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**Private Sector Involvement in
Public Infrastructure**

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Synopsis The scope for private involvement in the provision of infrastructure services, beyond the well-established role of contract construction of facilities, is limited for the following reasons:

1. the risks involved in operating these facilities are inevitably borne by government and only the government has any control over these risks;
2. the advantages of private sector provision flow mainly from competition, but competition is impossible for these services because they are natural monopolies; and
3. also because of natural monopoly in infrastructure markets and for equity and environmental reasons, it is necessary for governments to regulate providers, which further limits the scope for innovations by private sector providers.

Levels of private sector involvement

The private sector can be involved to a greater or lesser extent in the provision of infrastructure services. Four different levels are readily identified, and there are other combinations of functions that can be franchised to private firms. An additional option not discussed here is the introduction of some of the disciplines of the private sector into the public sector, one form of which is corporatisation.

1. Contracting out particular functions. Governments have for a very long time contracted particular functions to the private sector, where the functions to be performed could be specified quite precisely and their performance monitored at no great cost. The most obvious examples are the construction of capital works and functions such as cleaning, catering and the supply of particular inputs by competitive tender.
2. Contracting out construction and operation. In this case the government decides the services and facilities to be provided and contracts with a private firm for their provision, but pays all of the costs from its own revenue. Examples are the private construction and operation of water treatment plants, sewerage treatment, or the Sydney Harbour Tunnel. In all of these cases the government is the owner of the facilities. Effectively it uses the private sector as a means of supplying capital as well as a source of operating expertise. Although the Sydney Harbour Tunnel was set up to appear as though it was privately owned and the contractors collect the tolls, the contractors' income does not vary with its toll collections. Many of these operations have been undertaken in the past as a means of reducing government borrowing, and therefore avoiding Loan Council restrictions. (A variation on this level is provided by the M4 freeway in Sydney which was built by government but then "sold" at a low price to a private operator whose income is from toll revenue.)
3. Private provision of facilities and collection of revenue under government control. This occurs particularly where private firms provide part of a network of services. The government decides where the investments will occur and the level of charges. The best example in the classic infrastructure area is the provision of freeways such as the M2

and the M5 in Sydney. The private supplier's income depends on the revenue it collects rather than being provided or guaranteed by the government. This form of operation is possible only where users are charged directly for the use of the service.

4. Private decisions about provision of services and level of charges. This is what could be called full privatisation though, for reasons to be spelled out later, the level of charging is generally regulated by the government. The classic case of this in Australia is gas supply, which in some large cities has been privately supplied for many years. Recent moves toward privatisation of telecommunication, electricity and water supply services are moving these services towards full private operation.

Advantages of private sector involvement.

Three important advantages are claimed for private sector provision of infrastructure services.

1. Commercial discipline. A private firm that is not operating efficiently is likely to go out of business whereas public sector authorities cannot become bankrupt because their debts are guaranteed by the parent government. Traditionally also it has been easier to dismiss a private sector employee who is not performing satisfactorily.

2. Competition. Private firms must compete in the markets for factors of production, especially capital, as well as competing among one another for the dollars of customers.

3. Reduction in public borrowing. Government borrowing is restricted because it increases future need for funds to pay interest, forces up the interest rate at which it must borrow, and also is claimed to "crowd out" private capital formation.

It will be argued later in this paper that the first two of these advantages are difficult to achieve from private involvement in provision of infrastructure because of the nature of the services, and that the reduction in public borrowing comes at a high price because the private sector borrows to provide the same services at a higher cost, and because many of the risks remain with the government.

