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## **Financial Structuring of Public-Private Partnerships for Road Infrastructure Projects in India**

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## **Abstract**

The Public-Private Partnerships (PPP) scheme has become popular in India as an innovative approach for the development of roads with the involvement of the private sector. The financial structuring of PPP projects is quite complex. The issues involved in arriving at an effective financial structure are discussed. The effect of debt service options on the cash flow situation and the intricacies of debt service relationships are explained. The inferences derived are likely to be valuable to prospective concessionaires in preparing for successful negotiations for financial closure.

**Keywords:** Project Management; PPP projects; Finance; Financial structure; Equity; Debt; Debt-Equity ratio; Debt Service; Cash Flow; Road infrastructure.

## **Introduction**

Due to the widening gap between the financial requirements and the available budget allocations, the governments throughout the world seek to secure the cooperation of the private sector in building the needed road infrastructure through innovative approaches such as the Public-Private Partnerships (PPP). The PPP is based on an agreement between a public agency (such as the national, state and municipal government or a public sector undertaking) and a private sector company. The agreement facilitates the optimal application of the skills and assets of the concerned public and private sector organizations for the performance of the project, besides sharing the risks and returns from the operation. While the public sector usually retains the ownership in the facility, the private sector is granted decision rights in design and operation of the project, besides earning a reasonable return for an agreed period. The PPP is expected to result in better value for the public by combining the advantages of the entrepreneurial spirit, management skills and financial acumen of the private sector with the social responsibility, environmental sensibility and local knowledge of the public sector.

A popular method of the public-private partnerships is the Build-Operate-Transfer (BOT) scheme with its variants (UNIDO 1996, Malini 1999). Under this scheme, the government as project sponsor awards a concession contract to an entrepreneur (concessionaire) to design, build, maintain and operate a road or bridge facility for an agreed period (concession period). The concessionaire is usually a specially formed company called Special Purpose Vehicle (SPV), constituted by a consortium of parent companies and shareholders. The SPV is an independent legal entity which enters into several contractual agreements with a number of parties as required for the project. The concessionaire is fully responsible for mobilizing the necessary finance for the project, and is allowed to recover the investment with profit through levy of tolls (user fee) on the users of the facility or by other arrangements such as annuity or shadow tolling. Some of the issues related to the financial structuring of PPP road projects, with emphasis on debt and debt servicing aspects, based on experience in India are discussed in this paper.

## **Capital for PPP Projects**

The capital mobilized for a PPP project essentially consists of Equity and Debt. Some projects may attract Mezzanine capital and Grant from government. Each component serves a specific role in financing, with its attendant risks and returns. Timely mobilization of funds is critical for the prompt completion and success of a PPP project. The SPV should have the capability to raise the necessary finance at the right time, with flexibility to manage possible cost overruns. Typical financing details of selected PPT road projects as at the time of financial closure (compiled from various sources) are listed in Table 1 for the purpose of discussion of the trends, and are indicative of the approximate order of magnitude of the investments. As private participation in road infrastructure is relatively new in India (having started effectively after 1991), the early projects have been of smaller total cost, e.g. Rs. 170 million for Thane-Biwandi bypass on NH-8. With increasing confidence with PPP schemes, projects with high investment are being taken up, e.g. Rs. 15 billion for Rajasthan Mega Highways Project.

### **Equity Capital**

Equity is subscribed by the parent companies sponsoring the SPV and by the shareholders, who view the project as an attractive investment opportunity. Contractors for construction, maintenance, operations and supply of equipment are also normally persuaded to participate in the equity.

Government agencies such as the National Highway Authority of India (NHAI) and state government undertakings may also contribute to equity to a limited extent in some projects. For example, NHAI promoted the SPV for the Moradabad bypass project and contributed nearly 83% of the equity. Recently, in the case of the Road Infrastructure Development Company of Rajasthan (RIDCOR), which is the SPV for the Rajasthan Mega Highways Project, the equity has been subscribed equally by the two joint venture promoters, Rajasthan State Government and Infrastructure Leasing & Financial Services Limited (Arora 2006).

