PPPs and Infrastructure Investment

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Public infrastructure projects involve large capital expenditures to create physical assets which will be subsequently used for the production of economic and social services over a typically long term. They are complex activities requiring specific expertise and resources for both the construction and operating phases, significant financial outlays, and the need for some parties to bear the risks associated with the project.

Historically there was a tendency for infrastructure financing, construction and operation to be undertaken primarily within the public sector, although contracting out of some specific construction or operational tasks also occurred. Highways, telecommunications, power, railroads, hospitals, prisons and schools were common examples. These were viewed as having natural monopoly characteristics, involving externalities, or as not appropriate for a "user-pays" approach, and thus not suitable or feasible for private sector provision.

A variety of reasons have prompted a reassessment, and led to the growth of private sector participation in provision of public infrastructure. These reasons include technological change, better appreciation of the linkages between incentive structures and operational efficiency, and greater acceptance of a "user pays" philosophy (Grimsey and Lewis, 2004).

In some cases, regulated private monopolies have replaced public sector provision. In others, joint involvement of private and public sectors has emerged as a favored

approach. Provided that appropriate contractual arrangements between the parties can be designed and enforced, and that the assignment of responsibilities reflects efficiencies in production, operating, financing, or risk bearing skills, more efficient infrastructure provision can occur. Public-private partnership (The Parliamentary Library, 2003) has become the catch-cry of those encouraging such an approach.

More efficient infrastructure provision can occur through optimal design and management of rights and responsibilities of both groups in such a contractual "partnership". But, reflecting the complexity of infrastructure projects themselves, there are many potential pitfalls in designing and managing the relationship.

Although "partnership" is a politically appealing label for these arrangements, it is potentially quite misleading. Partnership signifies agreement to work together in pursuit of a common goal, and de-emphasizes the potential for conflicts in managing the relationship and over shares of inputs provided and outputs received. While both public and private participants in an infrastructure process aim for successful completion, in each case it is in pursuit of differing ultimate goals. Profit drives the private sector participant, while low cost delivering of quality services is the objective of the public sector. Designing contractual arrangements which reconcile these generally conflicting ultimate objectives is no simple task.

Use of the term partnership also downplays the principal agent relationship involved and implications for governance and monitoring arrangements. Ultimately the public sector needs to monitor the compliance of private sector agents in meeting contractual terms across a broad range of project features, including quality standards. Verifying

performance against such standards can, in some cases, be costly or even impossible, and contract design needs to take such issues into account.

In the following sections of this paper, some key features of the design of such contractual arrangements will be considered. It will be argued that it is critical to identify the net advantage possessed by private sector participants (relative to the public sector) in performing certain roles in infrastructure provision, and estimate the value of that advantage as a prelude to the determination of appropriate contractual terms. Specifically, it is suggested that some common arguments for private sector involvement are based on incorrect claims of advantage in certain skills, and that quantification of the net benefit is a complex matter which is not always done correctly.

Finally, drawing on the arguments of Hart (2003) it is argued that recognition of the inability to write complete contracts, which specify outcomes for all eventualities, is perhaps the most important consideration in designing contractual arrangements and in determining particular situations and ways in which private sector involvement in infrastructure projects is likely to add social value.

Financing Infrastructure Projects

Infrastructure projects require large cash outflows in the construction phase and thus significant provision of finance. The terms and conditions on which finance is provided reflect the risk borne by the provider, which in turn reflects the risk associated with the project and the allocation of that risk between stakeholders.

Two important features follow from these simple observations. First, in comparing the cost of alternative sources of finance (such as private versus public sector) it is important

to take into account any differences in risk. Second, unless the contractual arrangements associated with financing affect the underlying risk of the project, financing arrangements only reallocate project risk.

If financing arrangements merely reallocate project risk (rather than change total risk) any social value from financing arrangements must stem from different costs of bearing or managing particular types of risk.