Rights, responsibilities and risks in the provision of infrastructure

The right to provide infrastructure and the responsibility to ensure it is provided are fundamental aspects of the functions of government. They are government responsibilities, first because they are 'essential services', an old fashioned term used for example by Mathews (1967), and second because they cannot be provided competitively, a matter to which I return. The concept of "essential" services means those that are needed by individuals living in urban areas and they are needed collectively to prevent the actions of individuals creating a nuisance to others. It is implied also that they have low income elasticities of demand. That government has these rights and responsibilities is not questioned by any of the proponents in the debate about who should provide the services themselves. One term which has been used to describe the role of government when private firms provide infrastructure, is that the government is the "host" who deals with the private "owner" of the infrastructure on the one side and with the public on the other (Gilligan, 1994). The host, in other words, has

responsibility to the community to ensure that the services are provided and enters into a contract with the owner to provide them.

While governments can contract with a private firm to provide a service by selling (franchising) the right to provide the service for a time, final responsibility for provision of the service, and the right to provide it, remain with the government. There are two reasons for these being rights and responsibilities of government:

- the legal reason is that only governments have the power to establish the rights of way and to use them for the purposes of providing such services; and
- the political reason is that, because these services are "essential" and because they are both required to reduce some externalities but in doing so produce some of their own, voters hold governments responsible for ensuring that they are provided. For the purpose of the following discussion the relative importance of legal and political reasons does not matter.

The responsibilities of government can be seen most clearly by considering the situation that would arise if the provision of a service by a private firm failed. Take the M4 motorway in Sydney. If the private company which has the franchise to operate the motorway were to fail to maintain it so that the quality of service fell, it would be the responsibility of the government to enforce the terms of the contract to ensure that it was repaired. If the company could not do so without becoming insolvent, it would be the government which would have to renegotiate the contract or find another operator or take over the operation of the 'unprofitable' business. It would be politically unacceptable for the Government to tell the users of the road that they would simply have to make do with Parramatta Road until another company was willing to take over the business and operate the motorway under the terms of the original contract. Similarly, if one of the private companies to be franchised to distribute electricity in Victoria were to fail the Victorian Government would take responsibility for ensuring that supply was maintained.

It is because of the existence of this untransferable risk that the contracts with private providers of infrastructure services are written in terms that either leave most or all of the risks with the government as in the case of the Sydney Harbour Tunnel, or in terms that are sufficiently favourable to the private provider that there is little chance of failure. In some cases this requires adjustment to the terms of the contract after the facility has begun to operate, as occurred with the M5 motorway in Sydney. (For evidence on both of these facilities, see NSW Auditor General, 1994.) The NSW Auditor General found that, notwithstanding the formal legal situation, the NSW Government is effectively the owner of the Sydney Harbour Tunnel since the operating company's financial returns are essentially independent of the volume of traffic using the tunnel.

The risks involved in supplying these services are of several kinds.

- Cost risks derive from unexpected changes in cost during the construction period. Construction cost risk is one which the private sector is accustomed to assuming and can deal with as well as government. It can be, and usually is,

shifted to a private construction contractor through a fixed price contract. Longer term operating cost risk where it occurs is usually covered by some kind of escalation clause on payments by the government or in the charges which can be levied.

- Interest rate risks derive from unexpected changes in rates during the period of operation. This is another risk the private sector is accustomed to assuming. For these services, however, the long lives of the assets means that the interest rate risk is greater than is common with private investment. This is especially true if the loans to build the assets are amortised over their full lifetimes, as they need to be if the cost of the assets is to be shared in an optimal and equitable manner between different cohorts of users. Governments have commonly handled this problem either by using tax revenue for capital investment, especially in the case of roads, or by borrowing at fixed interest rates over long periods to fund income earning infrastructure assets used, for example, to provide electricity, telephones and hydraulic services. The Commonwealth Government has some control over interest rates, though less since financial deregulation, and state governments none. It is not clear whether the public or the private sector is best able to take interest rate risks.
- Demand risk results from the possibility of a lower demand than that predicted at the time the decision was taken to make the investment. The public sector has traditionally dealt with demand risks in several ways. The problem can be avoided by using its taxing powers rather than user charges to provide revenue: if the tax base is unrelated to the level of use, as in the case of property taxes used to finance water and sewerage, local roads and drainage, revenue is stable even if demand changes. However, there are both efficiency and environmental disadvantages of financing many infrastructure services from taxes, and recognition of these has led to taxes being progressively replaced as a source of revenue by user charges. This change has made private sector provision feasible over a wider range of infrastructure services, though it has not necessarily made it any more efficient relative to public provision.

