (2012) point

out the difficulties in identifying strategic misrepresentation, given that providing deceitful information is generally illegal and some jurisdictions penalise misleading forecasts.

But they also report a tendency for the short-term focus of some PPP bid consortium members to result in manipulation of forecasts. Requiring project promoters to consider reference class forecasts is unlikely to eliminate bias in situations where there are incentives for making strategic adjustments to forecasts. The onus is on the contracting agency to use reference class forecasts as a check on the SPV's business case.

Those responsible for PPPs in the government's contracting agency are of course also potentially exposed to authorisation imperative risks. The number of projects delivered is likely to be one of the measures of success of a PPP unit. An external agency such as a general accounting office might be better placed to run reference class checks.

Considerable regulatory effort is required to counter strategic forecasting techniques as these tend to evolve to out-manoeuvre rules established to counter them. Back-loading is one technique frequently employed to enhance results on tests of feasibility and value for money. For example, traffic forecasts can be made to fit with reference class forecasting values in early years but be followed by continuous growth into the later, more uncertain years of a concession to inflate the net present value of the proposal. Similarly, if investments can be staged over the concession period, large expenditures for enhancements can be scheduled late in the concession. The profile of revenue forecasts and expenditures over time can be shaped for optimal results in relation to discount rates etc. Back-loading of risks is facilitated if there are break points in the concession period when the contract can be revised or ended subject to only minor penalties.

Demand risk sharing arrangements whereby the government makes up shortfalls in revenues or takes some of the additional profits when actual traffic and revenue diverges from an agreed band of projections create more subtle opportunities for back-loading risk. Often the more sophisticated the rules the more opportunities there are for gaming them. Shaping projections to suit the rules is always to be expected. One consequence is that governments negotiating PPP contracts need significant expertise and resources for making decisions on the award of contacts. And because of the problem of success being measured by project approval rates, contracting out such expertise is of itself risky.

3.3. Over-optimistic demand forecasts and risk transfer case study: the channel tunnel rail link in the united kingdom

The contract to build the Channel Tunnel Rail Link to London and take over running of Eurostar international train services was awarded to London & Continental Railways Limited (LCR) in 1996 with the government providing grants totalling £1.8 billion for the construction of the rail infrastructure and its use by domestic train services. Construction was to start in 1998 once the company had raised private finance from a stock market flotation and the issue of debt. Funding prior to flotation consisted of £60 million in equity and £430 million short term bank loans. Opening of the line was planned for 2003.

The company failed to raise the funds needed as it became clear that the forecasts for Eurostar traffic and revenues were over optimistic and Eurostar was losing money heavily. In bidding for the project, LCR forecast that Eurostar would attract 9.5 million passengers in 1996-97, the second full year of operation of the service, running on the existing track. The actual number of passengers that year was 5.1 million, passing 9 million only in 2011. LCR stuck to its forecast even after its French Eurostar partner, SNCF, had revised its own forecasts to 6 million for 2007 (Kain, 2002).

In January 1998, the company asked for an additional £1.2 billion in grants. The government refused but did not terminate the contract. Termination would have made the Government liable for costs of up to £0.8 billion under debt guarantees issued with the contract.

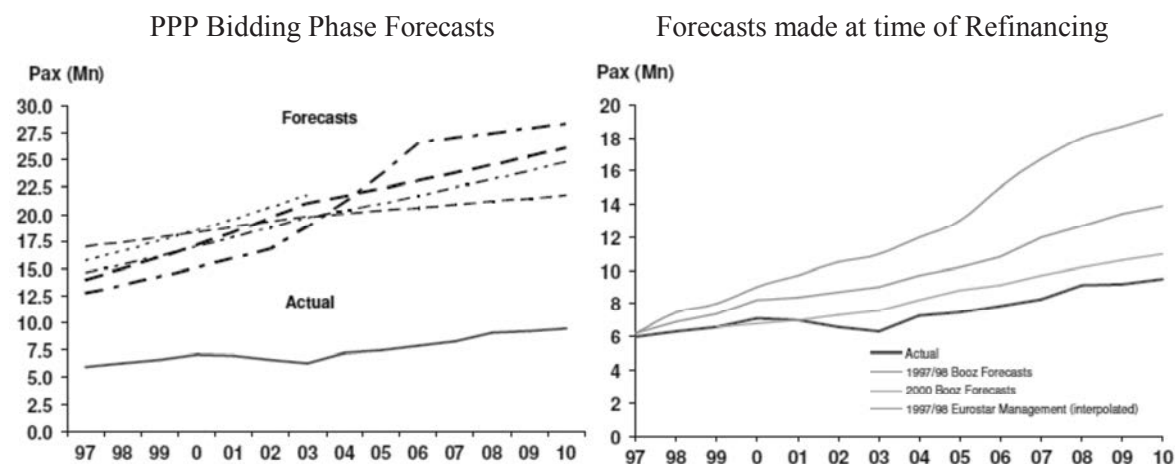
The transaction costs of finding another partner were also prohibitive; around £200 million was spent on establishing the initial PPP. Instead of terminating the agreement, the Government therefore agreed to a restructuring, with £3.75 billion in bonds to be backed by government guarantee, exposing the taxpayer to further substantial risk. It also wrote off £109 million in cancelled leases for trains and took a small shareholding in the company with extensive rights to undertake further restructuring. The bonds were issued in 1999 and 2003 and subsequently classified as government borrowing by the National Office of Statistics (Butcher 2011).

The first stage of the line opened in 2003 and the whole project completed in 2007 at a total cost of £5.8 billion (£6.2 billion including additions). The project was completed within the extended time and budget envelope made available at refinancing but 11 months behind target completion date and 18% over target cost (NAO 2012). There is of course no counterfactual publicly procured project to make a direct comparison with but British Rail's project for the high speed line before privatization in 1994 foresaw completion in the last quarter of 1999, seven years earlier.

Under the bonds issued by the Department of Transport, the government guaranteed debt repayments from 2010 onwards in case of a shortfall in revenues from Eurostar services. The Department of Transport did not expect the guarantees to be called on but traffic remained well below the forecasts made for it by Booz&Co around the time of refinancing (right hand graph in figure 7). By 2009 it was clear that the guarantees would be called on and ownership of the project was transferred to the government together with debt totalling £5.169 billion. In 2010 the government awarded a concession to operate the line for 30 years to Borealis Infrastructure and Ontario Teachers' Pension Plan for £2.1 billion, with the line to be maintained to standards set by the Office of Rail Regulation.

The National Audit Office estimates that net taxpayer support, largely as a result of debt service obligations will, total £10.2 billion through 2070 in 2010 prices (NAO 2012).

Figure 7. CTRL passenger forecasts and actual passenger numbers carried



Source: Booz 2012.

The Public Accounts Committee in Parliament reviewed the causes of financial difficulty of the PPP (HoC, 2002). Its report noted that the forecasts had been accompanied by a downside scenario assuming

cost over-runs and traffic shortfalls but not of the scale that materialized. There were external factors; a fire that closed the Channel tunnel for several months and the emergence of strong competition from low cost air carriers. But subsequent development of demand reveals these factors were of little relevance.

Both the Committee and later National Audit Office report attributed the problems to over-optimistic forecasting. The Committee criticized the fact that neither the company nor the government commissioned independent forecasts until 1998.

The Committee concluded as follows. “The level of equity capital was insufficient to reflect the high level of commercial risk in the project, which depended on inherently risky forecasts of passenger numbers. If a project involves a high degree of commercial risk, then it needs to be financed with a commensurately high level of risk capital relative to bank debt” (paragraph 25).

It also concluded that “the government needed the co-operation of London & Continental's shareholders if the deal was to be renegotiated without further delay to the construction of the Link. As a consequence, the Department was not in a strong position to insist that the shareholders should bear full responsibility for the near collapse of the project. Under the PFI, the private sector is paid for taking risk. Responsibility should therefore remain with the private sector should these risks actually occur. Departments should ensure that equity risk in PFI deals is real and that over-optimism in bidding for contracts will lose money for the shareholders if things go wrong” (paragraph 27).

An earlier parliamentary Committee³ concluded that it would be “regrettable and anomalous if the project were to receive uniquely favourable consideration” through government underwriting of bonds. It therefore recommended much wider use of such guarantees to help finance infrastructure projects (Kain, 2002). This is anathema to the transfer of commercial risk to the commercial partner. In the case of the CTRL the revenue risk was not amenable to standard commercial risk assessment practice. There were no relevant existing traffic flows to use as a reference for assessing risk. The project was to be remunerated from the increase in traffic consequent on raising train operating speeds. But the forecasts were to be made even before services at conventional speeds had started. This placed forecasts clearly in the realm of uncertainty rather than quantifiable risk. Other projects are much better suited to revenue based PPPs. Estuary crossings such as the Queen Elizabeth II and Severn bridges in the UK for example (see section 3.4) where an existing crossing provides data on traffic trends and location in a busy existing trunk network provides latent demand for the service. The 2002 committee’s recommendation suits this kind of project. For the CTRL the conclusion might instead be that it was simply unsuitable for concession as a PPP.

4. MANAGING DIFFERENT CLASSES OF RISK

Risk allocation in PPPs is the subject of a large literature but debate over the merits of PPPs is often confused by a compounding of different classes of risk. Irwin (2007) provides some of the necessary detail to operationalize the standard principle of assigning risks to the party best able to manage them. Irwin's principle is as follows.

Each risk should be allocated, along with rights to make related decisions, so as to maximize total project value, taking account of each party's ability to:

- Influence the corresponding risk factor.
- Influence the sensitivity of total project value to the corresponding risk factor—for example, by anticipating or responding to the risk factor.
- Absorb the risk.

As Irwin explains, this reflects the three ways in which a risk can be managed. First, there are times when one party can influence the risk factor. For example, a construction company can change construction costs by its choice of techniques. This risk should therefore be allocated to the construction company. Such an allocation does not eliminate the risk but compared with other allocations it will tend to lower the cost of construction risk.

Second, there are times when one party can influence the sensitivity of the value of the project to the risk factor. For example, no one can influence whether a severe storm will occur but the design of a project may be able to reduce the damage caused by storms. Third, there are times when no one can influence, anticipate, or respond to a risk factor in a way that changes the project's value. At such times, the risk should be allocated to the party that can absorb the risk at the lowest cost. The firm may be able to absorb a risk because it can buy derivatives or insurance to protect it from the risk (although of course the government might be able to do this at lower cost).

Applying the principle of risk allocation can be hard and Irwin concludes that trying to give definitive general advice on whether governments should bear particular risks is futile. However governments should be inclined to bear project specific risks that they control or strongly influence, such as risks related to standards for construction that they set. They should also probably be inclined to hold risks where there is no clear benefit to the risk being transferred to the SPV from where it is likely to be passed down to a construction or operating provider.

Governments sometimes strongly influence other risk factors, such as the demand for a road when that demand depends heavily on the construction of competing and complementary roads in a government-planned network. In such a case, it may make sense for the government to bear demand risk by giving a revenue guarantee or by making availability payments independent of demand.

Irwin argues that governments should be disinclined to bear economy-wide risks. Although governments can often influence such risks, they should not shape economy-wide policy to suit the interests of a particular project. Moreover, although the firm and its creditors cannot influence economy-wide risk factors, they can often influence the sensitivity of the project's value to the risk factor. Their choice of the extent of borrowing in foreign currency, for example, influences how sensitive the value of the project is to the exchange rate. It was argued by many roundtable participants that road operators are comfortable with handling demand risk when project characteristics fall in the lower risk category in Table 1, for example for extensions to existing facilities or concessions. Most importantly, Irwin's principle implies that the risks a government should bear depend on the way it allocates rights to make decisions related to the ability to manage or respond to that risk.

Table 2 summarises risk categories for typical transport sector PPPs, noting common ways in which governments intervene, sometimes inadvertently, to limit the allocation of risk through the planning process and by issuing detailed design guidance. Where decisions are constrained this way risk is effectively retained by government and the potential for cost saving in relation to conventional public procurement is curtailed. The trade-offs to be made in allocating risks in design and construction become clear once they are separately identified.

Table 2. Constraints on risk allocation to private partners and mechanisms for limiting risk exposure

Risk category	Constraints on allocating risk to private partner	Mechanisms for retaining or sharing risk	Private mitigation instruments
Route/ planning	Planning authorisation	Phasing of contract award in relation to planning authorisation	-
Design	Design guidance	-	-
Construction	Design guidance	-	Insurance
Debt finance	-	Loans guarantees	Hedging, other credit enhancement guarantees
Demand/ traffic/ revenue	-	Availability payments; Revenue caps and collars; Exclusive concessions.	-

Planning, design and construction risks

Planning risk is widely accepted to rest with government but can nevertheless be partly re-allocated to the private partner by phasing contract awards in step with planning decisions. Design and construction risks are split between government and private partners depending on the specification of the project under guidance and design manuals that can be very detailed. Design risks are often borne entirely by the government as a result of specifications in the contract even though the biggest potential efficiencies from PPPs are achieved when the risk and freedom to innovate in design is transferred to the project developer. Construction risk is often transferred in surprisingly large measure to government by detailed specification of the techniques and materials to be employed.

Coordination risk

As discussed in section 1, coordination risks are transferred to the SPV under PPPs. This key transfer is not always successful. The UK National Accounting Office attributed the 2007 bankruptcy of Metronet, holder of two of the three London Underground PPP contracts, to failure in its corporate structure and governance under which its five shareholders, each a supplier to the SPV, were expected to make unanimous decisions (NAO 2009).

Demand risk

How best to allocate demand risk (traffic / revenue risk) is least evident. Demand risk for a transport infrastructure project depends on a number of factors:

- Development of feeder routes and connections to the rest of the network.
- Competition with alternative routes.
- Inter-modal competition.
- Fuel prices and taxation.
- Development of housing, commercial and industrial property in the vicinity of the infrastructure.
- overall economic activity, with growth increasingly uncertain the further into the future it is projected.

Government can influence these factors to some degree, for example through planning decisions and authorisations for projects on nearby parts of the network. It can offer exclusive concessions and limits to access to infrastructure for competitors, as for example with passenger rail franchises in Great Britain. Feeder routes for a PPP road can be built with public finance. Adjacent river crossings may be bundled into a single PPP to contain competition. Toll facility operators lobby hard against toll-free projects in their vicinity that would compete with them, for example in the case of the 83 year old Ambassador Bridge between Detroit and Windsor where future revenues are threatened by a proposed toll-free crossing to be built by the Canadian government. Where there are such network-related risks Governments may choose to bear demand risk through availability payments in place of direct tolls.

As noted, economy-wide risks should not be taken over by the government even if it is better placed to respond to some of these risks because it should not make responses to protect returns on an investment that distort the wider economy, for example, lowering fuel taxes to counter a decline in road traffic during an economic downturn. Project-specific responses are more appropriate. This is another reason governments employ availability payments in place of tolls. An alternative is to employ minimum revenue guarantees, and revenue-sharing agreements for later periods in tolled concessions.

The difficulty of forecasting traffic far into the future makes it hard for either party to determine the value of projects. Rail franchises in Great Britain have historically used a cap and collar approach to share demand risk.⁴ If revenues fall short of the central forecast band, government makes up part of the shortfall. When revenues exceed forecasts the surplus is shared. Judging the appropriate level for the collar has also proved difficult, however, as 7 of the 10 franchises employing this mechanism have made recourse to supplementary compensation from the first year in which it was available under the terms of the contract (Ford 2012).

Engel, Fisher and Galetovic (2011, 2001) argue for greater use of variable concession length as the most appropriate way to manage demand risk. In its purest form concessions are awarded on the basis of the lowest bid for the net present value of revenues under tolls⁵ fixed by the government. The concession ends at the point when actual revenues have accrued to the level of the bid. A boom in traffic will shorten the concession; depressed traffic levels will lengthen it.

Demand risk is retained by the government, with future income from re-concessioneering foregone to the extent the concession lengthens. Chile was the first country to use net present value of revenue as the sole criteria for awarding a PPP concession with the Santiago to Valparaiso highway in 1988. The government also chose this approach because it lends itself to calculating the residual value of the concession without controversy in case the government seeks to end the concession prematurely; in the case of this project re-concessioneering early to expand the highway to cope with rapidly growing traffic was seen a distinct possibility.

The Queen Elizabeth II bridge estuary crossing downstream of London (Dartford Crossing) is a leading example of employing a simple formula to manage uncertainty in traffic forecasts this way. The project was financed 100% by debt, with no equity contribution. The contract specified that the bridge would revert to public ownership either after 20 years or when toll revenues had covered principal and interest, whichever happened first. The concession was agreed in 1987, the bridge opened in 1991 and the concession ended in 2002. The project was relatively low risk in terms of the factors summarised in table 1, an isolated link in a trunk road network and effectively an expansion of an existing facility as the concession packaged the bridge with two existing tunnels that had reached capacity. Nevertheless traffic forecasts were uncertain and making the concession variable should have reduced financing costs. The Second Severn Bridge, also in the UK, employed a very similar variable concession length to manage demand risk, coupled with taking over the concession for the existing tolled bridge on the crossing. For both the Severn and Dartford Crossings the new links were not financially viable on their own and existing capacity was therefore included in the deal. In the case of Dartford one existing crossing with no related debt was given to the concessionaire.

India's 2005 Model Concession Agreement for Highways also provides for risk mitigation through concession period extension when traffic growth is lower than expected and shortening of the concession period when growth exceeds the expected level (Haldea 2012). The Agreement limits extension to 20% of the concession period and uses a formula for establishing the extension according to the percentage shortfall in traffic after 10 years.

Variable term concessions have a number of advantages. First, the incentive to make over-optimistic traffic forecasts in order to win the concession is much reduced. Second, the mechanism replaces costly contract renegotiation when traffic is lower than expected avoids direct calls on public finance when traffic falls short of forecasts. The contract is either lengthened by a formula based on actual traffic records or extended up to the point when the firm has obtained the total revenue stipulated in its bid.

A variant of variable term concessions might include lowering tolls in situations of low demand and raising them if the road experiences congestion problems, promoting efficient pricing of the facility (Nombela and de Rus, 2004). Variable concession length has also been successfully employed in Chile to manage demand risk although Engel, Fisher and Galetovic also cite less successful cases of employing variable concessions for toll roads both in Chile and in Portugal, using more complicated formulas. As with other risk sharing arrangements, the more complicated the arrangement the more scope there is for gaming the rules and this may have contributed to the difficulties. More generally, equity investors are likely to be put off by an arrangement that prevents the realisation of additional returns through cost savings in operation.

The purpose of PPPs is to transfer at least some design and construction risk and all of the coordination risks to the private partner. The extent to which it is appropriate to transfer demand risk is less clear but for all of these risks the desire to attract private finance in the face of competition for funds from other kinds of investment has often led governments to retain risk through project specification requirements and the use of availability payments in place of direct user tolls.

The largest benefits from employing PPP contracts arise when a maximum of risk is transferred (as distinct from simply allocated) to the private party. When risk transfer is substantially curtailed, much of the rationale for PPP's rests on advancing projects in the face of short term limits on public finance rather than efficiency.

5. POLICY OBJECTIVES OF PPP PROGRAMS

Bringing forward investment when a political decision has been made that finance is not otherwise available is perhaps the primary attraction of PPPs but the rationale usually advanced for employing PPPs in place of public financing of transport infrastructure is three fold: avoiding the short-termism typical of public finance; cost-efficiency and innovation; responding to public finance constraints. A number of other objectives and motivations may also underlie the purpose of introducing PPPs in the transport sector. Each of these rationales is briefly discussed or recalled in this section.

5.1. Avoiding short-termism

Traditional public procurement is subject to political cycles resulting in stop-go investment decisions which are always problematic but particularly so with long-lived assets. Stop-go problems affect the annual budget cycle as well as longer political cycles, with budgets for investment agreed at the beginning of the year frequently cut back before year end. This problem afflicts maintenance budgets particularly as there is scope to defer maintenance from one period to the next at relatively little additional cost. However, repeated deferral can lead to greatly increased overall maintenance and renewal costs in the long run that are invisible to many budget decision-makers (Nilsson 2012). PPPs protect against this cyclical, myopia and uncertainty through a long-term contractual engagement. However, because the cost of PPPs must be met, their costs add pressure to the remaining transport budget, potentially exacerbating the short-termism problem in relation to non-PPP projects.

5.2. Efficiency, cost savings and innovation

As discussed in section 1.2, PPPs can save construction costs and enable the design of projects to deliver the services required at lowest cost if contracts avoid over-specifying projects. When project guidance is sufficiently flexible PPPs can stimulate innovation in both project design and execution. Projects can sometimes be downsized compared to what government initially plans without sacrificing capacity or service quality, resulting sometimes in cost-savings running to billions of dollars (Ugarte, Gutierrez and Phillips 2012). These are the grounds most commonly advanced for financing transport projects under PPP contracts. A majority of PPPs projects are, however, specified in ways that severely limit this scope for achieving efficiencies.

A number of roundtable participants noted that financial indicators for PPP proposals tend to get distorted to fit tests of value for money, undermining the value of such assessments. This problem might be alleviated by explicit acknowledgement of some of the other goals discussed in this section. Guidance for assessing value for money usually rules out broader considerations, in order to ensure consistency. UK Treasury Guidance (HMT 2006), for example, requires the decision to undertake a PFI investment to be made on value for money grounds alone, once affordability (in relation to the Transport Department's current budget plans) is established. Accounting treatment is not to be part of assessment (paragraph 1.17). The restriction promotes clarity in this stage of decision making.

The value for money test might be complemented, however, by an appraisal summary table analogous to that used in the UK⁶ and elsewhere for informing decision-makers on the results of economic and environmental assessment of transport investments. The quantitative results of financial, economic and environmental appraisals are presented side by side with notes on economic and environmental impacts that are difficult to quantify and the relevance of the project to social equity and relevant policies pursued by the government. A PPP appraisal summary table would include the results of tests of affordability and value for money, economic return on investment and a statement of how the project relates to fiscal sustainability, accounting objectives and infrastructure investment and maintenance policy.

5.3. Public finance considerations

PPPs spread capital expenditure over time and delay payments on borrowing from the public finance point of view, making it possible to initiate projects when public finance is insufficient, because of government or externally imposed constraints, to cover capital expenditure up front. PPP projects financed through availability payments shift public expenditure to a slightly later date. The major part of public expenditure begins when the facility enters service rather than at the start of construction. In comparison to public financing the public liability is deferred, and increased, rather than avoided. Tolloed PPPs substitute user funding for public finance but at the cost of foregoing future toll revenues, which then accrue to the concessionaire instead of the government. Many publicly financed roads are tolled by government, as is the case for example with the New Jersey Turnpike.

Engel, Fisher and Galetovic (2011) demonstrate that either type of PPP has a fiscal impact that resembles public finance more closely than privatisation. They point out that although PPPs are frequently justified on the grounds that they release public funds or reduce distortionary taxation, any resources saved by a government that does not finance the upfront investment are offset by giving up future revenue flows to the concessionaire. That is, the government could have collected toll revenues, and is of course obliged to make payments under availability contracts.

The long run utility of PPP projects rests chiefly on cost effectiveness. Any improvement in efficiency compared to public procurement is set against any distortion in the order in which projects are undertaken in a network planned by the state; more broadly their opportunity cost.

To the extent that liabilities under PPPs do not appear in public accounts, PPPs enable investments to be made that cannot be publicly financed because of public spending limits. Unless there are new sources of revenue (user tolls) and cost savings, accelerating investment in this way has little economic merit because private finance is typically more expensive than public borrowing⁷. In the absence of new sources of revenue, investment to off-set short term cyclical declines in economic activity can be financed at lower long run cost with public borrowing.

Limits on public expenditure, such as those imposed by the European Union on its members under the Maastricht Treaty, do not make a distinction between investments bearing economic returns and other types of expenditure. This diverges from general accounting practice and could result in chronic underinvestment in productive assets. PPPs can be used for off-balance sheet funding of investment, getting round spending limits, and many commentators see this as the primary motivation for recourse to PPPs.

Public spending limits are usually imposed to address chronic budget imbalances, which future PPP liabilities are likely to exacerbate. Rather than allowing one special class of investment to escape the rules, public accounts should distinguish between capital and current expenditure.

PPPs have made a major contribution to acceleration of the improvement of infrastructure in some rapidly developing economies. Chile, for example, developed a high quality highway system through concessions established on the basis of a 1991 law establishing conditions for infrastructure PPPs. By 2007 \$10 billion had been invested in the Pan-American Highway, interurban connections and motorways in Santiago with 26 concessions. Above all the legislation dispelled fears of expropriation (Engel, Fisher and Galetovic, 2008). PPPs can play a useful role in strengthening governance but are not immune to changes in policy or changes in government as experience in Argentina in the same period. The twelve highway contracts awarded in 1990 were called in for renegotiation by the Government after only 5 months. As Engel et al. document, another round of renegotiations started in 1995, dragging on until 2000. The quality of the roads improved but defects in the design of concessions and abrupt changes in policy resulted in relatively few kilometres of highway for the money spent and high toll levels.

The acceleration of investment facilitated by PPPs can be useful in a rapidly developing economy where infrastructure has been neglected and where transport bottlenecks are identified as an obstacle to growth. But traffic is not easy to forecast where market conditions are changing rapidly and a slowdown in growth can leave investors in tolled facilities unable to service debt. This happened with the M1 Budapest-Vienna motorway in Hungary, let as a concession in 1993, opened in 1996 and nationalised in 1999. Traffic was below forecast not only because of weaker economic growth but also the level of tolls, which discouraged much of the potential domestic traffic from using the road. The level of tolls was also contested in the courts and ultimately ruled to be unconstitutional.

PPPs funded by shadow tolls and availability payments can result in unsustainable financial liabilities for government when economic growth is weaker than forecast. The weakness of public finance in Portugal in the wake of the 2008 financial crisis forced renegotiation of seven motorway PPPs in 2012, cutting payments by a total of \$2 billion over the 30 year term of the concessions. RBConsult and Oxera (2012) report that Portugal's SCUT (Sem Custos para os Utilizadores – no cost to the users) shadow toll highway program became financially unsustainable even before the global financial crisis. It was designed to promote regional development, and as the number of concessions grew government SCUT payments rose to 0.4% of GDP by 2008. A number of local and regional governments in Europe and North America have suffered similar problems from over ambitious PPP programs. Aversion to accumulating future public finance liabilities has resulted in a strong preference for toll-based PPPs in India (Haldea 2012). And the UK Highway Agency's shadow toll PPP program has now reached maximum capacity, with PPP payments consuming 40% of its annual budget but PPPs only accounting for 17% of its motorway network (RBConsult and Oxera 2012).

5.4. Renegotiation without holdup

Engel, Fischer and Galetovic (2006, 2008) suggest that spending authorities use PPPs to get around oversight by the legislature that constrains public spending. They propose that this accounts for the pervasiveness of contract renegotiations that benefit PPP concessionaires in cases where terms are renegotiated after a project is built or before it is completed but at the initiation of the spending authority. In their model, an administration that spends more on public works is more likely to be re-elected. This creates an incentive to bring infrastructure investment forward by raising debt. Raising debt usually requires budget approval that in many countries involves negotiation with the opposition.

Knowing that higher spending increases the chance of losing an election, the opposition will try to limit borrowing as it will increase spending in the future. Renegotiations, on the other hand, are not subject to opposition scrutiny as they are not usually included in budgetary approval procedures.

The authors see renegotiation as a vehicle through which the administration obtains higher spending and the concession holder obtains better conditions than those in the original contract, but at the cost of adversely affecting social welfare and future administrations. They view the widespread renegotiation of PPP contracts in Chile as consistent with their model, as in other respects Chile's PPP contracts are a model of efficiency, avoiding most of the pitfalls associated with PPPs in Latin America (Guasch 2004). The authors acknowledge that long term contracts may need adjustment in response to unforeseen events because of the natural difficulties in writing complete contracts, but stress that renegotiations in Chile came early in concession periods in response to events foreseeable when contracts were made. Twelve out of sixteen highway projects awarded in 1998 had been renegotiated by May 2002. Renegotiation took the form of "complementary contracts" to provide additional infrastructure, representing a 15% increase in cost overall. Further renegotiations followed at the same rate, totalling \$1.27 billion by 2005 on top of initial contracts worth \$9 billion. Some but by no means all of this additional work can be attributed to oversights in the initial project designs. It should be noted that projects are also frequently renegotiated under public procurement.

5.5. User funding

It was suggested at the roundtable that PPPs are a useful device for advancing the introduction of user charges as a source of funding where public and political opinion is otherwise hostile. Though charging for infrastructure use on the basis of cost recovery may not always be optimal, it is preferable to long term degradation of infrastructure as a result of political limits on public funding and offers an alternative to earmarked funding of maintenance and investment from fuel and vehicle taxes. Tolling is also useful for demand-management on congested infrastructure. It is not evident, however, that the main function of PPPs should be to make tolling possible as there are examples of tolls on publicly owned facilities. Nevertheless, this was seen as the primary rationale for recourse to PPPs for roads in the USA as federal fuel tax revenues earmarked for road investment are in decline and there are deep seated political obstacles to raising taxes for investment.

6. REGULATED ASSET BASE MODELS FOR PRIVATE INVESTMENT IN INFRASTRUCTURE

Regulated utility models are employed in many countries for private investment in energy, water and telecoms infrastructure with similar economic characteristics to transport infrastructure (Oxera, 2012). Many airports are financed this way. The prevalent regulated asset base (RAB) model establishes a value for the assets managed by the private company and employs an economic regulator⁸ to determine the level of investment expected for maintenance and expansion together with the rate of return on investment the company is allowed to make (the model is also used for non-profit and state-owned companies). Charges for use of the asset are also regulated, sometimes with freedom to set prices for some services. Rates of investment, rates of return and prices are reviewed periodically, often on a five year cycle. The model has tended to be applied where capital expenditure is incremental, albeit in many cases large, relative to existing assets.

Setting charges for the use of infrastructure on the basis of the value of assets carries a risk of over-investment and linking profits to capital assets, e.g. through rate of return regulation, creates a strong incentive to expand capital investment regardless of efficiency (Averch and Johnson, 1962).

Price and revenue caps are usually employed to counter this tendency, most commonly employing a RPI-X formula to ensure prices rise at a rate below general inflation. Even under price cap regulation, infrastructure pricing is often controversial.

The regulatory model has a number of strengths. Fundamentally it provides flexibility to adjust contracts to changes in external economic factors over the long term while still providing long-term commitment and protection from relatively short-term political considerations. All very long term contracts are inevitably not fully complete and regulated utility models can be seen as a means to address this problem. Periodic review enables transparent adjustment to external conditions within the constraints of regulatory duties. This may be more efficient than renegotiation of a PPP contract.

However this model does require a fundamental political decision to remove the sector from the general public budget and to ring fence suitable revenue streams to remunerate the capital. Inevitably this reduces the freedom of manoeuvre of the Ministry of Finance and can lead to tensions between the Regulator and the Government regarding the required rate of investment. There are also challenges concerning the initial asset valuation and, in the particular context of roads, demarcation of the national and local road networks.

An independent regulatory office is more likely to be able to maintain a stable and adequate team of experts for the negotiation of regulatory conditions than a Ministerial department handling PPPs, where rapidly evolving priorities are likely to result in relatively frequent reallocation of resources. In this way, establishment of an independent regulator can be seen as a logical extension of the use of long-term contracting frameworks such as PPPs for providing infrastructure projects with a degree of insulation from relatively short-term political considerations. Regulatory offices are thus often better placed to address risk management issues including strategic behaviour. Independent regulation usually enhances

transparency in decision-making as the regulator publishes the analysis supporting decisions, and the results of periodic reviews into regulatory conditions are usually subject to a formal consultation process.

The principles by which decisions are made are stipulated in the legislative instrument establishing the regulator, which enhances predictability and lowers risk whilst preserving a degree of flexibility to adapt to changed external conditions.

Independent regulation is likely to be prohibitively expensive for application to most individual projects, but bundling potential PPP projects with similar characteristics into a regulated network generates economies of scale once critical mass is passed. Such regulation is then likely to be less costly and/or deliver better outcomes than making contractual agreements case by case for PPP projects.

In many cases, the regulator's duties include ensuring that the licence-holder has the ability to finance their functions, subject to efficient behaviour. These duties combined with periodic review eliminate much of the strategic behaviour and the risk of ad hoc renegotiation of contracts that prove financially unsustainable. This has the potential to achieve large cost savings in the long run, not least through a lower cost of capital.

Problems with the bidding process in particular, and the introduction of private capital more generally, are not eliminated under RAB models but modified and concentrated in the setting of the initial value of the regulated asset base. However, the regulated asset model is typically employed for existing assets where the demand risks are relatively well understood and in these cases the scope for strategic behaviour is likely to be less.

Regulated utilities are a familiar category of investment for capital markets with a clear role in investment portfolios. The British Airports Authority, for example, was floated on the London Stock Exchange under a RAB model in 1987. In 2006 Ferrovial purchased the company and it delisted from the Stock Exchange. 2012 saw a name change to Heathrow Limited and shareholdings acquired by three sovereign wealth funds, Qatar Holding, Singapore Investment Corporation and China's CIC International. Regulated infrastructure companies are able to provide returns to investors from year one, without the delay characteristic of PPP projects during the construction phase. PPPs on the other hand attract only more specialised investors that have the expertise to analyse the risks involved at the level of individual projects. For both these reasons RAB models for transport infrastructure have the potential to attract private finance at lower cost and from a broader pool than PPPs.

A RAB model for private investment in rail infrastructure has been adopted in Great Britain. This was the result of the vertical separation and privatisation of the national railway rather than a bundling of individual investment projects. Establishing the initial asset value is always controversial with this approach to regulation and UK rail infrastructure was no exception. The model generally displays the benefits described above in terms of economies of scale, expertise in risk management and transparency.

Nevertheless, the private infrastructure owner, Railtrack, collapsed as a result of failing to manage risks associated with asset quality effectively. The Regulator had identified this failure and was preparing an order for remedial action when track failure caused a derailment, ultimately leading to bankruptcy of the company. Track assets were transferred to Network Rail, a not for dividend company in which shareholder functions are carried out by 'members' drawn from Network Rail's customers and other industry players, that continues to be regulated by the Office of Rail Regulation (ORR). Train services are instead subject to franchise contracts (concessions) negotiated directly with the Department for Transport and awarded by competitive tender. The franchise agreements are similar to PPP contracts, where a high proportion of revenue risk is transferred to the franchisee. One stretch of UK rail

infrastructure, the high speed rail link between London and the Channel Tunnel, was built as a PPP (section 3.3).

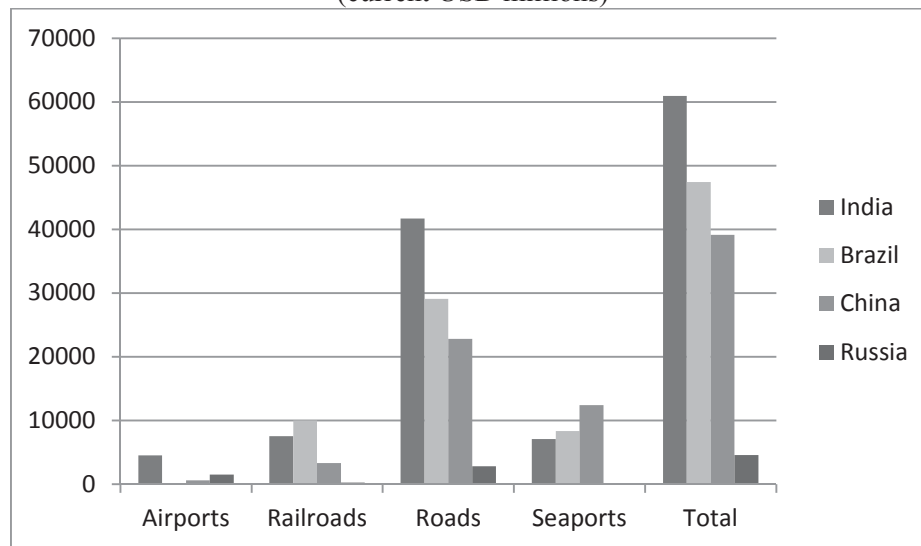
RAB models are able to accommodate a mix of public and private finance and can be adapted to a range of ownership models. Rail infrastructure in Great Britain was owned by a public limited company on privatisation but is now owned by a not for dividend company. Most of its financing is raised from capital markets and currently supported by a state guarantee.

Roads could be suited to the RAB model if a sufficiently large part of the network is included in the asset base to achieve the economies of scale required to establish a regulator. The UK Government is considering the possibility of managing the English strategic highway network this way. Under such a model it would be possible to introduce private finance incrementally as the model becomes more established and investors get comfortable with the risk profile. User-charging would be compatible with but not a requirement for applying a RAB model to a road network.

7. GOVERNANCE OF PUBLIC PRIVATE PARTNERSHIPS

PPPs in OECD countries currently represent about 0.8 trillion USD (OECD, 2012), and there are projects in the pipeline of about equal value. The World Bank’s PPI database reports a similar volume of PPP investment⁹ in middle and low income countries, 0.85 trillion USD invested between 1990 and 2011 (<http://ppi.worldbank.org>). The distribution of transport sector PPPs in the largest of these countries is shown in figure 8 and a global breakdown of infrastructure PPPs by value shown in figure 3 above. Clearly, governments and the private sector see PPPs as an effective way of delivering public service infrastructure. However, experience shows that it can be difficult to get value for money out of PPPs if government agencies are not equipped to manage them effectively. Moreover, PPPs can obscure real spending commitments by taking financing off-budget, creating risks for fiscal sustainability.

Figure 8. **Transport sector PPPs in major non-oecd markets, 1990-2011**
(current USD millions)



Source: World Bank and PPIAF, PPI Project Database. (<http://ppi.worldbank.org>) Date: 01/26/2013.

The recent OECD Recommendation on Principles for Public Governance of Public-Private Partnerships (OECD, 2012) is designed to help governments make best use of PPPs by outlining best practice based on Member country experience with what works (and what does not). The Principles (Box 1) focus on how to align the different parts of the public sector to ensure success, covering institutional design, regulation, competition, budgetary transparency, fiscal policy and integrity at all levels of government. The Principles also stress that just as much attention should be devoted to the PPP after the deal is done – i.e. during the operational stage, which can often be 20-30 years – as during initial negotiation of the contract.