If financing arrangements are contractually interlinked with construction and operational features of the project, and thus impact upon incentives and actions of those involved, project risk may be altered. For example, the contract for private construction of a sporting stadium for public sector use for a planned major event would typically involve penalties for late completion. This links the return on funds invested by the private contractor to the delivery date, and thus provides incentives for timely delivery and reduces risk that the major event will not be successful. (At the same time, any inability to perfectly contract for, and monitor, construction quality may see delivery dates achieved at the expense of quality and longevity of the stadium). In contrast, it may be that public sector incentive structures and remuneration practices reduce its ability to manage the delivery risk.

The particular case considered in this section is where private sector financing is to be substituted for public sector financing involving essentially the same level of risk. Jenkinson (2003) provides a good illustration of such a situation using the U.K. example of refurbishment of government buildings. That is a specific instance of the more general case of government choice between purchase and ownership of an office building for its own use versus long term rental of the building from a private sector owner.

Potential differences between these two approaches relate to who bears the risk of fluctuations in property value and consequent incentives for maintenance expenditure, and fluctuations in the market rental yield on property. It is easy to envisage lease agreements (such as a lease where ownership of the building transfers to the government for a pre-agreed price at the end of the lease) where the leasing option involves the same risk as the purchase option.

In such a case, the only substantive difference between the two approaches is that of cash flow patterns reflecting different financing. Under the long term lease, the government commits to a long term annual stream of cash outflows in the form of rental payments. These payments compensate the property owner for the foregone return on the funds tied up in ownership of the building and capital loss on the resale price of the building. The government bears the risk associated with the long term value of the property.

Under the purchase option, the Government borrows funds for purchase, commits to annual interest (and principal) payments on the borrowed funds, and bears the risk associated with the long term value of the property.

Under what circumstances might this private finance, lease, option be cheaper than the public finance, ownership, option? Absent tax considerations they should be equal. The private owner has a risk free cash flow stream promised by government, and thus a “stand-alone” ownership vehicle should be rated as equivalent to government and able to raise finance at the government bond rate. The present value of the lease payments should equal the present value of the debt repayments. Distortions created by the tax system (depreciation, taxation of interest versus equity returns etc) create complications, but any

tax advantage or disadvantage of the specific transaction in terms of rental costs is offset at a social level by changes in government tax revenues.

One reason often given for the use of such “private finance” approaches is the perception that the lower government debt on issue (compared to the government ownership case) is beneficial. Under a “cash accounting” approach to government budgets it would also have the apparent effect of lower government expenditure in the initial years. Under accrual accounting, capitalization of lease transactions means that both transactions should have the same accounting effect.

Indeed it can be argued that, for this specific example, society is better off under the Government ownership approach, since the asset then held by the private sector (government debt issued to finance the purchase) has a deeper and more liquid market than that for office property.

As this example suggests, it is difficult to envisage cases where private finance *per se* would result in cheaper financing of government infrastructure. In practice, of course, financing arrangements are much more complex and comparisons will typically involve some estimate of differences in risk bearing and consideration of contracting and incentive effects. The implication is that it is crucial to be aware of what those differences actually are, and how they should be valued. That is the subject of the following sections.

Risk Bearing and Financing

Society benefits if the market for risk-bearing works effectively. Some parties exposed to particular risks will be willing to pay a large sum to have those risks transferred to others. Other parties may be able to bear, or take actions to mitigate, those risks at low cost and

are thus willing to take them on in return for some lower sum. Insurance contracts are the classic case of such risk transfer (with benefits arising from pooling of risks by the insurer).

All financing arrangements involve some allocation of underlying risks. Infrastructure projects typically involve very complex financial contractual arrangements such as creation of Special Purpose Vehicles (SPVs) which play an important role in allocation of project risks. An SPV which undertakes the project under contract with the Government, may be a joint venture between several contractors who provide services to it in return for a share of project revenues. It enables specialized expertise to be drawn from several contractors, and limits the risk spillovers between the project and the other activities of the contractors.

Such a structure limits the liability of the contractors if the project turns out to be uneconomic, and their exit could mean that project risk would be transferred to the Government (taxpayer) in the absence of other risk sharing agreements. Consequently, there will typically be numerous and complex clauses agreed relating to risk sharing between all parties concerned.

