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# OVERVIEW

## Key points

- General government investment in infrastructure has fallen in recent years for most of the countries in this study, (information is not available to assess whether this is true for public investment more generally). Nevertheless, overall investment in infrastructure has remained fairly steady in recent years, although volatile in some countries.
  - Total Australian investment in infrastructure has rebounded in recent years to just below 6 per cent of GDP in 2006-07. Sub-national governments undertook 76 per cent of public infrastructure investment, with government trading enterprises accounting for around half of this.
  - With the global financial crisis, governments are looking to infrastructure investment as a way of stimulating the economy. But financing options have also been constrained by the crisis.
- Financing decisions are separate from the investment decision and can be made independently. Financing differs from public funding: the latter being the commitment of public revenue to meet any gap between the costs of infrastructure provision and the revenue from user charges. Funding decisions carry an opportunity cost and deadweight loss of raising taxes.
- Budget appropriations, financed on a pay-as-you-go basis or from public debt, remain the major form of financing for government investment in infrastructure (63 per cent in 2006-07). Specific-purpose bonds, where repayment is linked to the performance of the asset, are a major source of finance in the United States and Canada, but were phased out in the 1980s in Australia.
- Public-private partnerships (PPP), where the government contracts a private partner to variously finance, design, build and operate infrastructure assets for a fixed period, are growing in use. Used extensively in the United Kingdom, in Australia they made up 6 per cent of public investment in 2006-07 — higher in New South Wales and Victoria.
- Some approaches used to finance public infrastructure can improve efficiency and lower the life-time project cost through:
  - better management of project risk by aligning incentives for risk management with the capacity to manage the risk
  - improvements in information, contract negotiation and management and other transaction activities that pay-off in better risk management and cost savings
  - bringing greater market or other scrutiny to bear on the investment, and imposing the costs on potential beneficiaries to better reveal their willingness to pay.
- The most efficient financing vehicle will depend on the nature of the investment, the degree of asymmetry of information, the potential for competition, and the skills of the government as negotiators and contract managers.
  - The potential for governments to shift risk onto private partners may be limited, and any non-diversifiable risk assumed by the private sector will be reflected in their required rates of return.
  - PPPs offer considerable potential to reduce project risk, but are costly to transact. If such transactions are off-budget, this may inhibit the scrutiny needed to ensure efficient investment.

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# Overview

## The study focuses on efficient financing

Historically, governments have played the predominant role in owning and operating infrastructure facilities such as schools, hospitals, roads, bridges, railways, ports, telecommunications networks, and water and electricity supply facilities. Government investment in infrastructure has been justified as a response to natural monopolies, and where the infrastructure services are seen as essential. Difficulty in charging users also provided a justification for public provision of infrastructure such as roads. Increasingly, technological developments are reducing the transaction costs of exclusion and charging for use, while regulations are seen as an alternative to prevent abuse of market power, and to ensure security of supply.

Governments have also used their ownership of infrastructure to deliver subsidised services to specific groups on equity or other grounds, for example, where the minimum scale required for service provision is simply not financially viable with the service population. And, as infrastructure can provide benefits to groups other than the direct users (such as the effect of public transport on road congestion and greenhouse gas emissions), the benefits of the investment may exceed the potential revenue from user charges. With the current global financial crisis, governments are expanding investment in infrastructure projects as a source of fiscal stimulus, with the twin objectives of job creation and improving economic performance. While these features may justify some public funding for infrastructure services, in themselves they do not require public *provision* of infrastructure.

Growing acceptance of the user pays principle, along with recognition that there are generally greater incentives for efficiency in the private sector, have seen increased private involvement in the provision of both economic and social infrastructure. Nevertheless, governments remain a major influence on investment in infrastructure, and the efficiency of their investment decisions has considerable ramifications for the overall efficiency of the economy (PC 2006e).

Efficient financing is one element of efficient investment. The costs of financing large and complex infrastructure projects are substantial, so the savings from getting it right can be significant. And the financing vehicle may provide information and create incentives that improve other aspects of an efficient investment decision.

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This study explores the scope for efficient financing to reduce the life-time cost of an infrastructure project and the potential financing vehicles have to improve the investment decision. It does not attempt an overall comparative assessment of financing vehicles — many legal, institutional, market environment and project specific factors have to be weighed in making such judgements. Instead, it reports on the experiences of a number of countries following different approaches to help provide an assessment of the strengths and weaknesses of the different options.

