

Financing Private Infrastructure: Lessons from India

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The infrastructure requirements of East and South Asia are very large and are increasing rapidly because of strong economic growth. Countries throughout the region have recognized that the public sector is unlikely to mobilize the required resources and that the private sector must be brought in as a supplementary source of finance. Private sector participation in infrastructure is desirable not only to ensure a larger flow of resources but also to introduce greater efficiency in the supply of these services.

The explosion of global capital markets and the associated expansion of private capital flows to emerging market economies provide new opportunities to finance infrastructure projects in these countries, if projects can be made commercially viable. Several experienced international companies are interested in investing in infrastructure development in Asia provided the overall investment climate is perceived as attractive, and many countries in the region have domestic entrepreneurs keen to enter these sectors.

Despite these apparently favourable circumstances, the experience in introducing private investment into infrastructure development has been mixed at best. There have been some notable successes in East Asia, but the pace of implementation in many countries, especially in South Asia, has been much slower than was initially expected. The slow pace has not reflected the lack of private capital. Although the resources available are probably inadequate to meet all of the infrastructure needs of the region, which are indeed enormous, fewer private sector projects are currently being financed than are feasible with current levels of resource availability. In other words, the operative constraint is not the level of resource availability but the ability to structure projects in a manner suitable for private financing.

This chapter examines the reasons why so many developing countries have experienced difficulties in implementing private sector infrastructure projects. It focuses on problems associated with the fact that infrastructure projects are generally subject to tariff regulation, which presents special problems for private investment; the nature of the risks associated with infrastructure projects and the consequent need for complex risk mitigation arrangements to ensure financeability; and the need to mobilize a suitable mix of finance, especially long-term finance, which is not easily obtained.

The problem of tariff determination

Tariffs on all infrastructure projects are regulated; private operators are not free to fix or adjust tariffs at will. The tariff is typically fixed in advance and adjustable over time only in accordance with predetermined contractual terms. Private investment can be attracted into a tariff-regulated sector only if investors are convinced that tariffs will be set and periodically adjusted in a manner that ensures an adequate rate of return to investors. Equally important, the public utility character of infrastructure projects requires that the tariff be perceived as "fair" to consumers. This balance is not always easy to strike, and disputes over tariffs can delay project implementation. Some of the alternative ways of fixing remunerative tariffs, and the problems associated with them, are discussed in the following sections.

Cost-based tariffs

The traditional approach to fixing tariffs that are both remunerative and reasonable is to tie the tariff to normative levels of costs per unit for given levels of capacity and production.

These cost-based tariffs cover capital costs on the basis of approved levels of capital expenditure and variable costs on the basis of specified parameters of operating efficiency. They also include a component for return on capital, which is calibrated to yield an acceptable rate of return to investors at a reasonable level of capacity utilization and operating efficiency. Cost-based tariff formulas generally include explicit provisions for adjustment of tariffs over time to reflect rising prices.¹ This cost-based approach to utility pricing has been used to price electric power supplied by independent producers to a monopoly distributor. It has also been used to determine tolls for roads, bridges, and bypasses.

The cost-based approach has many problems. From the point of view of the producer, the attractiveness of the tariff depends on whether the rate of return on equity generated by applying the cost-based formula is sufficiently remunerative for investors. Experience suggests that private investors in infrastructure projects in developing countries typically expect rates of return on equity of 20-25 percent. This is much higher than the rates of return normally used for determining public sector tariffs. China initially capped rates of return in the power sector at 15 percent, deterring many investors. The cap has since been relaxed. In India the rate of return normally used to fix tariffs for public sector power producers is 12 percent after tax. In order to attract private investment the return on equity was raised to 16 percent at 68.5 percent capacity utilization, with incentives that yielded additional returns of 10-12 percentage points for capacity utilization of 85 percent. However, in the Indian tariff formula these rates of return accrue only from the date of commercial production; no return accrues during construction. The internal rate of return on equity, which takes into account the lack of return during the construction period, is therefore much lower. Private power producers have accepted this formula only because the operational efficiency norms used in computing variable costs are relatively lax, and most private power producers expect to improve on these norms, thereby achieving internal rates of return of more than 20 percent. The formula has been criticized on this count as being non-transparent.

Cost-based formulas are generally vulnerable to the criticism that the approved capital costs are excessively high or the efficiency norms excessively lax. There is no transparent way of countering this criticism. Estimates of capital costs are especially difficult to defend against suspicion of cost padding or "gold plating" of capacity. This problem is especially acute when equipment suppliers belong to the project sponsor group. Comparison with costs of other public sector projects is one way of determining whether costs are appropriate, but such comparisons ignore differences in technology and quality. For example, high capital costs in private sector power projects may be associated with greater fuel efficiency, which reduces the power tariff. All these issues, as well as issues connected with risk mitigation, have surfaced in one form or another in the public debate over the cost of private power in India (box 6.1).

Tariffs and competitive bidding

An alternative approach to fixing tariffs is competitive bidding. Relevant technical and production characteristics of the project are specified in advance, and qualified bidders are asked to bid in terms of the lowest tariff at which they would be willing to undertake the project. As in the case of cost-based tariffs, these tariffs have to be adjusted over time to reflect inflation, and the manner in which this adjustment will be made must be specified in the invitation to bid. Under this approach cost padding is not a problem, and there is a transparent way of determining the lowest tariff at which the project can be implemented. If existing public sector suppliers are also allowed to bid competitively, the approach establishes a level playing field for the private and public sectors and thus ensures least-cost supply for individual plants. High rates of return realized by investors in a competitive bidding framework need not attract controversy, since the bidding process ensures that the tariff is the lowest possible. High returns under these conditions can only reflect increased efficiency, which should be encouraged.

Box 6.1 India's experience with the power sector

India announced a new policy for attracting private sector investors in power generation in 1992. The policy envisaged bulk sale of power to the state electricity boards at negotiated rates based on a cost-plus formula. A large number of memorandums of understanding were signed, Evolving 80,000 megawatts of additional capacity. Implementation has been much more modest.

Problems of tariff determination and risk mitigation proved more complex than envisaged at the time the policy was announced:

The cost-plus formula was perceived as being vulnerable to padding of capital cost. The same formula had not attracted criticism earlier, when both generating stations and distributors were in the public sector, but the formula was felt to be unacceptable when applied to private sector projects. It became evident that much higher levels of due diligence are expected when there is a public-private interface. The government has since announced that future projects will be awarded on the basis of competitive bidding.

The policy did not originally envisage any guarantees by the central government, but many private investors were unwilling to accept assurances of payment for power purchased by the state electricity boards because of their poor financial condition. Moreover, they were not satisfied with guarantees given by the state governments and insisted on counter-guarantees from the central government. The central government ultimately decided to extend such counter-guarantees for the first eight private sector projects.

One limitation of the competitive bidding approach is that transparency in bidding requires full specification of the minimum technical requirements of the projects, which calls for considerable advance work before bids are solicited. Certain characteristics of the project, including basic technical specifications and the expected level of guaranteed supply, must be specified. Environmental regulations may also impose certain conditions with which all bidders must comply. However, it is important to avoid overspecifying technical details to the point of foreclosing technology choices, which are best made by private investors searching for least-cost solutions.

- Private investors sought much greater risk mitigation than public sector players had. Private investors looked for exchange risk protection, assured off-take of power subject to plant availability, protection against fuel supply risk, and other risk mitigation schemes. These special features were criticized in the public debate as being excessively favorable to private sector projects.
- The first power project sponsored by the Enron Corporation at Dabhol in the State of Maharashtra ran into a series of hurdles, including renegotiation of the initial agreement, because of a change in the state government. It also faced several legal challenges in public interest litigations, including challenges of the validity of environmental clearances. Fortunately, these obstacles, including twenty-five court cases, have been overcome, and the project is currently under construction.