Funke, Irwin and Rial (2012) examine the fiscal liabilities associated with PPPs and set out rules and procedures for minimising fiscal risks. As they discuss, part of the appeal of PPPs is that they allow new investments to be made with any immediate increase in reported government spending or debt. Typically, spending on a publicly financed infrastructure project is recorded as invoices are received during construction. Spending on a PPP is, in contrast, recorded only once construction is complete and is spread over the period of the concession. Similarly, if the government borrows to fund investment this is recorded as an increase in debt. But a commitment to make availability payments to a PPP company is not reflected in the figures for national debt. This encourages a government under pressure to reduce its deficit or debt in the short term to use PPPs even if their costs exceed public financing in the long run. This bias towards PPPs can ultimately lead governments to assume financial commitments that prove unaffordable

Box 1. OECD Recommendations on principles for public governance of PPPs

- A. Establish a clear, predictable and legitimate institutional framework supported by competent and well-resourced authorities
1. The political leadership should ensure public awareness of the relative costs, benefits and risks of PPP and conventional procurement. Popular understanding of Public-Private Partnerships requires active consultation and engagement with stakeholders as well as involving end-users in defining the project and subsequently in monitoring service quality.
 2. Key institutional roles and responsibilities should be maintained. This requires that procuring authorities, PPP units, the central budget authority, the supreme audit institution and sector regulators are entrusted with clear mandates and sufficient resources to ensure a prudent procurement process and clear lines of accountability.
 3. Ensure that all significant regulation affecting the operation of PPPs is clear, transparent and enforced. Red tape should be minimised and new and existing regulations should be carefully evaluated.
- B. Ground the selection of PPPs in Value for Money
4. All investment projects should be prioritised at senior political level. As there are many competing investment priorities, it is the responsibility of government to define and pursue strategic goals. The decision to invest should be based on a whole-of-government perspective and be separate from how to procure and finance the project. There should be no institutional, procedural or accounting bias either in favour of or against PPPs.
 5. Carefully investigate which investment method is likely to yield most value for money. Key risk factors and characteristics of specific projects should be evaluated by conducting a procurement option pre-test. A procurement option pre-test should enable the government to decide on whether it is prudent to investigate a PPP option further.
 6. Transfer the risks to those that manage them best. Risk should be defined, identified and measured and carried by the party for whom it costs the least to prevent the risk from realising or for whom realised risk costs the least.
 7. The procuring authorities should be prepared for the operational phase of the PPPs. Securing value for money requires vigilance and effort of the same intensity as that necessary during the pre-operational phase. Particular care should be taken when switching to the operational phase of the PPP, as the actors on the public side are liable to change.

8. Value for money should be maintained when renegotiating. Only if conditions change due to discretionary public policy actions should the government consider compensating the private sector. Any re-negotiation should be made transparently and subject to the ordinary procedures of PPP approval. Clear, predictable and transparent rules for dispute resolution should be in place.
 9. Government should ensure there is sufficient competition in the market by a competitive tender process and by possibly structuring the PPP programme so that there is an on-going functional market. Where market operators are few, governments should ensure a level playing field in the tendering process so that non-incumbent operators can enter the market.
- C. Use the budgetary process transparently to minimise fiscal risks and ensure the integrity of the procurement process
10. In line with the government’s fiscal policy, the Central Budget Authority should ensure that the project is affordable and the overall investment envelope is sustainable.
 11. The project should be treated transparently in the budget process. The budget documentation should disclose all costs and contingent liabilities. Special care should be taken to ensure that budget transparency of PPP covers the whole public sector.
 12. Government should guard against waste and corruption by ensuring the integrity of the procurement process. The necessary procurement skills and powers should be made available to the relevant authorities.

Source: OECD 2012.

To reduce bias towards PPPs, government can improve the information available on the future fiscal costs and risks of PPPs and can modify accounting practice to change the way PPPs affect reported spending and debt. Governments often measure debt and deficits in more than one way. To limit bias, the “headline” indicators used in setting fiscal rules and targets need to change so that they treat PPPs as creating public assets and public liabilities. Bias can also be countered by changes in budgeting. PPPs can be treated in the same way as publicly financed projects in medium term budgets, requiring the same approvals in budget plans as pure public investments. Commitment budgeting can be used, in which the legislature approves commitments to spending in future years under projects at the same time as approving cash expenditure in the current year. A two-stage budgeting process can also be adopted under which all projects must first be approved in budget planning under the assumption that they will be publicly financed, and a decision on the method of financing is made at a later stage. These approaches to limiting bias are summarised in Table 3, with examples of measures taken nationally.

The simplest approach to limiting the liabilities created by PPPs is to impose specific limits on the size of the PPP program. As well as containing the volume of PPP finance within prudent fiscal limits the changes in procedures outlined avoid PPPs being used essentially as presentational budgetary tools.

Table 3. Examples of measures to counter fiscal accounting bias

<p>ACCOUNTING</p> <p>On-balance sheet accounting for PPPs to International Financial Reporting Standards (under IFRS governments recognise PPP assets on their balance sheets rather than PPP companies)</p> <ul style="list-style-type: none"> • United Kingdom (publication of an assessment of PFI liabilities in the Whole of Government Accounts) • Australia
<p>BUDGETING</p> <p>Medium term budget approval by legislature treating PPPs as publicly financed projects</p> <ul style="list-style-type: none"> • India • New Zealand <p>Commitment budgeting – legislative approval of future commitment appropriations</p> <ul style="list-style-type: none"> • France • Germany <p>Two stage budgeting</p> <ul style="list-style-type: none"> • --
<p>PUBLISHING SUPPLEMENTARY INFORMATION</p> <p>Published forecasts of cash flows associated with PPPs</p> <ul style="list-style-type: none"> • Chile • Portugal • United Kingdom <p>Reports on fiscal risks associated with PPPs</p> <ul style="list-style-type: none"> • Chile • Philippines • Portugal <p>Public disclosure of PPP contracts</p> <ul style="list-style-type: none"> • Australia • Chile
<p>FISCAL RULES</p> <p>Cap on stock of PPP assets</p> <ul style="list-style-type: none"> • El Salvador • Hungary (but only for new commitments and excluding motorways) • Peru <p>Cap on annual spending on PPPs</p> <ul style="list-style-type: none"> • Brazil <p>Cap on stock and annual spending</p> <ul style="list-style-type: none"> • United Kingdom (for new PPPs - control total for all commitments arising from off balance sheet PF2 contracts signed)

Source: Based on Funke, Irwin and Rial (2013).

8. CONCLUSIONS AND RECOMMENDATIONS

8.1. Conclusions

Papers prepared for the roundtable review some of the most successful examples of transport sector PPPs (Ugarte, Gutierrez and Phillips 2012) and some of the widespread failures (Shaoul, Stafford and Stapleton 2012). The latter paper concludes from overall experience in the UK that procuring transport infrastructure services through PPPs is generally far more expensive than public finance, even if a counterfactual comparison cannot be constructed *ex post*. It also finds that the funding earmarked for PPP projects is usually insufficient and taxpayer funding to make up the shortfall displaces other services. The evidence considered at the roundtable was far from comprehensive, with perhaps more attention given to the extremes than the average. This reflects the somewhat patchy evidence base for the performance of PPPs in the literature. Nevertheless, some conclusions can be drawn as to how PPPs might be better regulated to reduce overall costs and maximise efficiency.

Two broad views on PPP performance and design emerged in the discussions. The first holds that PPPs will deliver value for money when they are toll-financed, with a large equity holding and transfer of all demand risk to the private partners (with or without freedom to adjust tolls). There should be transfer of construction, coordination and design risk to the private partners with the consequent freedom to alter design and construction techniques. This implies that the projects need to be relatively independent of the rest of the transport network in terms of interconnection and demand.

The second view holds that the need for private finance to supplement public finance in order to achieve more optimal levels of infrastructure investment goes well beyond the volume of projects that suit the first model. PPPs will therefore have extensive recourse to debt finance, with risks for investors reduced through availability payments in place of tolls in order to lower the cost of finance and attract a bigger pool of investors.

The UK accounts for the largest share of transport PPP projects to date, with projects most often employing availability payments with a high ratio of debt to equity. The regulatory framework and assessment guidance for PPPs in the UK is mature and widely recognised as following best practise in rigour and completeness, and in risk assignment but, as Shaoul, Stafford and Stapleton (2012) report, on average PPP finance costs have largely exceeded PPP budgets. This underlines the importance of tests of affordability for PPP programs, not just individual projects.

The choice of financing approach for transport infrastructure investment between public procurement, availability based PPPs, tolled PPPs and regulated utility models is dependent on the objectives underlying public investment in the sector. Making these objectives explicit clarifies debate on the relative merits of the alternative financing approaches.

Bringing forward infrastructure investment is a major attraction of PPPs but their impact on public accounts resembles public finance more closely than privatisation. PPPs should therefore be treated as public finance in public accounts and budget decision-making procedures.

Taking investment off public balance sheets is not on its own a legitimate reason for promoting PPPs even when public spending limits fail to make a distinction between investment and non-productive expenditure.

Countering the stop-go nature of purely public infrastructure provision, and especially maintenance, is an objective that makes some share of PPP finance useful in most environments. The assumption is that by bundling operation and maintenance with project construction, and structuring tolls or availability payments to reflect quality of service, maintenance schedules can be optimised and budgets protected under contract. In practice because construction and operations are conducted by different companies, public sector procurers need to monitor contracts and performance carefully to ensure that such potential benefits are achieved in practice.

Governments also use PPPs to discipline project construction. Bundling construction and operation of the facility into a single contract creates incentives to complete construction on-time where the facility operator is an equity investor. In principle, substituting a single PPP contract for multiple contracts with suppliers transfers project coordination risk from the procuring agency to the PPP company. In practice, if there are problems with a contract the bank and even the procurer may need to step-in.

PPPs can also be used to drive cost cutting innovation in project design and construction. For this, contracts have to be designed to leave the developer free to make changes to alignments, design and construction techniques. This means much of the detailed specification employed in public procurement, and indeed many PPP contracts, that aims to reduce cost by containing construction and design risks, has to be foregone to unlock the potential for innovation. At the same time, not all projects present opportunities for large scale cost savings through innovation.

Many governments seek to substantially increase the volume of private finance for public infrastructure to benefit from these potential efficiency gains. This is the aim, for example, of the UK's New Approach to Public Private Partnerships (HMT 2012). They aim therefore to attract a wider range of investors to transport infrastructure. Regulated utility type arrangements make investment feasible by a broad range of non-specialised investors, including sovereign wealth funds. The regulated utility type model has the advantage of familiarity for stock market investors and provides for a continuous stream of returns without the initial delay during construction inherent in PPPs. Many airports are financed by private investment in this way as is Great Britain's rail infrastructure. The model could be employed for roads if a large enough part of the network or a sufficient number of projects can be bundled together to cover the costs of establishing a regulator. Utility type regulation, in place of a series of separate PPP contracts has the potential advantage of making contracts more flexible to respond to changes in external conditions (e.g. economic growth rates over the long term). A dedicated regulatory agency has the potential to improve transparency and the capacity of government for managing risk. Regulated asset base models can be applied to both tolled and un-tolled facilities.

Investment in listed utilities are not, however, a good match for all types of "patient capital", such as insurance and pension funds. Returns on shares in listed utilities tend to vary with general trends in stock market performance. Pension funds have to provide for regular payments to pension holders regardless of the market.

The infrastructure funds in their portfolios are designed to provide for this constancy and therefore invest in infrastructure bonds backed by government guarantee and in bonds issued through the securitisation of PPPs once construction is complete.

Securitisation is facilitated in some jurisdictions by simplified administrative procedures, such as the 1981 Loi Dailly in France. This is the main route to broadening the range of investors in PPPs over the full project cycle.

From the perspective of maximising the volume of private finance for public infrastructure, availability payment-based PPPs have advantages over toll-based PPPs. Availability payments reduce investor risk, lowering the cost of debt finance and attracting a wider range of investors. In the current financial environment the willingness of banks to facilitate project development may depend more on their relationship with the project developer than on whether remuneration is based on availability payments or toll revenues.

Toll-based PPPs substitute user funding for taxpayer funding. Although this presents an opportunity cost for the public budget as toll revenues could accrue to government rather than a concession company, it relieves government expenditure in the short term. The public is generally somewhat less hostile to tolls when they remunerate private finance, probably because opportunity costs are not intuitively evident.

Tolls can also be used to manage demand, through peak pricing, even if examples in practice are rare. PPPs can be used to improve efficiency by facilitating the introduction of variable tolling.

Because of their higher risks, toll based PPPs generally require a higher ratio of equity to debt than availability payment-based PPPs (although low interest government loans can be made available to toll based PPPs, as with US Federal TIFIA loans). Equity investors seek to limit risks through the type of projects they invest in. Some projects are therefore more attractive than others for this type of PPP. These include roads where demand is relatively predictable and alternatives are unlikely to be built, such as estuary crossings in trunk highway networks. Tolling may not be feasible on large parts of the road network in countries with a tradition of generally toll-free highways.

Once construction of a toll project is complete, concessionaires can issue bonds backed by toll revenues. These bonds are often bought by pension funds and insurance funds, broadening access of tolled PPPs to capital markets. “Securitisation” in this way can weaken incentives for efficient coordination of project design and operation. Some jurisdictions therefore limit the proportion of debt finance that can be converted to bonds and a balance has to be struck between preserving incentives for efficiency and maximising the opportunities for patient, productive capital investment from such funds.

8.2. Recommendations

A mix of financing models spreads risks. Austerity programmes that cut public investment, or a policy aversion to raising taxes for investment in infrastructure, will emphasise the place of PPPs. But the long-run costs and liabilities to public finance of PPPs suggest that they should be subject to limits in terms of absolute volume or share of public spending on investment¹⁰.

A dedicated budget for PPPs, set in relation to the rate at which future liabilities will be accumulated, can provide such a limit. It can also provide certainty in funds being available for investment.

Explicit consideration of alternative financing arrangements should be employed in determining whether to proceed with PPP projects. Governments should test whether, holding quality constant, the PPP is expected to be affordable and cheaper in net present values than publicly financed investment. Most governments examine the second of these two criteria, with tests of value for money.

These tests are susceptible to manipulation when employed for pass/fail type assessment but should prove more robust when used to establish project priorities within a ring-fenced PPP budget for transport infrastructure.

It is recommended that governments also require PPP projects to pass tests of affordability and to clear the hurdle rates of return generally applied to publicly financed transport projects. Under affordability tests, the cut-off point for priorities would be determined by the volume of finance available for the pool of projects to be retained under public and private financing, and PPP projects would be subject to limits on the accumulation of liabilities for future availability payments.

The expected cost of PPP projects should take account of cost inflation resulting from the propensity for projects to be renegotiated. This could take the form of using a scenario incorporating an average uplift factor for similar projects from the historical record to test the robustness of project proposals. Monitoring of PPP performance over the full life cycle of concessions ought to be routine for all governments. Insufficient information of relevance for reviewing performance is collected or made publicly available. Assessments to date have had to rely on attempts by researchers to assemble the facts *ex post* (see for example Flyvberg, Holm and Buhl 2003).

Funke, Irwin and Rial (2012) propose a full set of tests and accounting rules to make the selection of PPP projects fiscally sustainable. These include:

- Supplementing public finance accounts with data that counts PPP companies as part of the public sector.
- Publishing forecasts of expected future spending on PPPs and incorporate these projections in fiscal forecasts and treasury debt-sustainability analysis.
- Budgeting for construction of the PPP assets as public spending:
 - subjecting PPPs to standard budgetary approval including authorization by parliament for expenditure commitments over the term of the contracts;
 - or approving PPPs first as publicly financed projects as part of medium-term expenditure plans.
- Changing underlying fiscal accounting rules to treat PPPs as creating government assets and liabilities.

These rules will avoid PPPs being used essentially as presentational budgetary tools and should contain the volume of PPP finance within prudent fiscal limits.

At the individual project level, risks should be assigned to the party best able to manage them, along with rights to make related decisions. Allocation should take into account each party's ability to influence the corresponding risk factor, to influence the sensitivity of total project value to the corresponding risk factor and to absorb the risk. Whilst appropriate allocation of risk does not remove risk it minimises the impact of risk on overall project costs.

Assigning demand risk is not straightforward and risk sharing arrangements are therefore common. In practice these often tend to transfer a disproportionate share of risk to the public budget. Forecasting demand, and thus revenues, is more difficult the longer the duration of the PPP contract. Demand forecasting is also subject to optimism bias wherever success for one or both of the partners is gauged by progressing projects and completing contracts. Reference class forecasts should be used to mitigate optimism bias and inject a dose of objectivity into project evaluation.

These forecasts need to be made by an agency that has no interest in the outcome of the project proposal under examination. Opportunities for strategic misrepresentation exist, however, even in the most sophisticated regulatory environments.

Containing strategic behaviour requires considerable resources. Public administrations need to be adequately resourced to carry out the financial analysis involved in evaluating proposals. The legal process of awarding contracts creates a degree of transparency that can be absent under traditional public financing arrangements. Reference class forecasts are an important tool for countering strategic behaviour and should ideally be prepared by an independent agency to avoid planning bias. That is independent of the contracting government department and independent of any PPP unit in the ministry of finance that measures success in terms of the volume of contracts agreed, and independent of any external financial or other advisors that have incentives to encourage the progress of contracts.

Continuity of resources and expertise is essential for addressing strategic behaviour and optimism bias more generally. One of the benefits of establishing a regulator under the regulated asset base model is maintenance of a critical mass of expertise in relation to forecasting and financial modelling and protection of this function from the impact of changing imperatives that regularly affect deployment of resources in Ministerial departments.

Regulatory agencies are also well placed to ensure transparency and accountability by publishing reports on the criteria employed to make decisions and publishing contracts (if necessary after the lapse of a reasonable period to respect critical issues of commercial confidentiality). Arrangements to provide for similar levels of transparency and regulatory capacity need to be made for PPPs.

The potential of PPP contracts to counter stop-go funding for infrastructure is widely appreciated but some commentators emphasize the risks of loss of democratic accountability and control attached to PPPs and to independent utility regulation. PPP contract re-negotiation is particularly difficult to manage, whether it is the result of strategic misrepresentation in bidding for contracts, a strategy to escape financing limits on the part of the commissioning agent, project misspecification or simply a consequence of forecasting uncertainty. A framework for potential re-negotiation needs to be included in PPP contracts, including arrangements for independent arbitration in case of dispute. To date, no PPP regime has succeeded in closing all the doors to abuse of renegotiation.

Despite the regulatory challenges and the difficulty of managing renegotiation, the benefits of maintaining a share of PPPs in the overall infrastructure financing mix outweigh the costs. Rather than comparing the absolute merits of PPPs versus pure public finance it is more constructive to think in terms of identifying circumstances where toll projects, availability payment-based PPPs and regulated asset based financing models are likely to be most efficient and affordable.

The specific economic and social circumstances of different countries may lead governments to a view that despite the regulatory challenges and the difficulty of managing renegotiation, there should be a share of PPPs in the overall infrastructure financing mix. How much investment should be financed through PPPs will be determined by the kind of budgeting and accounting guidelines set out in this report.

Limiting the volume of PPPs in overall transport infrastructure investment focuses project selection for PPP financing on delivering maximum efficiency gains. This will prioritise projects susceptible to achieving major cost savings from redesign and modification of construction techniques. Such cost savings also require governments to remove the strings of detailed project specification from the projects selected as most suitable for PPPs.

NOTES

1. Regulated asset base models, addressed in section 5, are also susceptible to overinvestment as a result of incentives created by regulating profit to capital ratios (Averch and Jonhsons 1962).
2. The reasoning is that lenders do not have direct access to the sponsor's financial resources.
3. House of Commons Select Committee on Environment, Transport and Regional Affairs, Twelfth Report 1998.
4. New rail franchises in Great Britain are using different mechanisms to share demand risk.
5. And a discount rate fixed by the government for the auction.
6. See online guidance for project appraisal from the Department for Transport and Treasury, WebTAG pages <https://www.gov.uk/transport-appraisal-and-modelling-tools>
7. Although the cost of public borrowing will in general not reflect the full cost of capital of the project (Oxera, 2012).
8. Note that the responsibilities and therefore the resources required go well beyond issues of legal interpretation of contracts. Some countries have a tradition of narrow legal regulators in place of or in parallel to economic regulators. This report is concerned with the broader economic regulatory function which requires economic expertise and judgement on issues of efficiency as well as law.
9. Subtracting management contracts and divestitures from the total figure for private participation in infrastructure investment.
10. The UK introduced such a limit for new PPPs in its December 2012 Private Finance 2 reform as “a control total for all commitments arising from off-balance sheet PF2 contracts signed” (HMT, 2012).

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**BUDGETING AND REPORTING FOR
PUBLIC-PRIVATE PARTNERSHIPS**

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1. INTRODUCTION

PPPs and publicly financed projects receive different treatment in the way governments record spending and debt in many jurisdictions. This can encourage a government under pressure to reduce its deficit or debt in the short run to use a PPP for an infrastructure project even if in the long run it costs more than public financing. To reduce such bias in favour of PPPs governments can take a number of measures, examined in this section. They can improve the information available on future fiscal costs and risks, change budget decision processes to treat PPP and publicly financed projects identically until the decision to invest is taken and change the way PPPs affect reported spending and debt in the short run. Some governments have already taken such steps although debt and deficits are often measured in more than one way. If there is no change in headline indicators the bias will probably remain. Governments can also limit the contingent liabilities associated with PPPs by capping the budget available for PPPs or the volume of assets that can be financed by PPPs.

Public-private partnerships (PPPs) can appeal to governments because they offer a new way of providing public services that is possibly more efficient than traditional public finance. But they can also appeal to governments because they allow new investments to be undertaken without any immediate increase in reported government spending or debt. This second motive for using PPPs rests largely on an illusion, because in the absence of efficiency gains (which are probably small relative to the total cost of the project), PPPs and publicly financed projects have a similar long-run effect on public finances. In some PPPs, the government defers payment, but ultimately must still pay the full cost of the project. In others, it concedes the right to collect user fees, and thus loses revenue it would have collected if the project had been financed traditionally.

The attraction of PPPs as a way of getting investment financed without immediately increasing reported spending and debt is closely related to the way that governments measure their spending and their debt. Typically, a government records spending on a publicly financed project when the project is under construction and the government is disbursing cash to, or being invoiced by, the contractor. Any spending on a PPP, by contrast, is usually recorded only when construction is complete and is usually spread out over as many as 30 years. Similarly, if the government borrows in traditional ways to fund the payments it makes during the construction of a publicly financed project, it must record an increase in its debt. But if it assumes an obligation to make payments to the PPP company over the life of the contract—an obligation that has fiscal implications similar to those created by traditional borrowing—it can usually avoid recording any increase in debt in the short run. This encourages a government under pressure to reduce its deficit or debt in the short run to use a PPP even if, in the long run, the PPP costs more than public financing. This bias in favour of PPPs can also lead governments to assume financial commitments that later prove unaffordable.

To reduce the bias in favour of PPPs, governments can improve the information that is available about the future fiscal costs and risks of PPPs. They can prepare and publish forecasts of future cash flows under existing and planned PPP contracts and ensure those forecasts are incorporated in medium- and long-term fiscal projections and analyses of debt sustainability. They can also publish PPP contracts and describe and, where possible, quantify the fiscal risks the contracts create. More challenging, but potentially more influential, is to change the way PPPs affect reported spending and debt in the short run. This is increasingly done in accrual-based fiscal data, which often treat PPPs as government projects, even though from a legal perspective they are undertaken by a private company. This means that the government treats investment in the PPP project as public investment and records the PPP asset on its own balance sheet, along with a corresponding liability.

But governments often measure their debt and deficit in more than one way, and if there is no change in the most prominent (“headline”) indicators of the debt and deficit, the bias will probably remain. The most prominent indicators are usually those used in setting fiscal rules or fiscal targets, so eliminating the bias requires ensuring that these treat investment in PPPs as public investment that creates both public assets and public liabilities. The consequences of the bias can be limited by imposing specific limits on the size of the PPP program.

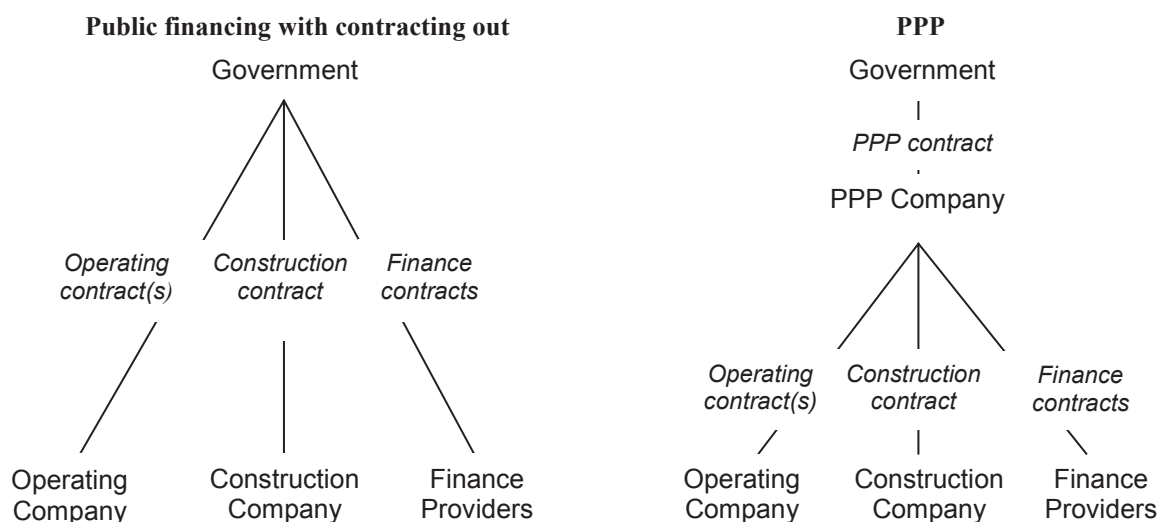
Removing the bias also requires changes in budgeting. One option is a medium-term budget framework that treats PPPs in the same way as publicly financed projects and therefore ensures that PPPs require the same approvals in the budget and budget plans as publicly financed investments. Another is commitment budgeting, in which the legislature approves not only the government’s cash expenditure in the budget year but also its commitments to spend money in later years. And a third is a two-stage budgeting process, in which all projects must first be approved in budget planning on the assumption that they will be publicly financed, and only then is a decision made about the method of financing projects deemed affordable in the first stage.

A. What are PPPs?

In PPPs, private firms invest in infrastructure used to provide services typically considered public. More specifically, PPPs, as we use the term, are long-term contracts between the government and a private contractor in which the contractor agrees, at its own cost, to build, operate, and maintain an asset in order to provide a service for which the government remains accountable; in return the government promises either to pay for the service or to allow the contractor to collect fees from users. PPPs thus include projects in which the government itself provides the contractor’s revenue (government-funded PPPs) as well as concessions in which users are expected to be the main source of its revenue (user-funded PPP¹¹ even if the government provides additional support in the form of subsidies and guarantees, including guarantees implicit in termination clauses. But PPPs exclude simple joint ventures and arrangements in which the contractor is not required to finance investment.

Although PPPs involve the contracting out of construction, maintenance, and operations, it is not this that defines them: in a publicly financed project, all these activities can be undertaken by private firms. What defines a PPP is that the government writes a contract with a single firm (usually a special-purpose company) that agrees to provide the service. That firm typically writes its own subcontracts with construction and operating companies (Figure 1). The use of a PPP contract thus allows the government to concentrate on specifying the services that should be provided, while delegating to its contractor the task of providing the services at minimum cost. Because the PPP contract usually lasts for most of the economic life of the asset, the government can give the contractor incentives to minimize the lifetime cost of the project.

Figure 1. PPPs versus public financing with contracting out



PPP, in this sense, are not new, but their popularity has increased since the 1990s. In the 1800s, many railways were built under concessions that guaranteed private investors a minimum rate of return. In the 1960s and 1970s, concessions were used to finance investments in French and Spanish highways. But the use of PPPs increased in the 1990s and 2000s, partly with the development in the United Kingdom of PPPs in which the government was the main purchaser of the project's services (in our terminology, government-funded PPPs). By now, most governments have used some kind of PPP, attracted by the prospect of greater efficiency and of developing new infrastructure without having to report an immediate increase in their debt or deficit.¹²

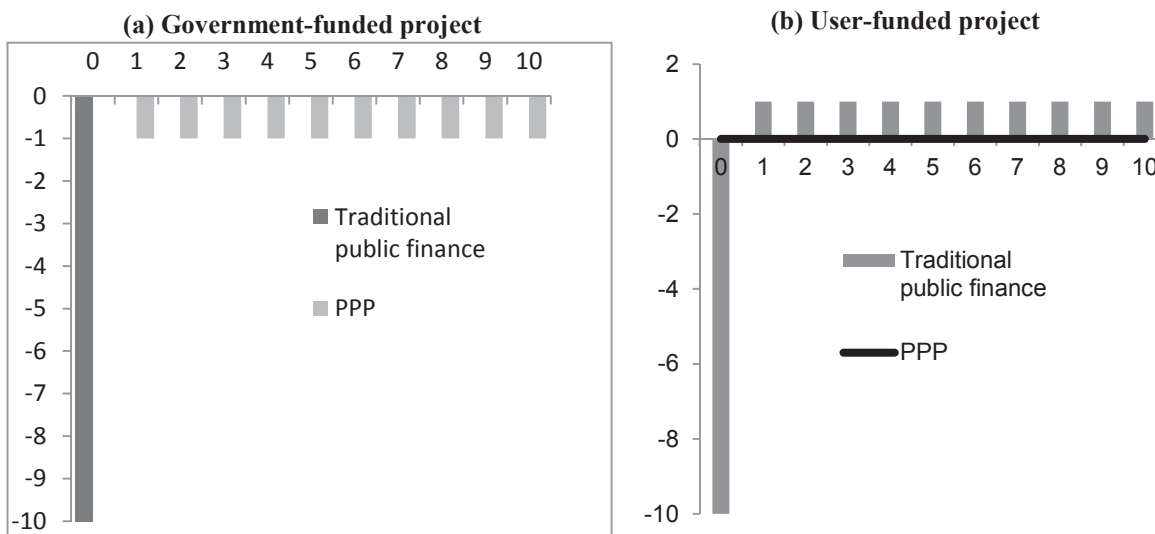
B. Fiscal implications of PPPs

PPP contracts create cash flows for the government that differ fundamentally from those created by traditional public financing, in which the government pays for the investment by borrowing (or raising taxes). Figure 2 illustrates for the case of two stylized projects, one government-funded and one user-funded, in which possible efficiency gains (or losses) are ignored and in which there are no costs of operations and maintenance.

- In a government-funded PPP (panel (a)), the government can agree to make payments only when the service is provided and only to the extent that the service conforms to the specifications of the contract. Its payments are therefore deferred. But the contractor will agree to pay for the construction of the asset only if the government agrees ultimately to pay enough to cover the expected costs of construction. Thus, the government's payments are deferred, not reduced. Under the assumptions of this stylized example, they are the same in present values as those that the government makes under a publicly financed project.
- In the simplest kind of user-funded concession in which user fees exactly cover project costs (panel (b)), the government does not need to make any payments at all. But nor does it receive any revenue. So the net present value of its cash flows from the project is zero. If instead the government uses traditional public financing, it pays for the construction of the project, but later it collects the user fees, which by assumption cover the costs. Again, the net present value of its cash flows from the project is zero.

In other cases, the concession may require subsidies or may generate user fees that more than cover costs, but given the simplifying assumptions of this example, the net present value of the government's payments will still be unaffected by whether it undertakes the project as a PPP or with traditional public finance.

Figure 2. **Stylized government cash flows for ten years with a PPP and traditional public finance**



If the use of a PPP instead of public financing does not change the net present value of the government's cash flows, the PPP does not make investment more affordable. If the government cannot afford to finance the project using traditional public finance, it probably cannot afford to undertake it as a PPP. Conversely, if the government can afford to undertake the project as a PPP, it can probably also afford to finance it traditionally.

In reality, the net present value of the government's cash flows may differ according to whether the project is undertaken as a PPP or with traditional public finance. For example, the use of a PPP could be associated with higher user fees than would be charged under public financing. Alternatively, the change in the structure of contracting shown in Figure 1 could lead to better management and lower costs under the PPP. Because PPPs can commit the government to a course of action for twenty or more years, it is usually thought that a PPP is more likely to save the government money when the government can predict the services it will need over the long run and can specify those services precisely; when the government is likely to change its mind in a few years, or cannot specify the desired service precisely, a PPP may lead to frequent and costly renegotiations. By contrast, when the government finances the project itself, it can change its mind without having to renegotiate any long-term contracts.

Although evidence on the differences in the net present costs of PPPs and comparable publicly financed investments is scarce, the differences may be small. The intrinsic differences between a PPP and a publicly financed project are subtle, as is apparent in Figure 1. So in the absence of inefficiencies in contracting that affect publicly financed investments but not PPPs, or vice versa, any differences in the net present values of the government's cash flows under the two approaches are unlikely to be large. It is

true that PPPs sometimes end up costing the government significantly more than was forecast,¹³ but the same also appears to be true of traditionally financed infrastructure projects.¹⁴

In both cases, forecasts often seem to be afflicted by optimism or opportunism. Partly because it is difficult to create experiments that can be used to compare the costs of the two approaches, there is little robust empirical evidence on the subject.

C. The bias in favour of PPPs

Even if the use of a PPP instead of traditional public financing does not reduce a project's net present cost to the government by much, the difference in the timing of the cash flows can create a strong bias in favour of using a PPP. PPPs can seem much more affordable even if they are not. In most countries, budgets, accounts, and statistics record the cash receipts and payments of the government (and define the government to exclude privately owned PPP companies). At the same time, governments are typically held accountable not for the effect of their policies on the health of public finances over the long run, but for the deficits and debts that they report during their term in office. When governments want to reduce the deficit in the short term, PPPs can therefore seem attractive irrespective of whether they are affordable and cheaper than publicly financed projects. Even when governments adopt relatively advanced procedures for budgets, accounts, and statistics, the bias may remain. The sophisticated rules that govern measurement of the fiscal deficit in the European Union, for example, have allowed European governments to undertake many PPPs without increasing their deficits until the governments start to make payments, which, when the contract is signed, may be several years in the future. This problem is not unique to PPPs; even publicly financed projects may not require any payments in the year in which the construction contract is signed. But the fact that PPPs distribute the government's payments (or the opportunity costs in the case of user-funded PPPs) over as many as 30 years can create a strong bias in their favour.

PPPs create fiscal costs or risks that are sometimes significant. In some countries, the government's annual payments under government-funded PPP contracts amount to more than ½ a per cent of GDP. In developing countries, user-funded PPPs are sometimes used for projects that are very large in relation to the government's limited resources. The hope in these cases is that the cost of the project will later be recouped from consumers, but the government (that is, the taxpayer) often bears the risk that revenue proves insufficient. As with other contingent or non-traditional liabilities, the fiscal obligations created by PPPs need to be assessed and reported.¹⁵

This note sets out three ways in which governments can seek to reduce the bias in favour of PPPs and to ensure that PPPs, when used, are affordable.¹⁶ The first set of options aims to improve the information available about the fiscal implications of PPPs (Section II). The second set aims to improve the way budgeting deals with those fiscal implications (Section III). And the third set aims to improve the way fiscal rules control the fiscal implications (Section IV).

2. ACCOUNTING FOR AND REPORTING PPP TRANSACTIONS

The way PPP transactions are accounted for and reported in the government’s accounts is an important factor contributing to the bias in favour of using PPPs. Countries with pure cash accounting and reporting may underestimate fiscal costs and risks from PPP transactions, particularly during the construction of the related asset. In this case, the main fiscal aggregates—fiscal deficit and debt—do not fairly portray the level of risk undertaken by the government. On the other hand, countries with more sophisticated accounting and reporting standards may be less exposed to the PPP bias, since the latter—even though country specific—normally require PPPs to be accounted for in a similar way to publicly financed projects.

Since reporting and accounting for PPPs is country specific, so is the capacity to avoid the bias in favour of them. Some governments follow standards that put most PPPs on their balance sheets. For example, governments in Australia and the United Kingdom follow accounting standards based on *International Financial Reporting Standards* and recognize typical government-funded PPPs on their accounting balance sheets.¹⁷ International Financial Reporting Standards contain an interpretation (*International Financial Reporting Interpretation Committee 12—Service Concession Arrangements*) that applies to companies, not governments, but because it has caused PPP contractors not to recognize the physical assets created by PPPs on their balance sheets, it suggests that these assets should be recognized on the balance sheets of governments. But most governments do not currently recognize PPPs on their balance sheets or treat investment in PPPs as public investment in fiscal data. Some present fiscal data only on a cash basis and do not have a balance sheet prepared according to any particular standard. Other governments apply accrual or partial-accrual standards that treat most PPPs as off balance sheet. In Europe, for example, the statistics underlying the main measures of debt and deficit have this effect.

For the sake of concreteness and cross-country comparison we focus our analysis on two international standards. For accounting purposes we refer to the *International Public Sector Accounting Standards* (IPSAS), which are similar to International Financial Reporting Standards but are adapted to governments; while for reporting purposes we refer to the IMF’s *Government Finance Statistics Manual 2001* (updated *GFSM 2001*, November 2012 draft) and the *2011 Guide on Public Sector Debt Statistics* (PSDS 2011). First we describe current international accounting standards for PPPs and summarize how they affect the two main fiscal aggregates—deficit and debt—and thus the PPP bias. Second, we describe international statistical standards and compare them to the accounting standards. We then briefly discuss the implications of not following these standards in terms of reducing the PPP bias. We finally recommend alternative ways for countries to strengthen accounting and reporting of PPPs transactions to remove or reduce the PPP bias.