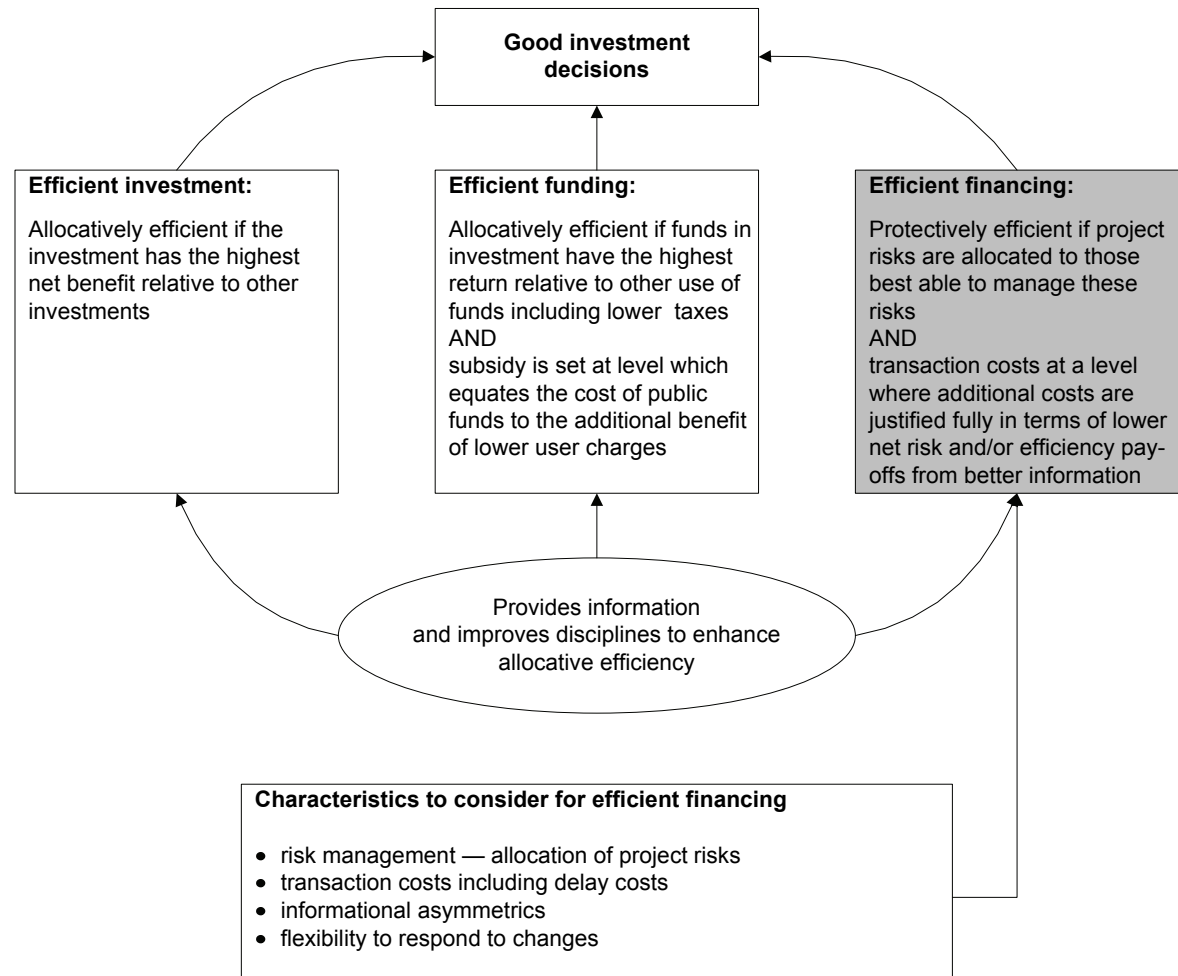
### **Efficient investment, funding and financing decisions make good investment practice**

The provision of public infrastructure involves the interrelated activities of investment, funding and financing — which all have distinct implications for economic efficiency.