A second way to deal with demand risk has been to spread it across a wide range of investments and consumers as in the case of Commonwealth/State funding of roads from nation-wide petrol taxes, and authorities which supply electricity to whole states or a large areas within them. A combination of these two approaches is used in telecommunication where there is a substantial fixed charge - a kind of tax - on users, and a nation-wide supply authority which spreads the risks.

Any privatisation of type three or four means that taxes are no longer available as a source of revenue: only governments can levy taxes. In addition, any splitting of the area-wide monopolies means that the capacity to spread the demand risk over a large, and to a considerable degree captive, market is reduced. This latter effect is more important than appears at first sight. The future demand for water, for example, within a particular sector of Melbourne is less predictable than the demand in Melbourne as a whole and the demand within a particular suburb, especially one on the fringe of the city, is even less

certain. And while those risks can be controlled by governments to some degree through land use planning and controls, private suppliers of water have almost no control over them. Similarly the demand for the use of an individual road depends on land use changes in the areas served by the road and on the capacity of alternative routes that can be used to make trips that would otherwise be made on the road. It is much more difficult to predict than the use of all roads within a state or a city. This is well illustrated by the M5 where one measure taken to improve its financial viability was to defer the building of access ramps between the northern end of the largely government funded western link and the Hume Highway in order to reduce the attractiveness of alternative routes. The political options available to the NSW Government were to make the M5 profitable or to take over its operation.

- Government policy risk results from unexpected policy changes during the life of the investment. In the light of new information or in response to political pressure from affected groups, the government may need to introduce more stringent standards for the quality of effluent from sewage treatment, higher standards of water purification or lower noise emission levels from motorways than were anticipated, and incorporated in the contract. It is both simpler and more equitable for the costs of higher standards that are decided in a political process to be imposed on public than on private providers of services. Such a change creates a problem for the private supplier if the contract is written in such a way that the company has to meet standards as determined from time to time by the government. If, however, for legal or political reasons (for example private providers may be a powerful political lobby) the standards required of the private provider cannot be varied, it creates a great problem for the government in meeting its own environmental objectives.

Gilligan (1994) describes this problem as resulting from the fact that not all of the eventualities can be foreseen at the time a contract is written and provided for in the contract. As a result it is necessary for there to be a relationship between the owner and the host of "mutual trust and respect". The need for this kind of relationship rings alarm bells among those who believe that one of the advantages of greater private involvement is that it permits relations between the two sectors to be placed on a contractual basis which avoids exploitation of the public by the private sector - usually in the form of capture of the regulators by the regulated.¹ The need for those kinds of relationships which cannot be specified in contracts is one of the main reasons for the existence of firms, or indeed of government authorities.

Natural monopolies and the lack of competition

Infrastructure services are natural monopolies for two main reasons.

¹ The need for relationships that cannot be specified sufficiently in contracts is one of the criticisms of attempted public sector reforms spelled out in the various chapters of Alford and O'Neill (1994)

1. The less general, but the better known, reason is that there are economies of scale in the provision of services as a whole. Examples are the economies of scale in the building and operation of dams, sewage treatment works and electricity generating stations. These economies provide more compelling reasons for provision of the service by a single supplier if there are large costs involved in transporting the service between cities, as there are for water and sewerage. In the large Australian cities these economies are largely exhausted as can be seen from the fact that each is served by more than one dam, water treatment plant, power station and sewage treatment facility. In smaller cities, scale economies for dams, and in smaller states scale economies in electricity generation are not likely to be exhausted. Only NSW and Victoria and possibly Queensland have markets that are large enough to support several private and competitive producers of electricity. Transmission costs are too high for Australia to function as a single market for electricity and even for cities in a single state to serve as a one market for water.