The complexities involved in achieving financeable packages for private sector power projects were not adequately appreciated at the outset. As a result, resolution of problems, involving interaction with several government agencies, took time. The government ultimately appointed a high-level board consisting of senior representatives of the various ministries involved to resolve problems.

Progress has recently accelerated. The 700-megawatt Enron project at Dabhol is under construction, and two power projects have actually started generating power (the 235-megawatt GVK project at Jegurupadu in Andhra Pradesh and the 208-megawatt Spectrum project at Kakinada in Andhra Pradesh).

Competitive bidding also has its limitations. A bidding process will yield the lowest cost option only if enough qualified bidders actively compete. In practice the number of bidders for an infrastructure project may be limited, for several reasons. Lack of information and clarity about various aspects of government policy relevant to the project may deter many eligible bidders from bidding. This may occur if the legal, financial, and technical requirements of the project are not spelled out in advance or there is lack of confidence that the integrity of the bidding process will be maintained (that is, the predetermined requirements will not be changed after bids have been solicited). In such situations fixing tariffs through competitive bidding could produce an outcome inferior to that that could have been achieved through negotiations. An International Finance Corporation study (1996) comparing tariffs in different power projects in Indonesia concluded that there was no evidence that tariffs arrived at through competitive bidding were lower than tariffs fixed through negotiation. The experience in the Philippines leads to the opposite inference. Tariffs in the earliest power projects, which were set on a negotiated basis, were as high as 8 cents a kilowatt hour; tariffs on the later projects, which were competitively bid, were as low as 5 cents a kilowatt hour.

In the final analysis the relative merits of fixing tariffs through competitive bidding or negotiation will depend on the quality of the bidding process in the one case and the quality of the negotiating process in the other. Negotiation may well yield a better outcome in some cases, but competitive bidding is more transparent, an overwhelmingly important consideration in government decision making. On balance competitive bidding is superior to negotiation, and most developing countries have adopted this approach where possible.

Regulated tariffs with competitive bidding

In many situations tariffs are not determined by competitive bidding but are fixed by a regulatory or other authority. In such cases competition can be used to select the private investor by soliciting competitive bids in terms of the license fee offered during the concession period or in terms of a revenue-sharing arrangement. This approach is particularly well suited to cases in which the independent producer deals directly with the final consumer and demand forecasts ensure profitable operation. In telecommunications, for example, there is often significant unsatisfied demand at prevailing tariff levels, and new licensees can expect to be profitable within a relatively short time.² A similar situation may obtain in port development, where capacity may be visibly overstrained and private sector investors may be willing to expand port facilities or set up new competing ports, subject to a common tariff fixed by a regulatory agency. The Jawaharlal Nehru Port Trust in India recently awarded a **\$200** million port expansion, involving private sector construction and operation of two new container terminals, to an Australian-Malaysian joint venture through competitive bidding on the basis of revenue sharing.

The license fee or revenue-sharing approach can be adopted wherever the licensee can make sufficient profit to be able to offer a license fee or a share in revenue. In other situations, such as construction of toll roads with low traffic projections in the initial years, it is not possible to ensure profitability with any plausible tariff for many years. In such cases private sector investment is possible only if returns to investors can be enhanced. The simplest solution is to offer an operating subsidy, or an up-front capital subsidy, with the subsidy determined by investors bidding competitively for the lowest subsidy. A second approach is to bundle an existing public sector asset into the concession to increase the profitability of the new investment. In India, for example, the government has announced that private investors will be invited to invest in widening two-lane toll-free roads into four-lane toll roads. The inclusion of the two-lane road, with its established traffic flow, provides a larger and more certain return, making competitive bidding possible. A third approach is to include other commercially profitable opportunities, such as commercial development of real estate in areas opened up by a new road, as part of the project. This internalizes benefits generated by the project, improving the attractiveness of the investment and making

competitive bidding possible. A variant of this approach is to delink the infrastructure component of the project from the exploitation of associated profit-making opportunities and to solicit competitive bids for each separately. Explicit subsidies can then be provided for the infrastructure component, financed by revenues realized from the profitable component. In Hong Kong, for example, the real estate development rights over each station on the rail link between the city center and the new airport have been bid out competitively, and the revenues generated will be used to finance the airport.

Public acceptance of tariffs

Any of these methods of fixing tariffs can ensure adequate returns to investors. More difficult is ensuring that the resulting tariffs pass the test of public acceptance. Private sector suppliers will often require higher tariffs than those being charged in the public sector system, because public sector supplies of urban services, roads, and even power, are typically heavily underpriced, reflecting large subsidies. The switch from under-priced public sector services to fully priced—and therefore more expensive—private sector services can generate resistance from consumers.³

Higher-priced services from the private sector may not be resisted if the private sector is seen as providing an additional, and perhaps higher quality, source of supply, with consumers retaining the choice to continue with the existing lower-quality public sector service. Introduction of a new privately operated toll highway as a higher-priced but faster alternative to a publicly maintained toll-free road may not evoke consumer resistance, for example. However, conversion of toll-free road into a toll road could meet with stiff resistance.⁴ The difference in consumer reaction to private entry into telecommunications and electricity generation in India illustrates the problem. Consumers showed no resistance to the entry of new private sector cellular telephone service providers, which offered a higher-cost service that competed with the fixed public sector phone service. In contrast, the entry of independent power producers selling power to the state electricity boards, which then distribute power to final consumers, did meet with some resistance. Although the tariff charged by independent power producers to the state electricity boards does not directly affect the tariff charged by the boards to final consumers, there was concern that reliance on higher-priced private sector power would raise the average cost of the state electricity boards, which would eventually lead to higher prices for consumers.

Is such consumer resistance justified? The answer clearly depends on whether the cheaper public sector supply reflects greater efficiency compared with the private sector alternative or merely reflects its subsidization by the government. In most cases low public sector tariffs reflect large subsidies, either explicit (through the budget) or more often hidden (in the form of public sector losses). Consumers pay for these subsidies in the form of higher taxation or reduced levels of expenditure on schools, public health, and other essential services, but this implicit payment is usually not recognized as a cost. Public acceptance of higher tariffs from private sector projects therefore depends crucially on public realization that continuation of subsidized public sector tariffs is simply not feasible. This is indeed the case in most developing countries, since the public sector cannot even ensure continued supply, let alone provide increased supply, at prevailing prices. Indeed, one of the compulsions for seeking private investment in infrastructure development is precisely the lack of public sector resources because of chronic underpricing.

This is not to say that tariff increases by private sector providers should be uncritically accepted. One of the arguments in favor of involving the private sector in infrastructure is that it is likely to be more efficient than the public sector, and it is important to ensure that these efficiency gains are achieved. The cost of services supplied by the private sector should therefore be the lowest possible and should compare favorably with the real economic cost (excluding subsidies) of the public sector alternative. At first glance cost

minimization can be ensured by competitive bidding, but if comparison with the public sector alternative is an important benchmark in ensuring public acceptance, competitive bidding is effective only if the public sector also participates in the bidding. The experience of Hyderabad, India, in privatizing the supply of drinking water is instructive in this context. International bids were solicited for a \$300 million urban water supply project, and three bids were received. However, the cost of the lowest bid was found to be more than 60 percent higher than the estimated real cost (excluding subsidies) if the project were to be implemented by the public sector. The city authorities decided to reject all bids and opt for the public sector alternative. Cost efficiency of private sector infrastructure projects, including comparison with the public sector alternative, must be a prime consideration in evaluating such projects.