- Investment in infrastructure should add to community welfare. Profitability alone is an inappropriate criterion for infrastructure projects with significant spillover benefits that are not fully captured in market prices. An investment is efficient in allocating resources if it delivers the highest ratio of benefits to costs compared to other alternatives. These alternatives include options such as expenditure on other public services or returning the funds to taxpayers.
- Funding sources should reflect benefits to users, with public funding making up the shortfall between user charges and the overall costs of the infrastructure (construction and operation). These costs include interest payments and principal repayments. Efficiency requires finding the balance between the effect of user charges on demand (including the impact of additional users on the quality of the service provided), with the reduction in costs imposed on taxpayers who may or may not use the service (adjusting for the transaction costs associated with user charges). Where there is a decision to fund the gap, this subsidy should be directly funded through budgetary processes to help ensure transparency and accountability of project funding decisions.
- Financing should minimise the lifetime financing costs of a project. While the major financing task is meeting upfront investment costs in a timely manner, the central efficiency issue is which financing vehicle best manages project risk. Financing vehicles that assign risk to the partner best placed to manage each type of risk are more efficient, reducing the overall cost of the project. There may also be scope for the financing vehicle to influence allocative efficiency by imposing greater discipline on investment and funding decisions.

Figure 1 indicates these three considerations in public infrastructure investment decisions. The highlighted section identifies the area covered by this study, that is, infrastructure financing.

Figure 1 **Efficiency considerations of good investment decisions**



### Efficient financing has three main aspects

This study draws on country experiences with different financing vehicles to identify their strengths and weaknesses in terms of their implications for improving:

- project risk management
- transaction costs (including costs of delay arising from cash flow constraints)
- information and disciplines that contribute to more efficient investment decisions.

Project risk can be reduced by good management. The financing vehicle may be able to better align incentives for managing a range of project risks with

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responsibility for risk management. For example, Public-private partnerships (PPPs) may assist in transferring construction and operational risks to private partners, while government retains regulatory and demand risk with a commitment to underwrite minimum revenue from user charges.

There may also be some scope to transfer risks to those more able to bear these risks, either as they can more effectively diversify the risks or because they have a higher tolerance to risk. However, one lesson from the financial crisis is that securitisation, which allows the sharing of financial risks, may reduce the incentives to manage specific project risk, so innovative financial products need to be assessed carefully.

Arranging and managing financing can have high administrative costs. Negotiations and contracting to bind risk exposures can be time consuming and costly, and outcomes may not always be as expected. Timing also can matter. Having adequate finance available when it is required is important for timely delivery of design, construction and operation of infrastructure. Delay can impose costs in forgone services, although it can bring better information to guide the investment decision.

Informational asymmetry affects how well risks can actually be allocated as the parties to the investment do not have a common understanding of the types and extent of risk associated with the infrastructure project. Information discovery can add substantially to transactions costs. Uncertainties will be reflected in higher premiums required by investors, and higher hurdle rates for public investment. Information asymmetry can lead to adverse selection, where good projects face a higher required rate of return that would be the case if information were disclosed. The financing vehicle can influence the incentives for the parties to share their information, and hence affect the allocation of resources.

While financing and investment decisions are largely separable, the financing vehicle can impose additional disciplines on the investment decisions where it requires greater scrutiny. Private investors will have a greater incentive to assess the financial viability of an investment where they bear all the contingent liabilities. These financial risks can arise through cost overruns in construction and operation, and revenue shortfalls, with the extreme situation where the asset becomes stranded or has to be decommissioned. Political processes can also impose scrutiny on investment decisions. These disciplines reduce the probability of poor investment prioritisation.

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## Recent patterns in public infrastructure investment and methods of financing

The use of particular financing vehicles by governments varies considerably across the countries in this study. While history may explain much of this variation, other reasons are differences in:

- infrastructure characteristics — affecting the user profiles and revenue-raising capacities of particular assets
- fiscal and macroeconomic conditions — potentially restricting use of particular financing vehicles because of their budgetary consequences
- institutional arrangements — defining the legal and regulatory framework as well as the intergovernmental relationship within which public infrastructure assets are operated and financed
- perceptions of the role of government — and voters' expectations for the involvement of government in delivering specific services and managing the economy.

