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Risk in Global Infrastructure Project Financing

by

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Submitted to the Department of Civil and Environmental Engineering on August 14, 1998 in partial fulfillment of the requirements for the Degree of

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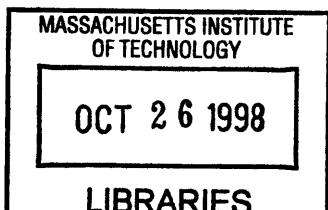
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Abstract

Project financing has been the main financing structure of public-private ventures in infrastructure projects. Investors face several risks when going into these projects. These risks are even higher when the project is located in a foreign country. This thesis examines the risk exposure of investors and more specifically of lenders when financing foreign infrastructure projects.

Basically these risks can be divided into three main categories: financial risks; political risks; and project's performance risks. The first category includes risks that have to do with the financial aspect of the investment such as interest rate risk, currency transfer and inconvertibility risks, and mainly currency devaluation risk. Political risks are country specific risks that could result from political, legal or regulatory actions that are unfavorable for the project's interest. The third category of risks includes the project's specific risks. These could vary from construction delays or cost overrun, to quality of performance of the project, to market risk...

The first step in risk management is to identify and quantify the exposure to each of these risks. This is relatively easy when dealing with financial risks, however much more difficult in the two other categories. Hedging financial risks is done by the appropriate use of financial derivatives coupled with internal hedging strategies. Political risk hedging is mainly achieved by either introducing "strong sleeping partners" or by buying insurance policies. Finally performance risks could be easily prevented by adopting appropriate contractual agreements.

Based on the results of a survey conducted with the major US commercial banks, lenders account for most of these risks. And when involved in international infrastructure financing they do hedge part of their risk exposure using the same hedging techniques discussed previously.

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Finally I would like to dedicate this thesis for my family, Souha, Wajdi, Azmi, Nina, and to Najouha.

Mahdi Mattar
Cambridge, MA
August 14, 1998

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Chapter 1: Introduction

Infrastructure has been one of the fastest growing sectors in terms of private participation and financing. The main form of financing these private-public ventures is project financing. Project financing is when the project is arranged as an independent economic unit. When raising funds to finance the project, lenders and equity-holders would look on the cash flows of the project as the source of the return on their investment. At the time of mobilizing debt financing, the project has no history, there is no creditworthiness to be checked, so lenders rely only on the anticipated profitability of the project. Even though investors are offered support from a third party, the project sponsors, they still face a significant amount of risk. These risks should be well identified and analyzed for the following reasons: 1) determining the systematic risk of the project and hence the appropriate cost of debt; 2) determining the appropriate risk sharing structure between the different participants. The aim of this thesis is to analyze the risk exposure of investors and more specifically of lenders, when investing in foreign infrastructure project financing. