

Project Financing and Risk Analysis

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Introduction

Since the beginning of the 1980s, a worldwide phenomenon of privatization has been taking place, involving an increasing number of countries both developed and developing. Just in the latter, the World Bank (1996) reports that total revenues from privatization amounted to \$112 billion over the period 1988-94, reaching almost \$27 billion in 1992 alone. Furthermore, approximately over the same period the majority of privatization transactions in these countries involved sales of industrial State-Owned Enterprises (SOEs) while infrastructure revenues represented a third of total revenues (Sader, 1995). This is to indicate the high value of a typical infrastructure project, whether in power, telecommunications, water and sanitation or transport. In addition to the large number of infrastructure projects privatized to date worldwide, an increasing number of greenfield projects are being undertaken with a significant participation by the private sector.¹

The 1994 World Development Report, devoted to infrastructure, underlines the importance of this sector for economic development. The report notes that although developing countries spend 4% of their annual national output on infrastructure, two trends emerge: first, the quality of infrastructure services provided is well below par; and second, a significant infrastructure deficiency still remains.

The low quality of infrastructure services is mainly a reflection of the low efficiency believed to characterize a large number of SOEs, and the improvement of which constitutes one of the main objectives of privatization.² As to the infrastructure deficiency observed in developing countries, it is mainly due to a combination of population growth which necessitates continuous infrastructure development and the reduced budgetary resources which most of these countries have had to face since the beginning of the 1980s.

In response, most governments turned to the private sector not just to take over existing infrastructure projects but also to undertake much needed new projects. Therefore, the poor quality of infrastructure services and the financial constraints faced by governments have contributed to weakening the argument traditionally made in favor of publicly-owned infrastructure, that is, its strategic importance to the economy.

Private sector involvement in infrastructure can take many forms. UNCTAD (1995) identifies four of these forms: service contracting, management contracting, privatization of development rights (which includes leasing and concessions) and private sector initiatives (which includes divestiture, full or partial). With respect to new investment projects in infrastructure, concession and particularly the Build-Operate-Transfer (BOT) arrangement (and its variants) has become in recent years the primary form of private participation in infrastructure.³ A BOT arrangement helps reduce the pressure on government finances and also bring in private sector efficiency to a project through its various phases. Despite the large initial costs and the long time frame of an infrastructure project, private financiers are increasingly interested in investing in this sector, which indicates that they expect to realize competitive rates of return given the potential risks associated with this type of investment.

In this paper, the scope is limited to the concession form of private sector involvement in infrastructure in developing countries, and more specifically the BOT arrangement (in the broad sense). Under this type of arrangement a number of financing sources are available to the project sponsors. However, financing a new infrastructure project may be a risky undertaking. The purpose of this paper is to analyze financing issues in the context of risk. The first part presents the different forms of financing an infrastructure project. The second part examines the main risks to which project financiers may be exposed, and discusses management of these risks.

Financing Sources

Under the BOT approach, an infrastructure project can be either undertaken by a special purpose corporation or sponsored by an established company. Financing of the project is typically of the nonrecourse or limited recourse type whereby the lenders can only be repaid from the revenues or cashflows generated by the project or from the sale of the assets if the project fails. Depending on the nature of the project, these revenues can be market driven or contract driven. In the first case the service is provided directly to the end user, like in a toll road project for instance. In the second case the service is provided to a specific customer, like when power is delivered to a public utility. Thus, under nonrecourse or limited recourse financing, also called project financing, potential lenders would be exposed to the various risks associated with the project. Furthermore, since an infrastructure project typically involves several parties each attempting to minimize its risk exposure, raising the funds for the project can be a very complex undertaking.⁴ In this context, the perception of the various providers of funds of the risks involved and the way in which these risks are allocated among the parties, will strongly affect the financing structure of the project.

In a recent evaluation of private participation in infrastructure projects in which it had been involved over the last thirty years, IFC (1996) reports that the average debt-equity ratio was 58:42 and also that 67% of the project costs were financed from foreign sources.⁵ Considering the leading role played by IFC in providing loan and equity finance to private sector investments in developing countries, the above figures could be taken as a fair approximation of a typical financing structure of an infrastructure project.⁶ In addition to the risks involved in an infrastructure project and how they are allocated among the parties, the financing structure also depends on the types of domestic and foreign sources of funds

available. The various sources of financing could be broadly classified into three main categories: loans, debt securities and equity.