### Trends in use of financing vehicles

While budget appropriations remain the major source of finance for public infrastructure, Australian and overseas governments alike have increasingly been drawing on capital markets to finance public infrastructure. This partly reflects the impact of financial innovation on financing efficiency, as well as changes in the attitudes of government to debt and ownership of infrastructure assets. In Australia, the corporatisation of government trading enterprises (GTEs) during the 1980s and 1990s included utility and transport services that traditionally owned major infrastructure assets. While GTEs can finance investment from retained revenue, or budget appropriations (equity injections) or debt, there has been a trend toward greater use of the later. For some GTEs, this appears in part to be due to rebalancing the capital structure to raise the debt to equity ratio (chapter 6).

The 1980s and 1990s also saw a trend toward privatisation in some infrastructure industries, reflected in the higher private sector share of investment. The trend continues with a greater reliance on PPPs in some Australian states, notably New South Wales and Victoria. Nevertheless, within those states, PPPs account for a small percentage of public investment in infrastructure (10 and 9 per cent respectively in 2005-06). Moreover, their share fluctuates from year to year (chapter 8). The global financial crisis has seen a sharp reduction in the availability of credit, and increased caution about innovative financial products utilised in some PPP financing arrangements.

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## Trends in public infrastructure investment

Comparisons of public infrastructure investment across countries are difficult, principally due to potential inconsistencies in defining what *constitutes* infrastructure investment. In addition, public investment is not consistently broken down into infrastructure assets and other fixed capital formation. While caution must be exercised therefore, in drawing any conclusions, some general trends are apparent:

- For most of the countries, the level of total (public and private) investment in social and economic infrastructure industries on average remained fairly constant in real terms over the past three decades, although some experienced slight declines. In 2006 investment was marginally below 4 per cent of GDP for most countries. In Australia, where investment had traditionally been relatively high, it experienced a downward trend. This was reversed after 2000, and in 2006 was just below 6 per cent of GDP.
- General government investment (which excludes public corporations) as a proportion of GDP has fallen in most countries over the past four decades. In Australia it stood at 2.4 per cent of GDP in 2005-06. This could reflect the pattern of corporatisation of GTEs as well as privatisation over the period.
- In Australia, national government investment has fluctuated between 1 and 2 per cent of GDP over the past four decades. In the 1980s and 1990s the decline in government investment appears to be largely due to declines in sub-national levels of investment, whereas in the 2000s growth in sub-national public investment has more than offset declines in national level public investment.
- In Australia, sub-national governments (and their public corporations) are responsible for the majority of investment, currently making up three-quarters of the total of public investment of 4.1 per cent of GDP. This split is similar to the United States.

## What is driving the observed trends?

The main trend among countries has been a decline in the relative share of public infrastructure investment with overall investment stable. This appears to be largely a result of privatisation, motivated by the view that private ownership tends to raise the internal efficiency of previously government-owned businesses engaged in commercial activities (Kain 1997). In addition, fiscal policy constraints have encouraged government to seek greater private sector participation in the provision of infrastructure under a range of structures. These trends largely transfer investment from the public to the private sector, although they may also reduce excessive investment by imposing market discipline. Conversely, the same forces

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allow for increased investment in circumstances where government has faced fiscal constraints. While corporatisation of government businesses should improve the efficiency of investment, corporatisation has no specific implication for the overall level of investment unless there has been systematic under or over investment.

Infrastructure investment is affected by general economic conditions. Private sector investment tends to be pro-cyclical, while the pattern is less marked for public investment. Use of public investment to stimulate the economy during a down-turn increases the demand for finance at the same time as government revenues are under pressure. The advent of new financing vehicles reduces fiscal constraint, but financing vehicles relying on capital markets face other constraints. Other factors that contribute to observed trends include population density and distribution, geographic factors, the regulatory environment, and changes in the structural composition of economies.

## **Strengths and weaknesses of different financing vehicles**

The financing vehicle is the method used to raise the cash to meet payments for construction and, in some situations the operation, of the infrastructure project. It can influence the funding gap through the incentives it generates for user charges, the disciplines it imposes on risk management, and the costs of financing which form part of the lifetime project cost.

Financing vehicles may differ in their:

- *risk management* — the assignment of non-diversifiable project risks and management of the overall project risk
- *transaction costs* — the cost of arranging and managing finance, and costs associated with delay or uncertainties with availability of finance
- *exposure to market or other disciplines* — the extent to which borrowers and lenders share, signal and can act on information on project prospects and risks in the investment decision.