Risk mitigation and private financing

All investment projects involve some risk, but infrastructure projects in developing countries are perceived as unusually vulnerable to risks, which constrains financing. Risks are perceived as high partly because projects are typically undertaken not by established utility companies with strong balance sheets but by special purpose companies executing individual projects on a build-operate-transfer or build-own-operate basis. Project financing is on a nonrecourse basis (that is, lenders do not have recourse to the sponsor company but look solely to the revenue stream of the project available to meet debt service obligations). The risks associated with the revenue stream are therefore scrutinized. Equity investors may be willing to accept higher levels of risk in return for higher expected returns on their equity, but lenders typically have a lower tolerance for risk and a greater need for risk mitigation mechanisms. Although governments conduct project negotiations with the sponsors, it is the lenders behind the scenes who set risk mitigation standards and determine whether projects are financeable.

Different kinds of risk

The general principles for risk mitigation are well known. The various risks involved should be unbundled and assigned to the participants able to manage them at least cost. Risks that can be more efficiently handled by agencies outside the project are shifted to these agencies, thereby reducing the residual risk borne by the project. This process of strutting risks typically involves a cost, which is subsumed in the tariff by the sponsors. If risks have been efficiently assigned to those best able to manage them, the cost of risk management is minimized and the tariff is a minimum-cost tariff.

The major risks involved, the methods for handling these risks, and the problems that can arise in each case are discussed in the following sections. Some of these risks are prevalent in most investment projects. Many are particularly important in infrastructure projects.

Construction risk. Construction risk refers to unexpected developments during the construction period that lead to time and cost overruns or shortfalls in performance parameters of the completed project. High capital intensity and a relatively long construction period make project costs especially vulnerable to delays and cost overruns. As a result construction risk is generally higher in sectors such as power and roads and lower in sectors such as telecommunications and urban services.

Construction risk can be reduced through a variety of instruments. The reputation and experience of the sponsors and the engineering, procurement, and construction contractor is an important element in assessing construction risk. Project sponsors can shift a portion of the construction risk to the contractor through engineering, procurement, and construction contracts that provide for turnkey responsibility, with penalties for delays and shortfalls in performance parameters of the plant on completion. Such performance guarantees add to the

cost of the project. While construction risk can be shifted to some extent, it cannot be eliminated entirely, since penalties for non-performance are typically capped at certain levels and the residual risk has to be borne by investors. However, lenders would be satisfied with risk sharing that reduces project risk to a level that can be absorbed by equity investors without jeopardizing loan repayments.

Operating risk. The technical performance of the project during its operational phase can fall below the levels projected by investors for a number of reasons. Operating risk is usually low for infrastructure projects that rely on a tested technology, as is the case with most power plants and roads. It is higher in sectors in which the technology is untried or is changing rapidly, such as telecommunications. Operating risks are typically mitigated by entrusting operation to experienced operations and maintenance contractors. Contractual arrangements with such contractors can include some provisions for liquidated damages. Many risks during the operational phase, including certain force majeure risks, are commercially insurable, and private investors will typically insure against such risks.

One source of operating risk that is very important in the power sector is fuel supply risk. Power projects are highly vulnerable to interruption of fuel supply, and independent power producers generally seek to shift this risk to the fuel supplier or the purchaser. Private financing of power projects depends critically on the ability to negotiate satisfactory fuel supply agreements, with appropriate penalties payable by the fuel supplier in the event of non-performance. Fuel supply problems are being tackled in different ways in different private sector power projects in India. The 700-megawatt Dabhol project in Maharashtra relies on imported naphtha, with the fuel supply risk borne largely by an international supplier. The 235-megawatt gas-based GVK project in Andhra Pradesh relies on natural gas supplied by the public sector monopoly supplier. In the event of a fuel interruption, the supplier has the option of switching to more expensive imported naphtha, with the higher fuel cost "passed through" to the tariff. In the 1,040-megawatt Visakhapatnam coal-based power project in Andhra Pradesh, the fuel supplier, Coal India Ltd., is a government-owned company, and coal transportation depends on Indian Railways, which is also government owned. The fuel supply agreements with Coal India Ltd. stipulate substantial liquidated damages, which cover the fixed capital charges and expected returns up to certain levels, in the event of nonsupply. In the 1,000-megawatt Bhadravati power project in Maharashtra, the private producer is developing a private sector captive coal mine to supply coal to the project. The project sponsors are taking on the fuel risk because fuel is being supplied by an associated company.

Market risk. Market risks relate to the possibility that market conditions assumed in determining the viability of the project are not realized. Nonfulfilment of demand projections is an obvious example of market risk. In certain situations investors expect the monopoly purchaser to guarantee a minimum level of purchase, thus eliminating market risk for the investor. This is typically the case when an independent power producer sells power to a monopoly distributor or a water supply project sells water in bulk to a monopoly urban water distributing company. In other cases, such as telecommunications, ports, and roads, in which the private producer deals directly with individual users and users typically face competing options, market risk is borne by the investor. Investors are expected to undertake market studies and satisfy themselves that market demand projections at feasible levels of tariffs would yield adequate profitability.

The situation in which no reasonable toll-cum-traffic projection can ensure profitability must be distinguished from market risk, which refers to situations in which traffic is projected to be adequate but there is considerable uncertainty in the forecast. Financial projections must allow for downside possibilities. In these situations project sponsors may expect the government to share downside risks through guarantees involving payments to cover part of the earnings forgone if traffic falls below a certain level. To ensure symmetry, such guarantees can be balanced by a corresponding sharing of revenues if traffic exceeds a

certain level. In this way part of the risk can be shifted to the government. Although governments are normally reluctant to offer such guarantees, they may well represent the less expensive option if the only alternative is for the entire burden of uncertainty to be borne by the government.

Interest rate risk. Interest rate risks arise because interest rates can vary during the life of the project. They are particularly important in infrastructure projects because of the high capital intensity and long payback periods. High capital intensity implies that interest costs represent a large part of total costs; long payback periods mean that financing must be available over a long period, during which interest rates may change. One way of handling interest rate risk is to pass it on to consumers, as, for example, in arrangements in which the impact of interest rate variations on unit costs are treated as a pass-through into the tariff. In the cost-based tariff formula used in many power projects in India, for example, interest costs are built into the tariff. Such an approach is neither necessary nor desirable, however, since any arrangement that automatically passes on these costs to consumers reduces incentives for cost minimization. An alternative is to allow the risk to be borne by the investor, who in turn can hedge the risk through devices such as interest caps and collars. The feasibility of this option depends on the sophistication of the relevant financial markets and the availability of hedging instruments. Typically, it is much easier to hedge interest rate risks in international markets than in domestic markets, since domestic hedging instruments are not available in most developing countries. The cost of hedging would, of course, have to be borne by the project and reflected in the tariff.

Foreign exchange risk. Two types of foreign exchange risk need to be distinguished. One relates to exchange convertibility, the assurance that revenues generated in domestic currency can be converted into foreign exchange for making payments abroad. This risk must be borne by the government through suitable convertibility guarantees. The other type of risk is exchange rate risk, the risk that exchange rate changes lead to large increases in the domestic currency costs of payments denominated in foreign currency. This risk is extremely important for infrastructure projects that rely heavily on foreign financing but that have tariffs fixed in domestic currency.

Exchange rate risk can be handled in different ways. When the tariff is fixed in foreign currency (as may be the case with port charges) or when it is automatically adjusted to reflect the impact of exchange rate variation on those cost components that are denominated in foreign exchange, exchange rate risk is borne by consumers. In many cases, however, tariffs may be indexed only to domestic inflation, exposing the project to the residual foreign exchange risk. It is not easy to shift foreign exchange risk in such cases. If long-term swaps between domestic and foreign currencies were readily available it would be possible to hedge this risk at a cost. Such swaps are typically not available in most developing countries, however, partly because of inadequate market development and partly because of government policy. Hedging instruments cannot develop as long as foreign exchange markets remain tightly regulated.