Loans

The sponsors of an infrastructure project can obtain part of the funds required to undertake the project in the form of loans from financial institutions, mainly commercial banks. These funds could be raised both on the domestic and international markets. Infrastructure loans have two characteristics that distinguish them from other types of loans: they are significant in value terms, and they can only be repaid from the cashflows generated by the project. Therefore, they require that the lending institution be large and also that it have some experience in project financing which can be a very complex undertaking. Most banks in developing countries are still small by international standards and do not yet have the necessary know-how to engage in this type of financing. Consequently, international banks are still dominant in infrastructure lending.

Banks are generally restricted by their regulators as to the size of the loans they can provide to a single client, sector or country. They are also constrained by the time profile of their deposits. Therefore, they negotiate very carefully the terms of their involvement in a new infrastructure project in order to avoid the possibility of default by the borrowing party, which is the primary risk faced by any financial intermediary. To this end, banks engage in project risk management which covers the whole period of their exposure, that is, all phases of the project (engineering and construction, start-up and operations) if the loan extends into the operations phase.

Given the size of an average infrastructure loan, it is usually underwritten by several large international banks and in which domestic banks may take part. Although syndicated loans require considerable time to be packaged, their main advantage is that they limit the exposure of each bank. Furthermore, the participation of a domestic bank in the deal and its willingness to take on part of the risk gives more confidence to the foreign partners in the viability of the project.

The same can be said about participation by multilateral government agencies such as IFC, the Inter-American Development Bank or the Asian Development Bank.⁷

Export credit agencies (ECAs) may also take part in the financing package provided by banks. This is usually the case for BOT projects which necessitate imports of equipment. However, opinions may differ as to the importance of the role of ECAs in infrastructure financing. O'Sullivan (1996), quoting two experts one from a commercial bank and the other from an ECA, notes that the bank officer believes that an ECA involvement is time-consuming and costly, while the ECA officer states that ECAs give more confidence to banks when they are involved in a project.

Debt Securities

An alternative to loans available to sponsors of an infrastructure project are debt securities, essentially bonds. If a large firm with good credit ratings is the main sponsor of the project, it will not face major difficulties in issuing these bonds whether on the domestic or international markets. These long-term securities are mainly purchased by institutional investors such as pension funds and life insurance companies. For pension funds, the long-term nature of contributions and retirement payments make their investment policies long-term, and thus bonds are suitable securities for these institutions. Life insurance companies also have long-term investment policies since their revenues extend over a long period. Furthermore, these institutional investors generally face strict regulations and are limited as to the types of securities in which they can invest. Highly rated corporate bonds are considered by regulators as acceptable investments for these institutional investors.

Another type of bonds which may be issued by the sponsors are revenue bonds. Unlike bonds issued by an established company, these bonds are backed by the cashflows generated by the project as well as the project company assets. This is a riskier type of investment and thus potential investors will be very demanding and will scrutinize all aspects of the project before committing any funds.

Commercial paper, a short-term security, may also be issued by the sponsors. However, this type of security can only be issued by large and established companies and sold at a discount on international markets. Commercial paper can be a suitable source of funds to meet short-term needs of the project company.

In developing countries, bond markets are still limited to government securities. Therefore, for a private firm to issue bonds, it generally has to access international markets. Even then, IFC reports that greenfield projects face difficulty in marketing these bonds when they do not involve a strong sponsor and do not have government support.

Equity

Unlike bonds which are fixed-income debt securities, equity securities represent ownership in the corporation. Although preferred stock characterized by fixed dividend is also an equity security, common stock is the main equity security. The common stockholder is the residual claimant on the corporation's income as well as assets, and is not guaranteed any return since the corporation is not required to pay any dividend. Therefore, common stocks are a risky investment. However, the stockholder may be willing to forego dividends if the value of the stock increases significantly, and thus he can derive a substantial capital gain.

In order to raise equity for an infrastructure project, the sponsors may access both the domestic and international markets.⁸ Stock markets in developing countries have grown noticeably in the last few years, especially those known as emerging markets. Therefore, sponsors will encounter less difficulty to market this type of security locally than in the case of bonds. Furthermore, issuance of stocks of infrastructure companies on the domestic markets will contribute to the development of these markets which in turn will make it easier for these companies to raise funds in the future.

Equity investment in a new infrastructure project in a developing country, although risky, may generate high returns. Indeed, the higher the performance of the project, the higher the return to equity investors. Thus, unlike bonds where income is fixed or loans where the return comes in the form of predetermined interest payments, return on equity could be very high. This potential makes various types of investors, both domestic and international, attracted to this type of investment. Among equity investors, and in addition to the individual investors, there can be investment banks (which can at the same time be part of the loan syndicate), life insurance companies (although very cautious), multilateral government agencies (such as IFC) and special investment funds. However, in any BOT project, lenders expect the sponsors to hold equity in their project. Walker and Smith (eds., 1995) cite two reasons why this is the case: one, if the debt service takes a considerable part of the cashflow, their loans will be at risk; and two, they want the sponsors to have some of their own funds in the project which will further motivate them to ensure a successful operation of this project.