A comparison of the different financing with respect to these three characteristics is given in table 1.

**Table 1 Comparing the characteristics of the financing vehicles**

<i>Financing vehicle</i>	<i>Exposure to market or other discipline</i>	<i>Incentives for project risk management</i>	<i>Transactions costs</i>
Government appropriation: PAYG	Low to medium: exposure to parliamentary scrutiny, and subject to binding budget constraints	Low: depends entirely on quality of public management of procurement and operation	Low: but cash flow constraints could delay project and little flexibility as only assets sales allow restructuring of ownership
Government appropriation: government bonds	Low: exposure to parliamentary scrutiny	Low: depends entirely on quality of public management of procurement and operation	Low: marginal cost of higher debt issue but little flexibility as only assets sales allow restructuring of ownership
Government appropriation: Inter-government transfers	Low: exposure to parliamentary scrutiny, could distort preferences	Low: depends entirely on quality of public management of procurement and operation and level of project monitoring by grantor	Low: as above, but may have additional costs associated with project monitoring
Specific purpose bonds (not tax exempt)	Medium: intermediaries provide risk assessments, and price in risk, but weaker if governments offer some backing	Medium: requirement for user charges to service debt imposes disciplines, but depends on government assumption of contingent liabilities	Medium: requires intermediary assessment and underwriting costs
Specific purpose bonds (tax exempt)	Medium: as above, but maybe lower if tax exemption acts an investment incentive (tax gain not fully passed into lower yields)	Medium: requirement for user charges to service debt imposes disciplines, but depends on government assumption of contingent liabilities	Medium: requires intermediary assessment and underwriting costs
GTE borrowing	Medium to high – if borrowing directly from the market Medium to low if borrowing restricted to CBAs	High: if good governance in place	Medium to high: if borrowing directly from market Low if borrowing from CBA
GTE retained earnings	Medium to low: good governance will improve scrutiny, incentives to reinvest are high	High: if good governance in place	Low: but depends on the cost to government of forgone dividends, could delay projects considerably
GTE equity injection	Low to medium: exposure to parliamentary scrutiny, and public interest	Medium to high: less than if funding came at a higher risk to the GTE	Medium to low: low cost of finance, but costs of negotiations with government may be significant

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**Table 1** (Continued)

<i>Financing vehicle</i>	<i>Exposure to market or other discipline</i>	<i>Incentives for project risk management</i>	<i>Transactions costs</i>
Development contributions as a source of funds and finance	Medium: depends on the potential for achieving nexus	Low: unless the contribution is in kind in the form of the infrastructure	Low to high: negotiated contributions and the potential for legal appeal create potential for high costs on an otherwise low cost of finance
Public private partnerships	Medium to high: depends on reliance on user charges or well designed service payments	High: as long as contracts allocate risk appropriately	High: contract negotiations are complex and can be lengthy

## **Budget appropriations**

The application of budget appropriations have undergone significant changes in many countries over the past two decades (chapter 4). These changes include the revenue sources used to fund appropriations (including general public debt as well as taxation revenue), the impact of public sector reforms (such as accrual accounting and output-based budgeting), trends in fiscal policy (such as fiscal responsibility policies), and the increased use of special (standing) appropriations in financing government spending. Budget appropriations remain the major source of finance for public infrastructure investment in the Australian states and territories. In the United States and Canada, they are more important at the municipal level, however, comparisons are difficult due to the different reporting of public capital expenditures.

Budget financing on a pay-as-you-go basis avoids the transactions costs of raising finance. Moreover, infrastructure investment can be presented as fiscally responsible and financially prudent if governments spend only what they can currently ‘afford’. This approach avoids a direct liability on future revenues, which may be important to keep credit ratings intact and preserve borrowing capacity for other circumstances. However, it still comes at the opportunity cost of the alternative use of the funds, including returning them to taxpayers who may themselves have invested at market interest rates. Other expenditure needs of government may delay major projects, particularly those that have to be completed in phases as determined by the availability of funds.

Public debt is another source of funds for budget appropriations. The total cost of debt finance includes the rate of return on government bonds, administration costs associated with debt issue and the contingent liabilities of the project, which with financing by budget appropriation remain fully with the government.