Two issues are particularly important in this regard. The first is the one of identifying and quantifying what risks are being borne by the various parties. The second is the one of correctly pricing those risks such that they are appropriately incorporated into the terms and conditions of the project agreements.

By its nature, infrastructure is lumpy and idiosyncratic. Consequently, understanding the extent of some types of risks can be difficult. What, for example, is the expected traffic

flow and thus expected revenue for a new tollway? What degree of uncertainty exists about those forecasts, and who is best placed to bear that risk?

The expected revenue for such a project is an important determinant of its viability or profitability, given the costs to be borne in its construction and operation. A major risk for governments is that they underestimate the expected revenues and give up too much. For example, they may charge an inadequate price for land contributed to the project, or allow too long a period of private ownership of the asset before it is transferred to the government. In such cases the private partner has the potential for excess returns.

Conversely, if governments overestimate the expected profitability, they will find difficulty in finding a private partner on terms acceptable to the government. Or, a private partner who similarly overestimates the expected profitability (by underestimating expected costs) may fail during the construction phase, leaving the taxpayer to bear the remaining costs of an unviable project. (Of course, that might be viewed as favorable to the taxpayer bearing the whole cost).

One source of uncertainty about future revenues may be potential future actions by one of the parties – such as a government decision to build a rail line near a tollway operated by a private partner. Consequently, contractual arrangements involve clauses restricting both parties from taking actions to the detriment of the other. The tollway operator may, for example, be able to sue for damages if a particular government action (such as building the rail line) adversely affects traffic volume and revenue.

Agreeing to such restrictions on future behavior is a potentially major implicit cost to governments engaged in such partnerships. It is also one which is very hard to value. Restrictions inhibiting the exercise of a *real option*, (Copeland and Keenan, 1998) such

as the future ability to build a new railway near a tollway (in response to an unexpected population increase), need to be carefully examined, costed, and included in the analysis of the PPP. Why? Because the alternative of government provision does not involve foregoing that real option.

Unfortunately, it is unlikely that real options foregone, or made more costly to exercise by the use of material adverse event clauses in PPPs, are adequately accounted for. They are sometimes hard to identify, and they constrain the ability to act of future, rather than current, governments. The cost involved is thus likely to be heavily discounted.

Uncertainty about future revenues (around a given expected value) imposes risks on the owners of infrastructure assets. However, if those risks are spread over a sufficiently large group of investors, they may become insignificantly small in the context of the overall portfolio position of each investor. Thus, for example, creation of listed infrastructure "trusts" enable both exit and recovery of capital (and realization of excess project returns) by original financiers of such assets, and spreading of risk over a wide range of investors.

Of course, not all risks can be diversified away. It is generally accepted that "market" or "systematic" risk, arising from correlation between returns on an individual asset and returns on all assets is non-diversifiable. Consequently, an expected return higher than the risk free interest rate will be required to induce investors (including those in such infrastructure trusts) to hold such assets. In contrast, those risks which can be removed by diversification will not command a rate of return involving such a premium.

This principle applies at all stages of the development of an infrastructure project and in deciding whether it should be undertaken using a PPP or by more traditional means. That

decision is an extremely complex one, since it involves assessing possible costs and revenues over long periods of time. Present value (discounting) techniques are required, which reduce the streams of risky expected future costs and benefits to a single net present value and enable a choice to be made.

This is the basis for the use of the *Public Sector Comparator (PSC)*, whereby the present value of costs of public sector project delivery are calculated and used as a benchmark for comparison with PPP proposals. As currently implemented, the PSC only involves a comparison of the present value of costs, based on an assumption that the present value of benefits is the same under alternative delivery modes.

There are at least three potentially controversial issues associated with the use of the PSC.

First, should the discount rate used in the public sector be the same as that used by the private sector – or is the public sector better able to absorb market risk and thus does not require the same risk premium? Using a lower discount rate for costs would tend to bias decisions against the traditional public sector method of supply, because the present value of costs incurred over the construction period would be higher (and the offsetting effect of a higher present value of benefits is ignored by focusing only on costs).