2. The more general and important, but less well-known, reason for natural monopolies is that there are economies of scale in the networks through which the services are provided. In eighteenth century London, water supplies were first provided by individual water companies, each of which had mains along each street. It was partly the manifest inefficiency of this situation and partly the inconvenience of streets that were continually being dug up as consumers decided to change from one supplier to another which resulted in the creation of the London Board of Works to take over the system.

For almost none of these services is it feasible to have genuine competition in the sense of individual consumers having the choice between competing suppliers. The fact that Melbourne Water is to be broken up into three retailing and one wholesaling corporation cannot achieve competition for individual customers by giving customers a choice between suppliers (though it is likely to reduce the price which the Victorian Government is likely to get for the assets). Nor will supply companies that buy a franchise to retail electricity within different parts of Victoria compete with one another. Similarly the M5, the M4 and the M2 in Sydney being operated by different companies does not introduce competition between them: the fact that the service offered on the M4 is better value for money than the M5 will seldom cause people to choose to live or work in Penrith rather than Campbelltown. Even in the case of telephone services, it is only on the long distance routes between large centres and the heavily used commercial routes within cities that it is not too expensive to offer competing services.

The Industry Commission (1994, p 25) concluded that "The major factor promoting efficiency is likely to be competition rather than ownership *per se*." Its study of the relative efficiency of public and private provision (1989, p 20) found that "Where natural monopoly elements are present and extensive government regulations are in place the results are inconclusive." It follows that the case for privatisation of such services is weak.

The need for regulation

Both the "commercial discipline" and the "competition" advantages of private sector involvement at the higher levels imply that competition between suppliers will be

relatively free rather than being restricted by regulations of various kinds. Regulations of a formal kind are, however, one of the costs of the separation of responsibility for provision of services from the responsibility for achieving other public policy goals through their provision. These regulations are needed for three main reasons.

1. Natural monopoly. Whether a natural monopoly is operated by a public authority or a private concessionaire, it is necessary for the government to regulate charges to avoid the supplier from exploitation its monopoly position by over-charging. Well established processes of ensuring accountability provide the information that enables governments to ascertain whether monopoly profits are being earned by public authorities, but commercial confidentiality and the control over cost information by the supplier makes the same monitoring more difficult where there are private providers. For example the NSW Auditor General has reported that he cannot assess whether the public interest has been adequately protected in the contract between the government and the private builders of the proposed F2 freeway because the terms of the contract are "commercial in confidence". Regulation of private providers inevitably reduces the flexibility which is one of the main advantages they are expected to bring to the production and marketing of these services.

There are two ways in which competition can be introduced into the provision of infrastructure services that are natural monopolies. The first is by introducing contestability for the market. This is achieved by the right to supply the market as a whole for a given period being opened to competition among potential suppliers. An existing supplier who is unsuccessful in bidding for the right to supply the market for the next period needs to be able to recover the value of its investment in capital assets. Otherwise the established supplier will have an incentive to cut prices to stay in the market. In the case of a bus company providing services over a particular route, the sale of its buses and servicing facilities is easy. But water and sewer mains, freeways and electricity and telephone networks cannot be sold to anyone except the new supplier. The viability of the bid of any alternative supplier depends entirely on the price at which those assets might change hands, and the established supplier has an incentive to quote a very high price. Such markets with immovable and illiquid capital are essentially non-contestable.

The second alternative to provide for third party access to the networks that these immovable assets comprise. In these circumstances the provision of the network itself remains a natural monopoly but different firms can compete in the provision of services through the network. The extent of competition for the service as a whole that results from third party access depends on the relative value of the services provided by the network itself and of what is provided through the network. This can be illustrated by examples. In the case of roads the whole value of the service is in the provision of the network: alternatively it could be said that third parties in the form of road users have always had access to the road network. In the case of stormwater drainage also the network is the complete service. Most of the value of water and sewerage services is in the pipes that distribute water and collect sewerage. The collection, storage and treatment of water and the treatment of sewerage account for relatively small proportions of the total service costs. At the other extreme, the cost of the network of pipes that distribute gas is much smaller relative to the cost of the gas that is provided through them and the same is true of electricity. Gas supply has been provided by

different companies through the same networks in Britain for many years. Telephones are changing from a mainly network service to one where the value-added components are becoming increasingly important, and with satellite and mobile phone communication the network is being by passed.