The absence of hedging instruments is not the only problem. The inherent uncertainty about exchange rate movements in developing countries is such that even if hedging instruments were to evolve, they would be very expensive. The only way to reduce foreign exchange risk in this situation is to limit the extent of external financing. This in turn depends on the existence of a healthy domestic capital market capable of providing sufficient domestic financing for infrastructure projects.

Payment risk. Investors in infrastructure also face the risk of not being paid for services delivered. The importance of this risk varies across sectors. It is not very important in projects in which the sponsor deals directly with a multitude of consumers, as in the case of a telephone company, a toll road, or a port. It becomes very important in situations in which an independent power producer has to supply electric power to a monopoly buyer, such as a

public sector distributor, or a water purifying company has to supply water to a municipal distributor. Because the financial condition of public sector utilities in developing countries is often very weak, investors are naturally concerned about the risk of nonpayment for power or water delivered to the distributor when the producer has no alternative outlet for the product.

The long-term solution to this problem is to improve the financial standing and creditworthiness of the utilities or to privatize distribution so that private sector suppliers can deal directly with private distribution companies or undertake distribution themselves. Pending such improvement, a variety of alternatives exist. Independent power producers in India have typically sought state government guarantees of payment for power delivered and credit enhancement through a counter-guarantee of the state governments' obligations by the central government. Alternatively, they have sought to set up escrow arrangements under which payments due to the utility company from high-quality industrial consumers are placed in escrow accounts for settlement of the dues of the private power producers as a first charge.

Regulatory risk. Regulatory risk arises because infrastructure projects have to interface with various regulatory authorities throughout the life of the project, making them especially vulnerable to regulatory action. Tariff formulas ensuring remunerative pricing at the start of the project can be negated by regulatory authorities on the grounds that the tariff was too high, as happened in the Bangkok Second Expressway and the recent privatization of the water supply in Manila. Problems can arise from the environmental sensitivity of many infrastructure projects. Extensive environmental clearances are usually necessary at the start of the project, but clearances can be challenged in public interest litigation or through direct activism by nongovernmental organizations, which can lead to delays in construction or disruption in operation. The experience of the Dabhol Power Project in the Indian State of Maharashtra exemplifies this problem (see box 6.1). Another source of regulatory risk is that environmental concerns and standards can become more stringent during the life of the project, adding to the costs of operation. Private investors will expect explicit assurances that cost increases imposed because of regulatory action will be reflected in a corresponding adjustment in the tariff to project profitability.

In general, regulatory risk is best handled by establishing strong and independent regulatory authorities that operate with maximum transparency of procedures within a legal framework that provides investors with credible recourse against arbitrary action. This is not simply a matter of setting up new systems and procedures. The systems must be perceived as credible, something that will happen only when sufficient experience is gained about their functioning. Until then risk perception will remain significant.

Political risk. Infrastructure projects have high visibility, and there is always a strong element of public interest. This makes them vulnerable to political action that can interrupt or upset settled commercial terms; in extreme cases it can even lead to cancellation of licenses or nationalization. These risks can be partially mitigated through political risk insurance offered by multilateral organizations, such as the Multilateral Investment Guarantee Agency, or bilateral investment protection agreements. They can also be addressed by building into the project agreement appropriate levels of compensation for arbitrary action, subject to international arbitration. The World Bank's new partial risk guarantee instrument, which covers debt service payments in case they are interrupted because of nonperformance of specific government obligations, is another instrument that can play a useful role in this context.

Arrangements for risk mitigation

The risks enumerated above are not equally important in all projects. The significance of particular risks will differ from project to project, depending upon sector characteristics. Road projects may have high construction risks, low operating risks, and high market risks.

Telecommunication projects may have low construction risks but high market risks. Power projects with suitable offtake guarantees may have high construction risks, relatively low operational and market risks, and high payment risk. Each project has its own risk profile, and risk mitigation structures will vary depending on the specific circumstances of each project.

Because of the nature of the risks and the involvement of many participants, including project sponsors, lenders, government agencies, and regulatory authorities, risk mitigation arrangements are usually complex. They involve detailed legal and contractual agreements that specify the obligations of different participants, set forth clear penalties for nonperformance, and offer protection to investors against actions beyond their control. The complexity of these arrangements often delays implementation. Because public sector infrastructure projects do not use such arrangements, host country governments are often unfamiliar with them. For example, public sector power generating companies that purchase fuel from other public sector companies typically do not insist on fuel supply agreements with strict penalty clauses of the type demanded by the private sector. Nor do they insist on power purchase agreements with as much protection in terms of guaranteed commitments to purchase power, incentive payments, and penalties. More generally, public sector interactions for contractual obligations are often loosely defined, with a great deal left to trust rather than laid down in tightly defined, legally binding contracts. Private sector investors cannot be expected to accept this approach. Moreover, a much higher level of due diligence is expected from government agencies in dealing with the private sector.

For all these reasons, the development of satisfactory risk mitigation arrangements is difficult and time consuming. Lack of experience with such arrangements—and inadequate appreciation of their necessity on the part of host governments—can lead to delays that hold back project implementation. These problems are more severe in the early stages and are illustrated by India's experience in trying to attract private sector investment in power generation (box 6.1) and telecommunications (box 6.2).

Costs of risk mitigation

Risk mitigation involves costs, which raises the question of whether private sector projects, which require risk mitigation, are unnecessarily costly compared with public sector projects. The answer depends on whether the risks involved represent real potential costs that have to be borne even if the project is undertaken by the public sector and whether the premium paid for risk mitigation is too high.

Many of the risks that concern private sector investors represent contingencies that should concern public sector projects as well. For example, the risk of a fuel supply interruption is just as great in a public sector project, and the resulting loss of power generation represents a real cost to the project and the economy. Public sector power producers are less concerned with protecting themselves against these risks, partly because they are less concerned with ensuring the commercial profitability of each project and partly because they perceive that shifting these risks to other parts of the public sector would not improve the system as a whole.⁵ Risk mitigation in these cases raises the explicit cost of private sector projects, but it does not necessarily make them more costly for the economy as a whole, since the same costs are incurred in public sector projects, whether or not they are made explicit. Explicit assignment of risk to agents better able to manage them could reduce costs if it leads to improved management of risk.

In some situations, however, private sector projects face risks that do not arise in the case of public sector projects. For example, private investors may be concerned about risks stemming from lack of clarity of government policy, the absence of a credible regulatory system, and the possibility of arbitrary political action. High risk perception on these counts leads to

high private sector project costs, because many investors are discouraged from exploring investment possibilities, leaving the field to investors willing to live with greater uncertainty in the expectation of higher returns. These high returns are ultimately paid for by the consumer in the form of higher tariffs (or where tariffs are fixed independently, lower license fees accruing to the exchequer). It should be noted, however, that higher costs in these situations are not caused by risk mitigation but arise precisely because risks cannot be mitigated and are traded off against high returns. The aim of policy in such situations should be to reduce perceived risks by introducing greater clarity in government policy and providing an environment that reassures investors. Such an environment, which should include a legal framework for enforcing contractual agreements and independent regulatory authorities to ensure fair treatment, would encourage a larger number of private investors to enter the field. The resulting increase in competition could be expected to reduce the cost at which services are offered.

Sources and methods of financing

Once suitable tariff fixing mechanisms and risk mitigation structures are in place, private sector projects become financeable in principle. At this stage project implementation depends on the ability to develop a financing package with a mix of finance suitable for the project. This mix varies from sector to sector. Telecommunications projects, which face relatively high market risks, may require a relatively low debt component, with debt to equity ratios close to 1:1. Power projects with assured power purchase arrangements may be financeable with debt to equity ratios of 2.5:1 or even 3:1. The maturity requirements of debt will also vary across sectors. Power and roads, which have longer payoff periods, typically require long maturities, while telecommunications projects can manage with shorter maturities. The mix between domestic and external financing also requires careful consideration. Even if external financing is available for well-managed developing countries, foreign exchange risk management considerations may argue in favour of keeping the amount of foreign financing within reasonable limits.