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### *Financing from higher level government grants can distort incentives for efficiency*

The Australian Government has traditionally provided ear-marked grants to the State and Territory governments to implement projects of national strategic importance. About \$3.7 billion of specific-purpose capital payments were provided by the Australian Government to the State and Territory governments in 2006-07, and through the State and Territory governments to local governments (Commonwealth of Australia 2007). Such transfers improve welfare where they generate spillovers within a country, or address vertical fiscal imbalance. They may also respond to equity concerns, helping close funding gaps where some state and local governments have inadequate revenues to meet their infrastructure and other expenditure needs, compared to wealthier regions of the country.

Investments may not be allocatively efficient where federal priorities do not reflect the best use of funds at the local level, a problem compounded if matching funds are required. Incentives for pursuing efficient pricing policies and the effective and efficient use of the funds may also be blunted. And the arrangement could encourage cost-shifting which is likely to lead to shortfalls in infrastructure construction, maintenance and replacement, or a lowering of service standards.

### **Specific-purpose bonds**

Specific-purpose securitised borrowing refers to the issuance of debt instruments such as bonds, debentures and inscribed stocks for the purpose of financing specific infrastructure by the public sector (chapter 5). These borrowings are usually secured on the asset, or against the revenue stream arising from the asset. The inability of governments to avoid contingent liability and the potential for cost savings from centralised borrowing, along with the privatisation of a significant number of infrastructure service providers, saw the phase out of specific purpose bonds in Australia by the mid 1980s. Such ‘revenue bonds’ remain a major source of finance for infrastructure investment in the United States and Canada. Revenue bonds in the United States are tax exempt. While this lowers the interest cost, evidence suggests that this does not fully offset the forgone tax revenue.

The exposure of bond holders to project risks provides an incentive for due diligence on the investment. However, this link is weaker where there are additional sources of revenue for servicing the bonds unrelated to performance of the asset.

Transaction costs can be fairly high, especially for small investments. The costs of engaging market players in the assessment of the risks and underwriting a bond issue are in the order of 1 to 2 per cent. Hence the market-related incentives for

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better project design and management need to be significant for specific-purpose bonds to be the most efficient financing vehicle.

## **GTE financing**

Reflecting broader trends, Australian GTEs have been increasing their debt-to-equity ratios, moving to capital structures that have higher leverage (chapter 6). New infrastructure investments have typically been predominantly debt financed, although a mix of instruments is often used. Government dividend requirements, and regulations that affect user charges, largely determine the capacity of GTEs to finance through retained earnings. In Australia, GTEs may face limits on borrowing in their Acts, which may leave capital injections by the shareholder government as the only source of finance.

Capital injections are on-budget and subject to parliamentary scrutiny, unlike GTE borrowings which are off-budget. Where GTEs raise finance from the capital markets, their financial performance and the viability of the investment is subject to market scrutiny. Market disciplines are weakened if the GTEs are required to borrow from the Centralised Borrowing Authorities (CBAs), as in Australia, although this lowers the transactions cost of arranging finance. Debt finance may make the GTE more sensitive to the cash flow implications of the investment, and hence to risks posed to outcomes such as timeliness of construction and quality. Where the GTE operates in a regulated market, regulators can impose discipline on the investment decisions where price rises are not justified solely on a cost basis.

The greater the government commitment to independent and accountable governance the greater incentive GTEs have to manage the project risks of their investments, regardless of the financing arrangements. Hence, whether a GTE is a good instrument for infrastructure investment depends very much on the quality of its governance. Reforms over the past two decades have seen considerable progress, though there is scope for further improvement (PC 2006d).

## **Development contributions**

Urban expansion and the higher expectations of more affluent societies have increased the demand for the quantity and quality of urban infrastructure. With greater acceptance of the principle of user pays, and limits on revenue raising of local government, development contributions have grown as a source of both funding and finance for urban infrastructure. Most governments apply the principles of reasonableness and accountability to the determination of development charges. Reasonableness covers issues of equity and fairness and generally applies the test of

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nexus and apportionment. Nexus has causal, spatial and temporal dimensions and is about justifying the proposed investment in terms of the need for the investment, the impact relating to the area of the development, and the benefits it delivers to those who contribute to its cost. Apportionment requires that the contribution liability should be proportionate to the share of the total benefit from financed infrastructure that is received by the development.