A. International public sector accounting standards (IPSAS) for PPPs

The recently issued accounting standard *IPSAS 32, Service Concession Arrangements: Grantor* provides a framework for accounting for and reporting PPP transactions in a government's accounts that reduces significantly the bias in favour of PPPs. Under IPSAS 32, which is similar in approach to *International Financial Reporting Interpretation Committee 12—Service Concession Arrangements*, when certain conditions are met, the impact of a PPP on the main fiscal aggregates is similar to that of publicly financed projects. Under these rules, debt and overall deficit indicators¹⁸ will both increase as the PPP asset is constructed. This is a major improvement in government accountability, since it prevents PPP-related assets and corresponding liabilities from being treated off government's balance sheet.

IPSAS 32 covers both government-funded and user-funded PPP contracts. A service concession arrangement is defined as a binding contract between a grantor (the government) and an operator (private sector contractor) in which: (i) the operator uses a public asset (the service concession asset in *IPSAS* language, for example a highway) to provide a public service for a specified period of time on behalf of the grantor; and (ii) the operator is compensated for its services over the period of the service concession arrangement. Thus, both government-funded and user-funded PPP contracts, as previously defined, are covered by this standard. However, arrangements outside the scope of *IPSAS 32* include those where there is no delivery of public services, and where the asset is not controlled by the government (e.g., outsourcing, service contracts, and privatization).¹⁹

It is expected that under *IPSAS 32* most PPP contracts would result in assets and liabilities being regarded as belonging to the government. According to this standard, the government recognizes an asset and a liability (with the corresponding flows) in its financial statements when the following conditions are met: (i) the grantor controls or regulates what services the operator must provide with the asset, to whom it must provide them, and at what price; and (ii) the grantor controls—through ownership, beneficial entitlement or otherwise—any significant residual interest in the asset at the end of the term of the arrangement. Experience suggests that most PPP contracts would comply with these conditions.

If *IPSAS 32* conditions are met, both the overall deficit and debt would be affected during the construction of a PPP asset, as in the case of a publicly financed project. As detailed in Table 1, if the government compensates the operator by making a predetermined series of payments during the life of the PPP (a *government-funded* PPP), it recognizes a liability equal to the full value of the asset (transaction 1 in Table 1). Similarly, if the government grants the operator the right to earn revenues from users (a *user-funded* PPP), the value of the liability recognized equals the full value of the asset. In both cases, the counterpart entry for the increase in the government's liabilities is the net acquisition of a nonfinancial asset, which increases the overall deficit—that is, a measure of the deficit that includes investment as spending—but not the net operating deficit. In turn, government's gross debt increases by the amount of the liability, while net worth remains unchanged (i.e., increase in liability is compensated by the acquisition of a nonfinancial asset).

Table 1. Accounting for PPP contracts in government accounts

Transaction	Accounting treatment 1/	Impact on Gov. Deficit		Impact on Gov. Balance Sheet	
		Net operating deficit 2/	Overall deficit 3/	Gross debt	Net worth 4/
A. Construction of the PPP asset (both government and user-funded PPPs)					
1. Recognition of asset/liability	*Increase in non-financial assets (service concession asset); *Increase in liabilities by full value of the asset	None	Increases by the full value of the asset/liability	Increases by the full amount of the asset/liability	None (increase in nonfinancial asset compensates increase in liability)
B.1. Contract operation (government-funded PPPs)					
2. Payment to operator for services provided	*Expense, purchase of goods and services *Decrease in cash	Increases by expense, purchases of goods and services	Increases by expense, purchases of goods and services	None	Decreases by expense, purchases of goods and services
3. Payment to operator for financial charges 5/	*Expense, interest *Decrease in cash	Increases by expense, interest	Increases by expense, interest	None	Decreases by expense, interest
4. Repayment of principal (amortization)	*Decrease in liability *Decrease in cash	None	None, it is a financial transaction (below the line)	Decreases (debt amortization)	None
5. Depreciation of the asset	*Expense, consumption of fixed capital *Decrease in non-financial assets	Increases by expense, consumption of fixed capital	None, internal transaction 6/	None	Decreases by consumption of fixed capital
B.2. Contract operation (user-funded PPPs)					
6. Revenue recognition and reduction of liability	*Decrease in liability *Revenue, capital grant (imputed)	Decreases by revenues, capital grant	Decreases by revenues, capital grant	*Decreases (debt amortization)	Increases by revenues, capital grant
7. Depreciation of the asset	*Expense, consumption of fixed capital *Decrease in non-financial assets	Increases by expense, consumption of fixed capital	None, internal transaction 6/	None	Decreases by the amount of consumption of fixed capital
C. End of Contract (both government and user-funded PPPs)					
8. End of service provision by the operator	Not a specific transaction	None	None	Equal to zero	Net cumulative impact from previous transactions

1/ Accounting on an accrual basis.

2/ The net operating deficit excludes net spending on nonfinancial assets (acquisitions minus disposals). It is closer to the IPSAS definition of deficit than the statistical concept of overall deficit.

3/ The overall deficit corresponds to net lending/borrowing according to GFSM 2001 methodology.

4/ Net worth equal total assets (financial and nonfinancial) minus total liabilities (debt liabilities and others).

5/ Splitting asset and service component of service concession arrangements by fair value (estimation techniques).

6/ The increase in expenses—consumption of fixed capital—is compensated by the reduction in nonfinancial assets by the same amount, so net lending/borrowing is not affected.

During the PPP contract operation phase, the government's liability related to the PPP is gradually extinguished. In the case of government-funded PPPs, the government pays an amount that compensates the operator for financial charges, the services provided, and the repayment of principal. The amounts corresponding to service costs and financial charges are accounted for as government expenses and thereby affect the overall deficit (transactions 2 and 3), while the repayment of principal is accounted for as a reduction in liabilities (transaction 4) with the counterpart being a decline in cash (i.e., it is a financial transaction not affecting the overall deficit).

Likewise, in user-funded PPPs, during the contract operation phase the PPP-related liability reduces as revenues are recognized (transaction 6 is imputed, since the operator does not transfer to government the service fees collected from users). In this case, the value of the government PPP-related liability is equal to the portion of revenues the operator has not yet earned. In both cases, the government depreciates the asset during the duration of the contract (transactions 5 and 7). While the treatment of *government-funded* PPPs (B1 in Table 1) is very similar to the treatment of financial leases in international accounting and relatively uncontroversial, the treatment of *user-funded* PPPs (B2 in Table 1) is more controversial. For example, in France a recent government accounting standard on PPPs uses criteria similar to those of *IPSAS 32* to decide whether the government should recognize an asset on its balance sheet, but requires recognition of a liability only in the case of government-funded PPPs.²⁰

At the end of the PPP contract the costs incurred by the operator are completely reimbursed by government. As a result, for both types of PPPs the PPP-related liability is totally repaid (i.e., gross debt is zero); while the nonfinancial asset remains in the government's balance sheet at its residual value (transaction 8).

B. International statistical standards for PPPs

International statistical standards also reduce the incentive to pursue PPPs just to minimize the impact of investment on the main fiscal aggregates. The IMF's *Updated GFSM 2001*²¹ and the *2011 Guide on Public Sector Debt Statistics* set out criteria for classifying PPP assets and associated liabilities and provide a consistent framework for reporting PPP transactions in government finance statistics. According to the *GFSM 2001*, if the PPP asset is regarded as a government asset, the impact on the fiscal deficit and debt are similar to the case of a publicly financed investment project.

Under *GFSM 2001*, PPP assets are accounted for in the government's balance sheet if the government bears most of the project's risks and rewards. The factors that need to be considered in assessing who bears most of the project's risks and rewards (i.e., who has the economic ownership of PPP-related assets) are closely related to the conditions prescribed by *IPSAS 32*—including those factors associated with acquiring the asset and those associated with the use of the asset. Risks associated with acquiring the assets are: the degree to which the government controls the design, quality, size, and maintenance of the asset, and construction risk. Some of the risks associated with using the asset in production are: supply risk, demand risk, residual value and obsolescence risk, and availability risk.

Both *IPSAS 32* and *GFSM 2001* should usually lead, in practice, to the same decision as to whether a PPP contract creates assets and liabilities for the government. While *IPSAS 32* and *GFSM 2001* approaches for asset recognition in the case of PPPs are different in nature, their implementation should typically lead to the same decision and therefore to a similar impact on main fiscal aggregates.

In contrast, the implementation of Eurostat's criteria for accounting for PPPs has resulted in many assets and related liabilities being treated off government's balance sheet. Although Eurostat uses the risks-and-rewards approach to determine whether a PPP asset can be considered as a government asset, its implementation according to Eurostat's criteria can result in a different decision from that derived from *IPSAS* and/or *GFSM 2001*. In practice, Eurostat requires that the PPP asset should be reported as belonging to the operator if the operator bears the construction risk and at least one of either availability or demand risk, and there are no other mechanisms in place (such as guarantees or grantor financing) to return these risks to the government.²²

Experience shows that under Eurostat’s criteria many *government-funded* PPP assets and related liabilities are recorded off government’s balance sheet. For *user-funded* PPPs (concessions), Eurostat’s criteria state that assets and liabilities are off the government’s balance sheet unless the government finances most of the investment or provides a minimum-traffic or minimum-revenue guarantee to the operator.²³

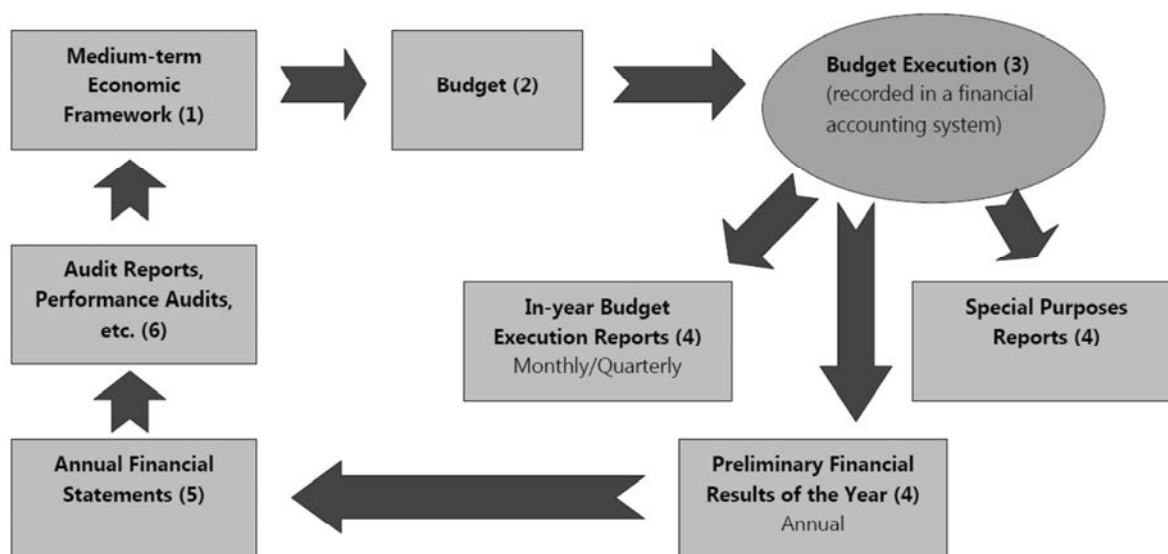
C. Country practices in accounting and reporting PPP transactions

Most countries deviate from international standards—IPSAS 32 and GFSM 2001—when accounting and reporting for PPP transactions, which increases the bias towards PPPs. Reasons for such deviations vary on a country-by-country basis, as well as countries’ capacity to avoid the PPP bias.

Overall, fiscal accounting and reporting for PPPs is very limited, and comparing national practices is complicated by the fact that data on PPPs can be generated and reported in different ways along a typical fiscal cycle. Figure 3 describes a typical fiscal cycle, identifies the main types of fiscal data generated during the cycle, and highlights the role of the accounting system in integrating fiscal data.²⁴ A fiscal cycle typically begins with a medium-term economic framework (element 1) that sets the premises on which the government’s budget is prepared (element 2). As the budget is executed (element 3), transactions are recorded in a financial accounting system, which generates various reports (element 4), such as intra-year *budget execution reports* and *preliminary annual financial results*. Following the end of the fiscal year, the *final annual financial statements* (element 5) are compiled and presented in an audited format (element 6) to the legislature and other oversight bodies. These results inform the decisions of the next fiscal cycle (element 1). The budgetary and accounting records, as well as the various reports produced during the cycle are the main inputs to compile *fiscal statistics*.²⁵ In turn, *headline fiscal indicators—including fiscal targets*—are determined, often at a national level, and the extent to which they are based on budgetary, accounting, and statistical records varies by country. Finally, a variety of other fiscal reports may be produced, drawing on the accounting system and other sources, including analyses of debt sustainability, long-term fiscal projections, and statements of fiscal risk.

The way PPP transactions are reflected in the overall fiscal cycle depends on several factors. In most countries, user-funded PPPs are excluded from the budget (i.e., the type of project matters). Since budgets are normally on cash basis, they may not show PPP operations at early stages of the PPP cycle, even for projects committing government resources (i.e., the accounting basis matters). Moreover, even countries with accounting systems on an accrual basis may not show PPP operations if the related asset is regarded as being owned by the private partner or if it is owned by a public entity outside the coverage of national headline fiscal indicators (i.e., classification of the asset and institutional coverage of fiscal data matter). Finally, countries with no integrated financial accounting system may report PPP operations inconsistently among different fiscal reports. For example, PPPs can be excluded from budget execution reports but their related assets and liabilities can be classified as public following international accounting and statistical standards—IPSAS 32 and GFSM 2001—and thus be included in annual financial statements and fiscal statistics. Similarly, headline fiscal indicators and fiscal targets can be based on any of such reports, and they could even incorporate further modification—such in the case of the European Union. This hampers the decision making process (i.e., consistency in reporting also matters). **Ensuring that all PPP projects are properly and consistently accounted for at every stage of the fiscal cycle reduces the incentive to pursue PPPs for the wrong reasons.**

Figure 3. A typical fiscal cycle



Sources: Fact Sheet, Government Finance Statistics (GFS), Statistics Department, IMF (2009).
<http://www.imf.org/external/pubs/ft/gfs/manual/comp.htm>

Both government-funded and user-funded PPP projects should be reflected consistently in all stages of the fiscal cycle. In the case of user-funded PPP projects, the government normally does not expect any related drain in fiscal resources and therefore may consider excluding these projects from the budget. But care should be exercised when excluding these projects from the subsequent stages of the fiscal cycle. It should be noted that even though the government may not expect to incur any costs, the fiscal risks can still be significant and the government may be required to pay if, for example, initial conditions do not materialize. This would still call for government monitoring and reporting of their operations in the other reports generated during the fiscal cycle (e.g., a statement of fiscal risks as one of the special purposes reports).

In countries where the government’s budget is on a cash basis, additional reporting is needed to adequately assess the fiscal implications of PPPs. Particularly at early stages of the PPP project cycle, where the construction of the asset and the recognition of the related liability take place, the discrepancy between cash and accrual accounting of PPPs can be substantial. Although fiscal data prepared on a cash-only basis can in principle include the spending and revenue of PPP grantors, governments that produce cash-only data tend not to follow “substance over form” rules of the kind found in accrual standards that might require them to treat investment by a PPP as government spending. Under a cash basis, the fiscal deficit and debt do not necessarily reflect government’s medium and long-term commitments normally arising from PPP contracts. Therefore, to avoid the bias towards PPPs fiscal analysis should be complemented by other reports where the medium and long-term implications of PPPs are clearly acknowledged.

Classifying the PPP asset as private or as belonging to a public entity outside the coverage of the headline fiscal indicators makes it easier for the bias toward PPP to persist. Even under *IPSAS 32* standards, some PPPs may not be treated as creating government assets and liabilities. Moreover, some countries with advanced accounting follow accounting standards that differ from *IPSAS 32*, in particular in their treatment of user-funded PPPs. When a PPP asset is classified as private, related contingent liabilities or other fiscal risks can be reported in special purpose reports—such as fiscal risk statements. However, their usefulness to counter the PPP bias depends on the extent they inform the decision making process in a typical fiscal cycle. Similarly, when PPPs are contracted by public entities outside the institutional coverage of headline fiscal indicators (e.g., state-owned enterprises in the European Union), the capacity to reduce the PPP bias is weaker. Governments may disregard fiscal costs and risks not affecting their headline indicators or their fiscal targets, even though correctly accounted in other fiscal reports.

Consistency in reporting PPP operations between various fiscal reports can help the government in making informed decisions about their future fiscal costs and risks. Countries that implemented an integrated financial accounting system can ensure that government operations, and in particular PPPs, are reported consistently across fiscal reports (i.e., budget execution reports, financial reports, annual financial statements, statistics, headline fiscal indicators).²⁶ Yet, integrated systems are rare and, in practice, most countries show inconsistencies when reporting PPP operations. For example, some types of PPPs are not included in budget execution reports, which are typically on a cash basis, while annual financial statements prepared in accordance to *IPSAS 32* would typically account for most PPPs. Similarly, fiscal statistics and headline fiscal indicators would exclude or include PPP operations depending on the main data source used to compile them (i.e., budget execution or financial statements). Failure to report PPP operations in headline fiscal indicators or fiscal targets complicates government decisions to pursue a PPP for the right reasons.

D. What can governments do to minimize the PPP bias?

There are several strategies for strengthening accounting and reporting of PPPs to ensure that they are pursued only when they offer value-for-money and are affordable. For governments with the capacity to apply accrual accounting and statistics, the best strategy is to adopt standards such as *IPSAS 32* and *GFSM 2001*. However, this may prove challenging for most countries, at least in the short-term, and there are several other things that can be done.

All governments can benefit from disclosing supplementary information—regardless of the complexity of their budgetary, accounting, and statistical standards—to raise awareness of the long-term fiscal impact of PPPs. This information could include supplementary statistics that provide medium- and long-term forecasts of PPP spending and revenue, descriptions of the contracts and their fiscal costs and risks, and the contracts themselves. The challenges of producing such information will vary among countries, and will depend on the level of development and the quality of the government’s information systems.

Governments can disclose supplementary fiscal indicators in which all PPP projects are classified as belonging to general government or the public sector. By doing that, even if international accounting and statistical standards are far from being fully implemented, the government can benefit from similar results. For example, governments can disclose a broader measure of spending that includes all PPPs, regardless of whether the PPPs are classified as public or private according to national standards. It is useful to present measures for the entire public sector. Under both accrual and cash accounting, even if the PPP project is classified as belonging to the public sector, it may not be classified as belonging to the government as defined in national standards underlying headline fiscal indicators.

For example, this is the case when the institutional coverage of headline fiscal indicators is narrow (e.g., budgetary central government instead of general government or the nonfinancial public sector) and PPP-related asset and liabilities (as well as expenses and revenues) belong to a public body outside this coverage (e.g., a state-owned enterprise). The related assets and liabilities and revenues and expenses will be recorded in the state-owned enterprise's accounts, but not those of budgetary central government, central government, or general government.

Governments can also publish forecasts of the cash flows associated with PPPs. These forecasts can facilitate a clear understanding of fiscal implications of PPPs beyond immediate cash drains. Whatever the basis of their accounts and statistics, governments can usefully produce long-term cash-flow forecasts that include availability payments, shadow tolls, and other relatively predictable cash flows between the government and the PPP contractor, as for example in Portugal and the United Kingdom.²⁷ Where feasible, the expected values of less predictable flows can also be disclosed, as in Chile for payments associated with minimum-revenue guarantees.²⁸

All governments can also include the expected fiscal cost of PPPs in their medium-term fiscal frameworks, debt-sustainability analyses, and other fiscal documents. This will provide a consistent treatment of PPP operation in main fiscal reports. The medium-term fiscal framework should include planned spending and revenue related to PPPs in the years covered by the framework—and, where possible, contingent liabilities as well. Debt-sustainability analyses should also incorporate these amounts. Finally, if the government publishes long-term fiscal projections, PPP spending and revenue should be part of the projections.

Similarly, disclosing information on the risks associated with PPP contracts can give the government and the public a better sense of their long-term implications. A report on fiscal risks associated with PPPs can supplement budget documents. That report can discuss how PPPs could cause spending to be higher, or revenues lower, than originally forecasted. Ideally, the discussion should be part of reports on all major fiscal risks, so that those created by PPPs can be seen in context. Examples of reports on risk can be found in Chile, the Philippines, and Portugal, among other countries.²⁹

To further enhance transparency, governments can disclose PPP contracts on their websites. The disclosures should include any amendment to original contracts, together with a summary of their main financial provisions. Certain material can be deleted on grounds of commercial confidentiality, but if the disclosure is to be useful the main financial provisions of the contract, including those in appendices and schedules, must be disclosed. Examples of disclosure can be found in Australia and Chile.

3. BUDGETING

The design of the budgeting process for investment projects is crucial in ensuring that PPPs are used to support high quality public spending and do not put fiscal sustainability at risk. The budget is where spending decisions are ultimately made. Thus, no matter how good the quality and availability of information on PPPs may be, the design of the investment budgeting process determines whether the approved public investment program properly reflects spending priorities and is consistent with sustainable public finances.

With respect to PPPs, the budgeting process should take account of the following principles:³⁰

- Decisions on investment spending should ensure that projects are chosen in line with policy priorities and that investment decisions are guided by cost-benefit analysis.
- The choice between PPPs and traditional public financing should be based on value for money, and thus the prioritization of investment projects should be independent of the method used to implement the project, except to the extent that the method affects value for money.
- Spending decisions should be consistent with fiscal sustainability and thus take account of the long-term implications of spending programs on government finances.

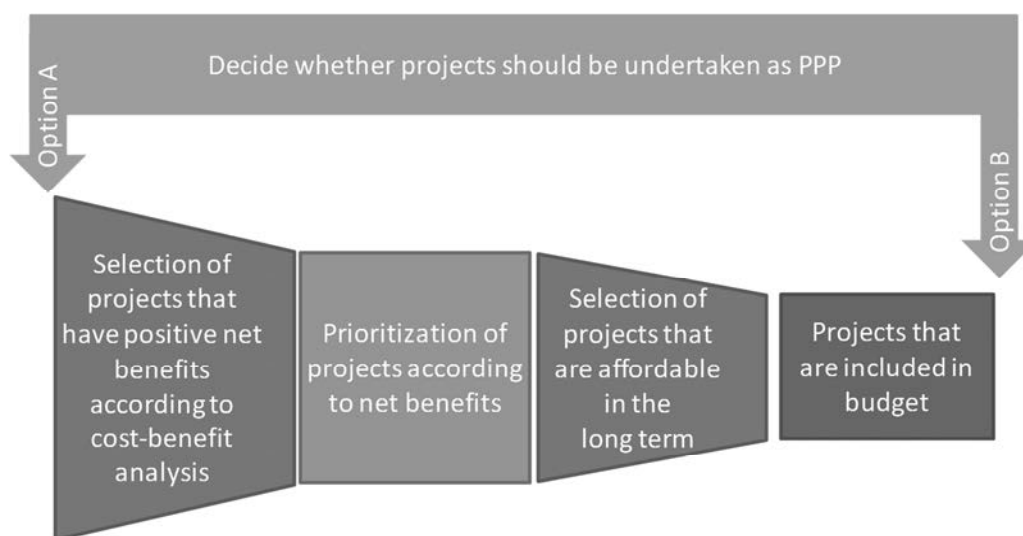
Budget choices between projects should be influenced primarily by policy priorities and by long-term budget affordability, and not by the timing of cash flows.

If the budgeting process can be designed to ensure that the overall net project cost (cost of constructing and operating an asset or of making availability payments, net of potential user fees) and not the timing of the cash flows drives the investment decision, it is reasonable to factor in the choice of the financing method (PPP or traditional public financing) before prioritizing projects and before deciding on whether to include the project in the budget (Option A in Figure 4).

Otherwise, the decision whether to use a PPP should be taken only after the decision is made to include the project in the budget (Option B in Figure 4). In this case, the budgeting decision should be made on an investment project inventory in which all projects are presented as if they will be publicly financed. This ensures that all investment projects are assessed according to the same criteria—cost-benefit assessment, policy priorities, and affordability—irrespective of the ultimate financing method. Although it does not allow the assessment to take account of the possible benefit of using a PPP, it is the safer option if the PPP bias has not been removed by other means. Therefore, for countries with less developed budgeting process Option B could imply lower risks for government.

In addition to treating projects under different procurement methods equally, independent of the procurement method, the budgeting process needs to ensure that the full lifetime costs of an investment project are taken into account at the time of project approval. While this is true for any investment project, whether it is implemented as a PPP or with public financing, this is a particular concern for projects that involve large and complex asset investments with long construction and contract periods, which is often the case in PPPs.

Figure 4. **Timing of decision to use a PPP in budgeting process**



Governments can do different things to ensure that long-term budget affordability and not the timing of the cash flows drives the investment decision. At the budgeting level, these are (i) a medium-term budget framework that treats PPPs as publicly financed projects, (ii) commitment budgeting, or (iii) a two-stage budgeting process.

A medium-term budget framework that treats PPPs in the same way as it treats publicly financed projects is helpful if most of the cost of the investment project is recorded under the medium-term horizon. As discussed in Section II, modern accounting and fiscal statistics increasingly treat PPPs as creating government assets. Thus, if the budget law requires authorization of the acquisition of government assets, it will require the authorization of investment in assets created by PPPs during the construction period. This approach is most likely to be adopted if the government’s budget is influenced by accrual-accounting principles, as in New Zealand where it has recently been used for the government’s first major government-funded PPP.³¹ But it could also be adopted under pure cash budgeting by treating PPPs as public projects, spending on which requires budget approval (i.e., if the PPP was recorded “on budget”). If the construction of an asset stretches beyond the time horizon covered by the budget and medium-term budget framework, however, this budgeting method does not ensure that the full financial implications of investment projects are considered when taking the investment decision.

The use of commitment appropriations—in addition to spending appropriations—can address the affordability issue and help reduce the bias in favour of PPPs. Under this budgetary process, which is used in France and Germany, the budget provides two kinds of authorizations, spending appropriations and commitment appropriations.³² Spending appropriations authorize government spending in the current year. Commitment appropriations authorize the government to commit public resources for future years.

The information included in the budget could look as shown in Table 2. If authorization is required before the government enters into any long-term contract, the parliament will be informed about, and have the power to limit, the future implications of investment decisions, no matter whether they are undertaken as PPPs or as publicly financed projects. The presence of commitment appropriations also draws attention to the full future costs of all long-term investment projects, including PPPs. However, because commitment appropriations are not usually reflected in headline fiscal indicators, including the fiscal deficit and public debt, commitment budgeting does not necessarily eliminate the bias in favour of PPPs over public financing.

Table 2. **Information included in the budget for commitment appropriations**

Commitment appropriations	Total	Current budget year (t)	t+1	t+2	t+3	Later years	Last year affected
Project 1							
Project 2							
...							

Governments that do not have commitment appropriations could instead introduce a two-step budgeting process for PPPs and long-term investment projects. Under such a two-step process, all investment projects would have to be approved as publicly financed investments as part of the long-term government investment program. The presentation of the investment program would include all relevant information on the long-term implications on public finances, including operation costs. So that this step can ensure that the investment program is compatible with long-term fiscal sustainability, a decision on the procurement method would be taken only after a project has been pre-approved under the investment program. Only those projects that are pre-approved as part of the investment program could be included in the budget. This two-step approach could apply to all investments that extend beyond the horizon of the medium-term forecast and that exceed a certain maximum amount.

4. FISCAL RULES

To encourage good budgeting decisions, the fiscal rules that guide budgeting may need to be modified to ensure that the fiscal implications of PPPs are taken into account. Fiscal rules usually set limits on some headline fiscal indicators, for example on public debt or on the fiscal deficit. The rules can be based on indicators that are derived from budgets, accounts, or statistics. As discussed above, depending on the standards followed, these may or may not create a bias in favour of PPPs. However, in most countries, the accounting underlying fiscal rules treats PPPs as not creating any government liabilities or spending in the short term. To the extent that the fiscal rules bind, they therefore create a bias in favour of PPPs. Removing this bias requires a change in the accounting underlying the rule, along the lines discussed in Section II. In particular, if the accounting treats the assets created in PPP projects as belonging to the government, and if a liability of equal value is recognized on the government's balance sheet when the assets are created, then investment in a PPP will lead to the recognition of public expenditure and new debt in the same way as publicly financed investment. However, even with accounting standards that treat PPPs in the same way as publicly finance investment, affordability issues are not necessarily taken into account. Therefore, fiscal rules that refer to the lifetime spending or the full value of a project may be valuable.

Specific ceilings on PPPs can be applied if the main fiscal rules fail to capture their fiscal consequences. These ceilings should in general be guided by the following principles:

- Ceilings should cover both the stock and the annual flow of PPPs. A ceiling on annual PPP-related payments helps ensure that PPPs remain affordable. A ceiling on the size of the PPP program helps limit the government's exposure to fiscal risks and prevent circumvention of the flow ceiling by pushing payments further into the future at a higher fiscal cost. The size of the PPP program should be consistent with affordability in the short, medium, and long term. See Box 1 for some examples of PPP-specific ceilings.
- The size of the PPP programme should be measured using an unambiguous indicator that captures fiscal costs and risks as far as possible. It is important for the measure to be unambiguous so that it is credible and can be verified by independent experts. Thus, simple methods that measure the PPP program for example based on the capital investment under the contracts or the present value of known future obligations of the government (e.g. availability payments) are most useful. If reliable valuation methods are available, the ceilings can be broadened to include the expected costs of contingent liabilities.

There is no simple rule of thumb for setting the ceilings. The assessment of the maximum size of a PPP program should be guided by the medium-term budget framework and debt-sustainability analysis that incorporates known government payments under PPP contracts and scenarios of what may happen with contingent claims from PPPs.

Box 1. Examples of ceilings for PPPs

Brazil. A ceiling on current spending from PPP contracts of 3 per cent of net current revenue applies to all levels of government (articles 22 and 28 of the PPP law). That is, new PPP contracts cannot be signed if: (i) existing commitments already amount to 3 per cent of net current revenue or (ii) the new contract would entail commitments in excess of 3 per cent of net revenues at any time during the forthcoming 10 years. The Ministry of Finance is responsible, through an inter-ministerial council, for monitoring compliance with the ceiling, as well as for monitoring fiscal risks from PPPs (article 14).

El Salvador. The present value of the cumulative amount of quantifiable firm and contingent future payments, net of revenue, assumed under PPPs cannot exceed 5 per cent of GDP.

Hungary. In a given budget year, the nominal value of new long-term commitments cannot exceed 3 per cent of total state budget revenues. The ceiling does not apply to commitments of local governments or other general government units not covered by the state budget (e.g., the National Motorway Construction Company (NA)). Long-term commitments cover expenditures for investment, renovation, operation and maintenance, service purchase, and rents, including those arising from PPP contracts. See Hungary's Concession Law 1991.

Peru. According to the Peruvian PPP law, the present value of contingent and no contingent liabilities in PPP projects cannot exceed 7 per cent of the GDP.

NOTES

11. There are other definitions. For example, Eurostat (2012) distinguishes PPPs from user-funded concessions.
12. For older PPPs, see Gómez-Ibáñez and Meyer (1993, ch. 8), Grimsey and Lewis (2004, ch. 3), and Irwin (2007, ch. 2). Grimsey and Lewis also discuss the new PPPs in the UK. Data on the use of PPPs and similar arrangement in developing countries can be found at www.ppi.worldbank.org.
13. See, for example, Shaoul, Stafford, and Stapleton (2012).
14. Flyvbjerg, Bruzelius, and Rothengatte (2003).
15. On reporting contingent liabilities and, more generally, making public finance transparent, see IMF (2012).
16. For earlier discussions of related issues, see Hemming and others (2006), Schwartz, Corbacho, and Funke (2008), and World Bank (2012, section 2.4). For more general discussions of PPPs, see, for example, Delmon (2011), Engel, Fischer, and Galetovic (2008), and Grimsey and Lewis (2004). For useful guidelines on PPP policy, see OECD (2012).

16. See the U.K. government's accounts available at:
http://www.hm-treasury.gov.uk/psr_government_accounts.htm and the Victorian government's (for an Australian example) at
<http://www.dtf.vic.gov.au/CA25713E0002EF43/pages/publications-annual-financial-reports>.
17. Overall deficit refers to the statistical concept of deficit that treats the acquisition of fixed assets as spending. In the GFSM 2001 methodology it is called “net lending/borrowing,” in contrast with the “net operating balance,” which excludes acquisitions of fixed assets. IPSAS follows business accounting, which focuses on measures of the deficit that exclude investment spending, similar to the “net operating balance” in GFSM 2001 statistics.
19. In such cases other IPSAS standards, as IPSAS 13, may apply.
20. See French Conseil de Normalisation des Comptes Publics (2011).
21. The updated GFSM 2001 refers to the November 2012 draft.
22. Eurostat (2012, pp. 241, 267–68).
23. Eurostat (2012, pp. 260–61).
24. This follows closely the description in the 2009 Fact Sheet, Government Finance Statistics (GFS), Statistics Department, IMF.
25. At the international level, the IMF's Government Finance Statistics Manual 2001 (GFSM 2001) and guide on Public Sector Debt Statistics of 2011 provide guidance on the preparation of fiscal statistics. At the regional level, the European System of Accounts (ESA) 1995 sets out standards that are critical in Europe because they are the basis for measuring compliance with the debt and deficit rules.
26. They can still be different, but they can be easily reconciled. A chart of accounts compliant with international accounting standards can be harmonized with statistical reporting requirements, and can be adapted to specific report needs.
27. See Portuguese Ministry of Finance (2012) and U.K. Treasury (2012).
28. See Chilean Budget Department (2011).
29. See Chilean Budget Department (2011), Indonesian government (2011, section 6.4), Philippine Development Budget Coordination Committee (2012), Portuguese Ministry of Finance (2012).
30. See Hemming et al. (2006).
31. See the New Zealand Government (2012, pp. 30–31).
32. See German government (2007) and German government (2011).

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**ALTERNATIVE WAYS OF FINANCING
INFRASTRUCTURE INVESTMENT**

Potential for ‘novel’ financing models

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1. INTRODUCTION

This section of the report examines the issue of financing (transportation) infrastructure investment projects. It looks closely at what market failures result in the private sector not being able to cover the investment requirement itself. It then assesses the government failures associated with intervention, and identifies what public–private partnerships (PPPs) offer in overcoming these failures. The limitations of PPPs are then addressed, and the regulated asset base (RAB) model is introduced as a potential alternative, with an assessment of its advantages and disadvantages.

1.1. Objectives

This report examines the issue of financing large-scale infrastructure investment projects. The objectives of the report are to:

- Re-examine the conventional wisdom around infrastructure and why there is/is not a funding and/or financing problem.
- Provide an assessment of different models for delivering and financing infrastructure.
- Consider the circumstances in which one financing model may be preferred to another—in particular, concentrating on public–private partnerships (PPPs) and the potential for the regulated asset base (RAB) model as an alternative to PPPs for certain investments.

The report looks closely at what market failures result in the private sector not being able to cover the investment requirement itself. It then assesses the government failures associated with intervention, and identifies what public–private partnerships (PPPs) offer in overcoming these failures. The limitations of PPPs are then addressed, and the regulated asset base (RAB) model is introduced as a potential alternative, with an assessment of its advantages and disadvantages. The report discusses:

- The economic characteristics of infrastructure.
- Market and government failures associated with infrastructure investment.
- Benefits and issues associated with PPPs and the RAB model.
- Circumstances under which the RAB model may be preferred over PPPs, and vice versa.

The report observes that the up-front, sunk cost profile of infrastructure investment, as well as its long-term nature, leads to market and government failures. Government intervention following private sector provision of infrastructure leads to an inherent problem, namely the time-inconsistency problem. This describes the potential for the government to initially provide a guarantee to investors ensuring recovery of costs associated with the investment, only to renege subsequently and to expropriate rent from the private sector. PPPs and the RAB model both represent a way in which the time-inconsistency problem may be mitigated.

Benefits of PPPs over traditional procurement process arise from (potential) efficiency gains associated with the private sector managing the construction and operation of the infrastructure asset. The main issue concerning the PPP model relates to its inflexibility. This lack of flexibility is necessary

in order to mitigate the time-inconsistency problem, but can be a constraint, especially when projects involve very uncertain prospects over the long term. The RAB model overcomes this problem by having a regulator to periodically assess the performance of the private sector provider. However, the RAB model itself has several issues which mean that it does not always represent a superior alternative to PPPs.

- Difficulties in providing an accurate initial RAB valuation.
- Funding—the RAB model does not necessarily resolve the question of who ultimately pays for investments.
- Public procurement—for greenfield projects, the RAB model still requires a method of public procurement.
- Bias towards higher gearing—as in the PPP model, there may be a tendency for assets to be financed with high levels of gearing. This may be considered a concern from a public policy perspective if it results in risk of default that might lead to users being asked to pay more for using the asset.
- Capital expenditure (CAPEX) bias resulting from the fact that CAPEX is added to the RAB and earns a rate of return over time, whereas operating expenditure (OPEX) is remunerated on a pay-as-you-go basis.

The analysis in this report suggests that the relative advantages of PPPs and the RAB model depend on the specifics of the investment project. Consequently, RAB- and PPP-based approaches provide a broad spectrum of options for encouraging private finance in the transport sector, enabling policymakers to take a ‘horses-for-courses’ approach. In particular, the report reaches the following conclusions.

- The inherently inflexible nature of PPPs means that when future demand/usage or prices are uncertain, PPPs may prove to be a constricting factor in attempting to maximise social welfare. Under such circumstances, transaction costs are also likely to be large due to the difficulty in assessing contingencies and negotiating consequences. Moreover, the problems with the competitive tender process may also be exacerbated for projects with a high degree of uncertainty. These factors may lead investors to require higher rates of return than otherwise, resulting in excessively high costs of capital for PPP projects.
- Creating a regulator may not be feasible or appropriate in certain situations, especially when the infrastructure investment is not significant. Due to the costs associated with regulation, PPPs may represent a better value-for-money option than the RAB model for relatively small projects (assuming that transaction costs associated with such projects under PPPs are small).
- Past PPPs have exhibited a tendency to attempt to transfer too much risk to the private sector owing to the reluctance of government departments to take on risk. This problem may be mitigated under the RAB model if the regulator can effectively retain its independence from the government.
- Given that even a small saving in the cost of capital can imply a large absolute saving due to the scale of infrastructure investments, it is crucial to evaluate various options, including the RAB model, when financing infrastructure.