There are limitations and constraints associated with each source of debt and equity financing, which should be kept in mind when devising financing packages for individual projects (table 6.1).

Table 6.1 Financing sources for private sector infrastructure

Domestic sources Equity

Domestic developers (independently or in collaboration with international developers) Public utilities (taking minority holdings) Other institutional investors (likely to be very limited)

Debt

Domestic commercial banks (3-5 years) Domestic term lending institutions (7-10 years) Domestic bond markets (7-10 years) Specialized infrastructure financing institutions.

Equity financing

Private sector infrastructure projects require substantial equity financing, with higher equity requirements required for projects with higher levels of perceived risk. Project sponsors are an important source of equity, but they contribute only part of the total equity in most cases. Although preconstruction, or developmental, would be treated as a current expenditure for purposes of computing taxable income, the Department of Revenue took the view that under Indian tax law it would have to be treated as a capital expenditure. It has subsequently been clarified that the license fee will be treated as a capital expenditure, with full amortization within the license period.

Box 6.2 Competitive bidding in telecommunications services in India

India's telephone services were run as a public sector monopoly until 1992, when private sector cellular services were allowed to operate in four metropolitan cities (Delhi, Bombay, Calcutta, and Madras). Shortly thereafter both cellular and basic services were opened up for private sector operators in twenty telecommunications circles covering the entire country. Although at each stage private sector operators were chosen through a form of competitive bidding, the process was criticized and challenged in court.

Introduction of cellular services in the four cities was done by soliciting bids from companies short-listed on the basis of qualifying criteria. Call charges were independently fixed, and potential entrants were asked to bid in terms of criteria such as the rental charge on the phone, the extent of domestic equipment purchase, and projections of investment and performance. The weights assigned to each criterion for bid evaluation were not made public. The initial selection of licenses on this basis was challenged in court, and a fresh selection had to be made at the direction of the court. The bidding process was much more transparent for the extension of cellular and fixed phone services throughout the rest of the country. Eligibility criteria were made public, and bids were solicited for individual circles on the basis of the license fee offered and three other quantifiable criteria. Weights assigned to each criterion were also made public. Potential bidders were even asked to seek clarifications, and all clarifications issued were made public before the final submission of bids. Despite these efforts at transparency, problems persisted :

Although bidders were given the opportunity to seek clarifications, key issues remained unclear. For example, although bidders had assumed that the license fee costs represent only a small fraction of total cost in infrastructure projects, they can nevertheless run into several millions of dollars, all of which must be financed by equity provided by project sponsors. Once the developmental phase ends, equity must be committed as part of the financing package. Sponsors typically commit a substantial proportion or total equity themselves, and they also tie up additional equity from other investors at this stage. Foreign sponsors may often be keen to link up with domestic investors at this stage on the grounds that this will reduce political risk. Domestic investors tend to evaluate risk less conservatively than foreign investors, and their involvement often helps to improve the perceptions of foreign investors.

- Winning bidders ran into difficulties in reaching financial closure, because it was not clear whether the licenses could be assigned to lenders in the event of a debt service default. Lenders took the view that without assignability the projects could not be financed, it was subsequently agreed that these licenses could be assigned.
- Disputes arose over the interconnection charges levied on the new operators for connecting with the existing public sector system. The tender documents had not specified the interconnection charges, indicating only that they would be based on costs. Private operators claimed that the charges were much higher than justified, and the charges were subsequently reduced through consultation.
- The absence of a telecommunications regulatory authority meant that negotiations on points of dispute/ were conducted between new private operators and: the Department of Telecommunications, which is also responsible for operating the public sector telephone system. This led to complaints from private sector operators of lack of transparency and fairness. A statutory regulatory authority has since been established.

Well-structured projects can expect to mobilize equity from international infrastructure funds specializing in investment in infrastructure projects- The Global Power Fund, which has a target of \$1 billion, is an example of an infrastructure fund aimed at financing power pro-

jects in emerging markets. The AIG Asian Infrastructure Fund, which will invest \$1 billion in the Asia-Pacific region, and the \$750 million Asian Infrastructure Fund are examples of regional funds. The amounts available through these funds remain modest relative to the total requirement, but the pool of global capital they can tap is very large, and the flow of equity from this source could increase substantially if bankable projects become available and the track record of implementation improves. An important aspect of these funds is that they allow international investors to pool risks by investing in a mix of projects. They also enable institutional investors, who are relatively risk averse, to invest in infrastructure projects after the construction stage, when project risks are much lower. This provides valuable opportunities for "take-out" financing, enabling projects to be financed through the earlier and riskier stage by much larger involvement of equity from the sponsors or by high-cost debt, with a subsequent restructuring through attraction of equity from infrastructure funds through sale of sponsors' equity or refinancing of debt with equity.

A limited amount of equity support for private sector infrastructure is also available from multilateral organizations, such as the International Finance Corporation and the private sector window of the Asian Development Bank. Although these funds can provide only a small amount of capital, their participation in a project provides comfort to other investors.

The scope for raising equity from domestic capital markets is probably limited. Public utilities and domestic institutional investors may be willing to contribute part of the equity for project expansion, but significant domestic equity support may not be forthcoming for new infrastructure projects until there is a track record of performance. However, once project implementation proceeds and revenues begin to be generated through partial commissioning, it may be possible to tap a wider range of equity investors. This can be a useful financing strategy in the case of power projects with more than one generating unit or in telecommunications projects, in which the build up of line capacity occurs over time.

External debt financing

Several sources of external debt financing are available to well-structured private sector projects in countries with reasonable credit ratings.

Export credit agencies. Export credit agencies, which provide direct finance and guarantee commercial bank credit, have been the dominant source of international capital to finance infrastructure projects. In recent years export credit agencies have tended to guarantee bank loans. Traditionally, they funded public sector projects backed by sovereign guarantees, with some willingness in recent years to lend against guarantees of commercial banks. Unless the agencies can reorient themselves to provide financing without sovereign guarantees, their role in financing private sector infrastructure projects is likely to be limited.

International commercial banks. International commercial banks are the largest source of private finance for infrastructure development in developing countries. Of the \$22.3 billion raised by developing countries for infrastructure financing in 1995, syndicated loans accounted for \$13.5 billion, bonds for \$5.3 billion, and equity for about \$3.5 billion (World Bank 1997). Banks tend to be "hands-on" financiers, lending on the basis of a detailed analysis of project risk.

There are important limits to bank financing, however. The number of international banks actively involved in developing countries is small, and they are subject to exposure limits for projects and countries. This often leads to syndication, which involves cumbersome procedures. Another important limitation of commercial bank lending is the mismatch between the fifteen-to twenty-year loans needed by infrastructure projects and the seven- to ten-year maturities sought by international banks. Maturities of commercial bank loans can

be lengthened from the beginning through multilateral guarantee support for later period repayments, as discussed later in this section. Reliance on bank financing for infrastructure projects must therefore be part of a mix involving other long-term lending, or it must be accompanied by suitable refinancing arrangements.

International bond markets. Bond financing is in many ways the ideal source of finance for infrastructure. Costs are higher than for syndicated loans, but maturities of ten to thirty years are typical, and even longer maturities are available for creditworthy issuers. Bond financing has been the fastest growing source of finance for developing countries in recent years, with total flows increasing from \$2.3 billion in 1993 to \$45.8 billion in 1996 (World Bank 1997). Its role remains modest, however, with only \$5.3 billion provided in 1995 compared with \$13.5 billion from syndicated loans.