Currently, foreign firms, particularly those from Malaysia, Japan and Indonesia, are evincing interest in taking up BOT projects in India with investment of their funds in equity. A notable example is the Malaysian initiative in the Tada-Nellore project on NH-5, which is commissioned with 100% foreign direct investment for equity.

Equity is the lowest ranked capital in terms of its claims on the assets of the project. Equity holders get their returns only after all other project obligations are met. Thus the equity holders may gain a profit or lose their expected return, depending on the success or failure of the project. Equity holders carry the highest risk, and it is natural that they expect high returns (about 20%).

### **Debt Capital**

Debt capital is necessary for most PPP projects as the concessionaire may not be able to provide the entire investment in the form of equity. The sources of debt are the commercial banks, financial institutions and multi-lateral organisations. Commercial banks in the past have been providing debt instruments with short tenure of less than seven years, to be in tune with the normal deposit tenures. In

recent years, the banks in India are shedding their reluctance for direct infrastructure lending, and are coming forward with high value loans of a longer duration, thus proving to be less risk averse now than before. A striking example in this context is the contribution of Rs. 10.6 billion senior debt with a tenure of 16.5 years by a consortium of eleven banks and financial institutions for the Rajasthan Mega Highways Project (Arora 2006).

Financial institutions are willing to advance funds for longer duration. Multi-lateral agencies, such as the World Bank, the International Finance Corporation and the Asian Development Bank, provide funds for road development on long term (20 to 30 years) basis, but they insist on government guarantees. A promising source of debt funds is the insurance sector, whose appetite for long-term assets matches with the needs of infrastructure projects for long-term debt.

Debt from these lenders is termed as "Senior Debt" to denote that, in the case of project default, the lenders of senior debt will have the first right to the cash flow and assets of the project, over the providers of equity and mezzanine capital. Debt can also be mobilized by issue of bonds, including deep discount bonds, with duration to match the debt repayment period for the project. Tax-exempt infrastructure bonds are permitted by government for this purpose.

A recent innovation is the 'take-out' financing scheme pioneered by Infrastructure Development Finance Company (IDFC) with a view to encourage bank lending. Under this plan, commercial banks could lend funds to a PPP project in the initial period on a short/medium tenure, and IDFC would 'take-out' these assets from the banks at the end of the agreed duration. This route has been followed in the Delhi-Noida Toll Bridge project. The 'take-out' scheme serves to assure 'comfort' to the banks in their lending to the infrastructure projects.

## Mezzanine Capital

Mezzanine capital is investment with some qualities of debt and equity, and so it carries a risk profile intermediate between debt and equity. This may take the form of subordinated debt or preference shares with regular interest. Mezzanine capital ranks below the senior debt, and carries a higher rate of interest than senior debt. It is normal to persuade the contractors/suppliers to subscribe to mezzanine capital. The concessionaire may be able to secure a larger senior debt on favourable terms in view of the mobilized mezzanine capital.

When the financial viability of an otherwise desirable project is weak, the government may assist the SPV by providing a subordinated debt and/or a guarantee to award a bridge loan for debt servicing in case of a shortfall in revenue in the early part of the operation period. For instance, NHAI gave a subordinated debt of Rs. 140 million along with an offer of a bridge loan up to Rs. 50 million for the Durg bypass project with a project cost of Rs. 700 million.

## Grant from Government

With a view to assist the private sector to take up certain identified BOT road projects with inadequate financial viability on their own, the Government of India has initiated enabling legislation to award capital grants up to 40% of the project cost on a case-to-case basis. For example, NHAI has given a grant of Rs. 2110 million to Jaipur-

Kishengarh road on NH-8 costing Rs. 7289 million and another grant of Rs. 1675 million to Tada-Nellore road on NH-5 with a project cost of Rs. 7555 million. These grants reduce the net cost of the project to the concessionaire, improve the bankability of the projects, and facilitate higher leverage for obtaining debt funds. Such grants are treated as 'Equity support'.

The first case of 'negative grant' occurred in the Delhi-Gurgaon expressway project costing Rs. 5452 million, in which the successful bidder offered to pay Rs. 610 million to NHAI for the right to be awarded the concession with an operating period of 17 years (Anand 2003). Since then, many other projects with high density traffic have also offered negative grants, which are payable by the concessionaire at agreed amounts during the first eight to thirteen years.