Second, how should the discount rate be adjusted to deal with different degrees of risk associated with future costs. Here, confusion abounds. It is often argued that a lower discount rate (such as the risk free rate) should be used for risky expected future cash outflows for the PSC, because a higher rate would (counter-intuitively) give a lower present value figure. This is the approach commonly advocated (Partnerships Victoria, 2003).

This argument misses completely a key message of portfolio theory. Suppose that risky future cash outflows are positively correlated with some indicator of economic activity (such as the stock market index). The commitment to make those risky cash flows, if combined with the holding of assets whose value (cash inflow) is also positively correlated with the stock market index, reduces the risk of the overall portfolio position. That diversification benefit is correctly captured if cash outflows with higher systematic risk are discounted at higher discount rates (Ariel, 19XX).

The third issue faced in using the PSC is the supposed need to adjust the discount rate for evaluating PPP proposals to reflect the implied transfers of risk between private and public sectors. The common approach used is a somewhat ad hoc assessment of the extent to which systematic risk has been transferred. The theory behind such assessments is at best primitive. The approach relies on some estimate of the extent to which correlations of public sector cash flows with market returns are altered by the PPP. Unfortunately, systematic risk depends not just on cash flow correlations but also on correlations between discount rates (Campbell and Mei, 1993).

Perhaps more importantly, the focus on transfer of systematic risk takes the focus away from the more important issues involved in the design of PPPs. Discount rates should reflect systematic risk, but systematic risk is easily managed. The theory of hedging provides numerous examples of how systematic risk can be removed by, for example, use of share price index futures. For transfer of systematic risk through PPPs to become a key focus of attention, when simpler ways exist for doing so, is unfortunate.

Incomplete Contracting and PPPs

Fundamental to PPPs is the design of contracts between public and private sector participants which involve pricing and allocation of risk bearing and risk management. As Hart (2003) argues, the relevant issue is the one of incomplete contracting between a principal (government) and agents (private sector participants in PPPs) and resulting incentives.

It is generally impossible to design contracts which specify how agents should act in all future states of the world. Self interested agents will take actions in response to external events (and in the absence of appropriate monitoring) which impose costs on (or reduce possible benefits to) the principal. What is the optimal contract design which attempts to minimise such contracting costs?

It will clearly differ depending on the particular circumstances of the project under consideration. Suppose it is impossible to verify the quality of a just completed infrastructure asset and thus the likely maintenance expenditure over its long operating life. A private constructor, contracted to hand over the asset for a fixed price, may have an incentive, when faced with some unexpected additional costs, to take actions which lower costs of construction and asset quality. The subsequent public sector operator bears the cost arising from the incomplete contract.

In contrast, if the private constructor bears some of the resulting cost of the lower quality, the incentive to take such actions is reduced. A build, own, operate (BOO) contract such as where the private participant is contracted to construct an asset such as an office building and lease it to the public sector (and thus incurs the higher maintenance costs arising from lower quality) may be preferable.

Conclusion

The optimal method of delivering public infrastructure will vary depending on the types of assets and services involved, but is likely to involve some private sector input in many (if not most) cases. Designing appropriate contracts which provide the right incentives is critical. So also is correct pricing, such that society receives maximum net benefit from the infrastructure project, and that undesirable wealth transfers between taxpayers and private sector participants in PPPs do not occur.

Optimal contract design and pricing for PPPs is an emerging art, with many lessons learnt from both successes and failures. Some lessons have not been learnt as rapidly as might be hoped, such as the appropriate methods for pricing and comparing risks of alternative approaches. Many of the lessons, such as the costs of real options implicit in PPPs and the consequences of incomplete contracts, may take many years to be fully recognized. Unfortunately, the complexity of, and secrecy demanded by, commercial contracting means that the public analysis and discussion which would facilitate continuous improvement in PPP design is less than optimal.

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