One reason for the modest scale of bond financing of infrastructure is that access to international bond markets is not easy. Rule 144a and Regulation S of the U.S. Securities and Exchange Commission allow non-U.S. companies to raise capital in the United States from qualified institutional buyers without complying with the full listing procedures or conforming to generally accepted accounting practices. However, this window can be effectively tapped only by corporate bodies with relatively high credit ratings. Newly established infrastructure companies may find it difficult to access bond markets. Despite these limitations bond markets are likely to become increasingly important over time as more and more private sector infrastructure projects are successfully implemented in developing countries, companies engaged in such projects gain financial recognition, and countries develop track records of successful implementation. Even new infrastructure companies may be able to access bond markets in the postconstruction stage, when risk perceptions have diminished and projects begin to generate steady revenue streams. Bond financing could be used in this way to refinance shorter-term loans taken initially to finance the construction stage.

External sources

International developers (independently or in collaboration with domestic developers)

Equipment suppliers (in collaboration with domestic or international developers)

Dedicated infrastructure funds Other international equity investors

Multilateral agencies (International finance Corporation, Asian Development Bank)

International commercial banks (7-10 years) Export credit agencies (7-10 years) International bond markets (10-30 years) Multilateral agencies (I S-20 years) Bilateral and agencies

The pricing of private corporate securities issued in international bond markets depends partly on corporate financial characteristics and partly on country characteristics. The efficiency of bond pricing can be enhanced by the existence of sovereign debt actively traded in the market. This increases country visibility, and therefore the appetite for corporate securities, and also provides a benchmark against which corporate debt can be efficiently priced. Issuing sovereign debt, however, implies that countries must be willing to accept continuous scrutiny of macro-economic performance and economic policies by international credit rating agencies.

Multilateral institutions. Multilateral institutions, such as the World Bank and the Asian Development Bank, which have traditionally funded public sector infrastructure projects, are now willing to support private sector projects. The role of these agencies is necessarily

limited, however. There are many competing claims on their scarce resources, and diversion of resources to fund private sector projects may represent no net gain for the economy. It can be argued, however, that these agencies can play an important catalytic role in the early stages of attracting the private sector into infrastructure. The transparency of their project evaluation procedures and their ability to benchmark an individual private sector project in a particular country against international experience of similar projects could help avoid controversies that may otherwise arise about private sector projects. Their active involvement as lenders in a project can also help reduce risk perception on the part of other investors. However, the procedures of these institutions are often too cumbersome to be acceptable to private sector investors.

The International Finance Corporation (IFC), the private sector arm of the World Bank Group, could play an important role in financing private sector infrastructure, but its scale of operations is relatively modest. The IFC's own commitments for infrastructure projects have increased from a little less than \$200 million in 1990 to \$727 million in 1996, and IFC syndication provided an additional \$700 million in 1996. An important feature of IFC syndication in financing private sector infrastructure is that it has brought in nonbank financial institutions, including international insurance companies, to finance infrastructure projects in developing countries. A strong case can be made for much more extensive IFC involvement in financing private sector infrastructure projects in developing countries.

An innovative role played by multilateral institutions is the use of their guaranteeing capacity to extend the maturities of commercial loans to private sector infrastructure projects. The World Bank's partial credit guarantee is an example of such assistance. It was used to guarantee principal repayment from year eleven to year fifteen for a \$150 million commercial bank loan for the Zhejiang project in China. Since China had access to commercial loans of only about six-year maturities at the time, the partial credit guarantee helped to extend even the uncovered period of commercial lending beyond the normal six-year period to ten years, after which the guarantee period extended it further to fifteen years. In the Philippines the partial credit guarantee has been used to support a \$100 million ten-year bond issue by the National Power Corporation in the form of a put option that enables the investors to present the bonds to the World Bank for principal repayment at maturity. The Asian Development Bank has also provided loan guarantees.

Bilateral aid agencies. Bilateral aid agencies have traditionally funded public sector infrastructure projects, but their role in funding private sector projects is likely to be very limited. Their resources are severely limited, and their priorities are shifting to social sector projects, making them reluctant to finance projects that are commercially financeable. However, like multilateral agencies, bilateral agencies could play an important catalytic role in the early stages of promoting private sector investment in infrastructure, especially by co-financing private sector projects with multilateral agencies.

Domestic debt financing

Unlike the supply of external debt, which is plentiful, the supply of domestic debt is severely limited in most developing countries. Analysis of 140 private sector infrastructure projects from the IFC's portfolio shows that only a sixth of debt financing (which represented 61 percent of total project cost) was domestic debt (International Finance Corporation 1996). Moreover, all of the domestic debt was from local commercial banks, which do not provide long-term finance. This is clearly not a viable financing pattern. If private sector investment in infrastructure is to increase substantially, more domestic debt must be secured, and the composition of this debt must shift to longer maturities. This can happen only if domestic debt markets in developing countries develop.

Development of domestic debt markets

Domestic debt markets in developing countries are underdeveloped for many reasons, and action to develop these markets has to be taken on several fronts. A high rate of domestic savings is the most important structural prerequisite for ensuring an adequate flow of domestic finance for private infrastructure. High savings rates are not enough, however. Most East Asian economies, for example, have very high rates of savings, and yet debt markets in these economies are underdeveloped, with long-term debt particularly scarce.

A critical requirement for well-functioning debt markets is a sound macroeconomic balance, as reflected in modest fiscal deficits. High fiscal deficits have significant negative effects. If monetized they lead to inflation, which discourages savings in general and long-term saving in particular. If not monetized they put pressure on interest rates, which discourages investment, especially in projects with long gestation periods, such as infrastructure. High interest rates also tempt governments to intervene in financial markets to reduce the cost of government borrowing by forcing banks, insurance companies, provident funds, and pension funds to invest a high proportion of their assets in government securities. This reduces the cost of government borrowing, but it obviously does not eliminate the crowding out effect of high levels of government borrowing for nongovernment borrowers. In fact, the artificial lowering of interest rates on government securities distorts the government debt market, discouraging active trading in government securities and preventing the emergence of a reliable yield curve, all of which work against the development of an efficient debt market. Effective control over fiscal deficits is therefore an important element in any strategy for developing debt markets.

Another factor that helps to develop deep and liquid domestic debt markets is the existence of strong long-term contractual savings institutions, such as insurance companies and pension funds. These institutions have long-term liabilities and therefore have a natural interest in long-term debt instruments of high quality. Unfortunately, the insurance and pension funds sector is in an early stage of development in most developing countries. Statutory pre-emption of resources is high in many countries. In India insurance is also a public sector monopoly, although the government has recognized that reform of the insurance sector is linked to financing of infrastructure and has initiated a process of reform in this sector. An ideal environment for domestic debt markets is one in which domestic savings rates are high, fiscal deficits are low, and there is a strong insurance and pension fund segment in the financial sector.

Tax incentives for infrastructure financing. Faced with weak debt markets, many developing countries have sought to use tax incentives to stimulate a larger flow of domestic savings to infrastructure development. A wide variety of incentives are in use in many countries:

- The most popular incentive, available in China, India, and Thailand, is a tax holiday for the profits of private sector infrastructure projects. This instrument is not aimed specifically at domestic debt financing. However, it improves project profitability and thus enables the project to compete more effectively with other claimants for scarce domestic debt. The additional cash flow also enables the project to sustain larger debt service payments, thus enabling it to manage with shorter maturities, an important advantage where long-term debt is scarce.
- Incentives can also be directed at individual holders of equity or debt. In India, for example, long-term savings by individuals in the form of premiums for life insurance

policies or contributions to the Provident Fund benefit from a tax credit. This incentive has been extended to investments in the shares or bonds of infrastructure projects. In a similar vein, capital gains on sale of shares have been exempted from taxation if the proceeds are invested in equity or debt instruments issued by infrastructure projects. These incentives do not distinguish between equity and debt, but they will help to attract debt financing into infrastructure.