Another financing source for infrastructure projects is what is known as quasi-equity or mezzanine finance. Benoit (1996) describes this type of investment as one that “frequently takes the form of debt, but enjoys many of the qualities of equity” (p.9). An example of this type of equity is the convertible unsecured loan stock which is a loan stock that pays fixed interest but gives its holder the right to convert it into common stock sometime in the future. Walker and Smith observe that this type of financing is attractive to both investors and project sponsors. For investors, the appeal is in the rate of return which is several percentage points higher than the cost of senior debt. For project sponsors, the advantage of such financing is that it allows the share of equity in the capital structure of the project to remain low which makes the return on equity higher.

Risk Analysis

In finance, risk is defined as the possibility that the actual return on an investment will be different from the expected return. In an infrastructure project, the various parties involved face some type of risk at one time or another during the life of the project. Financiers, whether those who provide debt or equity, are the main parties exposed to these risks. As mentioned above, the bulk of infrastructure financing in developing countries still originates from foreign sources. This international dimension to an infrastructure project makes it even more complex than it already is since foreign lending and investing involves additional risks. In the following, the main risks to which project financiers may be exposed will be examined and various ways to manage these risks will be discussed. There are several ways to classify the various risks associated with an infrastructure project. For the purpose of the present paper where the focus is on the main risks faced by the project financiers, the classification adopted is as follows: currency risk, market risk, technical risk and political risk.

Currency Risk

The sponsor/developer of an infrastructure project in a developing country generally uses both the local currency and a hard currency. The local currency is used to meet the operating expenses such as raw material available on the domestic market and wages and salaries. However, in order to pay for imported equipment, pay dividends to foreign stockholders and repay foreign loans, the sponsor needs hard currency. Since the revenues generated by the project are in local currency, the local currency requirement is met. But a risk may arise regarding the hard currency needs of the project sponsor. Here, the currency risk may take two different forms: currency convertibility and currency fluctuations.

If the local government imposes any restrictions on currency convertibility, this will be known to all parties concerned before the project is launched. Therefore, this question will need to be negotiated with the local government, and

settled before the project can proceed. The sponsor can obtain a special permit from the central bank to convert local currency into certain foreign currencies whenever a need arises. In cases where the government or one of its agencies is the customer (for example, in the case of a power station), part of the payments to the sponsors can be made directly in foreign currency. Another alternative that both parties could agree on is for the project company to set up an offshore escrow account where project revenues would be deposited and foreign loans paid (Walker and Smith).

With respect to currency fluctuations, an appreciation of the value of the local currency against hard currencies can only be beneficial to the sponsor and the foreign equity investors. Since an infrastructure project serves primarily the domestic market, an appreciation of the value of the currency would not cause a reduction in foreign revenues since there are basically none. However, the local currency value of the foreign debt service would be reduced, and foreign stockholders will receive higher dividends denominated in their home currency.

But when the value of the local currency depreciates, the opposite happens. Foreign debt service becomes more expensive in local currency terms, and foreign stockholders will receive lower dividends denominated in their home currency. In the preceding, the terms appreciation and depreciation have been used, which assumes a flexible exchange rate regime. However, the outcome would have been similar if the terms revaluation and devaluation had been used, meaning a fixed exchange rate regime in the country where the infrastructure project is located. Regarding the foreign debt, it is generally denominated in a hard currency; thus, the foreign lenders should not be affected by a depreciation of the value of the local currency unless the depreciation is so severe that the project cashflows cannot even cover the foreign debt service. But the sponsor and the foreign equity holders would be affected no matter what the depreciation percentage is. In addition to the impact of the depreciation on the foreign debt service, there would also be an impact on the prices of imported input if the project company uses any.

In order to reduce the risk of exchange rate depreciation, the sponsor could get some guarantees from the local government to cover part of the project company's foreign commitments if the depreciation exceeded a certain percentage. An alternative, as suggested by Haley et al. (1994), is for the government and the project company to agree on indexation whereby any exchange rate depreciation would be passed on to the tariff or toll. However, such a solution may not be politically feasible. Foreign exchange risk can also be reduced through the use of hedging instruments available on international capital markets. As discussed by Hines (1997), currency forward, future and option contracts are available for a number of currencies and can satisfy specific needs for their users.