- Finally, the overlap between the two methods of financing regarding brown- and greenfield investment suggests that there may be potential for a hybrid approach of PPPs and the RAB model that combines the benefits of both.

1.2. Background

Infrastructure investments are generally associated with significant economic benefits. These benefits can be increases in short-term output and also longer-term growth. For example, of the 21 countries and six types of infrastructure considered in Egert, Araujo and Kozluk (2009), the vast majority of estimated relationships with GDP are found to be positive and to show a return to infrastructure investment over and above that of investment in the capital stock more generally.³³ This is not surprising given that firm activities are almost always built on underlying infrastructure such as water, electricity, gas and transport.³⁴

For these reasons, and together with the fact that there has traditionally been a lack of investment in infrastructure, future infrastructure investment is expected to exceed historical levels by a substantial amount. That is, there is a potentially wide infrastructure ‘gap’ that will have to be filled in the near future, as the following illustrates.

- Infrastructure UK has estimated that average annual UK investment in infrastructure will need to rise from £30 billion per annum between 2004 and 2009 to £50 billion per annum between 2010 and 2030.³⁵ The same report estimates that worldwide total investment over 2010–20 is expected to reach more than £20 trillion.³⁶
- In the EU alone, the cost of infrastructure development to match demand for transport has been estimated at over €1.5 trillion for 2010–30 for the entire transport networks of the Member States.³⁷
- The OECD has previously estimated the average annual expenditure requirements in the road and rail sectors by 2030.³⁸ In the roads sector, it estimates new infrastructure construction (i.e., net additions and maintenance/replacement) over the period 2000 to 2030 at between \$220 billion and \$290 billion per year. The report estimates that around two-thirds of all new infrastructure construction in roads is expected to take place in OECD countries, with the majority of this investment requirement arising from the need to maintain, upgrade and replace existing road assets.
- In the rail sector, the report estimates the infrastructure requirement to be between \$50 billion and \$60 billion per year over the period 2005–30. This includes rail upgrading from the EU TEN-T programme and future high-speed rail plans. As in the roads sector, approximately two-thirds of the investment is expected to occur be made in OECD countries.

However, the wider economic benefits of infrastructure can be realised only if projects are approved and receive sufficient financing. This requires that the government is able to issue debt. However, the following constraints on the provision of capital by the public sector might suggest that this is not possible.

- **Investor demand**—the cost of credit and ability of government to place certain amounts of debt in the market, given investors’ demand for government debt.
- **Cost of debt**—the cost of credit, default risk and the credit rating of the government debt.
- **Government/supranational limits**—for example, limits on debt and deficit introduced in the EU.

- **Long-term fiscal policy**—requirement for sustainable levels of debt and deficit in the long term given the target level of indebtedness and projections for tax revenues and expenditure.

As Helm (2009) notes, simply relying on the private sector to provide infrastructure investment is likely to lead to underinvestment due to market failures (market power and externalities):

There are multiple market failures, which together are sufficient to conclude that the private sector, left to its own devices, will produce a seriously sub-optimal level of provision. Put simply, there will be inadequate energy, transport, communications and water networks, to the detriment of consumers and industry.³⁹

In a bid to overcome these difficulties, governments are seeking private investment in transport infrastructure from ‘novel’ sources (including sovereign wealth funds, pension funds, and other investors) and governance models. Since the early 1990s, this has often taken the form of PPPs, which have involved long-term contracting between the public and private sector. Under these contracts, the private sector has been required to provide the up-front financing for the infrastructure, and has then received payment from the public sector for providing it with a stream of services.

More recently, there have been calls for alternative models. The RAB adopted in the regulation of utilities in the UK, and subsequently further afield, is one proposed model that has garnered increasing attention. This report considers the market failures that result in the private sector not being able to cover the investment requirement itself. It then assesses the government failures associated with intervention, and identifies what PPPs offer in overcoming these failures. The limitations of the PPPs are then addressed, and the RAB model introduced as a potential alternative, with an assessment of its advantages and disadvantages.

1.3 Structure of the report

The structure of the remainder of this report is as follows. Section 2 assesses the market failures which occur in the infrastructure sector that lead to an insufficient source of investment from the private sector, as well as the government failures associated with public sector provision. This section also explains what PPPs are intended to deliver. The observed limitations of PPPs are the subject of section 3. In section 4, the RAB model is introduced and evaluated, and section 5 contains a comparative assessment of the two financing options.

2. WHAT ARE WE TRYING TO DELIVER WITH PUBLIC-PRIVATE PARTNERSHIPS?

The introduction to this report has noted that there is a significant scope and need for future investment in infrastructure, including in the transport sector. In the past, governments have tried numerous ways of funding infrastructure, from full privatisation at one extreme, through partial privatisation, to nationalisation at the other extreme.

This leads to two questions. First, why the market, left on its own, may not deliver socially optimal levels of investment. That is to say, what are the ‘market failures’ in the infrastructure sector that make it necessary for the public sector to intervene? Second, and conversely, what prevents the public sector from fully closing the investment gap itself? That is, what are the ‘government failures’ that make it necessary for the private sector to be involved?

This section looks to answer these questions by:

- First, looking to identify the market failures that occur in the infrastructure sector, and that might be expected to lead to an insufficient source of investment from the private sector.
- Second, shifting focus on to why state intervention in the sector may lead to government failure.
- Third, examining what PPPs are intended to deliver, given the market failures in the infrastructure sector, and the governmental failures of intervention.

2.1. Market failures in infrastructure provision

Infrastructure inherently presents the potential for multiple market failures due, to a large extent, to its heavily front-loaded, sunk cost profile and its long-term nature. Its cost profile discourages investments both by incumbents (which fear that their assets could become stranded and their construction costs could run out of control), and by entrants (which, in addition to the stranding and cost control issues, fear that they will not be able to provide services more cheaply than the incumbents). The long-term nature coupled with its monopolistic characteristic implies that demand and regulatory uncertainties are exacerbated, leading to a riskier perception of its cash flows by the investors.

These points are explored in more detail in the following sub-section.

Market power

Infrastructure, by its very nature, would constitute a textbook natural monopoly in most cases if left untouched by the government. This is mainly due to the large costs associated with new entry to the market. For example, once an electricity grid is built, it is likely to be uneconomic for another company to build its own grid. In these cases, the monopoly would be able to charge above marginal cost price to its customers.

While this would enable investors to recover the large initial build costs associated with the infrastructure, which would be impossible in a competitive market, it comes at a cost of underinvestment, relative to the socially optimal amount, and a potential lack of innovation.

Provided that the entry cost is not too large (i.e., infrastructure represents a monopoly but not a natural monopoly), it is possible for monopoly rents to induce entry by competitors and the rents to be eroded in the long run. This means that cost recovery by allowing companies to act as a monopoly cannot be an optimal solution.

Externalities

Infrastructure has benefits (positive externalities) which may not necessarily be directly captured by the investor; rather, they might be appropriated by users and wider society. For example, while an investor will accrue some revenues from building a toll road, the spill over benefit arising from, say, more reliable commute times for road users may not be realised by the investor, but by the wider society. Thus, in the face of positive externalities, the investor, who is primarily interested in direct benefits, would price the infrastructure investment lower than the wider society. This would lead to socially suboptimal, low levels of investment.

Conversely, for infrastructure that also creates negative externalities (e.g., noise, pollution, severance, etc.), the investor may be led to finance socially undesirable investment projects.

2.2. Government failures in infrastructure provision

Problems with public provision: inefficiency

As a way of overcoming the market failures associated with private sector provision of infrastructure, nationalisation was common during the twentieth century.⁴⁰ Under nationalisation, the private sector may be involved in the construction of infrastructure assets (in the role of contractor), but does not play a part in their operation. This meant that governments had the control and the responsibility to develop the infrastructure assets themselves. This allowed prices to reflect marginal costs, while capital costs could be recovered through general taxation. However, while potentially overcoming market failures, nationalisation was associated with several government failures, including public sector financing constraints, inefficiencies, gold-plating, and a lack of innovation.⁴¹ For example, Ehrlich et al. (1994) studied productivity and costs of 23 international airlines over the period 1973–83 and indicated that a change from complete state ownership to private ownership would, in the long run, be expected to increase productivity growth by 1.6–2.0% per annum, while costs would be expected to decline by 1.7–1.9% per annum.⁴²

Problems with intervention: time-inconsistency problem

From a financing perspective, arguably the most prominent government failure in terms of intervening in private sector infrastructure investment stems from its cost profile. Since the proportion of fixed capital costs to total costs is high (that is, infrastructure assets are characterised by high operational gearing), there tends to be a large differential in the levels of average costs and marginal costs.

In fact, infrastructure commonly represents a public good such that, up to the point of congestion, the marginal cost of serving an additional customer is close to zero. This creates a time-inconsistency problem.⁴³ The investor needs an ex ante guarantee that it will be able to recover average costs from customers in the long term, but there is an incentive for governments and regulatory bodies—in the

knowledge that operation of the asset will continue so long as the operator is able to recover its marginal costs—to intervene to drive prices down to the level of marginal costs *ex post*. As Helm (2009) notes:

the temptation for politicians and regulators is to promise *ex ante* that investors who sink capital will be able to recover their investment and the cost of capital. In other words, they will be able to charge average not marginal costs. However, the time inconsistency arises when the investment is complete and the assets are in place. Now the politicians and regulators can force prices to marginal not average costs, and the services continue to be provided. They renege on their *ex ante* bargain with investors.⁴⁴

The crux of the time-inconsistency problem is that governments need to provide investors with a credible, long-term commitment that they will recover, and earn an adequate rate of return on, their (efficient) investments. Without such a credible commitment mechanism, investors would demand compensation for the political/regulatory risk, leading to a higher cost of financing or worse, lack of funding.

Note that as, by definition, this risk is not within the control of the private sector, its cost should not be borne by the private sector. Indeed, financial theory demands that such exogenous risk be moved to where it is best managed or controlled and, naturally, the government is the most suitable bearer.

2.3. What are PPPs?

The potential for market failures in infrastructure calls for government intervention. However, at the same time, the potential for government failure also suggests that state intervention must be undertaken carefully. What is clear is the need for a synergy between the private and the public sectors in building infrastructure.

Public–private partnerships, as the name suggests, aim to provide a means by which such synergy between the two sectors may be achieved in reality. Despite popularity around the world, a unanimous definition of PPPs is yet to be agreed⁴⁵ Indeed, there have been almost as many attempts to define PPPs as there have been PPP projects, and there are widespread differences in what the term is taken to encapsulate. The OECD has provided a definition that distinguishes PPPs from more traditional procurement methods on the basis of the amount of risk transferred to the private sector:

One can define a public–private partnership as an agreement between the government and one or more private partners ... according to which the private partners deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners.⁴⁶

This report follows the OECD definition of the PPP. The major difference between PPPs and traditional public procurement models is that the public sector does not purchase an asset in a PPP; rather it purchases a stream of services under specified terms and conditions.⁴⁷ In other words, the private sector finances and builds the infrastructure, and it retains ownership of the asset at least until the end of the contract (usually around 20–30 years).

Different models fit within the broad PPP concept but, in line with the definition above, the operation of the asset is always the responsibility of the private sector. Each of these models allocates different levels of risk to the private sector. This report is concerned with PPPs in which the role of financing the project falls to the private sector, as the following illustrates.

- **Build–Develop–Operate.** The private sector party buys or leases an existing asset from a public agency, invests capital to enhance and develop the infrastructure, and then operates it according to the terms of a contract with a public agency.
- **Build–Own–Operate.** The public agency awards a single contract—which bundles the construction and operation of the infrastructure—to a private entity. The public agency is responsible for specifying the design of the project, but ownership of the asset remains with the private agency once it is built.
- **Build–Operate–Transfer.** The private entity is responsible for the construction of the infrastructure—according to the design specifications agreed to by the public agency—and subsequently operates the infrastructure for a specified period of time under a contract or franchise agreement with the agency. At the conclusion of the contract, ownership and operation of the infrastructure is transferred to the public agency.

Note that, in the literature, the terms Private Finance Initiative (PFI) and PPP are used interchangeably, although the former was a policy set up by the UK government in 1992. This convention is adopted in this report.

2.4. Are PPPs solutions to the infrastructure investment gap?

The remainder of this section analyses ways in which PPPs may be able to overcome the market and government failures highlighted above. It identifies what governments are trying to deliver, and what potential benefits they are trying to achieve, by introducing private finance instruments. In particular, this relates to overcoming the governmental failures involved in nationalisation and traditional procurement in terms of:

- Overcoming the time-inconsistency problem by providing a credible long-term contract.
- Targeting private sector efficiencies.
- Targeting benefits derived from more efficient risk allocation.
- Overcoming public sector capital constraints, and concerns relating to affordability and intergenerational equity.

These potential benefits are considered in turn.

Solving the time-consistency problem

PPPs are governed by contracts that are drawn up between the public agency and the private sector. To the extent that the contract is legally binding and thereby credible, the long-term nature of the PPPs means that they represent a solution to the time-inconsistency problem described in section 2.2.

Without such commitment, investors would require a premium on the rate of return of the project. This would mean that the discount rate would be higher—essentially, the investors would require cost recovery sooner rather than later. This is similar to investment having a front-loaded depreciation profile. PPPs therefore mitigate this problem by providing assurance to investors that they will be able to recover their (sunk) initial cost. This also implies that payments are spread across current and future generations of customers, consistent with the long-lived nature of the assets—i.e. promoting intergenerational equity.

Efficiency

Nationalisation and rate-of-return regulation have both been criticised on the basis that they lead to operational inefficiencies, and potentially to gold-plating. In terms of nationalisation, Sappington and Stiglitz (1987) state that, if the conditions of an ‘ideal setting’ are met, the government can always achieve both productive and allocative efficiency by delegating the provision of a good to a private firm through an auction mechanism.⁴⁸ Consequently, public production cannot, in principle, improve upon private production.

PPPs have often been built on this expectation that the private sector will be able to provide services more efficiently and more effectively than can the public sector. An objective of PPPs has therefore been to encourage investors to achieve operating cost reductions and to maximise the use of capital expenditure (CAPEX). This can be achieved at several stages in the life cycle of assets, each of which is considered in turn below.

It is important to separate out two key roles that can be played by the private sector in the context of infrastructure assets. First, there is the role played by the private sector in the financing of the infrastructure. Second, there is the role in terms of the on-going operation of the infrastructure. With regard to efficiency, the benefits of private sector involvement have typically been propagated in the context of the operational management role. The exception to this has been the project selection stage, where it has been suggested that there may be benefits associated with the financing role.

Project selection

One area that can affect whether infrastructure delivery is efficient is the process by which the decision to carry out the investment project is originally reached. In terms of efficiency, it is important that projects are undertaken where they are net present value- (NPV) positive.⁴⁹ In this context, private financing could potentially lead to more efficient decisions being made at the project selection stage.

The public sector may deliver NPV-negative investments if politicians choose to undertake ‘vanity’ projects, or if there is a general political bias towards the short term (i.e., if the politician is likely to be seen in a positive light for getting a project ‘off the ground’, but may have left office by the time the project runs into any problems). The increased scrutiny of private sector companies and their financiers, which are both putting their money at risk, could in theory ensure that projects are undertaken only if they are likely to perform well.⁵⁰ There could thus be benefits from subjecting potential projects to private sector risk assessment, if the private sector has a comparative advantage in such assessments. This has been noted by Jenkinson (2003):

why have some governments been so keen for public services to raise private finance? Possibly the best argument, although one that is seldom articulated, is that the private sector may be better at evaluating risks than the public sector, and hence the involvement of private finance results in better investment appraisal.⁵¹

However, this does not appear to have been the case with all projects in practice. Indeed, high-profile PPP failures (e.g., Metronet, the M7 Clem Jones Tunnel in Brisbane, Australia, and many more) suggest that private sector appraisal has not helped to ensure that only high-performing projects are undertaken, and that short-termism has also characterised PPPs.⁵²

Design and construction

At the design and construction stage, it is important to find a balance between the project being over- and under-specified. While ensuring that sufficient CAPEX is provided to deliver a network of appropriate quality, well-designed PPPs should be able to strike this balance by:

- Removing incentives to build in additional unnecessary CAPEX or to gold-plate the network.
- Creating incentives to minimise the whole life-cycle costs of the infrastructure.

In theory, the private sector is more likely to take the best possible long-term asset stewardship decisions, since it does not face short-term political manipulation. This should result in the minimisation of costs over the whole life cycle of the asset and, in particular, the choice of an appropriate level of up-front CAPEX to keep maintenance costs low in the longer term. Grimsey and Lewis (2004), for example, state that a private firm will have greater incentive ‘to plan beyond the bounds of the construction phase and incorporate features that will facilitate operations’.

By contrast, under traditional public sector procurement methods, the contractor—who is involved only in the construction of the infrastructure, and not its operation—has an incentive to minimise capital costs, both to win the contract and to maximise profit relative to a fixed fee contract. This may result in under-spend on construction and, in turn, to inefficiently high maintenance and operation costs in the future. As Parker and Hartley (2003) state:

The private sector becomes responsible for the initial design and construction and operation and maintenance, thereby aligning incentives for low-cost construction with minimising life-time costs of operation. By contrast, capital constrained governments are tempted to lower the construction costs of a publicly financed project at the expense of much higher long-term costs of maintenance and operation.⁵³

Operations and maintenance

Under traditional public sector procurement models, the private sector plays no part in the on-going operation of the infrastructure. However, PPPs can include provisions for the private sector to undertake an operational management role, as well as a financing role, once the infrastructure has been built. In general, private sector companies are expected to have greater incentives to make cost reductions such that their involvement in operations generates additional operating efficiencies.

This follows from the fact that shareholders—who are the residual claimants of any additional profits resulting from lower costs—are expected to exert pressure on senior management to achieve efficiencies. This profit motive is not commonly mirrored in the public sector where managers do not stand to gain from any profits related to their behaviour.⁵⁴

In spite of these potential efficiencies, Oxera and RBconsult (2012) note that, in practice, governments appear to have been more concerned with minimising their own costs (or maximising their receipts), rather than entering partnerships with private entities that are able to achieve the greatest efficiencies:

Once bidders have pre-qualified, their bids have been subject to little scrutiny outside of their demand forecast. It is only after the concession has been awarded to the highest bidder that attention has shifted to attempting to ensure that the asset is operated efficiently (i.e., by viewing the asset as part of a network, not as an isolated and insulated, individual project)⁵⁵

Consequently, the actual efficiencies realised in the design, construction and on-going operation of infrastructure assets may not be as great as might be predicted. This is considered further in section 3.5.

Optimal risk allocation and pricing

Recalling the definition of PPPs set out by the OECD, risk and who bears it are important factors when considering PPPs.⁵⁶ Risks regarding infrastructure may be divided into two types: commercial and political risk. It is generally assumed that the private sector is better suited to managing commercial risk, while the public sector is more suited to controlling political risk.

Under PPPs, the private sector assumes control of commercial risk. Since commercial risks are endogenous and under the company's control, this leads to technical efficiency. Hence, risk allocation in this way can be seen to be an improvement over simple public provision. However, such risk allocation can be achieved even with traditional public procurements. What PPPs bring is the ability to pass on other risks: demand risk and other risk specific to the private sector party. To the extent that the private sector is able to manage these more effectively than the government, this could potentially lead to additional efficiencies.

It is sometimes thought that, because the government can fund projects more cheaply than the private sector (since it has its taxpayers to fall back on), public sector provision involves less risk. This is a misconception. The transfer of risk from the government to the private sector does not involve reductions in the aggregated risk. The latter remains constant with the transfer. The difference in perceived riskiness suggested by the difference in financing costs arises because the risk of the project is priced explicitly when conducted by the private sector, whereas it can to some extent be masked with public sector provision.

By making project risk explicit, PPPs can, if designed appropriately, bring to light the true riskiness of the project, which may have been disguised under public provision.⁵⁷ Specifically, under public provision, the cost of capital would consist of remuneration for only (government) debt risk, while the equity risk of the project would be masked by the government's vast portfolio. When the private sector attempts to finance the project, on the other hand, the equity risk would be priced into the cost of capital. The question remains as to whether risk can be priced accurately, but the improved transparency in the true cost of capital for the project is a benefit if it is then accounted for in decisions over which projects are selected by government for funding across the board, both with public funds and under PPPs.

Affordability

The financing problem is in large part a short-term 'affordability' problem combined with heightened uncertainty about long-term demand. By using private sector financing, rather than traditional government debt funding, governments have not been required to make up-front payments for projects that have been undertaken by the private sector. This has helped them to overcome two constraints.

- **Cash constraints**—since governments have not been required to provide up-front payments, they have not needed to find short-term cash flows to fund the project.

- **Budgetary constraints**—a key objective of PFIs has been to get capital investments off the government balance sheets due to fiscal rules or budgetary limits. Under PPPs and PFIs, the financing for the infrastructure comes from the private sector so, as Grout (1997) explains, ‘the investment may be provided without affecting the public sector borrowing requirement (PSBR), even though the present value of the financial commitment by the government may be very similar whether the public sector owns the asset or not.’⁵⁸

In countries with commitments to fiscal rules (e.g., EU government under the Stability Growth Pact), the latter constraint has created a strong political attraction for private finance incentives. This was previously the case in the UK, for example, where the Labour government introduced requirements for overall fiscal balance (i.e., government budget must be balanced) and for public sector net debt to not exceed 40% of GDP over the economic cycle.

However, the fact that the project cost is not included in the PSBR does not make it affordable. OECD (2008) defines a project to be affordable ‘if government expenditure associated with a project, be it a PPP or other mode of delivery, can be accommodated within the inter-temporal budget constraint on the government’.⁵⁹ Reducing the requirement for the public sector to make up-front payments may make a project more affordable, but this is not necessarily the case, since it may not affect the present value of the liability. Instead, the payment of the fees by the government may merely be pushed back to a later date. Therefore, concerns about budgetary constraints ought not to be the reason for pursuing PPPs over traditional procurement methods.

2.5. Summary

This section has identified the market failures that prevail in the provision of infrastructure as well as the potential government failures from complete state provision or intervention. Most notably, it has been argued that the private sector, without credible commitment by the government on its cost recovery, will deliver a sub-optimal level of investment due to the time-inconsistency problem. The greater the mismatch between the profile of costs and the profile of cost recovery, the greater the time-inconsistency problem, and the greater the risk to the investor.

New private finance instruments have been introduced as a means of overcoming the time-inconsistency problem, while trying to capitalise on the potential efficiencies of private sector participation. This includes efficiencies related to:

- Explicit pricing of risk.
- Any private sector comparative advantage in risk assessment.
- On-going operational and maintenance efficiencies.
- Greater likelihood of entrepreneurial and innovative processes.
- The transfer of risk to the private sector in instances where it can manage it more effectively.

It should be noted that the use of PPPs should not be driven by any desire on the government’s part to remove future liabilities from the balance sheet.

Despite these targeted benefits, problems with PPPs have been extensively discussed in the literature (and, indeed, the extent to which efficiency benefits have been realised has been one point of contention). Moreover, there have been some high-profile PPP failures that have garnered considerable media and political attention. An insight into the circumstances in which PPPs seem less successful is provided in the next section.

3. LIMITS OF PPP FINANCING

The use of PPPs to replace or complement the public provision of infrastructure has become common in recent years, as governments have looked to reduce government borrowing and capitalise on perceived efficiencies of private enterprise. Blanc-Brude, Goldsmith and Vällilä (2007) report that in Europe alone, more than 1000 long-term, infrastructure PPP contracts were signed between 1990 and 2006, with a capital value in excess of €200 billion.⁶⁰ At the forefront of this has been the UK, which, in the form of PFIs, accounted for 76% of the PPPs signed by European countries over this period (57% by value).⁶¹ However, PPPs have also been increasingly prevalent in Australia and continental Europe (notably France, Spain, Portugal, Italy and Germany).

Despite the popularity of PPPs, their effectiveness compared with traditional procurement is yet to be determined. Indeed there have been some high-profile PPP failures. Recent examples include the default of Metronet, which was responsible for the maintenance, renewal and upgrade of nine lines on the London Underground,⁶² the significant cost overruns for the Edinburgh trams project; and the legal and financial difficulties facing the M7 Clem Jones Tunnel in Brisbane, Australia.⁶³

The remainder of this section focuses on the limits of PPP financing, focusing on the circumstances under which PPPs may not be appropriate.

3.1. Cost of PPP financing

One of the perennial objections to PPPs is that private sector financing costs are higher than the government's cost of debt, and hence PPPs are more expensive to finance than traditional public procurement.⁶⁴ Thus, the argument goes, PPPs will deliver overall cost benefits only where the private sector is able to generate substantial efficiencies in operations. For example, Parker and Hartley (2003) state that:

Governments can always borrow more cheaply than the private sector. For PPPs to produce overall cost savings, therefore, the extra financing cost (estimated at between one and three percentage points in the UK) needs to be offset by savings in other aspects of the project achieved by the private sector.⁶⁵

This argument has been echoed by numerous academics and, indeed, governments. The UK House of Commons Treasury Committee, for example, recently argued that 'government has always been able to obtain cheaper funding than private providers of project finance' and that the cost of capital of PPPs was currently double that of government gilts.⁶⁶

However, Grout (1997) and Jenkinson (2003) argue that, in theory, private sector borrowing costs should not always be higher than public sector costs, where the latter are properly calculated.⁶⁷ This builds on Modigliani and Miller's proposition that the overall cost of capital is invariant to the method of financing, including whether it is funded by public or private finance. What does determine the cost of capital is the overall underlying risk of the project.

While this risk is captured in the returns required by the private sector, it is not captured in the government's cost of borrowing as measured by real interest rates on government debt.

There is always equity in any financing structure although it is not always easy to spot it. In the case where finance is provided via the public sector, the equity is essentially provided by taxpayers in general and/or the customer ... debt raised on the back of a government guarantee is, in the case of major economies, essentially risk free and non-hypothecated: governments will not refuse to pay the interest and principle if a particular public service cannot cover its costs. The only remaining ways of absorbing such risks are to inject funds from general taxation and/or increase user charges. In either case, the risks that cause the loss are real and are being borne by some, or all, taxpayers.⁶⁸

The argument that public sector finance is cheaper because government borrowing costs are lower than the private sector cost of capital has thus been challenged, on the basis that it does not account for the (equity) risks borne by taxpayers. Specifically, equity risk is borne by taxpayers in the sense that if the publicly provided service does not cover its costs, the gap will be funded through higher charges or the use of general taxes. However, that is not to say the costs of public and private finance are the same in all instances. As Jenkinson (2003) acknowledges, the costs of financing a particular project will be the same for public and private finance only if 'contracts are easy to define, risks are well understood, transaction costs are low, and competition to provide finance is active'.

Under certain situations, however, it may be the case that the cost of financing under PPPs is higher than under public provision. For example, misallocating risks associated with various aspects of the project may lead to a higher cost of capital under PPPs relative to public provision. This relates to the fundamental idea in financial theory that risks should be transferred to the party that is best able to manage it. Hence, if too much risk is passed on to the private sector via PPPs, investors would require a higher return in order to compensate for it.

Indeed, a feature of PPP contracts in practice has been that the public sector has looked to push as much risk as possible on to the private sector, regardless of which party is best able to manage that risk.⁶⁹ This has seemingly stemmed from a reluctance within some public agencies to take on risks/costs, even where they have been best placed to do so. The effect of inappropriately passing risk to the private sector is that it pushes up the cost of capital, and hence the overall cost of the project.

In the UK, the Treasury Select Committee has highlighted the negative impact this has had on PPP outcomes.

Allocating risk to the private sector is only worthwhile if it is better able to manage the risk and can pass on any subsequent savings to the client ... We have seen evidence that PFI has not provided good value from risk transfer—in some cases inappropriate risks have been given to the private sector to manage. This has resulted in higher prices and has been inefficient.⁷⁰

Hence, although there is nothing in theory per se that would imply a higher cost of financing for private sector provision of infrastructure investment, inappropriate allocation of risk and many other factors (some of which are discussed below) may mean a higher cost of capital when investment is undertaken by the private sector relative to the public sector.

3.2. Transaction costs

One means of overcoming the problems created by uncertainty around future outcomes is to build other outcome-dependent terms and risk-sharing mechanisms into the contracts. However, this can make the contract increasingly complex and has led to the criticism that the transaction costs associated with PPP contracts (including costs of specification, tendering and agreeing contracts) have been high.

Microeconomic theory was historically dominated by the paradigm that markets contained perfect information and that there was no cost involved in completing transactions. Coase (1960), disproving the latter assumption, explained that transactions are not, in fact, costless:

in order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up a contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on.⁷¹

Typically, there are considered to be three main categories of transaction cost.

- **Search and information costs**—those costs associated with finding a private sector company (or consortium) capable of supplying or operating the infrastructure as required by the public sector. This will also include bidding costs for the private sector companies.
- **Negotiation costs**—those costs related to agreeing the terms and conditions of a contract, including the structure of payments, the transfer of risk, and other detailed project specifications.
- **Monitoring and enforcement costs**—once the contract has been signed, and the private sector has commenced construction or operations, the public sector needs to ensure that the private sector is delivering against its promises.

Related to transaction costs is the additional criticism that PPP procurement processes have been drawn out, creating long lead times from project selection to inception.⁷² Grimsey and Lewis (2007) suggest that procurement for PPP projects has taken an average of 12–18 months in Australia, and around 22 months in the UK, and note that:

It takes a long time to agree the risk transfers, payments and terms that are acceptable to both parties—imposing considerable legal and due diligence costs on both the contractors and public sector side.⁷³

As an example, the costs of the five-year procurement process for the London Underground PPP contract were estimated at £455 million.⁷⁴ London Underground itself spent £180 million during contracting, covering expenditure on legal, engineering and operational advice. Bidders' costs, including those of unsuccessful bidders, equalled £275 million. However, what arguably matters is the size of these costs relative to the total costs (and benefits) incurred over the lifetime of the PPP. The £455 million transactions costs of the London Underground PPP represented 2.8% of the NPV of the deal.⁷⁵

The relative transaction costs of tendering for the London Underground PPP contract appear to be fairly typical of PPP contracts in general. A report by the Adam Smith institute in 1996 found that the total cost of tendering for PPP projects, when all potential contractors (i.e., winning and losing bidders) were considered, was just under 3% of total expected project costs. In comparison, the corresponding figure for conventional procurement was lower, at around 1%.⁷⁶

3.3. Problems with the bidding process

PPPs have failed to overcome some of the problems of bidding that are associated with traditional procurement methods. In particular, a criticism of transport infrastructure projects has been that private sector companies have systematically underestimated the costs that will be involved in delivering these projects,⁷⁷ or overestimated the demand for the finished product.⁷⁸ In PPPs, this has led to overbidding in the form of inflated traffic and revenue forecasts.⁷⁹ As noted in Oxera and RBconsult (2012), examples of overestimated demand forecasts are prevalent in studies on toll road PPPs.

- Baeza and Vassallo (2008) found that, for a sample of 14 Spanish toll roads, annual traffic was, on average, 35% below forecast in the first year of operations; 31% below forecast in the second year; and 27% below forecast in the third year.⁸⁰ The authors conclude that there is ‘a clear bias towards overestimation of traffic in the ramp-up period for toll motorway concessions in Spain’.
- Bain (2009) analysed the ratios of actual traffic numbers to those forecast in more than 100 road, bridge and tunnel concessions. Ratios smaller than 1.0 suggest an overestimation in the forecast numbers. Bain found that the observed ratios ranged between 0.14 and 1.51 (i.e., from actual traffic being only 14% of the forecast to actual traffic exceeding the forecast by 51%), with a mean of 0.77. These results are indicative of a systematic tendency to overestimate traffic forecasts, with actual traffic volumes 23% below the forecast levels, on average.
- A study of Australian toll roads undertaken by Li and Hensher (2010) found that actual traffic volumes using five facilities (the M2, M7, Cross City Tunnel, Lane Cove Tunnel and EastLink) were 45% below forecast in the first operational year, and, despite the gap reducing over time, remained 19% lower than forecast after six years.⁸¹

On the one hand, overbidding can be to the benefit of taxpayers in the short term, as the government raises greater premium payments (or is required to grant a smaller subsidy).⁸² On the other hand, it can lead to underinvestment, financial distress—and potentially even default—and could dampen enthusiasm for subsequent involvement in the industry.⁸³ Defaulting operators can impose high costs on the government in terms of:

- The direct costs of terminating the contract.
- The costs of re-tendering the project and assessing bid submissions.
- The costs of stepping in as the ‘operator of last resort’.
- Forgone revenues from the defaulting party.

Overbidding can also have less obvious costs. One of the intentions of competitive tendering for PPP contracts is that it should ensure that each PPP is awarded to the private sector party that can carry out the contracted functions most efficiently. However, overbidding could discourage well-qualified (and perhaps better-qualified) parties from entering the bidding process—because they understand that they will win the contract only if they pay over the odds—and could thus be particularly damaging from an efficiency perspective.

3.4. Flexibility and incompleteness of PPPs

PPPs are partly designed to mitigate the time-inconsistency problem inherent in infrastructure investment. This necessarily means that contracts between the private and the public sectors must be sufficiently concrete and well-specified to deter each party from behaving in an opportunistic manner. The unwanted consequence of this is that PPPs tend to be inflexible.

The lack of flexibility may be a problem if terms under initial contracts are mis-specified, which is likely in the case where future demand is highly uncertain. For example, the inflexibility of PPPs might not allow the parties to take into account exogenous, unexpected cost shocks. As argued earlier, however, PPPs need to be sufficiently concrete to mitigate the time-inconsistency problem. Thus, a successful PPP must provide a good balance between adequate flexibility following an unexpected, exogenous event while ensuring sufficient investor protection.

Another concern for PPPs is derived from the fact that the contracting takes place with inherent uncertainty about future market and macroeconomic conditions. This means that PPP contracts do not specify what actions are to be taken and the resulting consequences in all possible future contingencies—i.e. PPPs are examples of incomplete contracts. This problem is magnified by long duration and infrastructure-specific issues (e.g., greenfield volume risk).⁸⁴ As Parker and Hartley (2003) explain, contract incompleteness may lead to opportunistic behaviour that is harmful to the PPP:

Where buyers and suppliers have imperfect and asymmetric information when contracting, contracts cannot be optimal in a full information sense. It is difficult to write complete contingent claims contracts (allowing for uncertain events) especially where contracts cover a lengthy period of time, technologies and costs are inherently uncertain or the economic environment is in a state of flux. [Moreover,] imperfect information enables parties to a contract to operate opportunistically exploiting any information asymmetry.⁸⁵

Note that either the government or the private sector side may behave opportunistically.

On the government side, this could take the form of post-contract exploitation of the private partner. Hence, if PPP contracts are not well-specified, PPPs would not adequately overcome the time-inconsistency problem. The incompleteness of contracts can therefore create a high degree of uncertainty and greater risk in PPPs, which can in turn push up the cost of capital.

For the private sector, the scope for opportunism is related to the specificity of the infrastructure assets provided.⁸⁶ If the assets have been constructed and operated using investments, technologies and procedures which are specific to the incumbent, the value of the assets would be diminished were that company to be replaced. This creates a ‘lock-in’ effect with the public authority unable to switch to another operator without incurring considerable costs. Insofar as the incumbent is aware of this lock-in, it will have incentives to behave opportunistically by, for example, strategically investing in non-transferable assets. A second opportunistic action the private sector can take is to take on an excessive level of debt and increase the risk of financial distress. The incumbent may then look to renegotiate the terms of the contract so as to make them more favourable, with higher user charges or a lower investment requirement).

Guasch (2004) studied a dataset of more than 1,000 concessions granted in the Latin American and Caribbean region during the period 1985–2000.⁸⁷ Renegotiation of the initial contract was found to have occurred in 55% of transportation concessions, an average of three years after their award. The majority of these renegotiations were made at the request of the private contractor and typically involved an increase in tariffs (62% of cases), delays in investment obligations (69% of cases), and a reduction in the fee paid by the contractor to the public sector (31% of cases).

Although renegotiation can enhance welfare where it helps to address incomplete contracts, the ability of firms to renegotiate in this manner after the contract has been awarded—and, in doing so, to secure more favourable outcomes for themselves—can exacerbate the problems at the bidding stage.⁸⁸ Unless companies feel that their bids represent an actual commitment to deliver the stated outcomes, they could have an incentive to push their bids up, on the basis that they can later be revised down.⁸⁹ This reduces the likelihood that competitive bidding will ensure that the most efficient bidder is awarded the contract.

One means of overcoming this would be to include up front, in the initial contract agreement, framework parameters to allow subsequent renegotiation of contracts. Such a framework could cover the grounds for initiating renegotiation, preferred mechanisms for adjusting contracts (e.g., concession extension, increased tolls, reduced investments, etc.), and so on. This could act to ensure that there is flexibility to change the contract in the event that there is a change in the business environment, while limiting the potential for the incumbent to hold the government to ransom. However, as noted in section 3.2, this could lead to increasingly complex contracts and thus excessively high transaction costs, which could limit any potential benefits.

This approach is also unlikely to provide sufficient flexibility to deal with unforeseen circumstances, without creating some scope for opportunism.

The inflexible and incomplete nature of PPPs implies that they may not be appropriate for all types of infrastructure investment. Particularly for investments that are unprecedented—and thus which typically involve highly uncertain revenue and growth prospects—PPPs may be superseded by other forms of procurement. For example, Oxera (2011) sets out a co-investment model for telecoms next-generation access (NGA) investment.⁹⁰ This is due to the inherent risky nature of the investment where there is still no consensus on exactly which technology would best replace the legacy infrastructure.

3.5. Efficiency gains

One of the motives behind PPPs has been to capture the profit-maximising motive of the private sector in order to drive technical efficiency. However, not all PPPs have been conducted with the secure knowledge that the private sector will be more efficient than the public sector. For example, when the UK began its PPP initiative—the Private Finance Initiative (PFI)—lack of interest in PPPs from the private sector meant that the government was forced to make the scheme more attractive, which ultimately led to the abolition of universal testing of projects for private finance. In 1992, rules relating to the use of private funds by the public sector were revised such that privately financed projects would be allowed to go ahead without any need to compare them with a similar project in the public sector.