- Tax incentives can also be aimed at financial intermediaries. Financial institutions in India are encouraged to provide long-term finance for infrastructure by allowing 40 percent of the profit attributable to such loans to be deducted from income in computing taxable income.

Tax incentives are criticized by purists on the grounds that they are indirect subsidies, which are usually not justifiable. But a good case can be made for such incentives, at least in the early stages of attracting private investment. The concern that tax incentives may lead to excessively high rates of return is fully met by ensuring a process of competition in fixing tariffs or license fees. Within such a framework tax incentives essentially allow private investors to provide services at lower cost to the consumer than would otherwise be possible. Since public sector suppliers benefit from various hidden subsidies (such as low-cost loans from the budget or provision of government equity on which a commercial rate of return is rarely earned or even planned for), the tax incentive serves only to level the playing field.

Innovative instruments with which to promote debt financing. Innovative financing instruments, such as the use of mezzanine debt, can sometimes attract domestic financing to infrastructure projects. Mezzanine debt refers to hybrid instruments that are somewhere between debt and equity (subordinated to secured debt but senior to equity in the hierarchy of creditors). A variety of such instruments, including simple subordinated debt, convertible debt, debt with stock warrants, and debt with an additional interest payment above the coupon rate contingent upon financial performance, exists. These instruments appeal to investors looking for higher returns than secured debt provides or for a share in the "upside" risk of the project. Introduction of mezzanine debt in project financing for a given level of equity helps to improve the quality of senior debt and therefore its marketability.

There are several examples of the use of mezzanine debt in infrastructure financing in Asia. The Zhuhai Highway Company Ltd. raised \$200 million in international capital markets, consisting of \$85 million in senior notes and \$115 million in subordinated notes. The Manila Skyway project relied on a combination of senior debt and mezzanine capital. The demand for mezzanine debt is also reflected in the emergence of dedicated mezzanine debt funds, such as the Asian Infrastructure Mezzanine Capital Fund, sponsored by the Prudential Capital Insurance Company. The ability to adopt a mixed strategy of relying on a combination of higher-cost mezzanine debt and lower-cost senior debt widens the pool of investors that can be tapped and can lower the overall financing cost of the project.

The role of specialized financial institutions. Many countries have sought to address deficiencies in their domestic debt markets by creating specialized institutions to deal with infrastructure financing. Examples of such institutions are the Pakistan Private Sector Energy Development Fund, established in 1988, which provides subordinated loans to private sector power projects, and the Jamaica Private Sector Energy Fund, established in 1992, which was set up to provide long-term finance. In India the Infrastructure Development Finance Company was recently set up as a private company, in which the government has a minority stake, with the objective of playing a catalytic role in channeling resources into commercially viable infrastructure projects (see box 6.3). A similar institution is being set up in Colombia.

Scepticism is sometimes expressed about whether creation of a specialized institution will improve financial intermediation. A new institution adds little if it only redirects resources that would have flowed from existing institutions to target sectors. Specialized institutions may appear to contribute additional resource flows if they are a conduit for government resources earmarked to support private sector infrastructure or if they are able to use government guarantees to obtain funds from the market at lower rates. However, the same subsidies could be extended just as effectively by channeling this support through existing financial institutions. It can be argued that because of their special mandate, specialized institutions will ensure a larger flow of funds to target sectors. If more financing flows to target sectors because these institutions are better able to find bankable infrastructure projects, then these institutions are providing valuable financial intermediation. If, however, more funds flow to target sectors because these institutions simply apply lower standards of credit appraisal in order to achieve some externally set target, the institutions may end up financing infrastructure projects that other financial institutions regard as unfinanceable on conventional criteria, and they will not be contributing to the efficiency of the financial markets.

The case for establishing a new institution therefore depends on whether it fills some critical gap in the financial environment facing infrastructure projects. Several such gaps justify creating a specialized financing institution:

Box 6.3 India's infrastructure development finance com

The Infrastructure Development finance Company (IDFC) was incorporated in January 1997, with 40 percent of the equity held by the government of India and the Indian Reserve Bank and 60 percent held by non-government domestic financial institutions, foreign investors, and multilateral agencies. The IDFC will operate on a commercial basis to finance viable projects in power, telecommunications, roads, ports, and urban services. It will not compete with existing financial institutions as a direct lender but will engage in innovative financing to help other institutions raise funds for infrastructure or provide support for infrastructure projects in critical areas.

The IDFC will provide direct lending, purchase of loans, and co-financing; take-out financing, standby finance, and refinancing of longer maturities; partial credit guarantees and other forms of credit enhancement for infrastructure projects; securitization of infrastructure loans and market making for these loans; and mezzanine finance.

The initial capitalization is \$530 million. The IDFC's capitalization and commercial practices will enable it to achieved high credit rating. It will also be able to benefit from credit enhancement through credit risk guarantees provided by multilateral development banks.

- *Identification of financeable projects.* Specialized financing institutions may be able to identify financeable infrastructure projects more effectively and proactively than multipurpose financing institutions. Moreover, they may be able to help structure projects in a manner that makes them financeable, taking care to meet the complex risk mitigation requirements of different types of investors.
- *Take-out financing.* Infrastructure projects may need financing arrangements in which the project can be financed initially on the basis of shorter-term debt (such as credit from suppliers to finance equipment purchase) that is refinanced later by longer-term debt. A spe-

cialized institution could help guarantee such refinancing within a predetermined financing cost. This amounts to giving the project an assurance that if refinancing is not available on specified terms when needed, it will either be provided directly by the institution or the difference between the predetermined cost of financing and the cost at which funds can be raised will be reimbursed to the project. A commercial fee should, of course, be charged for this service.

- *Liquidity support.* Bond issuance by infrastructure projects can be encouraged by providing liquidity support for such bonds in the form of a put option prior to maturity or in the form of market making.
- *Securitization.* A specialized financing institution could securitize the cash flow from loans in a pool of successfully operating infrastructure projects, thus helping to create a wider market for such assets. Pooling of assets would help reduce risk through diversification and thus create a high-quality asset that could be effectively marketed to both domestic and international institutional investors.
- *Direct financing.* Conventional direct financing of infrastructure projects on a limited scale by a specialized institution may give confidence to other investors, which could leverage larger flows from other sources. This is especially true if the institution aims to fill critical financing gaps. The provision of subordinated loans, for example, helps to improve the quality of senior debt and may stimulate a larger flow of total resources at lower cost than would otherwise be possible. A specialized institution can also play a very useful role as an interface between the government and new private investors in infrastructure. Many practical problems are likely to arise in the course of implementing private sector projects that may require constant review and modification of announced policies and also of the regulatory framework. A specialized financing institution with direct involvement in individual projects and with knowledge of domestic and international financial markets can help to identify problems and work cooperatively with government agencies to find solutions consistent with the requirements of financeability on the one hand and public concerns on the other.

The role of government guarantees

A general issue that arises in the context of financing private sector infrastructure projects is the role to be played by government guarantees. Private investors seek guarantees to cover a variety of circumstances. However, indiscriminate use of the government's guarantee power is not justifiable, since it involves a potential cost to the exchequer that becomes a real cost if the guarantee is invoked. Many projects that face financing problems are denied finance because of genuine deficiencies in financial viability. In such cases, the deficiencies must be remedied at the source rather than being covered by government guarantees.