Third party access commonly requires one party that owns and operates a network and provides services through it, allowing access to one or more competitors. For this access to be provided on terms that allows genuine competition, the initial owner must not charge too much for use of the network, and must not charge too little (predatory pricing) to consumers in order to freeze out any competitive use of the network. Baumol and Sidak (1994) have derived definitions of the level of charges that should be permitted to provide efficient access to a competitor using the local telephone network. In a review of their book Stephen King (1994) argues, however, that the information required to enable a regulator to ensure that the initial owner complies with such conditions are very large, and those information sources are all under the control of the initial suppliers. Access to information is a problem for all regulation of natural monopoly, and is not overcome by providing third party access. (See Skinner, 1994, on cost information for water supply.)

2. Environmental Objectives. Private companies supplying water or electricity are likely to maximise their profits by selling as much of their respective products as possible at a price that covers the cost of provision. Yet the environmental costs of the use of water and electricity are very considerable and those costs are not borne by either users or the supplying companies. The same incentives will impact on public suppliers, but public suppliers are finally responsible to the same political masters as determine environment policy.² Indeed there is now plenty of evidence that public suppliers can and will respond to political pressures: water authorities are urging consumers to save water and looking at alternative ways of re-using water, and electricity authorities are urging their customers to insulate their houses and take other measures to conserve energy (e.g. ACTEW *Environment Plan, 1993/94*, and recent annual reports of the Water Board on its environmental management on the Sydney and Wollongong region).

3. Equity Objectives Another reason for public take over of the private water companies in London in the nineteenth century was that the companies found it unprofitable to supply low volume consumers, often those living in low income suburbs, especially in periods of shortage. For public suppliers, the provision of services to all consumers within their supply areas is an obligation that goes with their monopoly supplier privileges.³ A classic example is the responsibility of Telecom to supply telephone services to remote clients, even where the cost exceeds revenue. With private suppliers it is necessary to spell out such obligations in the regulations under which they operate, and to ensure that the same quality of supply was provided in rich and poor areas alike. These problems are not unknown with public supply as high

² This statement does not take account of the situations in which one level of government in a federal system is responsible for environment policy while another controls infrastructure.

³ These obligations are not unqualified. For example sewerage authorities may not connect a suburb until some proportion of the allotments have been developed, or in isolated settlements which would be costly to service, and Telecom may not provide broad band services to all homes in remote areas.

income users can often lobby for better services, but there is not the same incentives as exist in the private sector. The introduction of increased bank charges for small account holders by the recently privatised State Bank demonstrates the effects of competitive pressures to shed unprofitable customers. There are incentives for low cost suppliers to avoid the obligations of universal service at standard charges. For example Eli Noam (1992) constructs a theory of the pressures for privatisation of telecommunications networks based on the advantages to high volume users in large urban centres of avoiding their share of the costs of extending the service to low volume users in more remote locations that are more expensive to serve.

Given that governments wish to achieve equity objectives through the provision of these services, it is sometimes argued that they should not be funded by cross subsidisation from other consumers but should from government funds. Community Service Obligations (CSOs) as they are called, can be imposed on either public or private suppliers. In the latter case, no matter how they are funded, the supplier has to be regulated to ensure that the obligation is in fact met.⁴

One particular equity impact of privatisation of public infrastructure authorities occurs in the case of regional authorities such as the Hunter District Water Board. The assets of the Board have been financed by loans that have been amortised from the revenue of the Board from local users of the service. Thus the assets "belong" to the users of the service. But when such authorities are privatised it is generally assumed that the assets belong to the state government.