The Bond-BOT scheme of Madhya Pradesh state government is a noteworthy initiative, in which the government subsidizes a number of BOT projects for state highways from funds raised through issue of bonds (Thadani 2002). The grant of subsidy would render an otherwise non-viable road project financially feasible.

### ***Financial Closure***

When a SPV successfully negotiates a legally binding commitment of the equity holders and the debt financiers to provide or mobilize the required funding on agreed terms, the stage in the progress of the project is referred as the financial closure. This is a critical mile-stone, denoting the preparedness of the project to commence construction. The financial closure will be facilitated if the lenders perceive the project as 'bankable' and view the projected cash flows realistic and adequate to cover the debt service obligations.

The lenders derive 'comfort' if the project sponsor contributes significantly to the equity and issues guarantees against traffic risk. For example, the expeditious financial closure and award of debt at a reasonable rate of interest of 9 % per annum for the Rajasthan Mega Highways Project can be attributed to the active support of the state government by way of equity participation and guarantee of contingency support to meet cash shortfall in the early years of operation.

The lenders show marked enthusiasm to furnish debt capital to BOT projects which come under the annuity method of private participation, because the concessionaire is insulated from traffic risk, while being assured of half-yearly payment of annuities from the government. An example is the Pangarh-Palsit project. In contrast, some of the earlier direct tolling BOT projects suffered considerable delays in achieving financial closure. However, the Karanodai bridge project on NH-5 and the Delhi-Gurgaon expressway project on NH-8 witnessed speedy financial closure due to high potential for toll revenue.

### ***Debt-Equity Ratio Norms***

There is no norm for an ideal Debt-Equity (D/E) ratio for the success of a PPP project. Based on a study of six BOT projects, Tiong observed that the D/E ratio varied from 100:0 for the Dartford bridge project to 80:20 for the Channel Tunnel project (Tiong 1991). The Net Present Value (NPV) and the Return on Equity (ROE) of a BOT project can be quite sensitive to the selected D/E ratio, and these decline rapidly as the concessionaire borrows more than the optimal amount (Dias and Iannou 1995) The optimal D/E ratio is project-specific and country-centric.

In contrast with developed countries, developing countries do not have mature capital market structures with risk-taking readiness. Hence the amount of equity for new PPP projects is limited and the debt instruments play a far more significant role. Debt-equity ratios for road projects in India tend to be in the range of 50:50 to 80:20, the more usual value being around 70:30. The Udaipur bypass project had a D/E ratio of 50:50, and the Delhi-Gurgaon Expressway had a ratio of 70:30, while that for the Panagarh-Palsit road project was 80:20. A higher D/E ratio favours the equity holders, by way of reduced exposure and potential increased returns. On the other hand, creditors would prefer lower D/E ratios as this would facilitate better compliance with debt service obligations by the borrowers. As an incentive to promote privatization of transport infrastructure projects, the Ministry of Surface Transport (now Ministry of Road Transport and Highways), Government of India permitted the minimum acceptable equity to be 15% of the project cost. A minimum level of equity of about 15% to 20% of the project cost is required to convince the lenders that the project is credit worthy and also to assure the government regarding the commitment of the concessionaire for the long-term success of the project over the concession period, besides serving as a cushion against bankruptcy.

Using a case study and the simulation technique, Malini (1998) pointed out that BOT projects are likely to suffer liquidity or cash flow crisis at the early part of the operation period and that the D/E ratio may have to be limited to a maximum of 80:20 to avoid such a liquidity crisis. This finding is amply borne out in the case of the Mumbai-Pune expressway project which has a D/E ratio of 100:0 (CRISIL 2003). Realising such a risk, the Rajasthan Mega Highways Project with D/E ratio of 74:26 has a built-in provision of a contingency loan to meet the cash shortfall during the first five years of operation period (Arora 2006).

### **Debt Service Terms**

The terms for debt service should be planned with prudence and pragmatism. The terms should be specified clearly in the lender agreement. The main features to be detailed are: (a) Tenure of debt; (b) Interest rate; (c) Moratorium period; and (d) Debt service option chosen.