Market Risk

It is essentially that involved in the supply of the project company's input and the demand for its output/service. In both cases, the project company's revenues are at stake. With respect to the supply of the company's input, the risk is that the project cannot operate due to a reduction in input supplied or a sudden halt in that supply. This is mainly the case in power plants where fuel is the input in question. Both the lenders and the project sponsor want to ensure a continuous supply of fuel, and also do not want to be surprised by any unilateral fuel price increases imposed by the supplier. Thus, in order to avoid any unexpected changes in both price and quantity of input, the sponsor will require a guarantee regarding a continuous flow of supply whether from the supplier itself or from the local government.

With respect to the demand for the project company's output/service, the risk is that the demand falls short of expectations and therefore revenues will be affected. In the case of a power generating project company, the customer is usually a local utility company. In order to avoid any fall in demand by the utility, the sponsor will require that this utility company or the local government guarantee purchase of the plant output. To that end, both parties conclude a Power Purchase

Agreement (PPA).⁹ In the case of another type of infrastructure project where the project company provides a service such as in a toll road project, the risk is similar, that is, revenues may fall short of expectations. The demand risk regarding the provision of services concerns the level of demand as well as its elasticity. The latter involves the demand response to a service fee change. In this type of project, what the sponsor is required to do prior to any commitment is a thorough market study including reliable forecasts of future demand. A safe strategy in this case would be to base the decision to undertake the project on the most conservative demand forecast. However, if the demand is below expectations and the project company's revenues are in jeopardy, the government may take some measures to help raise these revenues. For example, in the case of a toll road it can prevent certain types of vehicles from using alternative roads.

Technical Risk

This category includes risks associated with both the construction and operation phases of the project, but which are technical in nature. In the construction phase, unforeseen technical conditions may result in cost overruns (inflation may also lead to the same outcome). Unforeseen technical conditions as well as other factors such as a poorly planned construction process may also result in completion delays. The project sponsor can deal with these two types of risk in a number of ways.

With respect to cost overrun risk, the sponsor can either provide additional capital in the form of debt or equity or it can initially agree with the contractor on a fixed price contract. In the first case, the sponsor takes on the risk whereas in the second case the contractor is constrained to keep construction costs within budget or will have to forego part of the construction profit under the best circumstances. With respect to completion delays, as was the case for cost overruns, the project company can either set aside contingency funds to face the costs of these delays or it

can have the contractor commit to a specific completion date. In the latter case, the contractor would be fully responsible for any completion delays.

In the operation phase of the project, the sponsor may face various types of risk which can affect revenues in different degrees, depending on the severity of the situation. To name a few of these risks, there can be an equipment breakdown, unproven technology may have been adopted and unskilled labor may be operating sophisticated equipment. The main characteristic of these types of risk is that they cause the project to operate at a lower efficiency level. Thus, there will be a direct impact on the performance level of the project company. Since the sponsor is generally required, under the concession terms, to meet a certain performance level or face penalties, he must take measures to reduce these types of risk. For instance, with respect to a possible equipment breakdown or the use of unproven technology, the sponsor can ensure that the responsibility lies with the contractor by specifying that in the construction contract. For unskilled labor, the sponsor (also operator of the project) can ensure that the employees working on advanced equipment get the proper training before operations start.

Political Risk

In the present context, political risk is primarily intended to mean any action of a political nature which may affect in any way the project operations. This may include a change of political regime or legislature and a change in the regulations governing the concession agreement. A change of political regime or legislation may cause a policy shift regarding private participation in infrastructure or in the extreme case regarding foreign participation in domestic infrastructure projects. If the new government stands against private ownership of infrastructure projects on the grounds that a strategic sector should be publicly owned, the likely measure that it will take is to nationalize the project. In this case, the government should compensate the financiers on the basis of the present value of their future income. If the government opposes foreign participation in domestic infrastructure projects, it should compensate the foreign financiers in a similar fashion. In the above two cases, and in order to avoid any type of dispute or legal complication, the

concession agreement could clearly address this possibility by including a buyout clause.

The riskier possibility is for the local government to expropriate the foreign owned project company. Even though in the present world economic and political environment, the likelihood of such an event happening is rather remote, such a possibility still exists. In a discussion of potential risks involved in foreign infrastructure investments, Wells and Gleason (1995) state that what Vernon called the “obsolescing bargain” regarding countries’ preference for local ownership of infrastructure is still valid. They argue that since an infrastructure project is not characterized by a continuous inflow of technology and capital, and does not generate any revenues from exports, therefore it can be operated without foreign involvement. In any case, the project sponsor has always the option of taking up insurance against political risk. The main providers of this type of risk are multilateral government agencies such as the World Bank, or national government agencies such as the Overseas Private Investment Corporation.