Development contributions, by imposing a ‘user charge’, should improve the allocative efficiency of the infrastructure investment. However, developers have an incentive to provide infrastructure that is either highly marketable and easily recovered from home buyers, or low in initial up-front cost if the charges cannot be passed on. In either case, ongoing maintenance or operating costs could be higher than optimal. Local planning authorities, on the other hand, have incentives to minimise future maintenance and replacement costs, and to make up for inadequate past investment. The temptation can be to ‘gold-plate’ the requirements up front, with implications for housing affordability.

Transaction costs can be high and outcomes uncertain, especially for negotiated contributions. Where contributions have been in-kind, such as land for a public park, the financing task for capital improvements falls fully to the government if it is responsible for the investment. Where development contributions are made up front in cash, this provides timely finance for the investment.

Allowing governments to accumulate the funds raises concerns about the reasonableness and accountability of the development contributions. While achieving a nexus improves allocative efficiency and equity, there is little in funding by development contribution that ensures project risks are minimised.

## **Public private partnerships**

Public-private partnerships constitute around 5 per cent of investment in public infrastructure, more in New South Wales and Victoria which have been the main users of this financing vehicle. This growth be due in a large part to the scope to bring in private sector management skills, the opportunity that bundling design, construction and operation, or parts thereof, provide to improve efficiency and the ability to bring forward the provision of the infrastructure service. There can also be less scrutiny from off-budget financing.

The potential to lower total costs through alignment of incentives to manage project risks with capacity to do so is considerable. Contract design and management are important to ensure that only risks that can be better managed by the private sector partner are allocated to them. It is also important to ensure that public underwriting

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of user charges and committed payments for services do not undermine these incentives. Trying to extract the last ounce of rent can also create contingent liabilities for government if it increases the probability of failure.

There is evidence that private sector partners are more realistic in their estimates of construction time and costs than public agencies. Private partners have an incentive to develop a realistic financial model that takes into account all costs and revenue flows. The quality of this information is likely to be superior to that of public sector agency where the proponent has less experience in the area.

While PPPs may assist in improving productive efficiency they are no guarantee that the investments are optimal, and the off-budget treatment of future funding obligations related to some PPPs may reduce the scrutiny applied to the investment.

Public-private partnerships work best where government has considerable skill in contract negotiation and management, and where there is adequate competition for the projects. The costs of tendering, negotiating and managing contracts can be considerable – with tendering costs alone estimated at up to 3 per cent of the project cost. And while risks may be transferred to private partners, the cost of risk will be factored into the cost of finance. The main advantage of PPPs comes from the scope for lowering the total cost of the project through improving project risk management. And while contract negotiation can be lengthy, PPPs provide a more flexible, and potentially more timely source of finance for important infrastructure investments that might otherwise be constrained by public debt pressures.

## **Franchise arrangements**

Government franchising involves a government or public-sector agency (the franchisor) granting an exclusive right to a private or other independent entity (the franchisee) to occupy, operate and maintain publicly owned infrastructure facilities to deliver services over a predetermined period of time. This approach differs from licensing arrangements whereby businesses are granted permission to supply infrastructure services with their own assets.