### **Tenure of Debt**

The debt for a PPT project is invariably on a long-term basis, the tenure covering a major part of the concession period. A longer tenure would facilitate easier repayment. On the other hand, a shorter tenure for debt may lead to liquidity crisis in the early part of the operating period. For most of the PPP road projects, the current trend is to secure debt for a period of about 15 years.

### **Interest Rate**

The interest rate for debt differs significantly depending on the source of funds, perceived credit risk, the prime lending rate (PLR) of banks prevailing at the time of financial closure, and the agreed type of interest rate (fixed or floating). The earlier financial closures embodied mainly fixed interest rate for the entire period of the debt. Recent debt agreements adopt a floating rate mechanism, providing for a spread

over the London Inter Bank Offered Rate (LIBOR) for debt denominated in foreign currency or a premium over the PLR for rupee debts. The fixed interest rate has the merit of simplicity and permits easier determination of the interest payable along with periodical instalments of debt repayment. However, the floating rate is more rational in an atmosphere of volatile interest rate regime, and would also obviate the need for renegotiations and debt restructuring, when the interest rate fluctuates significantly during the course of the concession period.

Taking advantage of falling interest rates, the Madurai Municipal Corporation refinanced a Rs. 430 million road project, cutting the interest rate from 15.5% to 12.5% (Anand 2003). The interest rate for debt has fallen from 16 % per annum for the earlier projects to 9 % for the Rajasthan Mega Highways project. The debt for the Moradabad expressway has been structured on the basis of floating rate.

### **Moratorium and Repayment Period**

PPP projects are characterized by heavy outflows in the initial part of the concession period due to construction, operation and maintenance costs besides the interest on debt. The revenue starts only after the commencement of the operation period and picks up gradually. Debt service involves two components: (a) Payment of interest on the outstanding debt; and (b) Repayment of the debt in agreed instalments. The interest during the construction period (IDC) is not paid, but capitalized and included in the outstanding debt. The payment of the interest component normally commences with the operating period. Debt service is usually so designed as to incorporate a grace period called the moratorium period. The repayment of debt starts at the end of the moratorium period.

Past practice has been to prescribe the moratorium period to coincide with the construction period, so that payment started with the commencement of the flow of toll revenue. In the case of the Moradabad bypass project, which had a debt repayment period of 15 years, an extra period of 3 years beyond the construction period of 3 years was allowed as moratorium period, so that the repayment of debt could start at the end of six years from the commencement of the project.

### **Effects of Debt Service Options**

The effects of debt service options on the cash flow situation are shown conceptually in Fig. 1. The abscissa denotes the time scale covering the concession period AC, composed of the construction period AB and the operating period BC. The toll revenue starts at B and rises gradually at first and steeply later to reach D at the end of the concession period. The operation and maintenance costs follow the path BE. The area bounded by BDEB denotes the net amount of cash available for debt service, taxes and profit. Three options for debt service, indicated as DS-1, DS-2 and DS-3, are considered here.

Debt service option DS-1 represents the usual practice of paying equal instalments towards debt repayment obtained as the debt outstanding at the start of the operation period divided by the number of instalments, along with the interest due on the outstanding loan at the start of the concerned interval. The option DS-1 is shown as BGF in the figure. Repayment of debt starts at B. It should be noted that the ordinate from the abscissa to the line BGF at any year represents the sum of O & M costs for the year and the debt service amount. The line BGF intersects the toll revenue line BD at G. The extent to which the segment BG of BGF is above the segment BG of

BGD indicates the shortfall in revenue to meet the debt service obligation. BH on the time scale denotes the period of cash flow (liquidity) distress, while BJ indicates the repayment period for this debt service option.

The ratio of the amount of cash available to the amount required for debt service at any year is known as the Debt Service Coverage Ratio (DSCR) for that year. For the option DS-1, the value of DSCR is negative at time K, is 1 at time H and is positive from time H to J. The lenders would like to be assured of a DSCR value of 1.5 and above for the debt repayment period while considering the project for supplying debt. They may be willing to accept a DSCR value of about 1.2 in case of reputed promoters.