In some situations, however, extension of government guarantees is necessary and appropriate. The most logical use of government guarantees is to cover events over which the government has full control, such as nationalization, government action that forces interruption of the project, or nonperformance of specific government obligations. In all these cases extension of government guarantees reduces the perception of risk and therefore costs. Government guarantees may also be sought to backstop obligations of government-controlled entities when the guarantees of these entities are not commercially acceptable. For example, private power producers selling power to public utilities may insist on guarantees from the government to cover nonpayment for power, or they may expect the government to backstop guarantees of public sector fuel suppliers against defaults in fuel supply agreements. In both cases government guarantees are insisted on because of the lack of financial credibility of the buying and supplying organizations directly involved. The ideal solution in such cases is to improve the financial viability of these organizations so that their own guarantees can be

credible. This transformation is bound to take time, however. In fact, it may take several years after a credible restructuring process has been initiated before these organizations gain full financial credibility in financial markets. During this period the guarantees of these organizations may not be acceptable, and government guarantees may have to be provided as an interim arrangement. Extension of government guarantees in these circumstances can be justified, provided the projects meet high standards of viability and the more fundamental corrective steps are under way. In order to minimize the extent of guarantee exposure, the guarantees can be structured to include "fall-away" provisions, which are triggered as soon as certain credit benchmarks are achieved (Johnston, Mody, and Shanks 1996).

Conclusion

Despite active pursuit of private investment in infrastructure by most developing countries and a growing number of success stories, the pace of such investment remains slower than initially expected. The main reason is that the preconditions for private financing of infrastructure are more difficult to establish than is commonly realized. Inadequate preparatory work leads to unanticipated problems and delays in implementing private sector infrastructure projects.

One set of problems arises because infrastructure sectors are invariably subject to tariff regulation, and it is difficult to strike a balance between ensuring that tariffs are sufficiently remunerative to private investors and ensuring that they are seen as fair to consumers. Consumer acceptance is especially a problem where consumers have grown accustomed to unrealistically low tariffs charged by public sector systems, reflecting large explicit or implicit subsidies. Since similar subsidies cannot be extended to the private sector—indeed, their continuation even for the public sector may not be feasible—a shift to more viable tariffs is unavoidable. Unless the need for this shift is widely accepted, it will be difficult to attract private investment in infrastructure.

Even where the need for higher tariffs is accepted in principle, tariffs charged by private sector suppliers may still attract criticism if they are perceived as too high. Economic efficiency requires that private sector projects should represent least-cost options. This objective is difficult to realize. Cost-based formulas for determining tariffs make it difficult to ensure that efficiency considerations have been fully observed: the padding of costs is difficult to detect and leads to unduly high tariffs and inflated rates of return. Competitive bidding is the only transparent method of resolving this problem. It must be recognized, however, that the effectiveness of competitive bidding depends critically on the quality of the bidding process.

Risks associated with infrastructure projects also pose special problems in implementation. Many of the risks are common to any commercial venture and can be handled in proven ways. But other risks are unique to infrastructure, for example, those arising from interface with regulatory authorities and with other government-dominated agencies. These risks can be reduced to acceptable levels through explicit risk sharing arrangements that define the compliance obligations of the government and government agencies and specify penalties for default. But these arrangements are complex and are very different from the normal ones with public sector suppliers. Governments are sometimes reluctant to enter into these arrangements and often do not appreciate the need for them from the investor's point of view.

Independent regulatory authorities with a clear mandate to ensure fair treatment for private sector suppliers help to reduce perceptions of risk, as does an efficient legal system that provides quick redress, especially in matters relating to contract enforcement. Few countries have all these institutions in place, however, and deficiencies in this area explain some of the delay in project implementation.

Financial markets also impose constraints on project implementation. Once remunerative tariff structures and acceptable risk mitigation arrangements are in place, projects have to achieve financial closure. This requires mobilizing an appropriate mix of financing in terms of equity and debt. Infrastructure projects require long debt maturities, reflecting the long payback period. In the absence of long-term debt, they need reasonable assurance of refinancing or take-out financing.

Availability of domestic finance is perhaps the most serious constraint on infrastructure financing. Infrastructure projects cannot be financed exclusively or even primarily through external capital, if only because tariffs are usually fixed in domestic currency and a large share of foreign currency financing implies a correspondingly high foreign exchange risk. A substantial share of project costs must therefore be domestically financed. Domestic debt financing is likely to pose a special problem because most developing countries do not have well-developed domestic debt markets and long-term debt is especially scarce. Measures to develop domestic debt markets are therefore crucial to support private sector infrastructure projects.

By contrast, external capital is more plentiful for well-structured projects in countries perceived as investor-friendly and creditworthy—both restrictive criteria, but applicable to a large number of countries. The pool of international debt and equity capital available for such projects is fairly large and could grow substantially as private sector projects are seen to operate successfully in more and more countries. As with domestic finance, the biggest problem is accessing long-term debt. International bond markets are the logical source for such capital, but access to these markets remains limited, especially for new companies implementing projects on a non-recourse basis. Credit enhancement through partial credit risk guarantees of the type now being offered by multilateral development banks may be helpful in improving access to bond markets.

The development of domestic debt markets requires an environment of fiscal prudence with moderate fiscal deficits that do not put pressure on domestic interest rates. It also requires the development of an efficient and liquid market for government debt, which provides the foundation for developing a broader market for corporate debt. And it requires the development of institutions engaged in mobilizing long-term savings, especially insurance and pension funds, which have a natural appetite for high-quality, long-term debt.

No country presents an ideal combination of circumstances, and experience shows that there are many ways of solving problems that constrain such investment—ways that differ from project to project and country to country. Financial markets show great scope for innovation in tailoring financing solutions to financing needs. Policies need to be flexible to allow such innovation to flourish.

The problems discussed here appear formidable, and indeed they are. But despite these problems an increasing number of private sector projects are being implemented in an ever-growing number of countries. Greater clarity in policy and proactive efforts by governments to create the conditions necessary to attract private investment in infrastructure will result in successful implementation of more and more projects. This favorable experience will improve expectations among investors and reduce perceptions of risk. That should help to accelerate a process that is clearly already under way, though still lacking the momentum that is needed and that is also feasible.

Notes

Montek S. Ahluwalia is finance secretary of India. The views expressed in this paper are his own and do not necessarily reflect the views of the government of India. Acknowledgments are due to Gajendra Haldea, Harinder Kohli, Edwin Lim, Ashoka Mody, and Teh Kok Peng for helpful comments on an earlier version of this chapter.

1. In periods of high inflation even the periodicity of the adjustment can become an important factor, since too long a delay may cause significant erosion in profitability.
2. New licensees are typically either given monopoly access to the market or face only limited competition. In India, for example, the market has been divided into thirteen subdivisions (circles) for telecommunications licensing. Bids have been solicited for one additional supplier of basic (fixed telephone) services in each circle to compete with the existing public sector service. Cellular telephones are entirely in the private sector, and bids have been solicited for two competing suppliers per circle.
3. In principle it is possible for fully priced private sector supply of services to be cheaper than under-priced public sector services because of greater operational efficiency. This effect may not offset the effect of hidden subsidies in all cases, however.
4. The Don Muang Tollway in Thailand has suffered from inadequate traffic because the government did not dismantle the untolled flyovers, which were to have been torn down as part of the concession agreement. Consumer preference for continuing with the toll-free option proved stronger than expected, because the charging segment was not perceived as generating benefits commensurate with costs.
5. The view that shifting risks from one part of the public sector to another serves no purpose is erroneous. Even within a public sector framework, clear assignment of risk to individual public sector entities, with incentives for risk management, would increase the effort made by individual entities to avoid the contingency involved. For example, a fuel supply agreement between a public sector supplier of fuel and a public sector producer of power with penalties for nonperformance is likely to create incentives for the fuel supplier that will reduce disruptions in fuel supply.
6. Risk is also highest at this stage, since there is no certainty that a satisfactorily negotiated project will emerge. Project sponsors typically expect to reap very high returns on this portion of the investment. The high return to sponsors for preconstruction investment can be manifested in purchase of part of the sponsors' equity at a substantial premium by new investors brought in at the time of financial closure. The same result is achieved by charging a premium for fresh equity by new investors brought in at the stage of project implementation.

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