Given this government stance, the desired efficiency gain from private sector involvement may not be realised if it is the case that PPPs were used inappropriately. Despite this potential overuse of PPPs by the government, Hodge (2004) argues that the UK government departments that implemented PPPs registered cost savings of between 10% and 20%.⁹¹ Other experiences of PPPs have been generally positive.⁹² However, the literature is inconclusive on the effectiveness of PPPs—e.g., Gaffney and Pollock (1999) found that PFIs had not led to overall cost savings in the National Health Service in the UK.⁹³

The assumption that private sector operations will generate efficiencies (that the public sector will not) builds from the fact that private sector companies have a profit motive—that is, equity holders are the residual claimants of any additional profits which are achieved by becoming more efficient. However, debt and equity holders may have different financial incentives, regarding whether they are primarily motivated to increase the ‘gain’ or to minimise the potential for ‘loss’. Equity holders would be

expected to have an incentive to achieve performance greater than that expected when the contract is signed. However, creditors may be motivated to avoid downside risks. Since PPPs have tended to be highly geared (frequently greater than 90% gearing), equity incentives may not be as strong as anticipated, leading to fewer incentives to achieve private sector efficiencies.

The highly geared nature of PPPs also gives the private sector bargaining power over the government, especially for mission-critical infrastructure. Specifically, a high level of debt would imply greater financial risk, but this could be passed on to the government if it is ‘known’ that the government would not let the company go bankrupt. This occurs when the government’s cost of guaranteeing a company is lower than the cost of allowing it to go bankrupt.

3.6. Lack of bank financing

In the UK, PPPs have typically been bond-financed. Outside of the UK, however, PPPs have tended to be reliant on bank financing, with limited access to capital markets. A report by the European Investment Bank attributes this to a number of factors:

lack of a deep capital market, resulting in illiquidity in the asset; lack of a large private pension system, resulting in insufficient demand for the asset; a strong local banking market willing to maintain market share through aggressive pricing and terms; and insufficient knowledge of the bond market on the part of both the public sector and private sponsors leading to the perception that the bond execution is ‘difficult’.⁹⁴

Moreover, where European PPPs have been bond-financed, the large majority of bonds have been issued with monoline guarantees. The role of the monolines has been to issue guarantees on the repayment of the principal and interest to investors.⁹⁵ The issuer of the bond has then been able to benefit from the high credit rating of the monoline (which would maintain a sufficient capital base against the guarantees to secure a triple-A rating) rather than its own rating. This has had the result of lowering financing costs. However, following the financial crisis there has been a widespread downgrading of the monolines, with serious implications for the PPP bond market in Europe.

The demise of the monoline insurers has, to all intents and purposes, seen the closure of the wrapped bond market, and there has yet to be a viable, alternative means of tapping into the capital market.⁹⁶ The onus on bank financing for PPPs is thus stronger than ever. However, the current problems in the banking sector are well reported:

The collapse of the inter-bank lending market has drastically reduced liquidity. Most banks, particularly those with limited deposit bases, are struggling to raise funds even on short maturities ... Project finance and PPP lending is competing for scarce regulatory capital allocations with more attractive corporate opportunities. This is testing the viability of the current PPP model.⁹⁷

Going forward there remains a question of how banking sector reforms, introduced in response to the financial crisis, will affect the existing stock of infrastructure loans and banks’ capacity to supply financing.

3.7. Accounting conventions

It should not be ignored that a significant amount of the enthusiasm for PPPs (at least in the UK) arose from an accounting convention that meant that the future liability to pay the private sector did not enter the government's balance sheet/public expenditure. It is a problem if the government believes in the 'free-money fallacy' of PPPs and that it could spend the money 'saved' by using PPPs on something else. PPPs, by design, mean that the government purchases services from the private sector. However, the price the government pays will be higher (i.e., above marginal cost) in order for the private sector to recover the large sunk cost. In other words, financing infrastructure via PPPs is likely to cost just as much as if the government pursued a more traditional procurement method.

In the UK, the Office for Budget Responsibility has estimated that national debt would be increased by £35 billion (2.5% of GDP) if all current PPP liabilities were included in the national accounts.⁹⁸ Recently, however, the political incentives to target off-balance-sheet financing appear to have been reduced, for two reasons.

- Under the International Financial Reporting Standards (IFRS), which have become increasingly recognised over recent years, all PPP debt must be included in public sector authorities' financial accounts for financial reporting purposes.⁹⁹
- The liability on future generations from PPP contracting has come to the fore, as payments for the PPPs have begun to be made from current budgets. In turn, politicians have recognised that the apparent 'free money' of PPP projects was not actually free at all.

3.8. Summary

This section has shown that PPPs may not always be the most appropriate solution to the challenge of infrastructure investment. Indeed, under certain circumstances, PPPs may be superseded by other methods of financing. This has led some governments to look for alternatives to PPPs. Even the UK government, historically the biggest proponent of PPP projects, has acknowledged the potential need for such alternatives:

the Government shares some of the commonly identified concerns that PFI contracts can be too costly, inflexible and opaque ... The Government now intends to undertake a fundamental reassessment of PFI and wants to develop a new delivery model that draws on private sector innovation but at a lower cost to the taxpayer and offering better value for our investment in public services.¹⁰⁰

This has been the result of a number of contributing factors, including:

- High transaction costs.
- Inherent inflexibility and incompleteness of contracts and payments.
- Limits to cross-fertilisation of ideas across the public sector.
- Private sector opportunism, inflated demand forecasts and forced renegotiations.
- Inappropriate risk transfer raising the perceived risk to investors, and resulting in a high cost of capital.
- Lack of bank financing following the recent turmoil in the credit market.

The second and the third point, in particular, mean that when undertaking especially risky infrastructure investment, PPPs may not be the best procurement method. This leaves scope to discuss possible alternative financing methods in circumstances where PPPs are generally ineffective (see section 4). This section has also argued that the oft-cited higher cost of capital of PPPs relative to the case of public provision may be unfounded. In particular, the claim that the government can raise money ‘more cheaply’ than the private sector is often based on the misconception that the government has to pay only for the debt risk associated with the project and not the equity risk. In reality, equity risk is passed on to the taxpayers, and is simply masked in the case of public provision. However, this risk is priced explicitly in the case of private sector provision. To the extent that the pricing is correct, there is nothing that would suggest that the government should be able to raise money more cheaply than the private sector.

4. THE RAB MODEL

This section introduces the regulated asset base (RAB) model. One crucial difference between the RAB model and PPPs is that the former requires the presence of an independent regulator which, under directives from the government, seeks to ensure that companies act in a socially optimal way. With this in mind, this section introduces the concept of the RAB model and assesses its potential as a governance tool to promote infrastructure investment. A distinction is made between the RAB model as applied to existing capacity, and a model for new capacity, which could incorporate a role for a national infrastructure bank.

4.1. What is a RAB model?

The regulated asset base is a familiar concept in regulated utilities. It is an accounting number mainly used by economic regulators in the calculation of allowed returns. The RAB represents ‘the regulated company’s past investments, comprising what investors paid when the assets were originally privatised, plus the completed efficient CAPEX since then, adjusted for depreciation’.¹⁰¹ Thus, at any given time, the RAB refers to the cumulative historical investment made by the company, net of cash recovered from regulatory depreciation. The RAB is also usually indexed to a measure of price inflation in order to allow for the effects of inflation on the regulated company’s capital stock over time.

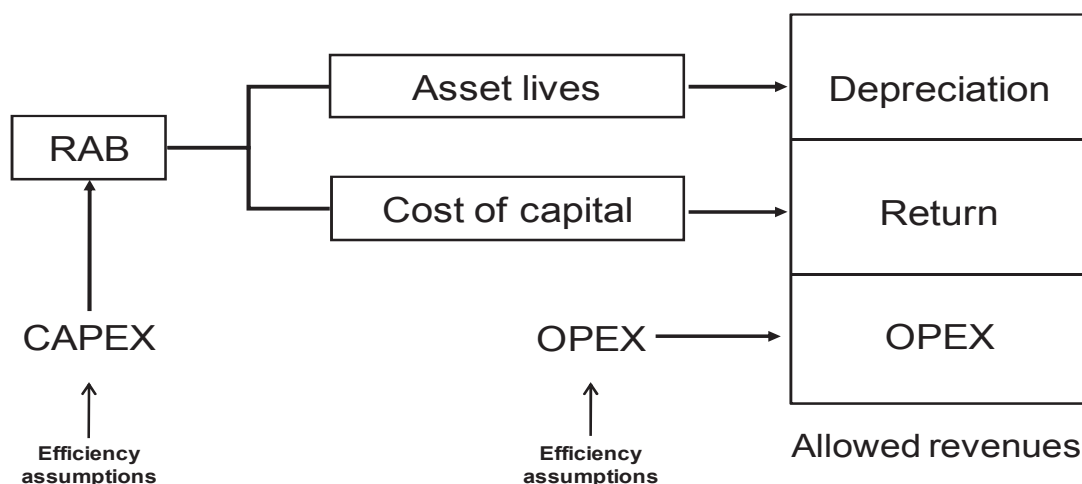
Under the RAB model, investors are allowed to earn revenues which cover three elements.

- An allowance for the depreciation of the RAB over time, calculated according to established regulatory techniques (i.e., a return of capital invested). Depreciation is calculated with reference to asset lives and can be straight line, front-loaded or back-loaded according to the preference for the recovery of sunk costs over time. The choice of depreciation profile is NPV-neutral, but can be altered to reflect the allocation of risk between the company and customers, inter-generational equity, and efficient capacity utilisation.
- A return to investors based on the value of the RAB (i.e., a return on capital invested). This has typically been calculated by multiplying the RAB by a weighted average cost of capital (WACC) (i.e., an average of the cost of equity and the cost of debt). The WACC is intended to reflect the opportunity cost of the investments made by the investor.
- The forecast level of operating expenditure (OPEX) associated with the day-to-day operation of the network. These are compensated on a pay-as-you-go basis.

The RAB has also been applied further afield as incentive regulation has become more frequently employed. However, there has been little exploration of the applicability of the RAB model beyond the regulated utility sector to facilitate, for example, infrastructure investments.

Crucially, the RAB model provides a guarantee to investors that they will earn a return not only on new CAPEX and OPEX, but also their sunk investments in the network. This guarantee typically takes the form of statutory legislation which places a duty on the independent regulatory body to ensure that it sets the company's allowed revenues such that the company can finance its regulatory functions (so long as it is run efficiently). Although it has never been formally tested, companies can have recourse to the courts in the event that the regulator does not meet its duty. It has thus been seen 'as a particularly credible and robust long-term contract ultimately guaranteed by law'.¹⁰² This feature means that the RAB model has the potential to solve the underinvestment problem in infrastructure largely resulting from the time-inconsistency problem.

Figure 1. The regulated asset base model



Source: Oxera

The RAB model for existing capacity

As noted, the RAB model was an offshoot of the privatisation and economic regulation of the utilities (i.e., the energy transmission and distribution, telecoms, water, and rail sectors) in the UK. This typically involved first establishing the infrastructure operator as a government-owned company and establishing an economic regulator to set charges based on an indicative value of the asset prior to privatisation. This allowed regulated cash flows to be generated for investors to value prior to the flotation. The RAB was then reset at the first, post-privatisation price review based on market capitalisation. The allowed return was also typically lowered at the price review to reflect the fact that there was likely to be less risk (i.e., less political, regulatory and commercial risk) once the frameworks were established.

Given the precedent set by these sectors, the RAB model is easily transferable to the roads sector and to other transportation infrastructure (e.g., underground systems, high-speed rail lines, etc.) for existing capacity.

The RAB model for new capacity

The traditional RAB model applied in the utility sector could also be extended to new infrastructure investments. Consider, for example, an asset that has been built, presumably under contracts closer to traditional government procurement. In order to apply the RAB model in this context, the government would have to repackage the asset at the refinancing point to sell on to new financial interests, potentially via a national infrastructure bank.

In this context, the repackaging might not necessarily have to be applied to only one ‘infrastructure asset’, but could instead incorporate an entire regional network (such as the roads example), or a collection of smaller, unrelated projects. If multiple projects are bundled, there would be potential for cross-subsidisation across projects, if this was considered necessary or desirable. This could be especially beneficial where a small project has significant economic benefits (i.e., positive externalities) but is not commercially viable on its own (and thus would not be pursued by the private sector in isolation).

Under the RAB model, the assets owned by the private sector would be regulated by an independent economic regulator. Hence, the RAB and regulation are intertwined. The regulator would be responsible for calculating allowed revenues and setting allowed prices while reflecting the underlying business characteristics in the relevant sector. For example, regulation could be introduced in the form of a price cap, revenue cap or yield cap. These alternative forms differ in terms of the allocation of the demand risk: under a price cap regime, the volume element of demand risk is borne by the regulated company, while in the case of a revenue cap the demand risk is passed through to consumers in full in the form of a higher allowed price if outturn volumes are lower than forecast.¹⁰³

4.2. Potential benefits of the RAB model

The main argument presented for the RAB model is that it is the most effective means of overcoming the time-inconsistency problem and thus should have investment benefits. The regulatory framework and commitment to the RAB have been crucial. In this context, the success of the RAB has been due to the fact that it is transparently calculated and the markets consider the regulator to be committed to it and to rewarding investors with a return equal to the cost of capital if the company meets the regulator’s projections. This credibility has stemmed from the legal requirement for the regulator to ensure that the regulated company is able to finance its functions (so long as it is run efficiently).

It has been noted that under public finance the equity risk is effectively borne by taxpayers. Similarly, the explicit guarantee to the RAB effectively transfers equity risk to customers and taxpayers.¹⁰⁴

Hence, by convincing shareholders that their investments are protected, and thus removing a substantial amount of investor risk, the RAB has been associated with a significantly lower cost of capital than for PPPs.

This could lead to significant financing cost savings. For example, using the OECD (2006) estimates of the total investment requirement for the road and rail sectors over the next 18 years of around \$5,400 billion (assuming \$300 billion per year), a 1% reduction in the cost of capital would lead to a saving of \$54 billion per year. This is enough to cover the annual investment requirement for the rail sector in full.

Moreover, the cost of regulation under the RAB, which is equivalent to the transaction cost under PPPs, is quite modest compared with the turnover of industries that are regulated. In 2001, HM Treasury estimated that the cost of regulation was less than 0.2% of total industry turnover across all the UK regulators,¹⁰⁵ whereas the transaction costs of the London Underground PPP were around 2.8% of the contract's NPV. In absolute terms, by 2009 the total cost of running the eight economic regulators in the UK was £354.4m per annum.¹⁰⁶

The credibility of the guarantee surrounding the RAB would also potentially allow the government to tap into capital markets in a way that has not been possible for PPPs since the demise of the monoline insurers (see section 3.6). For example, an infrastructure bank might be set up to sell RAB-backed assets primarily to pension and life funds:

Pension and life funds should be encouraged to play a greater role in channelling savings into infrastructure projects. Pension and life funds are the principal vehicles for savings. They have long-term liabilities, and utilities have long-term time-inconsistency exposures and long-lived physical assets. The RAB provides a means through which savings can be channelled by financial institutions into infrastructure investments.¹⁰⁷

The appropriateness of RAB-backed assets is increased by the fact that the RAB model is typically embedded within the RPI – X framework. This means that the asset is essentially indexed-linked, thereby protecting it from inflation risk.

A further potential advantage of the RAB model is its flexibility relative to PPP contracts. While both types of contract require the majority of conditions and deliverables to be determined ex ante, the RAB model allows for revenue and cost assumptions to be revisited during price reviews (typically held every five years). At these (typically) quinquennial reviews, the regulator can revise its assumptions relating to the appropriate cost of capital, the efficient levels of OPEX and CAPEX, and so on. PPPs, by contrast, tend to be inflexible, and tend to be revised only in cases where the entire contract is renegotiated. As noted above, renegotiations create a moral hazard problem during the bidding stage, and can lead to overbidding. This problem is reduced in the RAB model.

Finally, several other potential advantages of the RAB model have been noted from its implementation in utilities regulation.

- As part of the RPI – X regulatory framework, it has been combined with strong incentives for efficiency in the delivery of investments (CAPEX) and operations maintenance expenditure. This, it has been argued, helps to overcome the problems of gold-plating associated with the rate-of-return regulation which has been widespread outside of the UK.
- The model facilitates a 'market for corporate control' as a mechanism for incentivising owners to exercise oversight and discipline over the management of the assets.
- It incentivises owners of the assets to maintain the long-run condition and hence the value of the assets.
- Although it is easier to apply the RAB/WACC model where a company provides only one service, this model is sufficiently flexible to be applied in the case of a company providing a number of services using a single asset base. This would be a significant advantage where disparate assets are bundled into a single RAB.

4.3. Potential issues with the RAB model

There are several issues with the RAB model, including the following.

- **Initial RAB valuation.** Central to the discourse following privatisation and the introduction of the RAB model has been asset valuation. In particular, privatisations have been affected by the question of how to provide an initial value for assets. UK regulators did not set a RAB value at the time of privatisation, but at subsequent price reviews calculated initial RAB values on the basis of the companies' flotation values (often averaged over a period of time). These market values were significantly lower than the net book value of assets, such that using net book values would have led to a sizeable redistribution between consumers and shareholders.
- **Funding.** The RAB model does not necessarily resolve the question of who ultimately pays for investments. The investor needs to be compensated with a return on their investment, which requires some form of dedicated revenue stream. In some sectors, notably roads, there may not be a clearly delineated revenue stream in the form of direct user charges. Consequently, the RAB model may need to be implemented alongside user charging (i.e., road pricing) or some hypothecation of road taxes so as to establish an investor return. This is currently being discussed as part of the debate surrounding potential privatisation of the strategic road network in England.
- **Public procurement.** As discussed above, the RAB model is not proposed for greenfield projects. As such, one proposition is for greenfield investments to be undertaken through traditional public procurement methods (i.e., with the private sector responsible only for construction in the first instance), and then to be sold on only once construction is complete (i.e., when PPPs would typically be refinanced). However, this report has noted the potential disadvantages of traditional procurement techniques, including higher total life-cycle costs, lack of synergies, budgeting constraints and less developed risk evaluation. Improvements might need to be made to public procurement techniques to ensure that optimal investments were made.¹⁰⁸
- **Bias towards higher gearing.** In the standard RAB model, companies are allowed to earn their WACC on the RAB. However, this leaves scope for firms to earn rent through financial engineering. In particular, because the WACC is a weighted average cost of capital and cost of debt, if debt is cheaper than equity, the firm could earn a higher return by increasing its leverage. This also means that the equity incentive of companies may be eroded over time, thereby eroding the benefits of the profit-maximising motivation of the private sector.
- **CAPEX bias.** In some regulated industries, particularly the water and energy sectors, there has been a suggestion of a bias towards CAPEX rather than OPEX solutions, as the former is added to the RAB and earns a rate of return over time, while the latter is remunerated on a pay-as-you-go basis.¹⁰⁹

4.4. Summary

This section has introduced the RAB model as a potential alternative means of overcoming the time-inconsistency problem inherent in infrastructure investment. It has highlighted the benefits and issues in applying the RAB model to infrastructure investment. What is clear from the analysis is that the RAB model, like PPPs, is not suitable under all circumstances, and that there are situations in which it may be inadequate.

It is worth noting, however, that, in the regulation of UK utilities, the RAB model has provided a credible, legally backed guarantee to investors that they will earn a return on their (sunk) investments in the infrastructure network. The guarantee on the RAB has typically taken the form of a statutory duty on the independent regulatory body, requiring it to enable the company to finance its regulated functions. The credibility provided by this guarantee has effectively removed equity risk from investors and has thus allowed for debt financing closer to the level of government borrowing.

The RAB model could easily be transferred to existing capacity in other sectors. A more radical change would be required to apply the RAB model to new capacity. This could involve an infrastructure bank purchasing completed, publicly procured projects, repackaging them, and then selling them on to institutional investors. This could incorporate one, or a number of, projects, as necessary. This would, however, see a return to traditional public procurement—and its associated costs—for greenfield investment.

5. WHEN IS THE PPP OR THE RAB MODEL MOST APPLICABLE?

The prevalent use of PPPs by governments around the world has shed more light on their problems than their benefits. However, the question remains as to whether there are better alternatives to PPPs. The aim of this section is to consider the circumstances in which the RAB model may be preferred to PPPs. In assessing their relative advantages and disadvantages, the key areas to consider are:

- Efficiency (both allocative and technical).
- Flexibility.
- Transaction costs.
- Cost of financing.
- Allocation and pricing of risk.
- Potential for incentives to be distorted.

Some of these areas are inherently related, but there is sufficient distinction between them to consider them separately. Table 1 considers each of these key areas in turn and assesses the appropriateness of PPPs and the RAB model.

The importance of the time-inconsistency problem in infrastructure investment when the private sector is involved has already been made clear. Both PPPs and the RAB model represent potential ways in which this problem may be solved—PPPs through long-term contracts, and the RAB through the legal requirement for the regulator to ensure that the infrastructure’s functions can be properly financed. That is, they are both intended to remove the political/regulatory risk from the project; exactly how the market perceives the effectiveness of the risk transfer between the two methods may differ, and this difference in perception may lead to differences in the cost of financing between the two. Exactly how investors would view the two financing methods differently is an empirical question which is beyond the scope of this report.

Widespread use of PPPs has in part been due to the fact that they allow government to remove otherwise expensive investment from their PSBR. This, together with other, arguably more ‘real’ benefits of PPPs discussed in section 2, has led the government to set PPPs as the de facto way of financing infrastructure investment. The relative advantages of PPPs and the RAB model depend on the specifics of the investment project.

- The inherently inflexible nature of PPPs means that when future demand/usage or prices are uncertain, PPPs may prove to be a constricting factor in attempting to maximise social welfare. Under such circumstances, transactions costs are also likely to be large due to the difficulty in assessing contingencies and negotiating consequences.¹¹⁰ Moreover, the problems with the competitive tender process may be exacerbated for projects with a high degree of uncertainty.

These factors may lead investors to require higher rates of return than otherwise, leading to excessively high costs of capital for PPP projects.

- Creating a regulator may not be feasible or appropriate in certain situations, especially when the infrastructure investment is not significant. The associated cost of regulation implies that, for relatively small projects, PPPs may represent better value for money than the RAB (assuming that transaction costs associated with such projects under PPPs are small).
- Past PPPs have exhibited a tendency to transfer too much risk to the private sector due to the reluctance of government departments to take on risk. This problem may be mitigated under the RAB model if the regulator can effectively retain its independence from the government.

Given that even a small saving in the cost of capital implies a large absolute saving due to the scale of the investment requirement, it is crucial to evaluate a number of options, including the RAB model, when financing infrastructure.

Note that the RAB model described in this report is suitable for brownfield investments. However, for greenfield investments, the RAB model does not solve the problem associated with the initial procurement process. In contrast, PPPs aim to solve the problem associated with public procurement as well as the management of on-going operations. This overlap between the two methods of financing suggests that there may be potential for a hybrid approach of PPP and the RAB model that combines the benefits of the two.

Table 1. Comparison of PPPs and the RAB models in the six key areas

Area	PPPs	RAB model
Efficiency (both allocative and technical)	<ul style="list-style-type: none"> Allocative efficiency is achieved by the government being required to choose the socially optimal infrastructure investment, and is generally independent of financing method. Efficiency gain can arise only if the market failures associated with private sector provision of infrastructure can be addressed. Highly leveraged nature of infrastructure may lead to weaker profit-maximising motive. 	<ul style="list-style-type: none"> To the extent that RPI – X, on which the RAB model is based, can encourage efficiency in the infrastructure sector, it should not suffer from (technical) efficiency problems. Price review controls associated with the determination of X is transparent while being guided by economic principles, as compared with PPPs which are undertaken on a project-by-project basis.
Flexibility	<ul style="list-style-type: none"> PPPs are necessarily long-term contracts requiring conditions and deliverables to be determined ex ante. These are, by design, inflexible to avoid potential problems during the bidding stages. 	<ul style="list-style-type: none"> The RAB model requires ex ante specification of conditions and services. However, these can be revised during the price review process. These must follow sound economic principles, and although subject to potential abuse, imply that the RAB model is more flexible than PPPs.
Transaction cost	<ul style="list-style-type: none"> Past experience suggests that transaction costs for PPPs can be large; both in terms of cost and time. Transaction costs represent around 3% of the NPV of the project. 	<ul style="list-style-type: none"> Transaction costs are replaced with regulatory costs. The cost of regulation is less than 0.2% of the turnover of the regulated industries.
Cost of financing	<ul style="list-style-type: none"> If appropriately specified, the cost of capital for the project should only involve equity risk. However, in reality, the political/regulatory risk associated with PPPs tends to be high such that the cost of capital of PPPs is usually high. 	<ul style="list-style-type: none"> The credibility of the government stems from the legal requirement for the regulator to ensure that the company is able to finance its functions, which includes the RAB. To the extent that the indirect government guarantee for the RAB is more credible than government's commitment under PPPs, the cost of capital may be lower. The guarantee also implies that companies could issue RAB-backed assets, further enabling companies to raise finance more easily and cheaply.

Area	PPPs	RAB model
Allocation and pricing of risk	<ul style="list-style-type: none"> • PPPs can potentially lead to optimal sharing of risks between the public and the private sector. • In reality, the public sector has looked to push as much risk as possible on to the private sector, regardless of which party is best able to manage that risk. • The effect is to push up the cost of capital. • One advantage is that the equity risk associated with the project is explicitly priced by the market in the cost of finance. 	<ul style="list-style-type: none"> • Problem of passing too much risk to the private sector may be mitigated if the regulator acts appropriately. • In much the same way as the Bank of England enjoys independence from the government, regulators could be made independent so as to ensure optimal risk-sharing. • Similar to PPPs, the RAB model also makes explicit the equity risk associated with the project. • Any mis-pricing may be resolved in the next price control review, implying lower overall risk.
Potential for incentives to be distorted	<ul style="list-style-type: none"> • Incompleteness of PPP contracts may mean that firms behave in an opportunistic way. • Bidding processes in the past seem to have led to over-confident project estimates, in turn leading to forced renegotiations in the future. • The government's incentive in using PPPs may also be distorted by the fact that PPPs have traditionally not been recorded as part of the PBSR. 	<ul style="list-style-type: none"> • Allowing firms to earn the WACC on their RAB may lead them to increase their gearing over time. • This may inappropriately increase the bargaining power of the company over the regulator/government. • There may be a bias towards CAPEX rather than OPEX solutions. • Unless regulators can be sufficiently independent of the government, the political cycle effect may impede the ability of the RAB model to solve the time-inconsistency problem. • Similarly, the regulators must be sufficiently independent of the private sector to avoid regulatory capture.

Source: Oxera analysis and in previous sections.

NOTES

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44. Helm, D. (2009), 'Utility regulation, the RAB and the cost of capital', Competition Commission Spring Lecture 2009, May 6th, p. 3, available at <http://www.dieterhelm.co.uk/node/676>

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47. Grimsey, D. and Lewis, M.K. (2004), *Public Private Partnerships: The Worldwide Revolution of Infrastructure Provision and Project Finance*, Cheltenham: Edward Elgar, p. 6.
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51. Jenkinson, T. (2003), 'Private Finance', *Oxford Review of Economic Policy*, 19:2, p. 334.
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56. This report does not make the distinction between risk and uncertainty, where the former involves known probabilities of contingent events, and the latter is an issue of unknown probabilities.
57. Oxera and RBconsult (2012), *op. cit.*
58. Grout, P.A. (1997), 'The Economics of the Private Finance Initiative', *Oxford Review of Economic Policy*, 13:4, p. 54.
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**THE FANTASY WORLD
OF PRIVATE FINANCE FOR TRANSPORT
VIA PUBLIC PRIVATE PARTNERSHIPS**

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GLOSSARY

ATC	Air Traffic Controller
BR	British Rail
CAA	Civil Aviation Authority
DBFO	Design build finance and operate
DfT	Department for Transport
ECML	East Coast Main Line
LU	London Underground
NA	National Accounts
NAO	National Audit Office
NATS	National Air Traffic Services
NPV	Net present value
PPP	Public Private Partnerships
PSC	Public Sector Comparator
SBL	Skye Bridge Limited
SPV	Special Purpose Vehicle
SRA	Strategic Rail Authority
TfL	Transport for London
TOC	Train operating company
VAT	Value added tax
VFM	Value for Money
WCML	West Coast Main Line
WGA	Whole of Government Accounts

1. INTRODUCTION

This section reviews the experience of the United Kingdom's transport PPPs and the financial costs of different types of PPP. It concludes that rail PPPs have not generally been successful in delivering the outputs expected and that road PPPs are costly and as a result have reduced the overall physical volume of road investment. Using the private sector as a financial intermediary adds cost, complexity, bureaucracy and risk that public authorities are unable to overcome. This is reflected in the international as well as British experience. Although a project may fail to transfer risk and deliver value for money in the way anticipated, the scope for enforcement of conditions or dissolution of the partnership is in practice severely circumscribed for legal, operational and political reasons, with the result that public authorities find themselves locked into partnerships.

In 1993, the British government turned to the private sector to finance much needed investment in public infrastructure and manage services under its Public Private Partnerships (PPP) policy (Edwards et al., 2004), with transport forming by far the largest component by value of the PPP programme. Transport projects in Britain have typically taken one of a number of forms, including:

- A contractual type arrangement: the public sector pays for the use of the asset and its dependent services under terms set out in a contract, which may contain incentives for good and/or penalties for poor performance. Such contracts are usually designated as Private Finance Initiative (PFI) projects or design build finance and operate (DBFO) projects in the roads sector. Examples include the main trunk roads, where the public agency commissions the private sector to enhance, operate and maintain roads, paying for them on the basis of usage under a system known as shadow tolls.
- A free-standing project or concession: the private sector designs, builds finances and operates a road, but typically a bridge or a crossing, and charges the users directly (toll charge), as for example a number of estuarial crossings and Britain's first private toll road, the M6 toll road.
- An alternative freestanding project or concession: there is both public and user funding for either the construction and/or the service element. One example is the Skye Bridge where the Scottish Office paid some of the construction costs and later the Scottish Executive subsidised the tolls before ultimately terminating the contract. Another is the London Underground PPP, a contractual arrangement, where the public authority, London Underground, pays the private sector partner to upgrade and maintain the infrastructure, but receives a grant from central government, in effect a subsidy to the private sector, and charges passengers.
- A joint venture (joint ownership) arrangement: the partnership may charge either the public sector as in health and education, or the users (National Air Traffic Services).

Partnership arrangements have become ever more complex and include a proliferating number of hybrids and pre-existing formats¹¹¹.

Nevertheless, there are normally important similarities. The public authority will contract with a Special Purpose Vehicle formed specifically to deliver one project. It will raise the finance the vast majority of which will take the form of senior debt (or prior to the credit crisis bond debt) often as much as 90% with the majority of the balance being subordinated debt. A tiny amount of equity, often referred to as pin point equity, will be provided by the SPV's owners. Related companies, legally separate subsidiaries, will contract to deliver the construction and services elements of the project.

In the UK the various PPP arrangements normally have one common and apparently attractive financial aspect. They enable the delivery of infrastructure without the need for the government to find a lump sum up-front, since finance is provided by the private sector. This defers expenditure – a politically attractive option. The private sector makes an annual charge over a period of at least 30 years, so that PPP projects require a revenue stream to pay these charges, which will be a function of the size of the initial investment (typically large), usage, operating costs (typically relatively low), the cost of finance and the period of the loan. That is, the revenue must enable recovery of the full costs over the life of the project, including debt and equity costs.

To understand the realities of PPPs a distinction between financing and funding must be made. Although the finance for the capital expenditure comes largely from the private sector, the funding to service the costs of the project comes from either the public sector or users. This can be illustrated by comparing private finance under PPP with buying a house with a mortgage. The prospective homeowner finances the transaction with a loan from a bank or financial institution, and funds the interest payments and repayments from monthly income. In other words, the bank provides the finance, but the owner funds it. Furthermore, over the 30 year period of the loan, the total cash payments are typically at least four if not five times the actual purchase price. A PPP is no different: the finance comes from a bank but the funds come from the public authority via taxation or the user via user charges.

A key message of this paper is that it is more costly for the public sector to use the private sector as financial intermediaries. This is due in part to the higher cost of commercial over public debt and the cost of the profit margin of both the private partner and its extensive supply chain. But there are also the not inconsiderable legal and financial advisors' fees to each of the numerous parties to the transaction to structure and negotiate it¹¹².

The higher cost of capital under private finance is particularly important in the context of transport, where the capital as opposed to the operating cost is typically high and demand is rarely sufficient to recover costs. Demand may be high on individual routes but inadequate over the network as a whole.

For example, individual rail services, particularly the highly frequented inter-city and commuter lines may make a profit, but branch, feeder and off peak services, even on heavily trafficked routes, do not. Similarly, the national airlines are finding that the low cost operators have eaten into their frequent, short haul services, leading them to cut down on regional hubs and feeder services, leaving them highly vulnerable. In the case of roads, while high volume routes can be repaid within a relatively short period, political constraints may dictate low user charges or tolls spread over a longer period. Should however traffic flows be low or lower than predicted, then trains, roads and bridges will operate below capacity, making them difficult to fund, necessitating some combination of higher user charges, capital grants and public subsidy.

Transport projects are simply too capital intensive and thus financially risky, particularly since such services have never been sufficiently cash generative, if they are cash generative at all, to be run on a commercial, and geographically comprehensive basis. This is why the state has usually provided them. In order therefore to make such projects financially viable and attractive to the private sector, the government must ensure some combination of:

- Capital grants or subsidies.
- Implicit or explicit underwriting of the private sector's debt or the public authority's payments.
- Bundling together of projects to increase their size relative to transaction costs.

Projects tend to be new build rather than refurbishment and in relation to publicly financed schemes a combination of the following is typical, especially when financing difficulties arise:

- Project and service downsizing.
- Higher charges for the public authority or the users.
- A reduction in workers' jobs, wages and conditions.

All this has the potential to distort a capital prioritisation programme based upon an economic and social cost benefit analysis in favour of schemes that can be made to generate the requisite cash flows. Should income flows post-implementation turn out to be lower or costs higher than expected for the public agency, then a privately financed project must come at the expense of other services, further distorting rational resource allocation. But should the private partner find that its income is less than expected or costs higher, then it will either seek ways of increasing its income – typically by high charges for the inevitable changes to the original contract over its 30 year life – or hand back the keys.

In Britain, the policy and the inevitably higher cost of private finance is justified in terms of delivering value for money (VFM), an intuitively plausible but ambiguous concept. It is measured by comparing the discounted whole life costs with conventional procurement as reflected in a public sector comparator (PSC), which includes the cost of the risks transferred to the private sector. In order to proceed with capital investment under PPP, the public authority must demonstrate that the project is likely to deliver VFM over the life of the project and be affordable. That is, VFM rests upon estimates of costs for future services and risks which are at best uncertain over a long period, and is equated with economy.

It is also generally assumed that the private sector will be able to deliver the service at a lower cost due to the private sector's presumed greater efficiency, although there is no well evidenced basis for this as others have noted (see Hall and Lobina, 2005; IMF, 2004, to cite but two). VFM is an inherently ex ante concept as risks, and thus the cost of risk, cannot be adequately measured after implementation. In practice, since the public authorities know that private finance is 'the only game in town', their schemes almost always show that private finance is better VFM than public finance.

The international experience has reflected these realities. While the research literature relating to both developing and developed countries has generally been short on detailed financial evidence, it has shown that while many private road concessions and DBFO projects have been successful, where "success" means commercial viability, a significant number have not. Some have had to be renegotiated on more favourable terms to the private sector or taken over by government when the concessionaires faced inadequate revenues due to users' dislike of tolls and/or higher than expected costs. The broad conclusion is that in order to make such schemes financially viable and attractive to the private sector and users alike, a high degree of political commitment is required.

Such political commitment is reflected in various forms of financial support, not all of which are clearly visible to the public, and/or the elimination of competition from roads without charges. (See for example the work of Farrell, 1997; Silva, 2000; Freeman, 2003; Erhardt and Irwin, 2004; Estache and Serebrisky, 2004; Bel and Fageda, 2005; Boardman et al., 2005.) In the context of rail, the capital intensive nature of the industry has meant that it has proved impossible to run a large network on a commercial basis, irrespective of ownership structure, and without subsidy, capital grants, loan guarantees, or debt forgiveness.

This paper focuses on the financial or distributional aspects of projects because the policy choice is mainly between different financing options: public, either via sovereign debt or taxation; or private, using the private sector as a financial intermediary to access commercial – and costlier – debt. Clearly the social and economic benefits of projects will also differ in terms of consumer surplus to the users and environmental benefits/damages, and policy towards PPPs does have an impact on which projects are selected for implementation and how many projects can be funded. The paper is organised in several sections. The next (second) section sets the scene by examining in seven sub-sections case studies of major UK transport PPPs. The third, fourth and fifth sections examine more broadly the underlying issues raised by these cases. Section three examines accounting rules that provide incentives to use private finance whether or not a PPP project is VFM. Section four examines the implications when private finance is the only available means for public authorities to invest. Section five draws together some lessons learned about the use of PPPs. A short final section draws out the implications for the choice of financing method.

2. SETTING THE SCENE

The paper considers the financial costs and rewards to the various stakeholders involved in a wide variety of partnership forms, on-going and completed, successful and otherwise, in rail, road and air traffic services, all sectors that have traditionally used conventional public finance. It uses financial evidence derived from the research literature, official and regulatory reports, statistical sources and the press. The stakeholders will vary according to the type of arrangement (the taxpayers, users, providers of finance, contractors, etc.). Thus financing and funding transport is also about the politics of and accountability for such projects. Our findings, updated as appropriate from previous publications (including Shaoul, 2010; Shaoul *et al.*, 2007a; Shaoul *et al.*, 2008; and Shaoul *et al.*, 2011) provide evidence to substantiate our argument that procuring transport infrastructure and services via PPPs is expensive, far more expensive than public finance, and fraught with risk. The cost is such that the funding that is earmarked to pay for the finance is usually insufficient and additional taxpayer funding to make up the shortfall displaces other services.