One of the devices to avoid the cash flow distress indicated for DS-1 is to negotiate for a longer moratorium period with or without an extended repayment period. This debt service option, referred as DS-2, is denoted by KL in the figure using a procedure similar to DS-1. This option may involve slightly higher payouts on account of increased interest payments, but will shield the project from embarrassing liquidity problems.

As demonstrated with a case study by Malini (1998), the decisions on the year of commencement of debt repayment and the repayment period in years are critical to avoid cash flow (liquidity) problems, which may occur if the repayment is started too early or the repayment period is too short. These critical factors should be carefully addressed as part of the financial structuring for the BOT project.

Another innovative approach, introduced in the case of the Moradabad bypass project, is to adopt a back-ended repayment scheme in which the repayment amount is kept low in the initial period and increased in tune with the rise in toll revenue. This option, referred here as DS-3 and shown as BP in Fig. 1, completely avoids the liquidity crisis of DS-1. The back-ended repayment method is being adopted increasingly in recent projects.

## **Conclusion**

Public-Private Partnerships has become an accepted technique for financing road infrastructure projects in India. However, successful financial structuring of PPT road projects is a daunting task, which calls for meticulous planning and innovative approaches. The government may find it desirable to render active support by way of subordinated debt, debt service guarantee and/or outright grant, for selected projects on a case-to-case basis. The debt:equity ratio should preferably be around 70:30, and definitely below 80:20 to avoid cash flow (liquidity) problems in the early part of the operation period. The debt service terms should be determined with prudence and pragmatism, particularly with reference to the moratorium period and the debt repayment period. Cash flow (liquidity) problems may occur if the repayment is started too early or if the repayment period is too short. The conceptual framework detailed in Fig. 1 will serve to enhance the understanding of the intricacies of debt service relationships. Back-ended repayment approach which facilitates debt repayment to keep pace with toll revenue is more appropriate for PPP road projects than the conventional arrangement of equal instalments.

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## **DISCLAIMER**

[Note: The views expressed in this paper are those of the author, and they do not represent the views of the employers.]

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**Table 1 - Typical Financing Details of Selected PPT Projects**

Project	Total Cost Rs. M	Debt Rs. M	Equity Rs. M	D:E	Average Interest Rate for Debt, %	Concession Period Years	Remarks
<b>Toll-based Projects</b>							
Coimbatore Bypass NH-47	1035	621	414	60 : 40	16.0	32	First non-recourse project
Durg Bypass NH-6	700	350 + 140*	210	70 : 30	14.0	30	First BOT project by NHAI * NHAI Subordinated debt
Moradabad Bypass NH-24	1035	24.5	310.5	70 : 30	13.25 Floating	30	SPV set up by NHAI Back-ended repayment
Delhi-Noida Bridge	4080	2850	1230	70 : 30	16.5	30	
Vadodara -Halol	1750	1200	550	69 : 31	16.0	30	Back-ended repayment
Delhi-Gurgaon Expressway NH-8	5452 + 610*	4108	2054	67 : 33	13.0	20.5	*Negative grant to NHAI
Tada-Nellore NH-5	7555	3500	2385 + 1675*	60 : 40	n.a.	30	India's largest BOT road project *NHAI grant
Jaipur-Kishengarh NH-8	7289	3624	1554 + 2110*	70 : 30	13.0	20	*NHAI grant
Mumbai - Pune Expressway	~ 18000	~ 18000	0	100 : 0	13.5	30	Debt service problems
Rajasthan Mega Highways Project	15000	11100	500 + 3400*	74 : 26	9.0	32	* Subordinated Debt Contingency Loan to meet cash flow shortfall
<b>Annuity-based Projects</b>							
Panagarh-Palsit Road NH-2	5252	4202	1050	80 : 20	13.0	17.5	Semi-annual Annuity Rs.555 M for 15 years
Nellore Bypass NH-5	1570	1115	455	71 : 29	13.0	17.5	Semi-annual Annuity Rs. 130 M for 15 years

Source: Compiled from various sources

Note: Financial details are to be taken as approximate and indicative of status at time of financial closure. The exchange rates on March 27, 2006 were:

1 US \$ = IND Rs. 44.67 ; 1 Euro = IND Rs. 53.72 ; 1 UK £ = IND Rs. 78.03

Fig. 1 Effects of Debt Service Options