A second impact results from different amortisation periods. It is likely that private providers would amortise the capital cost of investment in the provision of these services over a shorter period than public providers. This is a disadvantage of private provision since it is both equitable and efficient for the capital cost of assets to be paid for by users over the whole of their productive lives. Private provision makes users in the period immediately after new assets are provided, pay too high a proportion of their cost. This is a well recognised impact of the introduction of developer funding of the reticulation of services in new subdivisions.

Evidence of the Effects of Privatisation

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In a recent Australia Institute Discussion Paper, John Quiggin (1994) examined the results of a range of sales of Government Business Enterprises (GBEs) in different countries and concluded that in all cases the public wealth was reduced as a result of the sale. This conclusion was reached by comparing the expected flow of earnings to the

⁴ It is not clear that it is better for governments to pay the cost of community service obligations to providers of infrastructure services rather than requiring the suppliers, whether public or private, to meet those costs. One reason is that it is not clear what should constitute a CSO, and what responsibilities derive from the privileges they are accorded when awarded the franchise. For example how is the cost of supplying small consumers discussed in the previous paragraph from profitable parts of their operations classified? Use of infrastructure services is a suitable tax base for raising funds to achieve public purposes in that their demand is commonly inelastic and, because of externalities, the social marginal cost of providing most of these services is greater than the private marginal cost. The widespread use of motor fuel taxes shows that one element of infrastructure use, the use of public roads, is widely accepted as a suitable tax base.

public sector (both dividends paid to the government and retained earnings) if the public authority had continued to operate, with the savings in interest which would have resulted if all of the proceeds of the sale were used to reduce public debt. This is an important criterion, though it may not be the only relevant one. It may be that the private operators are so much more efficient that the prices at which they provided the services after the sale were low enough to make people sufficiently better off as consumers to more than offset them being worse off as taxpayers. But if private buyers expected to be able to operate at lower cost, they would have been expected to pay a high price and privatisation should have yielded large fiscal benefits to the public sector, which is not what Quiggin found.

Many of the important reforms of providers of infrastructure in Australia have been made by public authorities, for example the introduction of pricing and investment reforms by the Hunter Water Board, which have been followed by almost all other suppliers. It is arguable indeed that all, or a very large proportion of the benefits that can be gained from privatisation can also be gained from public provision: as the Industry Commission found, efficiency of natural monopolies is not related to the type of ownership. Certainly there is no convincing argument for subsidising the sale of public assets or private investment in new infrastructure assets. If such investment needs to be subsidised, or if assets can be sold only at a price that is less than their value to the public sector, as Quiggin's evidence shows has occurred in a number of cases in the past, that is prima facie evidence that private providers are not more efficient than public providers.

There has been one apparent benefit from privatisation: it has resulted in a reduction in the need for public borrowing. By itself, however, this is a dubious benefit, and it is one that results to a large extent from Loan Council borrowing restrictions. If private borrowing costs more than public borrowing, the only beneficiaries are the lenders. One of the concerns about privatisation is that its major attraction governments appears to be that it has permitted governments to use the revenue from sale of infrastructure assets to reduce taxes or to increase current expenditure rather than to retire debt. Selling assets and using the proceeds for current consumption, like selling the family silver to pay for a holiday, is not a policy that can continue. Unfortunately, in the absence of balance sheets that show government assets and liabilities, it is not obvious to the public that their wealth is being eroded by such practices.

Conclusion

Privatisation of public infrastructure is primarily a way in which governments have reduced their need to borrow for capital expenditure, or to increase taxes to pay for current expenditure. Private borrowing is almost always more expensive than government or the public authority borrowing. Furthermore the evidence suggests that privatisation commonly reduces the level of public wealth. It appears also that many of the advantages of private involvement can be achieved, and in some cases have been achieved, by reform of public providers. One possible reason for these adverse conclusions is that following privatisation many of the risks remain with the government which cannot shed its responsibility for the provision of these services. Another is that the benefits are reduced by the need for considerable regulation of

private providers in order to avoid exploitation of natural monopoly power and to achieve environmental and equity objectives.

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