2.1. The national railways

Since the privatisation of the national railway industry (the network, locomotives, passenger, freight and engineering services) in the mid-1990s, the railways have been part-funded by a system of operating subsidies to private sector train operating companies (TOCs) which have a franchise to run designated services for a specified period. The train operators use the subsidies to lease the trains from privately owned rolling stock companies and pay track access charges to Network Rail, a private not-for-profit network infrastructure company, as well as to defray their other costs. The cost of leasing the rolling stock, the broad outline of which was set at privatisation, and of accessing the track, whose charges are set by the rail regulator to cover the cost of approved investment, maintenance and renewals, are essentially fixed costs for the franchise operators. While some fares were to be regulated and allowed to rise no more than 1% above inflation, some fares are unregulated. These two fixed costs, the leasing and track access charges, the expected level of demand, the fare levels and the cost of running train services determine the level of subsidies required.

The stated purpose of breaking up the integrated industry into numerous private companies linked by contracting relationships was to generate the efficiency and dynamism presumed to be lacking in the publicly owned operator, British Rail (BR) (Department of Transport, 1992) and to facilitate capital investment free from Treasury spending limits. Competition for the franchises to run passenger services, if not competition on the tracks, would ensure efficiency and value for money.

The leasing of rolling stock would enable companies to bid for the franchises and permit new entrants to the market. Together, the new structure would generate competition and efficiency bringing benefits to all.

In terms of PPPs, the railways therefore represent a mix of public and private finance and funding channelled largely through a system of concessions or franchises, whose service levels, frequencies and routes are set out in their contracts (not publicly available) and monitored by regulation, with inadequate performance against targets subject to penalties.

The first round of passenger rail franchises 1995-2004

The right to operate the train services was divided into 25 franchises for which competitive bids were invited between 1994 and 1997. Franchises were generally awarded to the bidders requiring the lowest level of subsidy, with only one awarded without subsidy. Subsidies were more than double that given to BR in the 1980s and the early 1990s before the restructuring of the industry for privatisation. Although the intention was that subsidies would decline to £0.9 billion by 2003, that had still not been achieved by 2009. The 25 franchises were awarded to just 11 companies, a number that has since halved as companies have merged, been taken over or left the industry.

The much vaunted performance targets were no more demanding than those set for BR in the interim regime 1994-96. Thus, no improvement was built into the franchises system, belying the government claim that services would improve. Performance indicators of punctuality and reliability are no longer published in a way that permits direct comparisons with standards of performance prior to privatisation. Performance deteriorated, particularly in the period 2000 to 2005, after Railtrack's failure to maintain the track in a safe condition, and subsequent collapse. Although much improved subsequently, even in 2009 performance has still not attained BR's level. But even these results would not have been achieved if the train operators had not made extensive use of a loophole in the regulations that allows them to exclude from performance data days when they have serious problems and extend the scheduled time. The deterioration in levels of service is widely attributed to the de-manning that took place after privatisation and the lack of capacity on parts of the network due to inadequate investment, leading to overcrowding and delays.

By 2006, the combined revenues (from fares and subsidies) of the 25 passenger franchises had risen from £4.6 billion in 1997 to £6.2 billion, more than double BR's total revenues in the last year (1993-94), when BR ran the integrated railway system (Shaoul, 2006). This was the result of several factors: fare increases on some routes that were higher than the rate of inflation; increased passenger numbers alongside a general increase in all modes of travel due to the expanding economy and traffic congestion on the roads; 'revenue protection' measures to ensure that passengers paid for their journeys; and the end of the sale of discounted fares on board the trains. But finally, and most importantly, revenues rose because subsidies were considerably higher than in the 1980s and early 1990s. Subsidies to BR averaged £700 million a year or 20% total revenue and £1.6 billion or about 17% income between 1985 to 1990 and 1991 and 1994, in the run up to privatisation. Following privatisation, subsidies accounted for £2.1 billion, 71% of total income in 1996, only declining to £1.1 billion, 17% in 2006.

It should however be noted that it is extraordinarily difficult to get clear and consistent information about the payments of subsidies to the train operators (Shaoul, 2006). All this leaves out the capital grants given to the network operator.

However, the increase in revenues notwithstanding, the majority of the franchisees are totally dependent upon subsidies to recover their costs and deliver a profit. Without subsidies, aggregate losses in 2006 would have been £1.1 billion, a sum equivalent to their subsidies. Only a handful of the TOCs made a profit. They paid out £144 million in dividends to their parent companies in 2006 and £1.5 billion since privatisation, due to the extensive system of public subsidies, not superior performance.

Had the ‘market’ and the franchise agreements operated as intended, many of the TOCs would have gone out of business. While the original franchises were let ‘competitively’, i.e., to the bidder requiring the lowest level of subsidy, the bids turned out to be hopelessly optimistic on the TOCs’ part (Transport Select Committee, 2004). With the government refusing to countenance re-nationalisation in any form, termination of the contracts and bringing passenger services back in house was not normally perceived to be an option. The short lived Strategic Rail Authority (SRA)¹¹³, was therefore obliged to step in to ensure continuity of train services and amend the franchise agreements.

Firstly, the SRA increased the subsidies (SRA 2003). In one of the more egregious examples, Connex South East received £58 million in 2002 due to differences in its cost and revenue assumptions. “They had got their numbers wrong,” as the SRA chair explained to the Transport Select Committee (Transport Select Committee 2004). In the event, shortly after increasing the subsidy, the SRA terminated the franchise due to the TOC’s poor performance. In January 2003, the press reported that more than half the TOCs were receiving emergency bailouts in the preceding two years. Amid claims that the SRA was imposing ‘gagging clauses’ on the TOCs to prevent them disclosing information about their bailouts, information became publicly available because the Stock Market requires the disclosure of information that affects corporate profitability.

Secondly, the SRA converted some of the franchises into management only contracts with payment on a ‘cost plus’ basis and a higher subsidy for less risk, prior to re-tendering the franchises. In 2003, “over one third of the franchises” (SRA 2003, p47) were operated in this way, which the SRA admitted “had become expensive” (SRA 2003, p39).

The second round of franchises

While the SRA had renegotiated first round of franchises at the taxpayer’s expense, in 2004 it negotiated a second round that were no more successful.

The routes were restructured to make them more commercially viable and the only companies eligible to bid were those in the transport sector, thereby confirming the monopoly position of the existing concessionaires. A few of the lines, such as the East Coast Main Line (ECML), were believed to be sufficiently profitable to enable the franchisees to pay the government an annual premium, and were awarded on that basis. (The ECML is a busy route connecting London with Newcastle upon Tyne, Edinburgh and Aberdeen, as well as a number of other cities). In an effort to ensure the profitability of the franchises and thereby avoid any future contract renegotiation, the government sought to limit the operators’ risk by assuming some of its revenue risks, the key risk. New franchises included clauses that would after four years reimburse the operators for 50% of any shortfall in revenue below 98% of the original forecast and 80% of any shortfall in revenue below 96%, and claw back 50% of any increase in revenue above 102% of the original forecast (Transport Select Committee, 2006).

In the event, GNER Ltd, which won a second 7 year contract for the ECML franchise in return for a £1.3 billion premium over the life of the contract, handed back the keys in 2006 when the franchise proved to be less profitable than its own overoptimistic forecasts had suggested. Indeed, simple projections of GNER’s cash flow, based on its annual report and accounts revealed that it could only have been viable if there had been a most unlikely 10% growth in passenger revenue. GNER then ran the franchise for a further year on a management only and risk-free basis. Yet its projections had evidently satisfied the Department for Transport’s financial advisors, since the then Transport Minister brushed off the industry view at the time that GNER had over bid. He said, “We crawled over the figures over the last few weeks because we wanted to make sure that the bid actually stood up”. But within two years, it had collapsed.

In August 2007, the government awarded the ECML franchise to National Express in return for a more onerous £1.4 billion premium over seven years. But National Express was no more successful. After paying the government £85 million in 2008, in April 2009 National Express demanded a renegotiation of its franchise. Not only did it demand to be let off the remaining charge, it also demanded that it be paid to keep running the railway on a management only, risk free basis. In response, the Department for Transport (DfT) insisted that it cannot renegotiate the contract and threatened to impose a “cross default” clause that would strip National Express of its other two profitable franchises, if it failed to keep up with payments on the ECML. Later, the government terminated the contract to deter other rail operators from seeking to renegotiate their contracts, increase the subsidies or reduce their premia, as passenger numbers, revenues and profits declined due to the global recession that has undermined the optimistic bids underpinning the recent franchise agreements. The government formed a publicly owned company to run the franchise which was originally to be re-let in 2010, although this has now been twice postponed. Its attempt to strip National Express of its other franchises failed largely due to the fact that they were held by legally separate subsidiaries.

The third round of franchises

In August 2012, undaunted by the experiences, the government announced that the winning bidder for the West Coast Main Line (WCML) franchise was FirstGroup, displacing Virgin Rail, who had held the franchise for the previous 15 years. The WCML is now the busiest and most profitable route, connecting London with Birmingham, Manchester, Liverpool and Glasgow.

Under the terms of the deal, FirstGroup, whose West Country franchise was one of the worst performers, will pay the government about £10 billion over 13 years or £13 billion if the franchise is extended to 15 years, with about 90% payable in the last seven years of the contract. While the newspaper reports have mentioned a lower figure of about £5.5 billion, this refers to the net present value (NPV) of the £10 billion payments. According to FirstGroup, the payments will rise from £26 million in the first full year to £739 million in the final year ending March 2026 on an NPV basis, or at least £1.5 billion in cash terms. Its main rival, Virgin Rail, had submitted a bid that would have paid £8.6 billion and £11 billion over 13 and 15 years respectively.

These payments assume a compound growth of 10.4% a year, more than Virgin achieved during the renaissance of rail under an expanding economy that saw an increase in all forms of travel, and two percentage points more than Virgin Rail was forecasting. Of this half will come from an increase in ridership (usually estimated as a multiplier of 1.2 or 1.3 of GDP which is optimistic in Britain’s present double dip recession) and half from running new services to the small cities of Shrewsbury and Telford. Seat numbers will rise by 35% by leasing an additional 106 new coaches and 11 new trains. Whereas previous franchise holders have been bailed out by the government’s “revenue support” scheme, this has now been scaled back. The government will only make up to 80% of the revenue shortfall if there is a difference of 4% between the official GDP forecasts upon which the estimates are based.

FirstGroup claims that there is room for cost cutting, which means cutting jobs, wages and conditions, and on board services. Most of all it will mean rising fares, in a country that already has high fares per mile. Next January, fares are set to rise by an average of 6.2%, much faster than the average rate of salary increases and with the economy in recession.

Thus the scene is set for another franchise collapse, as all the commentators in the media, including the pro-market business press, but not the government, recognises. But the risk to FirstGroup is small, just £245 million, the amount it will forfeit if it hands back the keys before the hefty payments to the government kick in after 7 years.

To conclude, the passenger rail franchises have proved to be a failure both in terms of performance and cost to users and taxpayers alike, and this is almost universally recognised - apart from the government, its advisors and the train operators, the beneficiaries of the regime. Such outcomes were entirely predictable. The fragmented and private ownership structure imposed on the industry ignores the basic realities of the industry.

Firstly, the essential problem of the railways the world over is that as a highly capital intensive industry it is difficult if not impossible to recover the full cost of running the industry, including the cost of enhancing the infrastructure and rolling stock, from the fare box, which is why, in the post-war period at least, public ownership and investment were necessary. Privatisation, which increases the claims of finance, only exacerbates the problem. Secondly, in the context of Britain, since the railways already had the lowest subsidies in Europe and the highest labour productivity, it was always going to be difficult to cut costs further to provide the necessary headroom for profits without either affecting service quality and safety or increasing subsidies and/or fares (Shaoul 2004). Taken together, this means that the risks that the government always retains are the demand, default, political and reputational risks and these are the most important ones.

2.2. A metro system - London underground

This section examines these issues of costs and risks in the context of the collapse of the three London Underground PPPs, by far the largest element of Britain's PPP programme. These were expected to procure capital investment worth £30 billion over 30 years for its aging underground network, used by 3m people a day for commuting and travelling around central London. Transport for London (TfL), London Underground's parent body, divided the lines into three separate packages and signed contracts with three consortia in December 2002, which became operational in April 2003. While London Underground would continue to operate passenger services, the consortia would maintain and refurbish London Underground's tracks, signals, stations and rolling stock in return for an annual charge for 30 years, although the contracts would be renegotiated every seven and a half years.

The run up to contract signing in 2002 had seen increasing public hostility to the outcomes of rail privatisation, particularly following the collapse of Railtrack, the private infrastructure operator. The London Underground PPPs were no more popular and were widely viewed as unworkable, even by sources such as the Economist, normally supportive of governments' market based policies. Prior to contract close, there had been several highly critical financial appraisals of the proposals (see Gaffney et al., 2000; Glaister et al., 2000; NAO 2000). They had queried the claims by the government's advisors (PwC 1999; 2000) that the private sector companies would be able to make savings of 30 per cent on London Underground's costs. Nevertheless, the government was committed to the policy and the projects and forced the PPPs on an unwilling TfL and pledged taxpayers' money to the projects.

In the event, the PPPs proved so costly that TfL had to scale back the investment. The Department for Transport (DfT) gave TfL about £1 billion a year, more than five times the existing grant, even though it had earlier stated its intention of terminating all subsidies for London Underground. Despite not being a signatory to the deals, it also guaranteed 95 per cent of the contractors' approved debts to reduce their cost of borrowing and reassure their financiers in the wake of Railtrack's collapse, with the result that the lenders "had limited downside risk" (NAO 2004a, para 10b). In addition, the DfT promised TfL that should London Underground find itself in financial difficulties as a result of the PPPs, the Secretary of State for Transport "regards it as untenable that" he would not consider further financial aid or that "he would stand by and do nothing in those circumstances".

In other words, the government would, in the event that London Underground found itself unable to meet its commitments, provide extra finance. This was tantamount to underwriting the consortia's income.

The NAO carried out two investigations (2004a; 2004b) after financial close that carried significant caveats. In the first, it observed that there was “only limited assurance that the price that would be paid to the private sector was reasonable” (NAO 2004a, para 4). In the second, it noted that while the contracts contained financial bonuses and abatements to incentivise performance, “the effectiveness of incentives is unproven” and these might have only a “limited impact” (NAO 2004b). It questioned whether the oversight mechanisms provided by the contract would be effective and warned that the ability of the PPPs to deliver the necessary improvements would depend upon effective contract management and the willingness of the DfT to provide the necessary financial support after the first 7.5-year phase.

The additional costs of private finance are those costs that would not otherwise have been borne under public procurement. They include the “leakages” resulting from first the higher rate of interest to the banks and second the post-tax profits attributable to the companies and their subcontractors. This may be estimated conservatively, using the data from the accounts and making estimates about the profit margins of their subcontractors (5 per cent of the subcontracted revenues). With Metronet subcontracting out half of the work and Tube Lines three quarters of the work, largely to their sister companies, the leakages amounted to between 14 and 22 per cent of the 3 consortia's annual receipts over the 7.5 years. Alternatively, to put it another way, around 20 per cent of London Underground's payments on its three contracts was the result of using the private sector as a financial intermediary. While such estimates are indicative rather than definitive, they are broadly in line with the additional costs noted in our study of hospitals and roads (Edwards et al., 2004).

The government's expectation was that the private sector's superior performance would compensate for this additional cost; this did not turn out to be the case. Despite all the government subventions, within two years the two Metronet companies, which had two of the three 30 year contracts worth £17 billion, were behind with their investment programme and over budget. In July 2007, just over four years since the start of the PPPs, they went into administration with debts of at least £2 billion after the owners, five international corporations, refused to commit further funding to their Metronet subsidiaries. The bankruptcy of the two Metronet consortia was precipitated by the refusal of the Rail Arbiter to award more than a fraction of their appeal for increased payments from London Underground to fund their nearly £1 billion overspend and a further £1 billion projected overspend by 2010. The Rail Arbiter said that if Metronet (referring to the two companies) “had delivered in an efficient and economic way, its costs would have been lower”.

The Mayor of London announced that £750 million would be made available to the Administrator to ensure that the trains would keep running. The two Metronet companies would continue their work while in administration, while their suppliers – their sister companies - and the workforce would continue to be paid.

Although TfL tried to reconfigure the contracts to sell them back to the private sector, it ended up retaining the ownership of the Metronet companies and the division of labour established by the PPP arrangements. It announced the postponement of some of the improvements expected under the PPP due to the additional costs created by Metronet's inefficiencies and collapse. Thus, the taxpayers and travelling public will bear the cost.

The NAO (2009) attributed the failure of Metronet to its corporate structure, governance and leadership. The five shareholders had to agree many of the decisions unanimously, but with shareholder-dominated supply chains, they had conflicting interests depending on their roles. The top management was therefore in an impossible situation, changed frequently and was unable to manage the work effectively. The NAO said,

“These suppliers had power over some of the scope of work, expected to be paid for extra work undertaken and had better access to cost information than the management. The poor quality of information available to management, particularly on the cost units of the station and track programmes, meant that Metronet was unable to monitor costs and could not obtain adequate evidence to support claims to have performed economically and efficiently.” (NAO 2009, para 7).

The DfT had to give grants of £1.7 billion to TfL to help purchase Metronet’s debt obligations. The NAO observed that despite underwriting Metronet’s debt, the DfT was not party to the contract, was not represented on London Underground or Metronet’s board of directors, and was therefore unable to manage its own risk. Ultimately reliant on information from Metronet about performance and costs, it effectively expected Metronet, the shareholders, lenders and everyone else to identify and mitigate its own risk.

The Tube Lines contract was no more successful. In May 2010, when the first 7.5-year phase of the PPP ended, TfL announced that it would take over Tube Lines at a cost of £310 million. This was because Tube Lines was set to get only £4.4 billion for the next 7.5-year period, £2.8 billion less than it expected or wanted. With Tube Lines’ costs rising, and its estimate for the next period beyond London Underground’s budget, TfL had referred their bid to the Rail Arbiter. The Rail Arbiter’s report showed three different costs: Tube Lines at £7.2 billion, TfL’s at £4.1 billion and his own at £5.1 to 5.5 billion, which was closer to TfL’s cost estimates than Tube Lines. Thus in all three cases, the independent Rail Arbiter found against the three PPP companies in terms of costs and efficiency. Unable to agree significantly better terms with TfL, the shareholders sold up at the breakpoint in the contract with compensation, when the deal became less profitable than they had anticipated.

The London Underground PPPs are important because they refute the assumptions at the heart of the PPP policy: first, that the private sector is more efficient than the public sector; second, that risk (and therefore cost) is transferred to the private sector; and third, that the private sector’s greater financial and commercial expertise will ensure viable and sound deals capable of delivering the specified contract performance.

2.3. Joint venture – the case of air traffic control

The case of National Air Traffic Services (NATS), Britain’s air traffic control operator and the third largest air traffic controller (ATC) in the European Union, provides another example of a PPP launched ostensibly to provide extensive capital investment, this time in the form of a joint venture between the public and private sectors.

NATS provides take-off and landing services at 14 UK airports, some international services and, most importantly, en route air traffic control services for aircraft flying over the UK and its North East Atlantic airspace. About 80% of NATS’ revenues are derived from North Atlantic travel. Its services are vital if the airlines are to operate safely and efficiently. But with Britain’s air lanes severely congested, the overarching safety requirement may lead to delays that create extra costs for its customers, the airlines, without careful management.

The then Conservative government reconstituted NATS as a corporation operating as a subsidiary of the publicly owned Civil Aviation Authority (CAA) and proposed to privatise it, which the opposition Labour party opposed. But as the party in power in 1998, the incoming Labour Government published plans for a partial sale of NATS to a private partner, under its flagship PPP policy, and introduced the necessary enabling legislation in 2000. The stated reason for this PPP was the need for at least £1 billion of capital investment over a ten year period. No evidence was produced to explain what was required, the validity of the estimates, or why NATS could not continue to borrow from its existing sources. In March 2001, the government agreed to transfer a 51% stake in NATS to the Airline Group, a consortium of seven airlines, NATS' UK customers, for about £800 million, more than twice the expected sum.

But in May, the Airline Group told the Government that as a result of the decline in the transatlantic traffic and costs that it had overlooked, it could not afford its offer price and a reduction was agreed. In July 2001, the government transferred a controlling stake in NATS to the Airline Group, a consortium of UK airlines, for £750 million, with the expectation that its new owners would invest in new equipment to the tune of £1 billion over 10 years. The Airline Group financed the deal with £55 million of their own capital as equity and raised the rest as loans that that would be repayable by NATS, with the intention of raising the £1 billion investment funding via additional loans.

Thus, NATS would be a PPP or joint venture between the private sector and the Civil Aviation Authority, NATS' former public sector parent. But within three months, in the aftermath of the terrorist bombing of the World Trade Centre in September 2001 which halted transatlantic traffic for three days and the subsequent downturn in traffic volume, NATS' bankers became concerned about NATS' ability to service its debts, forcing NATS to ask for government help to stave off bankruptcy. Given the government's international treaty obligations to provide air traffic services and commitment to its flagship policy, it had no option but to provide financial support.

Although NATS and the government attributed the collapse to unforeseeable events, an analysis carried out before financial close (Shaoul 2003), based upon the widely expected £350 million purchase price, had shown that the project was unviable: it was never going to be affordable, even without the unprecedented downturn in travel after 9/11. The PPP worsened rather than resolved NATS' financial problems. But no risk assessment was carried out prior to the PPP even though the government remained a part owner and as signatory to international conventions guaranteed service delivery (NAO, 2002b). This was despite the fact that the PPP generated additional risks as a result of the high level of private sector loans.

2.4. On-going DBFO contracts in Britain

We examined the first eight of the Highways Agency's 14 contracts¹⁴ to extend and maintain its roads (Shaoul et al., 2006). These eight contracts, operational since 1997, are paid for by the Highway Agency on the basis of traffic volumes or shadow tolls. The evidence relating to one of these roads, and there is no reason to believe that the results are substantially different for the others, suggests that in engineering terms, the road was constructed in accordance with the contractual requirements and its operation and maintenance are very good, although this assessment is considered in isolation from the cost (Shaoul et al., 2007a). Certainly, the Highways Agency views them as a success, although it has published no financial evidence about the operation of the contracts to demonstrate whether they constitute VFM in practice.

The concessionaires are special purpose vehicles (SPVs) or consortia, typically composed of a financial institution and construction and maintenance companies, which raise debt to finance the projects. As shell companies, the SPVs typically subcontract the work to their sister companies. The Agency pays about £220 million a year for these eight DBFO contracts, indicating a total cost of about £6 billion over the 30 year life of the contracts. With traffic volumes rising, the SPVs are commercially successful companies. Annual payments in just three years were £618 million, more than the £590 million cost of construction.

The annual cost of finance, interest payable and post-tax profits, was about two thirds of the revenues received from the Highways Agency, although in some years this was even higher due to refinancing gains. It illustrates the importance of capital as opposed to operating costs in roads. We estimated the additional cost of private over public finance to be more than 20% of revenues a year. This was however a conservative estimate, since the parent companies have additional, undisclosed sources of profit via subcontracting the construction, operation, maintenance, and financing of the projects to related companies, as well as refinancing gains, making it impossible to establish the total cost of using the private sector as financial intermediaries.

The additional cost of private over public finance raises two issues: the cost of risk transfer and affordability. The higher cost of private finance is justified in terms of risk transfer. But since risk and risk transfer are *ex ante* concepts, it is impossible to quantify the risk *ex post facto* and thus determine whether or not it constitutes VFM.

In the case of these DBFO roads, the main risks (NAO 1998, Shaoul et al., 2007a) were held by the public sector because all eight projects had already gone through the design and planning approval stages. Other than construction risk, there is therefore little direct risk to the parent companies (whose initial investment was in any event very small) and almost none to the banks, since the state *de facto* guarantees the debt. Indeed, the credit ratings agency Standard and Poor's, noted that the Highways Agency's "obligations were directly guaranteed by government" (2003, 9).

The higher cost of private over public finance also raises questions about the impact of these schemes on the rest of the Agency's budget. According to a Highways Agency official, the commitments for all its DBFO projects are about £300 million a year, or 20% of its budget, for 8 per cent of its network (Taylor, 2005). He said that the new contract for the M25 would add a further £300 million a year, meaning that 40% of the budget will be committed for a very small proportion of the network. Thus while these roads will be maintained, there may be little money left over for the rest of the network, which may not be the most rational way of prioritising road maintenance.

Moreover, the more recent projects, including the M25 DBFO, have an even higher additional cost of private finance (NAO, 2010). Following the collapse in the subprime mortgage market in 2007, the banking crisis in 2008 and the subsequent credit crunch, bidders for DBFO projects were finding it difficult to raise finance from either the banks or the bond markets. This was despite the nationalisation of some of the banks, huge subventions to the banking sector and an array of other financial measures to increase liquidity and bank lending. Having placed no requirements on the banks to lend and eager to secure the flow of PPP projects, the British government decided to set up its own Infrastructure Finance Unit to lend money on commercial terms to the banks to finance PPP projects, and thus rescue both the policy and the projects in the pipeline. This was justified in terms of the need to "stimulate the economy", although loans to the public authorities would have achieved the same results more cheaply.

The banks in turn lent on at rates that averaged 2.5 to 3.5 percentage points higher than their own borrowing rate, while at the same time negotiating more onerous conditions with the PPP consortia that reduced their risk (NAO 2010). The banks increased the cost of financing PPP projects by between 20 and 33 per cent (PAC 2010), claiming that this was a more accurate reflection of their risks.

However, as it is the public agencies, based on taxpayers' money, that are ultimately responsible, it is difficult to understand how their risk is anything other than minimal. The NAO estimated that between £500 million and £1 billion of extra costs were locked into these PPP projects. This is over and above the "normal" additional cost of private finance described earlier. Furthermore, the NAO noted that the procuring authorities had not recalibrated their VFM studies and questioned whether such projects were VFM.

Several inter-related conclusions flow from this analysis. The cost of the DBFO shadow toll road projects are in line with other UK DBFO road projects (Shaoul et al., 2008a) and hospitals (Shaoul et al., 2008b), and both toll and shadow toll roads in Spain (Acerete et al., 2009). The evidence suggests that the Highways Agency has paid a high price for risk transfer and challenges the notion that risk transfer delivers VFM. It also raises questions about affordability and suggests that these contracts must entail cuts elsewhere. This in turn means that far from providing additionally, the new construction (and maintenance) comes at the expense of other Highways Agency projects.

2.5. M6 private toll road

In 1989, the then Conservative government proposed a privately funded and financed venture to build a new road to relieve congestion on the motorways around Birmingham. The concession for the M6 toll road would run for 53 years, expected to be three years construction and 50 years operation. After long planning delays, the road opened at the end of 2003, with a construction cost of about £700 million. With its charges unregulated, the road operator originally set its prices to minimise its future maintenance costs by effectively pricing heavy goods vehicles off the road.

Shaoul et al., (2008a) found that in 2006, revenues, including those from the service station, were £51 million. This was widely acknowledged to be less than expected due to lower than forecast traffic volumes, although traffic was rising and had reached 50,000 on an average working day (company's website). Intended to relieve congestion, the new toll road still carries only 20 per cent of the traffic on the existing motorway, as drivers are reluctant to pay for using the road while others remain free, and despite reducing its charges for heavy goods vehicles from £11 to £7. The toll road has thus failed to achieve its stated *raison d'être*.

The company was financed by debt, which at £819 million was considerably more than the construction cost of the road (about £700 million). The interest payable to service the debt was £45 million, an effective interest rate of 5%. While this is as yet low and only marginally more than the cost of public debt, it may increase, as typically the interest payments are deliberately set low in the early years when revenues may be low. After paying interest, the company made a post-tax loss of £21 million in 2006. Losses continued and had risen to £28 million in 2008.

With construction complete the company refinanced its debt in June 2006, taking on a larger debt that would release about £350 million cash for investments elsewhere. This serves to increase the concessionaire's risk. It also increases the risk to the Highways Agency which would have to assume responsibility for the road should the concessionaire go under.

Anxious to increase the low traffic volume, the concessionaire came to an agreement with the government to use £110 million of the proceeds to finance the construction of two new road developments that would feed into the M6 toll road, which would not themselves be tolled.

Although the Highways Agency refused to release both the strategic case and the contract for the developments under a Freedom of Information request for reasons of commercial confidentiality, it did confirm what was implicit in the announcement: that the project had been agreed without advertisement or competition and that the roads had not yet received planning approval.

Irrespective of the fact that the roads will be built (if they are indeed built) without cost to the taxpayer this means that the roads have jumped the capital prioritisation queue as a result of an unsolicited proposal. That is, instead of the Highways Agency using a share of the refinancing gain for other projects, it approved the construction of new roads that may not have been justified on broader economic grounds in order to make the toll road viable, shielded from public visibility and scrutiny under the rubric of ‘commercial sensitivity’.

2.6. Completed road concessions

Our analysis (Shaoul et al., 2011) of the first two completed or terminated private contracts, the Dartford Crossings and the Skye Bridge respectively, provide further clarification of these issues. We deal with each in turn.

The Dartford Crossings, widely seen as a successful project, involved a private sector consortium building a new £180 million bridge for the Department of Transport. The bridge, the Queen Elizabeth II Bridge across the Thames, was designed in the mid-1980s to complement the two Dartford Tunnels and cope with the increase in traffic from the M25 that opened in 1986. The concession involved firstly building, operating and maintaining the bridge, which would be tolled, and secondly transferring the two tunnels and their associated revenues and liabilities to the consortium. The tunnels had cost £13 million and £45 million respectively to build, had been run by two local authorities and were already tolled. The first tunnel had been fully paid for, but the more recent tunnel carried a debt of £43.5 million. In other words, the concessionaire would manage and receive revenues for the three crossings while paying for the construction and financing costs of two. The concessionaire was a not for dividend company. The concession was awarded for up to 20 years from 1988 and the bridge became operational in 1991. It would terminate when the tolls had covered the cost of the bridge, including its financing.

With traffic flows that were high and higher than expected, the tolls were relatively low and stable¹¹⁵, thereby avoiding political controversy, with the result that the loans were paid off six years ahead of schedule in 2002, incurring unexplained and high penalties of £31 million. Our analysis showed that private finance added £50 million to the total cost, most of which was the £31 million early repayment penalty, meaning that toll charges could have been lower than the actual price.

In short, the Dartford Crossings were successful due to high and much higher than expected traffic flows. The tolls were relatively low and stable. It shows that the key to successful projects (and low tolls) lies in high volumes relative to construction and financing costs. Several other factors were important in the design of the concession. The concessionaire was a not for profit company, so no dividends were payable to the parent companies, thereby reducing the cost of finance and thus the toll charges. The Dartford project also included three crossings. That may be justified from a traffic management and operational perspective, but it reinforces the point that making new road schemes viable may entail bundling new construction work with existing high volume roads. One of the tunnels was essentially ‘given’ to the company since it had been fully paid for, while the other had £45 million debt outstanding.

Without the tunnels, which carried about half the traffic, the toll charges would have had to be very much higher. Thus even the most ‘successful’ schemes rely on public support. Moreover, that support may not be widely known to the public at large.

The Skye Bridge project, signed in 1991, on the other hand is held up as an example of failure. It involved the private sector building a short bridge – to be tolled – to the picturesque holiday island of Skye, in the west of Scotland, with a population of just 50,000. The concession would last until either total revenues had reached £23.6 million discounted at 6% to 1991 prices or 27 years, whichever was sooner. The total cost of £39 million, including the construction cost of £20 million, £4 million for operating costs and £15 million from the Scottish Office for the approach roads, was more than expected (NAO, 1997). The Skye Bridge opened to traffic in 1995.

The cost of constructing and operating the bridge combined with the low and seasonal traffic volumes determined the toll charge, the concession period, and ultimately the net cost to the public sector, albeit to different public sector entities. The intention was that the concessionaire would recover the full cost via toll charges, which would be the same as the pre-existing ferry charges, which would cease to operate on that route. But since traffic volumes were low, this meant that toll charges were high – the highest in Europe per kilometre of road. The Scottish Office, later known as the Scottish Executive, bowed to regional protests that attracted considerable publicity, and agreed to subsidise the tolls for frequent users as from January 1998 and freeze the tolls to users from January 2000, at its own expense. Later it agreed to pay the VAT charges, necessitated by EU law, to avoid toll increases. Continuing political pressure led the Scottish Executive to terminate the concession in 2004 at a cost of almost £27 million

Our estimate of the additional cost of private finance was about £18 million. However, this estimate was conservative, since it omits the leakages via subcontracting to sister companies. The Scottish Executive ended up paying £7 million to subsidise the tolls and cover the VAT and £27 million to terminate the contract, a total of £34 million. It means that if the bridge had been built with public finance, the toll charges, if there were any, could have been set at half the price.

The Skye Bridge case demonstrates that in freestanding projects with user charges, there are risks to the public purse. In the case of Skye, public opposition to the tolls was so great that ultimately the public authority had to bear the costs it had sought to transfer to the private sector, which had become much greater as a result of private finance. That is, the move to private finance may create additional risks for the public sector, as the experience of some toll roads in other countries has shown, and these risks are ultimately a political issue. The corollary of this is that the private partners’ rewards may not be commensurate with either the risks actually borne or the additional risks created. The government has now acknowledged that schemes such as the Skye Bridge are unlikely to be suitable for private finance in that they transfer demand risk (Treasury, 2003).

It is instructive to recall how the government had sought via the contract to mitigate demand risk for the Skye Bridge Company (SBL). Firstly, the Scottish Office extended the period of the concession to 27 years beyond the intended maximum of 20 years to ensure SBL could recover its costs. Secondly, under a ‘safety net’ provision, SBL would be able to raise tolls by 30% above the rate of inflation if toll revenues fell below a sum corresponding to 1990 traffic levels, implying a toll charge higher than ferry fares in 1991. Yet the Scottish Office’s stated objective was that charges should be no higher than the ferry charges. The Scottish Office thereby ensured that SBL’s revenue risk was low, with the risk falling on the road users. Indeed, the NAO admitted as much, reporting that both the Scottish Office and the company believed that the concession was likely to end within 14 to 17 years. More importantly, these revenue protection measures constituted a form of guarantee by the government, despite its original

objective of no disguised government guarantees (Department of Transport, 1989) that served to reduce the concessionaire's financing costs (NAO, 1997).

But the higher cost of private over public finance meant that both Skye and Dartford charged tolls which were higher than they would otherwise have been if financed with public debt. With toll schemes it is the road users not the taxpayers who pay. But private finance for public goods with wider external benefits and problems creates an additional cost. In the case of the Skye Bridge, those costs were so high (relative to revenue) that the state had to step in with taxpayers' money: £34 million for subsidies, VAT and the termination fee, costs that the road users would otherwise have borne. This was higher than the construction cost of the bridge which the then government had said it could not afford. Thus, where traffic flows are low relative to the construction cost, the users – and/or the company - are unable to bear the cost and the costs ultimately fall back on the taxpayer, as the international experience in Spain and Mexico also demonstrates (Acerete et al., 2009).

2.7. Proposed new bridge: the new Mersey gateway

The proposal to build a new bridge, the New Mersey Gateway, in addition to the pre-existing Runcorn Bridge, provides an interesting example of the way that the decision to use private finance changes existing arrangements in order to make a new project viable. The £589 million new bridge is to be built, financed and operated by the private sector and subject to toll charges.

In an attempt to ensure that traffic flows are high enough to deliver the requisite income and toll charges low enough not to arouse public anger, the concession involves reducing the number of lanes open to traffic on the existing bridge, diverting traffic away from the old bridge towards the new bridge and tolling the existing bridge. This will be the first known instance in the UK of tolling a hitherto free bridge in order to make a private scheme viable.

Having examined the details of these seven UK cases, the next three sections of the paper turn to consider the underlying issues more broadly.

3. FINANCIAL REPORTING AND NATIONAL ACCOUNTING

The rationale for PPPs has changed so much over time that even its proponents have described it as “an ideological morass” (IPPR 2001). Although the UK government’s focus has been on the VFM benefits of PPPs, it was originally justified as a way of providing infrastructure the state could not otherwise afford, and this latter justification is still evident in other countries. But given the high cost of using private finance, it is strange that such a justification persists. The answer to this conundrum lies not so much in terms of the cash governments are able to afford, but in the loans and expenditures that they report and which are therefore visible, or invisible, under some rather complex accounting rules. Two different kinds of accounting are applicable.

Firstly, there is the financial reporting of public entities, which in a small number of countries is also consolidated to form Whole of Government Accounts (WGA). The UK public sector is unusual in that for these purposes it reports using private sector accounting standards. In the early days of PPPs standards were issued locally but more recently the UK has moved to adopt international standards issued by the International Accounting Standards Board (IASB). HM Treasury’s initial position was that PPP primarily represents the procurement of infrastructure-based services, implying that the infrastructure asset and related liability would not be recorded in the public accounts. Initially therefore, PPP projects were often off public sector balance sheet, that is, the debt was invisible – an attractive outcome for government. However, broadly speaking this accounting treatment is at odds with requirements from both the UK and international private sector regulators because they view the legally binding future commitments to make annual payments as real long term liabilities. So over time UK PPP projects are tending to move on public sector balance sheet. The on balance sheet treatment is especially true of transport schemes - using figures from October 2007, Heald and Georgiou (2011) calculate that 88% by capital value (although 41% by number) of transport schemes were on balance sheet.

But it remains difficult to find sufficient information about PPPs to hold government to account. To improve the transparency of financial reporting we (Shaoul et al., 2008) make the following recommendations about the quality and specifically the disaggregation of public sector annual reporting:

- Disaggregated information about individual large-scale PPPs should be reported in the financial statements to provide information about the current year’s payments, expected payments and future commitments.
- There should be a breakdown in the financial statements of the unitary charge between availability and service elements, and amounts deducted for poor performance.
- An explanation of the risk assessment leading to any off-balance sheet treatment for PPPs should be disclosed.