Changes in the regulatory framework in which the project company operates may have a direct impact on its revenues. To reduce this type of risk, the sponsor can have the concession agreement include clauses that specify the adjustment process.

Conclusion

A combination of poor quality of services and budget constraints faced by governments has been the major factor behind the recent surge in private participation in infrastructure in developing countries. This participation comes mainly in the form of concessions, particularly BOT arrangements, whereby the government’s role during the concession period is limited to regulating and supervising the activity.

The purpose of this paper has been to analyze private infrastructure financing under the BOT type of concession, characterized by nonrecourse or limited recourse financing whereby the lenders can only be repaid from the revenues generated by the project. This limited recourse characteristic and the complex nature of an infrastructure project given its size and the number of parties involved bring to the forefront the element of risk. Therefore, any discussion of private infrastructure financing must be conducted in the context of risk.

A private infrastructure project can be financed through loans, debt securities and equity. Despite a recent growth in developing countries' financial markets, foreign financing, particularly lending, remains the dominant form of financing infrastructure projects in these countries.

With respect to the main types of risk faced by financiers of private infrastructure projects in developing countries, the paper has examined the currency, market, technical and political risks. The paper has also discussed ways in which these risks can be managed or mitigated. The discussion of risk was conducted from the perspective of the sponsor since his concerns reflect those of the other project financiers. From the analysis of risk it can be concluded that, although insurance remains an option, an alternative solution would be for each party involved to bear the risk that it can best manage.

Notes

1. Saghir (1997) reports that since 1984 the number of privatized infrastructure projects has reached 600 in about 100 countries, while that of greenfield projects both completed or underway stands at more than 700.
2. At the heart of the issue of privatization lies the question: does ownership matter? In other words, does the type of ownership (public or private) make a difference in terms of firm behavior? Based on evidence provided by European public enterprises, Hanke (1987) argues in favor of the non-neutrality of property rights arrangements and notes the higher efficiency of private enterprises. In the framework of the principal-agent problem, Vickers and Yarrow (1988) discuss the impact of different types of ownership on the managerial incentive structure and the performance of firms. They find that ownership does matter but indicate that its specific implications on the performance of a firm also depend on the regulatory framework and the market structure within which it operates.
3. Under the BOT type of concession, the private sector is responsible for the design, financing, construction and management of an infrastructure project for the period of the concession, at the end of which the project is turned over to the government. Under a variant of this arrangement, Build-Own (BO), the private firm remains the owner of the project indefinitely.
4. Bond and Carter (1994) identify the following as the parties involved in the financing of private infrastructure: sponsors or owners, contractors, government, customers, financiers and facilitators (financial analysts, lawyers and engineers).
5. The report also shows that the share of foreign financing has been steadily increasing over the last few years, from 62% in 1992 to 78% in 1996.
6. This structure will undoubtedly vary depending on the nature of the project, as the figures in the appendix table A-4 of the IFC report clearly show.

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7. For a detailed discussion of co-financing between multilateral institutions and international banks, see Bouchet and Ghose (1992).
 8. Foreign securities could be issued on the U.S. market through American Depository Receipts (ADRs). These instruments represent indirect ownership of a specified number of shares of a foreign company. The shares are actually held in a bank in the issuing company's home country, and ADRs are issued by a US depository bank.
 9. In a concise description of a typical PPA, Economic and Social Commission for Western Asia (1997, p.7) states: " The Power Purchase Agreement (PPA) concluded between the project company and the power utility secures the long-term income of the project by fixing the tariff rates for the power and energy produced. The power tariff consists of two components: a fixed rate and a variable rate. The fixed rate will be paid for the agreed or achieved availability of power, even if the power has not been requested by the utility. This fixed rate normally will cover all fixed costs of the project company such as debt service, return of an on initial investments and all other fixed operation costs. The variable rate will reflect the payments for fuel supplies and a number of other costs dependent upon energy actually produced and supplied to the utility".

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Abstract

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In response to both the low quality of services provided in most developing countries and the budget constraints faced by governments, the private sector is increasingly involved in infrastructure. In this paper, the scope is limited to the concession form of private sector involvement in infrastructure, and more specifically the BOT arrangement. However, financing a new infrastructure project may be a risky undertaking. The purpose of the paper is to analyze financing issues in the context of risk.

To this end, the paper first discusses the various financing sources available, then examines the main risks to which project financiers may be exposed and ways to mitigate them.