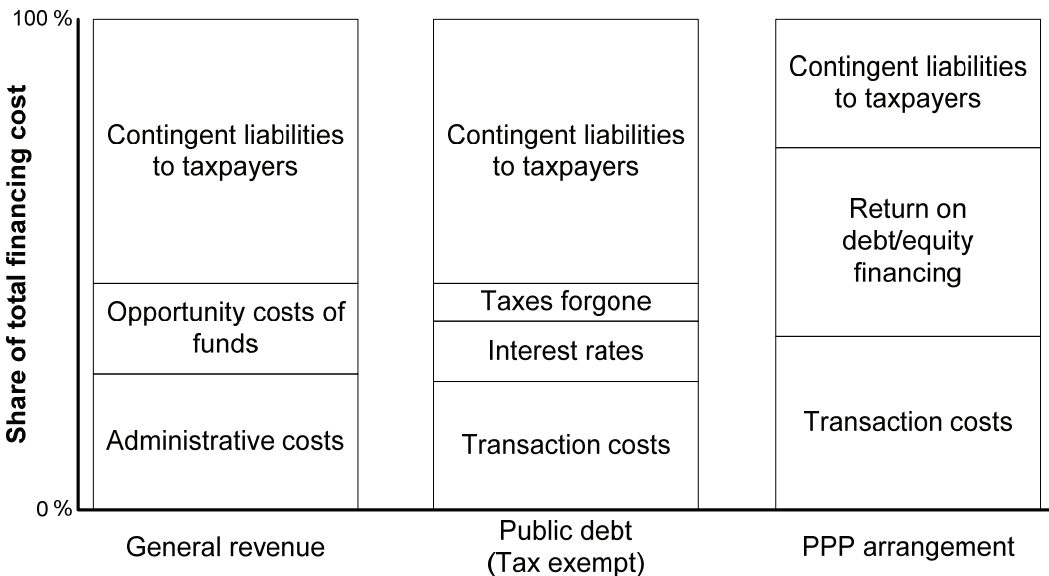
Infrastructure services are often characterised by significant economies of scale, scope and network integration, reducing the scope for competition in the market. Franchise arrangements can introduce competition for the market through franchise bidding. The effect can extend over the franchise period as the incumbent franchisee faces incentives to be efficient in order to receive favourable consideration upon franchise renewal or retendering. ‘Yardstick competition’ is created where the performance of franchisees operating different segments of an infrastructure network can be compared. This can be used as the basis for determining franchise

payments, or influence the award of future contracts. While government franchises aim to achieve higher operational efficiencies and lower maintenance costs they have not worked as well as envisaged. Breaking up networks to introduce yardstick competition comes at a cost of introducing network inefficiencies. And, while short-term contracts may raise scope to introduce competition, they reduce the incentive for maintenance that would otherwise have longer-term pay-offs.

### The total cost of finance

The total cost of financing is made up of the return paid to investors, the cost of contingent liabilities to government arising from exposure to project risk, the transactions costs of the financing arrangement, and any costs of delay that might be associated with a particular financing vehicle. The cost of financing does not include the deadweight loss associated with the collection of taxes to fund any gap between revenues from the infrastructure and its total cost, although this is an important cost of the project (chapter 2) that must be taken into account in the cost-benefit assessment. Nevertheless, financing from consolidated revenue has an opportunity cost as these funds cannot be used to support other programs or left with the taxpayer. For projects financed using tax exempt bonds, the cost of the forgone tax revenue must also be included in the cost of financing. Figure 2 sets out the major costs to be considered in comparing the total cost of financing three of the vehicles.

Figure 2 **Stylised breakdown of total cost of financing public infrastructure by different types of financing vehicles**



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A particular financing vehicle can reduce the total cost of financing to the extent that it can:

- better align the incentives for managing non-diversifiable project risk to those who have the capability to better manage this risk
- improve the portfolio balance for the investors, reducing the market risk through diversification, consequently lowering the return required to hold this asset
- reduce the life-time transaction costs of financing and or the costs of delay.

Of these three avenues for lowering total costs of financing, the most powerful is usually the potential for a financing vehicle to reduce the cost of contingent liabilities through aligning the incentives to better manage project risks. The case for PPPs, like the case for specific purpose bonds, lies largely on the potential to align these incentives, and hence the size of the premium that the private partner (or investor) will charge for taking on these risks. If they are able to manage the risks well the premium charged will be lower, lowering the total cost of finance. If a PPP or specific purpose bond leaves most of the contingent liabilities with the government, the premium charged might also be lower, but as this imposes additional costs on government, the total cost of finance is not reduced.

Estimating the total cost of finance is not a trivial exercise, as it involves assessment of contingent liabilities as well as life-time transactions costs. There can also be gains from refinancing that are uncertain at the time of the original contract. Figure 3 provides a comparison of the different component of costs of a PPP financing arrangement compared to a government bond. Below the zero line are the sources of higher costs associated with PPPs, while above the zero line the sources of cost savings are listed. Which dominates depends on the nature of the project and the project risks, the competition for the project, and the government's skill in negotiating and managing the contract.

**Figure 3 Comparing the cost of PPP and government debt finance**