- Information on all contingent liabilities together with assessments about the probability of crystallisation should be reported by the public authorities and collated and published by the Treasury, in accordance with the recommendations from the EU and OECD that quantitative information about contingent liabilities should be disclosed (EMU, 2003; OECD, 2001).

Contingent liability reporting in relation to PPPs in public sector accounts is especially limited, probably because governments tend to judge the likelihood of a guarantee being triggered as lower than it is. To avoid this Irwin (2007) suggests that public authorities should list all those events that could trigger a guarantee, and evaluate the maximum loss to the government and the expected loss, based on probabilities of listed events. Furthermore, because recession can trigger a number of guarantees in an economy simultaneously just as tax revenues are small, he argues that governments should insist on contributions to a special fund for the estimated cost of any guarantee.

Most other countries that adopt international standards follow those of the International Public Sector Accounting Standards Board (IPSASB), which has been slower to consider the reporting of PPPs. However, these countries will soon find similar pressures as those faced by the UK to bring PPPs on balance sheet as new IPSASB regulations effective from January 2014 essentially mirror those of the IASB.

The second form of accounting is the national accounts (NA) — the macro-economic accounts. In common with other European Union countries, the UK's Office for National Statistics (ONS) prepares these based upon the European System of Accounts (ESA). With respect to PPPs there are two key differences between the WGA and NA: the approaches to the definition of assets and debt. Speaking in broad terms, the WGA show more PPP assets and related liabilities on balance sheet than are captured by the NA within the calculation of the Public Sector Net Debt. Eurostat, the EU statistical office, has provided guidance for reporting PPP assets and related liabilities in the ESA (ESA 95). These regulations determine not only the financial reporting by the relevant entities, but also government statistics relating to debt, capital and current expenditure. Although Eurostat appears to bring PPP assets and related liabilities on balance sheet, there is enough ambiguity in the regulations to mean that this can be circumvented, thereby evading the constraints on public debt imposed by the Stability and Growth Pact. Under Eurostat's ruling, unless the private partner bears the construction risk and either the availability or demand risk, then the asset will count as a public sector asset. While this was widely viewed as a measure to rein in off-balance sheet projects, in practice PwC (2005:61) argue that 'the EU rules regarding the accounting treatment of PPPs in national accounts are less restrictive than many governments and industry commentators previously feared'. Hall (2005) argues that this is intentional because in principle the EU authorities are in favour of PPPs and see them as a route to enable investment by governments constrained by the EU's own fiscal rules.

Thus, whereas traditional procurement of infrastructure is usually financed by government borrowing which is visible on the balance sheet of the public sector, and therefore counts towards external or self-imposed restrictions on borrowing, as a UK parliamentary report (H of C, 2011) has recently acknowledged, there are incentives to use private finance over other procurement options because the rules still exclude PFI from statistical calculations of Public Sector Net Debt. That is, the use of private finance may be attractive to governments, irrespective of the associated interest costs or whether or not the project is VFM, because depending on the relevant accounting regulations the debt may be invisible. Furthermore, as this report explains from a budgetary perspective PFI appears more affordable if one looks into the future for a limited number of years (for example, over a spending review period) even if the total long term cost is higher than traditional procurement.

To counter the tendency of governments to minimise current expenditure and current liabilities by keeping costs out of current budgets and off current Balance Sheets, the report argues that HM Treasury should align the treatment of PFIs in departmental budgets with their (on balance sheet) treatment in financial accounts so that the PFIs score within budgets in the same way as direct expenditure. That is, all future PFI liabilities should count towards assessments of whether the government has met its fiscal rules.

This call for the clear reporting of debt in government accounts aligns with the call by IFAC (2012) for governments to adopt IPSASB regulations so that there can be a better and more transparent reporting of government debt on an international basis. This is because it is a well-established principle that citizens should be able to understand how society's resources are being used. While many citizens may not be capable of interpreting complex financial statements, these are nevertheless a key source of information for informed citizens to hold government to account. In this respect, transparency of financial reporting of PPPs is so essential that Boardman and Vining (2010a) caution that governments should not deal with companies that will not accept the need for transparency.

We (Shaoul et al., 2008) also recommend that public sector external auditors should investigate through the extended supply chain, and determine if private partners are viable and specifically that adequate provisions exist for future maintenance costs on PPP projects. They should ensure that public sector procurers enforce the provisions in contracts to ring fence front loaded payments. Governments should designate private companies that deliver public services as public authorities for the purpose of allowing citizens to make freedom of information type requests. (Under the Freedom of Information Act 2000 the Lord Chancellor has the power to do so in the UK but has thus far chosen not to exercise this power).

Further, to ensure that governments can be held to account for decisions made, we recommend that:

- There should be an agreed limit on the time period when commercial confidentiality may be used as a rationale for non-disclosure.
- After this time period public authorities should routinely publish their full business cases (In Australia, Victoria regularly publishes business cases online, although financial information may be redacted).
- Public authorities should conduct post implementation reviews for all major PPP projects and publish them in an agreed timeframe (Shaoul et al., 2008).

Without implementing such recommendations, public authorities cannot provide the public with the information needed about the costs, VFM and affordability, or the sustainability of public expenditure, public debt and the government's implicit liabilities. As Irwin (2007) notes, irritating as it may be for government the possibility of external criticism probably improves decisions.

The absence of appropriate accounting and budgeting rules can lead governments to favour PPP over public procurement. To ensure that their chosen route is adopted, many have withdrawn all other possibilities for public authorities to invest. The outcome is that the favoured approach becomes the only option – 'the only game in town'. In the next section we examine the consequences.

4. THE ONLY GAME IN TOWN

As the OECD (2011) has noted public procurement contracts and concessions work best where there is competition and less well where there is bilateral negotiation with an incumbent supplier rather than open competition. But forcing public entities to use PPPs removes the possibility of competition between traditional procurement and private sourcing. Internationally, this lack of public / private competition has been exacerbated by a shortage of private sector bidders for PPPs. Low numbers of bidders has been attributed to the high bidding costs, but may also be due to barriers to entry (Demirag et al., 2010). Smaller contractors suffer from lack of credibility and contacts in the market place, their balance sheets cannot support the equity investment that senior debt lenders expect from contractors because this increases the contractors stake in the project, and they are perceived to be more at risk of bankruptcy in the economic recession. All of this excludes them from joining syndicates (Demirag et al., 2010). The lack of competition may be aggravated after the preferred bidder stage when significant changes to contracts occur in the absence of competitive forces.

In circumstances of restricted competition where both public and private partners are aware that PPP is the ‘only game in town’, not only do the private bidders become very powerful, but also there is an incentive to bias estimates in the PSC to ensure that the PPP bid passes the VFM test. Just a few examples illustrate how this can occur. Firstly, the choice of discount factor is critical to the outcome of net present value / cost calculations. Boardman and Vining (2012) show how inflated discount rates increase the desirability of PPP options. Secondly, as it is known that the PSC project is not going to obtain approval there is less incentive to spend the necessary resource for its preparation, and it may not be kept up to date for negotiated changes (Shaoul et al., 2004).

Thirdly, there may be assumptions in the PSC that vary from the private bids. We (Edwards and Shaoul, 2003b) have shown how the same parcel of land to be sold for redevelopment was valued at different amounts in the PSC and private bids. Whereas the PSC based the value of land on the assumption that the public authority would comply with local authority guidance on housing density and 25% social housing, one private bid ignored both guidelines and so was able to increase the apparent attractiveness of its bid by giving the land a higher valuation. In the context of a tiny difference between the PSC and the private bid this distinction was significant.

Similarly, Boardman and Vining (2010b) discuss a Canadian example where high negative externalities in the form of disruption to downtown traders located on the path of the Canada Line project were not reflected in the comparison with the PSC, although these externalities would have been less under the PSC project, because it assumed more tunnelling. In the event these omitted costs became real costs when the traders successfully sued for damages.

These examples together with the evidence from failed projects both in the UK and elsewhere raise questions about the public authorities' appraisals of PPP bids. Under circumstances where the government is actively promoting the involvement of the private sector in running public services via PPPs by refusing to make funding available for traditional procurement, policy promotion may come into conflict with rigorous project appraisal. To avoid this Boardman and Vining (2012) suggest that separate government agencies approve projects from those that evaluate them.

However, these examples also raise questions about the role of the public authorities' advisors. Advisors have played a key role in devising the policy, the VFM methodology, the implementation process and promoting the policy internationally, but they also have a commercial interest in the policy as an important new market, acting as advisors to both the public and private sectors and in some contracts as partners or major subcontractors in their own right (Shaoul et al., 2007b).

5. LESSONS FROM PPPS

In this section we examine some of the claimed benefits of PPP and consider what experience to date shows.

5.1. Wide-ranging programme goals and the nature of projects

PPPs often have programme goals that are much more wide-ranging than simply building infrastructure and delivering the associated services, although whether such goals are ultimately achieved may not be formally evaluated. The first UK DBFO roads provide a good example. They were conceived as part of a wider policy of introducing road pricing, and the objectives included testing the enthusiasm of the market for DBFO roads contracts across a range of different roads projects, creating a market for roads and a private road operating industry (NAO, 1998). However, the Highways Agency has not made public any evaluation of whether these objectives, which may have distorted the allocation of winning bids because the projects were deliberately dispersed across a range of companies, were successfully achieved.

The nature of transport assets is that these are large, complex and risky projects, where the public benefits of transport links exceed the benefits accruing to users and investors. They do not benefit from well-functioning private sector markets so they need government support, and despite the rhetoric PPPs remain government projects (Boardman and Vining, 2012).

It is interesting that proponents of PPPs have focused attention on the supposedly favourable comparison between PPP projects that are said to come in on time and to budget against the propensity of traditionally procured assets to overrun time and budget estimates. PPPs, it is argued, provide certainty, although this was not part of the original policy objectives. However, the evidence is mixed. The UK's NAO (2009) reviewed a sample of PFIs and found that 31% were late and 35% over budget, so that good performance on these targets is not universal. And of course delivery on time and to budget, which could be achieved by suitable incentive mechanisms in traditional contracts, is no guarantee that the project delivers VFM.

Many PPPs are long term commitments, both because of the need to repay the debt where private finance is involved, and because of the nature of the assets which typically have long expected lives. Very long asset life spans demand predictability and long-term commitments in relationships whilst preserving some flexibility to deal with changing external circumstances (OECD, 2011). Thus PPP contracts for infrastructure and related services must hold good for 30 years or be sufficiently flexible to adapt to changing needs easily.

However, flexibility in contracts tends to add cost, potentially making the contract unaffordable. Thus there is a trade-off between flexibility and affordability. Experience suggests that PPPs, particularly of the contractual PFI nature, do not work well in complex fast changing environments where flexibility is needed to respond to changes in: service delivery methods; fluctuating demand driven by changing demographics; and fast moving innovative technological developments.

For example, HM Treasury accepts that IT projects are not suitable for PFI (HM Treasury, 2003). Where private finance is involved it makes changes to contracts more bureaucratic and expensive as variations require multi-party consent, including consent from senior debt holders (Demirag et al., 2010).

Proponents of PPPs argue that because infrastructure and services are combined in a single project the private sector has an incentive to minimise whole life costs and that this will lead to innovative design. But across a number of sectors the evidence about innovation is mixed. In transport the lack of innovation may be tied up with the risk associated with planning permission. To obtain planning permission detailed design information must be submitted and approved. This essentially means that innovative design must be known and included in the project before planning permission is granted. But because the private sector typically does not wish to hold planning risk where the project may be controversial, as is often the case, for example, with new roads, the opportunity for innovative design may have come and gone before the private partner has even been appointed (Shaoul et al., 2004).

5.2. Risk averse investors

Even after the credit crunch, when the proportion of equity has tended to rise slightly, PPPs are typically financed substantially by senior debt, a generally risk averse form of investment. Furthermore, because of this highly geared finance structure the SPV has limited risk carrying capacity (Demirag et al., forthcoming). That is, even the equity investors are risk averse. Risk diffusion away from the SPV is essential to obtain an investment grade rating for the project. Significant financial and performance supports are put in place to limit the liability of the financiers whose primary concern is to ensure that PPP risks do not rest with the equity partners but are passed to the contracting companies. But since the contracting companies do not have the expertise to manage all these risks they hedge or insure unwanted risks. These arrangements are complex so that they require the input of financial, legal and insurance experts. The consequent additional cost to the project is ultimately borne by the public sector procurer (Demirag et al., forthcoming).

HM Treasury (2003) has argued that the independent due diligence tests performed by these risk averse banks will ensure a robust project specification and hence reduce risk for the tax payer, as well as the bankers. But an examination of the capital values of the most well-known UK failures, outlined below, confirms Demirag et al's (2010) argument that the financiers' due diligence is only intended to protect their own interests and will not necessarily protect the public interest.

The £4.2 billion Channel Tunnel Rail Link PPP had to be renegotiated within months of signing. As described earlier, the £800 million National Air Traffic Services PPP collapsed and had to be rescued by the government within three months of financial close for reasons that were entirely foreseeable (Shaoul, 2003).

The Skye Bridge project was terminated due to public outrage over user charges that were the highest per kilometre in Europe. The cost of termination plus the subsidies to users was far higher than the original construction cost that the public authority had said it could not afford (Shaoul et al., 2011). By far the largest collapse has been that of the three London Underground PPPs, discussed earlier. Two of the concessionaires, Metronet BCV and Metronet SSL, went into administration in 2007 after making substantial losses, while TfL terminated the contract with the third, Tube Lines, in May 2010 at the breakpoint in the contract, after failing to come to an agreement on costs.

Taken together, it means that a significant proportion of UK transport PPPs by capital value have collapsed, been terminated or only survived because the contracts were renegotiated, penalties waived, etc. The capital value of just the failed/renegotiated transport projects listed above (excluding the failed and renegotiated rail franchises) comes to more than £35 billion. This compares with a recent Treasury list of existing projects (that excludes both these and the rail franchises), of £56 billion (Treasury, 2010) and is more than one third of the value of all the £91 billion projects. Such a high failure rate is hardly a ringing endorsement of the banks and financial advisors' ability to ensure a robust project specification and implementation.

However, there is a further point. While the failure of a large or high profile project is reported in the national press, the failure of smaller projects and their consequences may go unreported or reported only locally. There is no register of what happened to projects nor any overall assessment of what happened when projects collapsed, who bore the costs and how this corresponded with the risk premium. Thus, the true extent of project failure is unknown.

In practice the corporate structure of the SPV and its related companies, the legal arrangements around the loan agreements, and performance supports means that each project is ring-fenced so that in the event of failure the private sector partners can walk away, losing only their initial stake in this one project and any penalty as stipulated in the contract. The PFI structure insulates debt investors from holding risk. (Keating, 2004)

5.3. Risk transfer, risk premiums and evidence of risk transfer

Risk transfer lies at the heart of the rationale for PPP and the UK government claims that the higher costs of private finance are offset by the benefits of risk transfer, although Pollock and Price (2004) suggest that this claim is largely unsubstantiated.

Despite the centrality of risk transfer to the case for private finance the UK government or its agencies, such as the NAO, have not made a comprehensive assessment of the degree to which risk transfer has occurred in practice or has been commensurate with the risk premium or cost.

For example Pollock and Price (2008) found that while the NAO had made 10 financial studies of operational PFI projects where there had been significant post-contract changes, it only examined the relationship between the risk premium and risk transfer in three of them. What is most significant is that the relationship between risk transferred to the private sector and the risk premium charged for that transfer is obscured by the complex structure of PFI projects (Pollock and Price, 2004).

It has become an oft repeated mantra that risk should be held by the party best able to manage it at least cost, but the allocation of risks between partners has not necessarily been optimal in practice (Quiggin, 2005), and risk premiums may be high because the way that risk profiles change over the duration of PFI projects is not well known (Ng and Loosemore, 2007). Irwin (2007) takes a more sophisticated view of risk allocation. He argues that risks should always be allocated along with rights to make related decisions, and that consideration should be given to which party can best exercise real options, such as deferring, expanding, contracting or abandoning the project, and absorb risk. Furthermore, in relation to demand risk, one of the key risks and one that the private sector is usually unwilling to carry, he argues that it should be allocated to the party best able to forecast demand.

Concerns have been raised that the accounting tail may have been wagging the PPP dog, as inappropriate risks may have been transferred to ensure an off balance sheet accounting treatment and/ or that the private bid is VFM compared to the PSC. But what constitutes an inappropriate risk is debatable. Especially the question of who should hold demand risk is unclear.

In evidence to the House of Commons (H of C, 2011) Balfour Beatty a major contractor argued that risks should not be transferred unless the private sector could manage them better than the public sector. While this contractor's list of such risks included demand risks, the House of Commons committee suggested that PFI is only suitable if the risks associated with future demand and usage of the asset can be efficiently transferred to the private sector. Yet, this position contrasts with that stated by HM Treasury (2003).

Evidence about risk transfer in practice is mixed. There are examples where construction risk especially has passed to the private sector, but also cases, as outlined above, where risk has reverted to the public sector. Low penalties for poor service provision suggest, as the NAO (2007a) acknowledged, that the service element of PPP contracts carries little risk for the SPVs. The credit ratings agency Standard and Poor's (2003) confirmed this general point, observing that there been few deductions on PFI/PPP contracts and these had been small, in part at least because the complexity of the contracts made them difficult in practice to enforce. Although projects may fail to transfer risk in the way that the public agency anticipated, the possibility of enforcing the arrangements and/or dissolving the partnership is in practice severely circumscribed for both legal and operational reasons, with the result that a public agency may be locked into a partnership for better for worse (Edwards and Shaoul, 2003a).

While research and practical experience may be used to resolve issues about the allocation, measurement and pricing of risk, these technicalities are missing the point. PPP is not so much about risk and VFM as it is about creating investment opportunities for the private sector and prioritising the risk-return criteria of private finance over the needs of the public sector (Asenova and Beck, 2010). Our evidence has shown that the public sector has paid dearly for risk transfer, something that the IMF warned governments against:

“It is also possible that the government overprices risk and overcompensates the private sector for taking it on, which would raise the cost of PPPs relative to direct public investment.” (IMF 2004, 14).

6. CONCLUSION

This paper has sought to review the experience of the UK's transport PPPs and the financial costs of different types of PPPs to inform the international policy debate about the value or otherwise of using PPPs to secure and manage transport infrastructure.

Firstly, it is clear that the rail projects have failed to deliver the physical outputs expected of them, despite receiving higher funding than was ever available under public ownership. In relation to road projects, there is no evidence to suggest that they are any better or worse than their conventionally procured counterparts. In so far as the DBFO roads are better maintained, and this remains to be demonstrated, then this comes at a high cost and at the expense of other roads.

Some may argue that well written or at least better contracts would have avoided many of the problems outlined above. The argument here is not that the public sector always does things efficiently or that the problems are the result of poor contracts, although some may be. Instead, the point is - and this is our second conclusion - that using the private sector as a financial intermediary adds cost, complexity, bureaucracy – the latter is ironic in the context of the claims made for the policy – and risk in ways that contracts and their implementation in practice, particularly given the paucity of the public sector's resources, cannot overcome.

Thirdly, our evidence has demonstrated that partnerships have entailed a higher cost of finance than conventional public procurement. This is a universal phenomenon and independent of partnership form, contractual or joint venture. Likewise, success, as reflected in commercial viability, is also independent of partnership form.

The higher cost of finance has several inter-related consequences. It is justified, *ex ante*, in terms of risk transfer to the private sector. It is however very difficult to assess, *post-implementation*, whether that risk was priced correctly and therefore the project constituted VFM. If the project is successful, then the public agency pays considerably more than under conventional procurement. If on the other hand it is unsuccessful then the risks and costs may be dispersed as the rail franchises, London Underground and NATS PPPs demonstrate. In effect, the risk transfer is not from the state to the private sector, but from the consortia to its subcontractors and their workforce and to the public as tax payers and users, a travesty of risk transfer. The beneficiaries are the banks and to a lesser extent the consortia and parent companies, who are shielded from public scrutiny. These distributional effects confirm the experience elsewhere and in other sectors such as IT (Edwards and Shaoul, 2003a).

Although a project may fail to transfer risk and deliver VFM in the way that the public agency anticipated, the possibility of enforcing the arrangements and/or dissolving the partnership is in practice severely circumscribed for legal, operational and political reasons, with the result that the public authority may find itself locked into a partnership. The *de facto* lack of sanctions strengthens the contractor's already powerful financial and monopolistic position, forcing the public authority to (re)negotiate on the contractor's terms.

At best, partnerships have turned out to be very expensive with the inevitable consequences for future service provision, taxes and user charges, not just today but for a long time to come. These projects may burden government with hidden subsidies, diversion of income streams and revenue guarantees whose impact on public finance may not become apparent for many years and may all be triggered at the same time, precipitating a major fiscal crisis.

Fourthly, our financial analysis provides the detailed evidence to support and explain the international experience outlined in general terms in the literature. The high capital cost of transport projects makes it difficult if not impossible for such projects to be financially viable and thus attractive to the private sector. In other words, it is an international phenomenon, not just a British one. This is why governments must ensure some combination of capital grants, subsidies, implicit or explicit underwriting of the private sector's debt or the public authority's payments, bundling together of projects to increase their size relative to transaction costs, project and service downsizing, higher charges for the public authority or the users and a reduction in workers' jobs, wages and conditions.

Why, then are governments internationally still attracted to PPP? One contention is that the use of PPPs enables them to push costs to the future – the rent the money argument (Boardman and Vining, 2010b). But renting the money in this way is very expensive, and not a rational choice where there are viable alternatives. As the financial crisis has shown, governments have been able to find substantial sums to bail out their banking systems, often at short notice, so that it was a false argument to suggest there was no money for investment. Perhaps PPP is part of a very different agenda. The Partnerships policy provides a means of opening up to the private sector those parts of the public sector that could not be privatised as viable standalone commercial entities for financial or political reasons.

While the case for PFI/PPP made by successive UK Governments rests upon efficiency and risk transfer from which all would benefit, the real effect has been the redistribution of wealth to the financial and corporate sectors. Under conditions where government has chosen not to make public finance available, focusing on a concept as ambiguous as VFM has made the distribution issue invisible. The so-called VFM case is little more than a rationalisation for a decision already taken.

The implications of these findings are that policy makers committed to the broader public interest should examine the independent evidence and return to the public financing of public infrastructure.

NOTES

111. For example, the UK government now calls the fragmented and privatised railways, various parts of which receive extensive capital grants, operating subsidies and debt guarantees, a public private partnership (DfT, 2004). The terminology is also used interchangeably, for example PFI is used to denote free standing projects and PPP is used in the case of London Underground to denote a contractual arrangement.
112. In the case of the flagship London Underground PPPs, advisors' fees amounted to £500 million.
113. Infrastructure access – charges and competition on the tracks (mainly between freight operators) – is regulated by the Office of Rail Regulation (ORR, formerly the Rail Regulator) whereas competition for exclusive passenger concessions is managed by the Department for Transport, by the periodic negotiation and award of Passenger Franchises. For a short period this responsibility was assigned to a Strategic Rail Agency. One of the ORR's duties is to reconcile the government's demands for services from the passenger operators (its high level output statement) with the public funding made available to the railway from the government (statement of funds available).
114. http://www.highways.gov.uk/aboutus/documents/s110129_Network__Management_JULY.pdf
115. In 1991, when the bridge opened, charges for the crossings were £1.40 for cars and £2.20 for HGVs each way. They are currently £1.00 for cars and £2.90 for HGVs, although under a different regime.

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**PUBLIC PRIVATE PARTNERSHIP IN NATIONAL HIGHWAYS:
INDIAN PERSPECTIVE**

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1. PUBLIC PRIVATE PARTNERSHIP IN NATIONAL HIGHWAYS: INDIAN PERSPECTIVE

This section summarises the experience with PPP in India's road sector and describes the model PPP contract framework developed and adapted in India.

1.1. Overview of indian roads

India's road network of over 4.1 million km is second largest in the world consisting of expressways, national highways, state highways, major district roads and other roads. These roads carry about 65 per cent of freight and 80 per cent of passenger traffic. National highways constitute only 1.7 per cent of the road network, but carry about 40 per cent of the total road traffic. Road Transport has emerged as the dominant segment in India's transportation sector with a share of 4.7% in India's GDP in 2009-10. The number of vehicles on Indian roads has been growing at an average pace of 10.16% per annum over the last five years. Hence, development of road network assumes paramount importance in the context of a rapidly growing economy.

1.2. Investment in roads sector

Investment in the roads sector during the Tenth Five Year Plan (2007-12) and the Eleventh Five Year Plan (2007-12) are shown below:

Table 1. Investment in roads sector (10th and 11th Plan)

	Tenth Plan (2002-07)			Eleventh Plan (2007-12)		
	In Rs* (crore)	In \$** (million)	% Share	In Rs (crore)	In \$ (million)	% Share
Centre	71,536	17,884	46.87	1,55,367	38,842	42.94
State	68,143	17,036	44.65	1,34,246	33,561	37.10
Private	12,937	3,234	8.48	72,209	18,052	19.96
Total	1,52,616	38,154	100	3,61,822	90,456	100

* 2006-07 prices.

**An exchange rate of \$ 1= Rs 40 has been used for comparison at 2006-07 prices.

1.3. National highways authority of india (NHAI)

The National Highways Authority of India (NHAI) was established as a statutory entity under the National Highways Authority Act 1988 for development, maintenance and management of National Highways. Its initial mandate was restricted to a few projects undertaken with external assistance. From 1998 onwards, the Government has been implementing the National Highways Development Programme (NHDP) comprising:

- Phase I: Augmenting the Golden Quadrilateral connecting the four largest metropolis.
- Phase II: Augmenting the North-South and East-West corridors.
- Phase III: Four-laning of high density national highways connecting state capitals and places of economic, commercial and tourist importance.
- Phase IV: Upgradation of single-lane roads to two-lane standards.
- Phase V: Six-laning of four-laned highways.
- Phase VI: Construction of 1,000 km of expressways.
- Phase VII: Construction of ring roads, by-passes, underpasses, flyovers, etc.

Table 2. **The status of the different phases of NHDP as on 30th June 2012**

	Phase I	Phase II	Phase III	Phase IV	Phase V	Phase VI	Phase VII	Total
Total length (km)	5,846	7,300	12,109	14,799	6,500	1,000	700	48,254
Already 2/4/6 Laned (km)	5,842	6,031	4,071	2	1,052	-	16	17,014
Under implementation (km)	4	691	6,198	3,316	3,028	-	25	13,262
Balance Length for Award (km)	-	420	1,840	11,481	2,420	1,000	659	17,820

Source: www.nhai.org

1.4. Public private partnership in national highways

Owing to constraints of public funding, Public Private Partnership (PPP) has come to play a major role in the development of national highways. The National Highways Act, 1956 was amended in 1995 with a view to enabling private investment in development, maintenance and operation of highways. The Government initiated several other measures in this direction such as declaration of road sector as industry to facilitate borrowing on easy terms and reduction in the custom duties on construction equipment.

1.5. Models of PPP adopted in india

The two models of PPP adopted in India for the development of National Highways are BOT (Toll) and BOT (Annuity).

(a) **BOT (Toll) Model:** In the BOT (Toll) model, the Concessionaire recovers his investment by charging toll from the users of the road facility. This model reduces the fiscal burden on the government while also allocating the traffic risk to the Concessionaire. This is the model used for most of the projects and can be regarded as the default model for highway projects.

(b) **BOT (Annuity) Model:** Under a BOT annuity model, the Concessionaire is assured of a minimum return on his investment in the form of annuity payments. The Concessionaire does not bear the traffic risk and the Government bears the entire risk with respect to toll income.

Table 3. **Projects awarded under BOT (toll) and BOT (annuity) during eleventh five year plan**

Year	BOT (Toll)		BOT (Annuity)	
	No of Projects	Length (km)	No of Projects	Length(km)
2007-08	8	1,109	1	36
2008-09	8	643	-	-
2009-10	34	3,085	3	177
2010-11	28	3,057	20	1,577
2011-12	47	6,231	2	247
Total	125	14,126	26	2,037

1.6. Model documents

Creation of a standardised framework helps in ensuring transparency in the allocation of risks and providing clarity and predictability in the obligations of the Concessionaires while minimising the possibilities of disputes. It enables robust competitive bidding for individual projects with a reasonable commonality in approach across projects.

The adoption of standardised documents such as the Model Concession Agreement, RFQ, RFP and Manuals of Standards and Specifications have streamlined and accelerated decision making and implementation. The standardised documents are briefly described below:

1. **Model RFQ (request for qualification)** — A two stage bidding process has been adopted for PPP projects. In the first stage, that is the RFQ stage, the eligible and prospective bidders are pre-qualified. The second stage is RFP or the bidding stage.

The Model RFQ document lays down the norms, principles and parameters to be followed for prequalification of bidders in a fair and transparent manner with low transaction costs. The RFQ document aims at identification of experienced bidders who have the requisite technical and financial capacity for undertaking the project. The technical capacity is mainly determined on the basis of past relevant experience of the firm. The financial capacity is determined on the basis of net worth of the firm.

2. **Model RFP (request for proposal)** — The Model RFP document addresses the key requirements that must be observed for conducting a fair and competitive bidding process. The response sought at this stage is restricted to financial offers only, requiring the bidder to quote on the basis of a single bidding parameter. The detailed terms of the project are specified in the Concession Agreement which forms an integral part of the Bid Documents to be provided to the bidders along with the RFP document.
3. **Model concession agreement (MCA)** — The MCA spells out a precise policy and regulatory framework for implementing a PPP project. The MCA addresses the critical issues of a PPP framework such as mitigation and unbundling of risks; allocation of risks and rewards; symmetry of obligations between the principal parties; precision and predictability of costs and obligations; reduction of transaction costs; force majeure; and termination. The technical parameters are based mainly on output specifications, as these have a direct bearing on the level of service for users. The MCA specifies only the core requirements of design, construction, operation and maintenance of the Project Highway while leaving enough room for the Concessionaire to innovate and add value. More detail is provided in the Annex below.

The MCA allocates risks to the parties that are best suited to manage them. The commercial and technical risks relating to construction, operation and maintenance as well as the traffic risks are allocated to the Concessionaire. All direct and indirect political risks are assigned to the Authority. The MCA also stipulates a time limit of 180 days (extendable up to another 120 days on payment of a penalty) for achieving financial close failing which the bid security is to be forfeited.

A balanced and precise mechanism for determination of user fee has been specified for the entire concession period since this would be of fundamental importance in estimating the revenue streams of the project and, therefore, its viability. The MCA provides for indexation of the user fee to the extent of 40 per cent thereof linked to WPI. In the event of termination, the MCA provides for substitution of the Concessionaire by the senior lenders, failing which a compulsory buy-out by the Authority.

4. **Manual for Specifications and Standards** — The MCA requires the Concessionaire to bear the responsibility for detailed design. However, since the accountability for providing safe and reliable roads rests with the Government, the MCA mandates a Manual of Standards and Specifications that the Concessionaire must adhere to. The Manual specifies only the core requirements of design, construction, operation and maintenance of the project highway and the Concessionaire is free to bring in innovations in the design to arrive at the required output or delivery of service. The Manual, by reference, forms an integral part of the MCA and is binding on the Concessionaire.

1.7. Formulation, appraisal and approval of PPP projects

Since PPP projects need to undergo extensive due diligence, guidelines for their appraisal and approval have been devised. These guidelines apply to all PPP projects sponsored by Central Government or its entities. Under these guidelines, an inter-ministerial PPP Appraisal committee (PPPAC) has been set up for appraisal of PPP projects. The Ministry of Finance is responsible for examining the concession agreements from the financial perspective while a PPP Appraisal unit (PPPAU) in the Planning Commission undertakes a detailed appraisal of each project.

The sponsoring Ministry identifies the projects to be taken up through PPPs and undertake preparation of feasibility studies, project agreements, etc. with the assistance of legal, financial and technical experts, as necessary. The proposal is first submitted for ‘in principle’ clearance of PPPAC. After the ‘in principle’ clearance, the Ministry invites expressions of interest in the form of Request for Qualification (RFQ) which is followed by shortlisting of pre-qualified bidders. After formulating the draft RFP, the sponsoring Ministry seeks clearance of PPPAC before inviting the financial bids. Based on the recommendations of PPPAC, the final approval for a project is granted by the competent authority. In cases where the PPP project is based on a duly approved Model Concession Agreement (MCA), ‘in principle’ clearance by the PPPAC is not necessary. In such cases, approval of the PPPAC is to be obtained before inviting the financial bids.

1.8. Viability gap funding (VGF)

To bridge the viability gap of infrastructure projects undertaken through PPPs, the Government is implementing a scheme called the ‘Scheme for Financial Support to Public Private Partnerships in Infrastructure’. The scheme is applicable only when the concession is awarded to a private sector company which is selected through open competitive bidding and is responsible for financing, construction, maintenance and operation of the project during the concession period. Viability Gap Funding (VGF) is the quantum of financial support provided in the form of a capital grant at the stage of project construction and is equivalent to the lowest bid for capital subsidy, but subject to a maximum of 40 per cent of the total project cost.

1.9. Toll policy framework

Toll collection for use of the redeveloped and augmented sections of national highways was introduced in 1997 under the provisions of the National Highways Act. Subsequently, based on the experience gained, new toll policy was formulated and the National Highways fee (Determination of rates and Collection) Rules 2008 was notified on December 5, 2008. The main features are as follows:

- a) A uniform rate of user fee is charged on all sections of the NHs having two or more lanes, permanent bridges, bypass or tunnel forming part of National Highways.

- b) Discounted user charges are levied for multiple journeys in a day or on a monthly basis for residents living in the nearby areas.
- c) Local residents are entitled to a steep discount for short journeys.

1.10. Conclusion

There is a broad consensus in India that Public Private Partnership is the way forward for creation of world class highways. Since an enabling framework is a pre-requisite for attracting competitive private investment, the model documents, the appraisal process and the viability gap funding scheme have been adopted as the supporting pillars of a strong and sustainable PPP framework in the highway sector.

2. MODEL CONCESSION AGREEMENT FOR HIGHWAYS, AN OVERVIEW

A comprehensive framework is a pre-requisite for PPP

The highways sector in India is witnessing significant interest from both domestic as well as foreign investors following the policy initiatives taken by the Government of India to promote Public Private Partnership (PPP) on Design, Build, Finance, Operate and Transfer (DBFOT) basis. A comprehensive policy and regulatory framework necessary for addressing the complexities of PPP, and for balancing the interests of users and investors has been adopted in the form of a Model Concession Agreement (MCA) and standard bidding documents.

The MCA addresses the issues which are typically important for investors as well as for limited recourse financing of highway projects, such as mitigation and unbundling of risks; allocation of risks and rewards; symmetry of obligations between the principal parties; precision and predictability of costs and obligations; reduction of transaction costs; force majeure; and termination. It also addresses other important concerns such as user protection, independent monitoring, dispute resolution and financial support from the Government.

The MCA also elaborates on the basis for commercialising highways in a planned and phased manner through optimal utilisation of resources on the one hand and adoption of international best practices on the other hand. The objective is to secure value for public money and provide efficient and cost-effective services to the users.

2.1. Rationale for phased development

Phased development will be affordable and cost-effective

The four critical elements that determine the financial viability of a highway project are traffic volumes, user fee, concession period and capital costs. As the existing highways have dedicated traffic and the Government has prescribed the user fee for uniform application across India, revenue streams for a Project Highway can be assessed with a fair degree of accuracy. The concession period, on the other hand, can be extended only marginally for improving project viability as the growth of traffic would not permit very long concession periods. In any case, the present value of projected revenues, after say 20 years, is comparatively low from the Concessionaire's perspective.

As three of the four above-stated parameters are predetermined, capital cost is the variable that determines the financial viability of a project. Bidders would, therefore, seek an appropriate capital grant/subsidy from the Government in order to reduce the capital cost for arriving at an acceptable rate of return.

In the given scenario, higher the capital cost, greater would be the compulsion of project sponsors to seek larger grants from the Government. This, in turn, would restrict the ability of the Government to leverage a larger pool of extra-budgetary resources, including private investment, and would hence result in a limited programme of highway development.

In view of the foregoing, it is important to rely on cost-effective designs and to combine them with a phased investment programme to enable a more efficient and sustainable programme of highway development.

As a general principle, capacity augmentation of highways should be based on the standards recommended by the Indian Roads Congress for different bands of traffic volume. The emphasis should be on phased development rather than on providing high cost roads for catering to the projected growth in the long term.

Where traffic intensity is comparatively low, limited widening of highways could be undertaken with further widening planned after 7-12 years depending on projected traffic growth. Upgradation of designs and standards, construction of bypasses in urban and semi-urban areas and other improvements may also be planned in phases depending on traffic intensity. These issues have been subjected to in-depth examination and reflected in a Manual of Standards and Specifications that forms part of the standard documents associated with the MCA.

2.2. Technical parameters

Technical parameters will focus on the level of service for the users

Unlike the normal practice of focussing on construction specifications, the technical parameters specified in the MCA are based mainly on output specifications, as these have a direct bearing on the level of service for users. Only the core requirements of design, construction, operation and maintenance of the Project Highway are to be specified, and enough room would be left for the Concessionaire to innovate and add value.

In sum, the framework focuses on the ‘what’ rather than the ‘how’ in relation to the delivery of services by the Concessionaire. This would provide the requisite flexibility to the Concessionaire in evolving and adopting cost-effective designs without compromising on the quality of service for users. Cost efficiencies would occur because the shift to output based specifications would provide the private sector with a greater opportunity to innovate and optimise designs in a way normally denied to it under conventional input based procurement specifications.

2.3. Concession period

Concession period to be linked to projected traffic

The guiding principle for determining project-specific concession period is the carrying capacity of the respective highway at the end of the concession period. As such, the concession period is determined on a project-specific basis depending on the volume of present and projected traffic. Toll paying users should not be subjected to congested highways and the Concession should, therefore, cease when full capacity of the road is reached, unless further augmentation is built into the MCA.

The time required for construction (about two years) has been included in the concession period so as to incentivise early completion, implying greater toll revenues.

2.4. Selection of concessionaire

Competitive bidding on single parameter will be the norm

Selection of the Concessionaire is based on open competitive bidding. All project parameters such as the concession period, toll rates, price indexation and technical parameters are to be clearly stated upfront, and short-listed bidders will be required to specify only the amount of grant sought by them. The bidder who seeks the lowest grant should win the contract. In exceptional cases, instead of seeking a grant, a bidder may offer to share the project revenues with the Government.

2.5. Grant

Grants to bridge viability gap

Based on competitive bidding, the Government may provide a capital grant of up to a maximum of 20 per cent of the project cost. This would help in bridging the viability gap of the PPP projects. Where such assistance is inadequate for making a project commercially viable, an additional grant not exceeding 20 per cent of the project costs may be provided for O&M support during the period following the commissioning of the Project Highway.

2.6. Concession fee

Concession fee should be levied only if revenue streams can sustain it

Concession fee is a fixed sum of Re. 1 per annum for the concession period. Where bidders do not seek any grant and are instead willing to make a financial offer to the Government, they will be free to quote a premium on concession fee in the form of a share in revenues from user fee. In addition, the revenue share quoted for the initial year could be increased for each subsequent year by an additional 1 per cent. The rationale for the above fee structure is that in the initial years, debt service obligations would entail substantial outflows. Over the years, however, the Concessionaire will have an increasing surplus in its hands on account of the declining debt service on the one hand and rising revenues on the other. Recognising this cash flow pattern, the concession fee to be paid by the Concessionaire will be on an ascending revenue share.

2.7. Risk allocation

Risk allocation and mitigation is critical to private investment

As an underlying principle, risks have been allocated to the parties that are best suited to manage them. Project risks have, therefore, been assigned to the private sector to the extent it is capable of managing them. The transfer of such risks and responsibilities to the private sector would increase the scope of innovation leading to efficiencies in costs and services.

The commercial and technical risks relating to construction, operation and maintenance are being allocated to the Concessionaire, as it is best suited to manage them. Other commercial risks, such as the rate of growth of traffic, are also being allocated to the Concessionaire. The traffic risk, however, is significantly mitigated as the Project Highway is a natural monopoly where existing traffic volumes can be measured with reasonable accuracy. On the other hand, all direct and indirect political risks are being assigned to the Authority.

It is generally recognised that economic growth will have a direct influence on the growth of traffic and that the Concessionaire cannot in any manner manage or control this element. By way of risk mitigation, the MCA provides for extension of the concession period in the event of a lower than expected growth in traffic. Conversely, the concession period shall be reduced if the traffic growth exceeds the expected level.

The MCA provides for a target tariff growth and stipulates an increase of up to 20 per cent in the concession period if the growth rate is lower than projected. For example, a shortfall of 5 per cent in the target traffic after 10 years would lead to extension of the concession period by 7.5 per cent thereof. On the other hand, an increase of 5 per cent in the target traffic would reduce the concession period by 3.75 per cent thereof.

2.8. Financial close

Project implementation must commence as per agreed timeframe

The MCA stipulates a time limit of 180 days (extendable up to another 120 days on payment of a penalty) for achieving financial close, failing which the bid security shall be forfeited. By prevalent standards, this is a tight schedule, which is achievable only if all the parameters are well defined and the requisite preparatory work has been undertaken.

The MCA represents a comprehensive framework necessary for enabling financial close within the stipulated period. Adherence to such time schedules will usher in a significant reduction in costs besides ensuring timely provision of the much needed infrastructure. This approach would also address the typical problem of infrastructure projects not achieving financial close for long periods.

2.9. User fee

A balanced and precise mechanism for determination of user fee has been specified for the entire concession period since this would be of fundamental importance in estimating the revenue streams of the project and, therefore, its viability. The user fee shall be based on the rates to be notified by the Government.

The MCA also provides for indexation of the user fee to the extent of 40 per cent thereof linked to WPI. Since repayment of debt would be virtually neutral to inflation, the said indexation of 40 per cent is considered adequate. A higher level of indexation is not favoured, as that would require the users to pay more for a declining (more congested) level of service when they should be receiving the benefit of a depreciated fee. A higher indexation would also add to uncertainties in the financial projections of the project.

2.10. Local traffic

Owing to the absence of an alternative road, highways should be open to use by local residents without any payment of tolls until free service lanes are provided. This would ensure local support for the project and avoid legal challenges or local opposition arising out of easement rights.

Frequent users should be entitled to discounted rates, in accordance with the tolling policy.

2.11. Construction

Safety and quality of service must be ensured

Handing over possession of at least 80 per cent of the required land and obtaining of environmental clearances are among the conditions precedent to be satisfied by the Government before financial close.

The MCA defines the scope of the project with precision and predictability in order to enable the Concessionaire to determine its costs and obligations. Additional works may be undertaken within a specified limit, only if the entire cost thereof is borne by the Government.

Before commencing the collection of user fee, the Concessionaire will be required to subject the Project Highway to specified tests for ensuring compliance with the specifications relating to safety and quality of service for the users.

2.12. Operation and maintenance

Maintenance standards will be enforced strictly

Operation and maintenance of the Project Highway is to be governed by strict standards with a view to ensuring a high level of service for the users, and any violations thereof would attract stiff penalties. In sum, operational performance would be the most important test of service delivery.

The MCA provides for an elaborate and dynamic mechanism to evaluate and upgrade safety requirements on a continuing basis. The MCA also provides for traffic regulation, police assistance, emergency medical services and rescue operations.

2.13. Right of substitution

Lenders will have the right of substitution

In the highways sector, project assets may not constitute adequate security for lenders. It is project revenue streams that constitute the mainstay of their security. Lenders would, therefore, require assignment and substitution rights so that the concession can be transferred to another company in the event of failure of the Concessionaire to operate the project successfully. The MCA accordingly provides for such substitution rights.

2.14. Force majeure

Concessionaire will be protected against political actions

The MCA contains the requisite provisions for dealing with force majeure events. In particular, it affords protection to the Concessionaire against political actions that may have a material adverse effect on the project.

2.15. Termination

Pre-determined termination payments should provide predictability

In the event of termination, the MCA provides for a compulsory buy-out by the Government, as neither the Concessionaire nor the lenders can use the highway in any other manner for recovering their investments.

Termination payments have been quantified precisely. Political force majeure and defaults by the Government shall qualify for adequate compensatory payments to the Concessionaire and thus guard against any discriminatory or arbitrary action by the Government. Further, the project debt would be fully protected by the Government in the event of termination, except for two situations, namely, (a) when termination occurs as a result of default by the Concessionaire, 90 per cent of the debt will be protected, and (b) in the event of non-political force majeure such as Act of God (normally covered by insurance), 90% of the debt not covered by insurance will be protected. However, if the Concessionaire fails to commission the project owing to its own default, no termination payment would be due.

2.16. Monitoring and supervision

Independent supervision is essential

Day-to-day interaction between the Government and the Concessionaire has been kept to the bare minimum by following a ‘hands-off’ approach, and the Government shall be entitled to intervene only in the event of a material default. Checks and balances have, however, been provided for ensuring full accountability of the Concessionaire.

Monitoring and supervision of construction, operation and maintenance is to be undertaken through an Independent Engineer (a qualified firm) that will be selected by the Government through a transparent process. Its independence would provide added comfort to all stakeholders, besides improving the efficiency of project operations.

The MCA provides for a transparent procedure to ensure selection of well-reputed statutory auditors, as they would play a critical role in ensuring financial discipline. As a safeguard, the MCA also provides for appointment of additional or concurrent auditors.

To provide enhanced security to the lenders and greater stability to the project operations, all financial inflows and outflows of the project are to be routed through an escrow account.

2.17. Support and guarantees by the government

Support and guarantees by the authority are essential

By way of comfort to the lenders, loan assistance from the Government has been stipulated for supporting debt service obligations in the event of a revenue shortfall resulting from political force majeure or default by the Government.

Guarantees have also been provided to protect the Concessionaire from construction of competing roads, which can upset the revenue streams of the project. Additional tollways would be allowed, but only after a specified period and upon compensation to the Concessionaire by way of an extended concession period.

2.18. Miscellaneous

An effective dispute resolution mechanism is critical

A regular traffic census and annual survey has been stipulated for keeping track of traffic growth. Sample checks by the Authority have also been provided for. As a safeguard against siphoning of revenue share by the Concessionaire, a floor level of present and projected traffic has also been stipulated.

The MCA also addresses issues relating to dispute resolution, suspension of rights, change in law, insurance, defects liability, indemnity, redressal of public grievances and disclosure of project documents.

2.19. Conclusion

Private participation should improve efficiencies and reduce costs

The aforesaid contractual framework addresses the issues that are likely to arise in financing of highway projects on DBFOT basis. The regulatory and policy framework contained in the MCA is a prerequisite for attracting private investment with improved efficiencies and reduced costs, necessary for accelerating.

ROADMAP TO FUNDING INFRASTRUCTURE DEVELOPMENT

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1. COMPANY BACKGROUND

This paper discusses the initiatives and procedures necessary for the successful development of large-scale transportation PPP projects from a developer's point of view. The topics covered in this paper include:

- Project Procurement.
- Proper Risk Allocation.
- Direct Investments by Pension Funds.

Cintra is one of the largest private developers of transport infrastructure in the world. We currently manage a portfolio of 21 road concessions across Spain, Canada, the USA, Portugal, Ireland and Greece, representing a total managed investment of approximately \$25 billion. These projects include the world's first all-electronic, barrier free toll highway, the multi award-winning 108km 407 Express Toll Route in Canada and the Chicago Skyway, a 99 year lease agreement covering the first privatization of an existing toll road in the US. More recently, Cintra was awarded, and has begun construction on, two managed lanes projects in the Dallas-Fort Worth area, the LBJ Express and the North Tarrant Express.

As an infrastructure developer and long-term investor, Cintra is fully involved in the delivery and operations of all its toll roads. Cintra invests equity into all its projects, operates and maintains all assets using in-house resources, and exercises close supervision and control during the delivery stage, to ensure each project is well constructed and fit for its purpose.

Cintra has a proven track record in facing and solving challenging road concession projects through combining technical excellence with a flexible approach to project finance, leading to the delivery of new and upgraded infrastructure around the globe. Cintra has a strong reputation for rigorous and effective risk management, implemented through bespoke contracts, tailored to each project. As a result of our close collaboration with our sister company Ferrovial Agromán, which undertakes civil engineering construction works, Cintra provides a comprehensive approach to project development, investment, construction, operations and maintenance.

Backing Cintra is its parent company, the Ferrovial Group, based in Spain and one of the world's leading infrastructure companies, with activities in construction, management, maintenance and services, a market capitalization of \$8.9 billion, revenues over \$9.4 billion, and a workforce of over 60,000 people. Ferrovial Group's portfolio and track record includes management of key assets such as London's Heathrow Airport and construction of the world's 3rd largest desalination plant in Spain.

2. PPP BACKGROUND

Public-private partnerships (PPPs) have recently emerged as an increasingly popular way for governments around the world to develop large-scale infrastructure projects. This rapid growth has been spurred through the continued expansion of burgeoning infrastructure needs in the face of ever-tightening budgetary constraints in both developed and developing countries. Under this duress, governments are seeking alternative ways to improve infrastructure while maintaining some semblance of fiscal responsibility. And, as a result, PPPs have emerged as a popular solution because when properly structured, they allow:

- Proper (efficient) risk allocation
- Value for money via increased competition
- Ability to leverage limited public funds
- Capped liability exposure
- Other:

Figure 1. **Potential Advantages of PPPs**

Greenfield projects	PPP	Traditional
Fast development time = savings in cost	●	●
Streamlined construction process (turnkey contracts, fixed prices)	●	●
New assets generate public sector revenue with no gov't investment or future obligations	●	●
Customer-orientation, ownership mentality : maintenance, quality, technologies	●	●

Available
 Not available
 Partially available

There are many different kinds of Public-private partnerships with varying levels of private sector involvement. However, the most common, and the type that will be the focus of this paper, is known as a Design-Build-Finance-Operate-Maintain (“DBFOM”) transaction. Under a DBFOM, the government grants a private sector partner the right to develop a new piece of public infrastructure. The private partner takes on full responsibility and risk for delivery and operation of the public project against pre-determined performance standards established by the government. The private-sector partner is compensated through the revenue stream generated by the project, which could take the form of a user charge (such as a highway toll) or, in some cases, an annual government payment for performance (often called a “shadow toll” or “availability charge”).

Shadow tolls are schemes where payments made by the State to the private Concessionaire are calculated on a per vehicle basis. On the contrary, availability payments are payments made by the State in exchange for a level of service, and the payment is made regardless of the level of traffic.

2.1. PPP drivers

Over the past decade, there have been many examples of positive and negative PPP projects and procurements throughout the world. Cintra's experience as both a market participant and observer has given the company valuable insight into what is necessary to procure and develop successful PPP projects now and in the future. From this experience, we believe that the two main drivers of successful PPP project development are the Proper Risk Allocation and the Project Procurement Process.

3. PROPER RISK ALLOCATION

The goal of a PPP is to increase project value through the minimization of risk. Risk minimization occurs by assigning compartmentalized areas of risk to that party which is best able to mitigate the potential harmful effects that may stem from improper management of that risk. With the understanding that these parties, usually a private and a public sector partner, have inherent strengths and weaknesses that are often complimentary, a risk sharing structure may be established to assign risk to that party best able to mitigate that risk. However, to take full advantage of this concept, the industry had to undergo a complete shift in how they structured their infrastructure delivery deals.

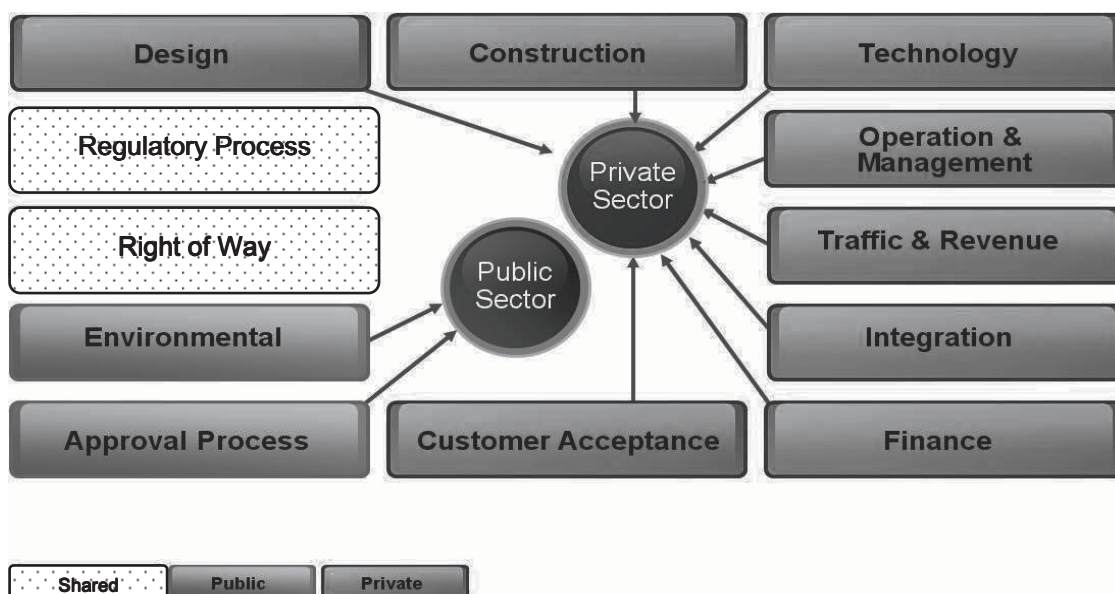
In the past, under the “traditional” method, public infrastructure projects were completed for the procuring agency via separate, independent contracts with design/engineering firms and construction firms. This bifurcated process was designed to avoid collusion and fraudulent claims, but also eliminated the opportunity for synergy between these two interrelated functions of design and construction. This lack of direct communication between designers and contractors often created problems, which delayed completion schedules and drove up costs. Further, many areas of risk stayed with the Public Sector (as detailed in the chart below). This retained risk, if not properly managed, increased contingencies and lowered the project value.

Figure 2. **Poor alignment of interests between contractor and public sector**



However, with the shift towards PPPs, public agencies are provided the opportunity to allocate more risk away from the public sector and towards the private developer. Under this deal structure, there are not bifurcated contracts. Instead, PPPs feature a single, more expansive, contract (often known as a “concession” agreement) agreed to between the private and public partners. This contracting structure facilitates risk transfer and more responsibility can be placed on the private sector under the umbrella of this concession agreement. Now, instead of contracting with a designer, and then in turn with a constructor, the procuring agency can sign a single concession agreement with a consortium of entities that will provide designer, constructor, financier, operator and maintenance services. In doing so, this contracting structure effectively shifts the risk of these additional services to the Private Sector. The chart below illustrates a potential risk allocation for the development of a PPP tollroad.

Figure 3. Improved alignment of interests



From the above chart, we see what risks are usually shifted to the Private Sector. While these shifted risks may vary from project to project, they are all based in the idea of allocating risk to that party best able to mitigate it. For example, a private developer with significant experience operating and maintaining toll road assets will probably be better positioned to operate and maintain a toll road project than a public partner that does not count a single toll road among its current inventory. On the other hand, the Private Sector could shoulder the risk of environmental approval. However, the cost of that burden would be significantly higher than if that risk was borne by the public sector, who often works with partnering governments and retains the environmental expertise specific to their particular geographic location. The efficient allocation of these risks, along with all the others, reduces uncertainty, thus increasing the project’s viability and the value received by the public sector.

3.1. Demand risk vs. availability payments

Deal structures are often defined based on the allocation of demand risk. If asset users pay for the privilege of using that asset, the private sector can be compensated directly by the user or the revenue can go to the government who will then compensate the developer through set payments (Availability payments). The advantage to taking this risk comes from the belief that the asset will be used by the public at or above projected use, in which case the “upside” will go to that party that holds the demand

risk. Conversely, the disadvantage to taking this risk would come if projections are not met and there is not enough revenue produced by the asset to compensate the project's financial expectations.

Since the onset of the global financial crisis, it has been stated that the private sector is unwilling to take demand risk and thus it needs to remain with the public sector. However, this assertion is untrue. Cintra believes that the private sector is better positioned to understand and project this risk, and thus mitigate the risk of asset use that falls below projections. Therefore, for the public sector to retain this risk, the risk is misallocated and erodes the project value. Some of the benefits of a demand risk project include:

3.2. Reduced public sector liability

Availability payment structures are essentially Design-Build contracts with an additional long-term funding liability from the public sector to the private sector. Given the lack of operational risk for the private sector, it is not as motivated to look for ways to optimize the project's viability.

Conversely, demand risk projects shift long-term risk from the public to the private sector and, as a result, the private side is extremely motivated to find all possible efficiencies. These efficiencies can be passed on to the public sector via reduced or eliminated one-time upfront subsidies.

For example, in the LBJ project in Dallas, the public sector had allocated \$700 million in public funds for the project. As a result of the project structure and Cintra's ability to develop efficiencies in the project's development and operations, the required subsidy was only \$489 million, a \$211 million savings for the state. Most savings are obtained by re-scoping the project, rather than by fine-tuning the operational expenses.

3.3. A reality check

The single most important reason for allocating demand risk to the private sector is so that the private sector can act as a reasonability and feasibility check for government agencies. Large-scale infrastructure projects are complex developments that involve large construction and capital costs, that account for the greatest share of the potential savings of the project – including operational efficiencies – and can be huge liabilities if proper project selection and scoping are not undertaken. By allocating demand risk to the private sector, the public sector eliminates the risk of overestimating or underestimating project scope. The economic viability and necessity of the project receives a rigorous reality check by the developers, and by extension their lenders, as they are risking their own capital.

This feedback significantly reduces the risk that projects are over built or under built, harming their optimal value production. The long-term investment profile of the developer aligns the goals of the infrastructure project with the goals of the capital behind it thus adding efficiency to the development process.

There have been many examples of the pitfalls for purely public financing decisions in recent history. For instance, in a project that included expansion of Japanese high speed rail services to non-profitable markets essentially bankrupted the public rail company despite the incredible success of the main Shinkansen trunk line. The private sector could have served as a realistic advisor to argue against this unwise investment.

3.4. Equity: availability payments minimize the developer's role

The revenue profile of an availability payment based project often mitigates the true potential added value of involving private infrastructure operators and developers. These projects are not awarded on the basis of operational expertise or ability to forecast and manage future demand but rather on commodity-based construction pricing. As a result, the main proponents and bidders in large-scale availability payment structures are third-party consultants and larger construction and financing consortiums. Developers involved in these projects are only occasionally required to contribute equity, and usually only a token amount, which leads to a much smaller risk profile being assumed by the developer/operator and implies less use of their services and knowledge.

As such, this bidding profile features parties (the financing and construction companies) that have a much shorter investment horizon and, much as with Design-Build projects, are looking to win the project on the basis of a narrow range of specifications rather than by proposing to enhance value through innovative engineering or optimized capital structuring. Without real equity repayment risk, projects are typically designed to maximize short term profits at the expense of improving design, engineering or lifecycle costs. Then, once the construction milestone payments are received, these parties will usually look to flip their participation to a third-party, placing project responsibilities with entities that were not vetted by the government agency during the procurement process.

Moving into operations, an availability payment structure dis-incentivizes the developer from directing resources to optimizing asset use. Under an availability mechanism, the road operator will meet minimal contract standards or face penalties; however, he will have no reason to go above these standards as his payment will remain constant. In fact, with more users, the developer may see an increase in operations and maintenance costs, cutting into his margin. Under a scenario where the developer is actively seeking to expand usage, he will maximize asset services to encourage use, thus pushing the asset to serve as many users as possible. This second scenario aligns developer and government goals and incentivizes the private sector throughout the life of the concession to provide top quality services.

3.5. Demand risk stimulates private sector innovation

In addition to enhancing goal alignment by matching the long-term nature of infrastructure development with long-term investment horizons, true infrastructure developers also invest larger equity commitments to their projects (as a percentage of total cost). As a result, these developers remain constantly vigilant in seeking creative ways to improve project feasibility.

Many proponents of availability payment financing argue that the tight spreads that typically separate final bids indicate that approach increases competition. However, it is more likely that the opposite is actually true. When three world-class construction companies are provided with the same specifications for a project, they will likely have similar prices as the largest cost driver is raw materials. The only tangible differences will be the risk premium (i.e. margin). It is for this reason that construction bids on availability payment projects are often within a few percentage points of one another.

The true value of PPP projects is in the ingenuity and creativity that can be brought in from the private sector. To protect their significant investment, developers typically perform intense due diligence to develop an understanding of a project's dynamics. Often, this understanding is better than that of third-party advisors or construction companies whose motivation is not fully based on developing infrastructure efficiently but rather on items such as success fees or gaining further patronage.

The due diligence of the developer can have significant effects on project value. For instance, one of the main areas where these traits can be monetized is with value engineering. As further elaborated upon in the LBJ case study below, Cintra was able to reduce the capital costs of the project by \$970 million by developing an innovative alternative design that accomplished the same end goals of the original project specification.

Another area of potential innovative value creation lies in project phasing and scoping as developers looking to maximize long term returns will look to develop the most efficient project lifecycle and development plan. As further explained in the LBJ/NTE case studies, both of those projects had initial scopes that were economically unfeasible. However, feedback provided by the private sector allowed for the successful development of both projects.

4. PROJECT PROCUREMENT PROCESS

There are four elements during the project procurement phase that are vital to the success of any PPP development:

- Project selection.
- Industry outreach.
- Transparent procurement process.
- Public-private sector co-operation.

While there are other elements that are important during the procurement, the items listed above are vital and if any are lacking, the project will not succeed.

Project selection

During the height of the PPP boom in the mid-2000s, there was a significant amount of capital chasing relatively few projects. As a result, certain projects were identified that, were not ideal candidates for PPP development. Many of these projects were roads whose necessity was based on optimistic future growth forecasts or so-called “pet projects” that were politically savvy but not financially viable. As a result, there are many road projects today that have entered bankruptcy proceedings or are facing significant financial stress.

The primary lesson learned from this period is that PPP development is only viable for projects that are designed to resolve a tangible problem hindering the efficiency of a city or region’s infrastructure. PPPs do not work economically as engines to spur growth. Rather, they must be constructed in response to establish need, or in the face of imminent growth.

Some jurisdictions have emerged from the PPP boom with a sense that demand-risk projects are not feasible in the post-financial crisis environment. However, this is not the case. One need look no further than the two US case studies attached to see evidence of successfully financed transportation infrastructure projects with full-demand risk transfer .

Industry outreach

It is beneficial for any procuring agency to involve all stakeholders, including potential sponsors and investors, during the early development phase. By beginning this involvement early, potential problems can be addressed early, increasing the project’s potential for success and value for the public sector.

Potential bidders on the LBJ Express and North Tarrant Express were offered a variety of ways to express their opinions on both the development and structure of the procurement – a move that delivered significant improvements to the outcomes of both projects.

Unlike most Requests for Qualifications (RFQs), the procuring authority engaged potential bidders on the issues facing the project by requiring respondents to submit a Conceptual Development Plan, which accounted for 30% of the scoring. In this plan, respondents had to develop an initial plan for the project utilizing the resources that were available at the time, which included preliminary traffic studies and a conceptual design that were completed to the 30% level.

As a result of this early interaction, Cintra was able to come up with changes and alterations to the project scope and phasing that substantially improved the project's viability.

This interaction with developers continued throughout the process and secured the successful procurement of both projects.

Transparent procurement process

The technical and political objectives and priorities should be made clear from the outset of procurement, to give the private sector the opportunity to develop efficient solutions. These objectives could include minimum capacity added, maximum amounts of public funds, or required opening dates.

Furthermore, the limitations and parameters of the project need to be outlined as well.

This occurred on the LBJ Express project, where the Texas Department of Transportation outlined the project parameters, including the total public funds available. This set clear expectations and increased competition as it clearly identified the financial parameters. Despite some expectations to the contrary, the winning consortium, led by Cintra, did not use the maximum available subsidy - the LBJ Express was won with a public funding requirement of US\$445 million, despite US\$700 million being available.

Public-private sector co-operation

While it is important for the procurement approach to have set objectives and priorities, the more flexible the procurement process can be, the more opportunities there will be for the private sector to develop more economically sustainable infrastructure, which requires lower contributions from public funds.

One example is the submission of as Alternative Technical Concepts (ATCs) and Alternative Financial Concepts (AFCs) by the proposers. These are new ideas submitted by the proposers in confidence during the procurement process.

Following consideration, the proposals are either approved, allowing their inclusion in the bidder's final submission, or rejected. Usually, this procurement approach not only has the ability to improve project viability but also increases competition between bidders.

Bidders should be provided with a base reference design (30% Design) on projects but significant design flexibility should be permitted as value engineering is one of the main ways the private sector adds value to the project.

5. CASE STUDIES

CASE STUDY 1: IH-635 MANAGED LANES (LBJ EXPRESS) – DALLAS, TEXAS

The IH-635 Managed Lanes (LBJ) project was the first DFW project to begin procurement, with an RFQ released in May 2005. The LBJ Express had been in various levels of planning since 1995 despite having support from all local stakeholders. An internal TxDOT memo from August 2002 estimated that project construction “could easily approach 20 years”.

TxDOT declared the Cintra-led consortium’s response to the RFQ to be the “best overall proposal” and commended Cintra’s ability to identify concerns relating to issues such as the right-of-way acquisition and our ability to balance the needs and concerns of the public while completing the project development.

Initial project scope:

The initial scope included the addition of six managed tolled lanes along a 33.6 km segment of IH-635. Additionally, the scope called for the reconstruction of the eight general-purpose toll-free lanes on IH-635.

TxDOT’s construction cost estimate for total initial project scope was US\$ 2.875 billion (2004, including all segments under planning).

Main objectives of the project:

- (i) Maximise value to the public sector.
- (ii) Congestion relief: average daily traffic counts exceeded 240,000 vehicles.
- (iii) Improved safety: the corridor needed wider lanes, additional shoulders, barrier separated traffic lanes and continuous service roads to help reduce accidents.
- (iv) Improved air quality as a result of reduced levels of congestion and maintaining traffic flow on managed lanes.

Main challenge of the project:

The existing traffic flows had to be maintained during construction. The high level of development along the corridor, the environmental constraints and public requirements constrained the development of the works. To overcome this, the original design included a twin bore tunnel, each bore containing three managed lanes, over an 8km section of the IH-635 corridor, and elevated managed lanes along the I-35E portion.

WHAT IMPROVED THE PROJECT TECHNICAL SOLUTION?

1. Efficiencies in scoping

The original scope of LBJ Express was not economically viable and this put the project's development in jeopardy. During the RFQ stage, there was collaborative work of the procuring authority, Cintra and other proponents, in a number of alterations to the scope which did not compromise achievement of the main project objectives. The alterations included:

Reduce the length of the project from the original 33.6 km to 21.9 km by removing a segment of road that did not have enough traffic congestion to warrant the addition of managed lanes on the corridor.

Open the project in sections rather than at completion of the entire project. This change would allow the developer to increase revenues during the initial stages of the project and reduce ramp-up periods as local commuters became accustomed to the managed lanes concept prior to full implementation.

2. Alternative technical concepts

During the procurement process, Cintra developed three ATCs to improve the connectivity of the IH-635 managed lanes on the north-south routes and maximise the project's future revenues. The improvements would increase accessibility to the main freeways crossing the project and impact positively on revenue generation. The example illustrated in the diagram below had the potential to deliver a 7% to 10% increase in revenues for the first 15 years.

3. Construction solutions:

The LBJ Express is located in a densely developed corridor in Dallas, making cost-effective design solutions difficult as there was limited right-of-way available. The design specifications for this project required six subsurface managed lanes to be constructed over a 3.2km section in the middle of the corridor.

The original technical solution called for dual tunnels that would provide the three managed lanes in each direction plus shoulders to reduce traffic impact during construction on this heavily used section. This design concept significantly increased the cost of the project and threatened its viability. A typical section of one of the tunnels is shown below.

Cintra, in conjunction with our sister company and construction partner, FerrovialAgroman, presented a solution that completely eliminated the tunnels and made the best use of the available right-of-way. Not only did this comply with the traffic management restrictions, but it also resulted in Cintra's consortium reducing construction costs by US\$ 970 million if compared to the most competitive bid offering the tunnel solution. Cintra's solution also resulted in improved safety and reduced on-going maintenance costs, maximising value for money beyond the concession period.

CASE STUDY 2: NORTH TARRANT EXPRESS – FORT WORTH, TEXAS

In December 2006, TxDOT released an RFQ for the North Tarrant Express (NTE) project. NTE comprised a network of related improvements to address critical transport and mobility issues in North Tarrant county, in Fort Worth region. The development of the project was crucial to reducing severe congestion and was an important part of TxDOT's wider transport planning efforts. TxDOT concluded that harnessing private-sector creativity through a concession and predevelopment agreement was the best way to ensure cost-effective and expedited delivery of the infrastructure.

Initial scope:

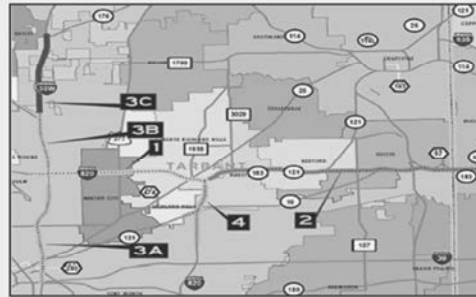
The initial scope for the NTE included improvements on six connected highway corridors including the addition of new general purpose lanes as well as the development of a four to six-lane managed lanes network throughout the corridor. The total length of all six segments was 58 km.

TxDOT's construction cost estimate for total initial project scope was US\$1,992 (US\$2006, including all segments under planning).

Main challenges of the project:

The main challenges of the project were:

- (i) Multiple segments with varying levels of pre-development work completed. TxDOT required the entire network to be developed by one developer to reduce cost redundancies and enhance future funding.
- (ii) Demanding traffic management requirements during construction required the contractor to keep traffic moving safely, with complex signalling.



Main objectives of the project:

- (i) Maximise value to the public sector
- (ii) Congestion relief
- (iii) Almost double road capacity along the corridor
- (iv) Address the requirements of continued population growth

WHAT IMPROVED THE PROJECT TECHNICAL SOLUTION?

1. Procurement environment

TxDOT had concluded that an identified first phase of the project, Segment 1, with an approximate length of 10,24km was ready for development through a concession. The other segments of the project were not ready for immediate development at that time, and TxDOT concluded that employing private sector creativity through predevelopment activities would bring efficiency

North Tarrant Express started as a two-part procurement process in which developers were to bid for Segment 1, with an option to a portion of Segment 2 and the rest of the project segments being part of a Pre-Development Agreement.

However, Segment 1 was not viable as a stand-alone project with its original configuration and neither Segment 2 nor the other identified segments improved the project's overall feasibility.

2. Cintra's approach to segmentation

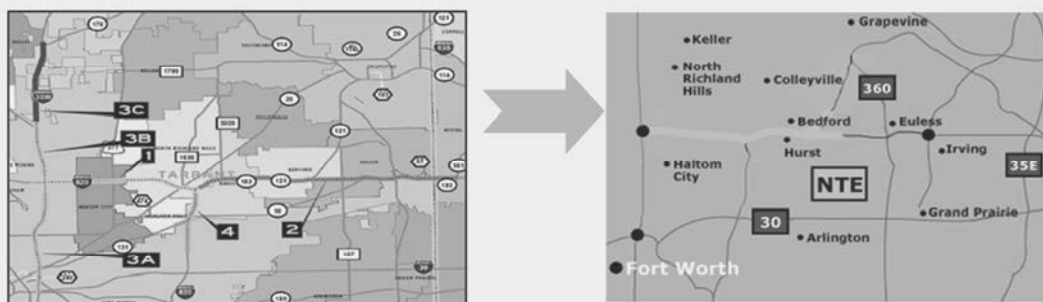
Cintra's analysis showed that there were a number of ways in which the project delivery could be de-scoped and phased, and we proposed to TxDOT the sub-segmentation of sections of the project.

In the initial scope, Segment 1 included the complete reconstruction of the IH35W/SH183 interchange, the addition of 2 managed lanes in each direction and the addition of 1 general purpose lane in each direction. This would have increased the capacity of the segment from the 2 General Purpose Lanes (GPLs) in each direction to 3 GPLs and 2 managed Lanes in each direction, an increase of 150%.

In order to increase the feasibility of the project Cintra proposed to split the Segment 1 scope into different components that would be delivered in stages:

The addition of 2 managed Lanes and 1 GPL by 2030, or before if a certain revenue threshold trigger was met

Reconstruction of the IH35W/SH183 interchange



This segmentation process was captured in a procurement approach that defined a Mandatory Proposal Scope, which was the minimum scope for each bidder (addition of 2 ML in Segment 1) and Additional Scope Segments whereby a Proposer may include one or more additional optional scope segments in their Proposal to the extent that those segments can be constructed within the maximum available public funding.

The Mandatory Proposal Scope plus the Additional Scope segments included in the Proposal became the Proposer's Proposed Scope. A scoring system was applied to award higher scores for proposals that maximize the public benefit by developing more segments within the maximum available funding constraints. That scoring criteria was then tied back into the general evaluation criteria. Under this plan, the Proposed Scope, as defined above, would be built at the beginning of the concession term.

6. PENSION FUND INVESTMENT

Pension funds are a relatively new entrant into the world of infrastructure investment but their importance has grown considerably over the last decade with larger funds such as OMERS and OTPP becoming significant players in the industry.

The attraction of infrastructure investing for pension funds is three-fold. Infrastructure assets typically provide:

- **Long term duration**

Due to the high initial expenditures relating to developing infrastructure, concession terms are typically significantly lengthy with investment durations in the range of 30-50 years and as long as 99 years in some cases. These long-term return profiles match the long-term liabilities that pension funds naturally face thus reducing the fund's exposure to reinvestment risk.

- **Inflation linked returns**

Most concessions are linked to inflation via adjustments to user fees throughout the course of the concession that are linked to CPI or GDP growth. Additionally, the demand profiles of infrastructure users tend to be relatively inelastic to incremental changes in tolls.

- **Reduced volatility and increased diversification**

Compared to equity investments, properly structured infrastructure investments have a relatively low volatility, particularly on more mature assets that have an established revenue history. Furthermore, infrastructure investments have a low correlation to at-large equity market returns.

Despite the multitude of benefits that infrastructure investment can provide to pension fund, the brief history of pension funds and infrastructure investments has been a mixed bag. For the largest and most sophisticated funds, infrastructure investment has become a core competency as they have the size and resources to develop and dedicate teams to the sector. This is borne out by a 2010 Infrastructure Investor ranking that showed eight of the largest 30 investors in the sector were pension funds.

However, for the remaining funds the road has not been as prosperous. Due to the niche characteristics of the sector, other funds have tried to invest in the sector through private-equity style infrastructure funds developed by investment banks and similar sponsors.

According to a Preqin survey, 58% of investors indicated their main concerns with infrastructure investing were related to the current format including concerns with high fees, fund structures and benchmarking. This style of fund is not appropriate for infrastructure investing as the high fees charged by the sponsors (typically a base percentage of funds committed plus a portion of returns above a IRR hurdle) eat away the more modest returns of infrastructure and can end up increasing volatility to pension funds. These style of funds have the potential to sour a large source of capital from investing in the sector.

For example in its bid for both the LBJ Express and the North Tarrant Express, Cintra partnered with the Dallas Police and Fire Pension Fund (DPFPF). DPFPF is the type of fund that would typically be limited only to PE-style funds if it desired to invest in infrastructure. Many of the risks presented by the projects were new to the fund and, similarly to other funds, its team of investment professionals was not familiar with the asset class as it did not have the resources to assign a fully-dedicated team to a niche asset class. DPFPF had an interest in infrastructure but was not overly enthusiastic about a 3PE fund structure.

As a result, DPFPF ended up becoming the first US pension fund to make a direct investment in the construction and operations of a major toll road. The relationship continues still with DPFPF being an equity investor in the next Cintra-led project, the NTE Extension.

LIST OF ROUNDTABLE PARTICIPANTS**PUBLIC PRIVATE PARTNERSHIPS FOR FUNDING TRANSPORT INFRASTRUCTURE:
SOURCES OF FUNDING, MANAGING RISK AND OPTIMISM BIAS**

27-28 September 2012

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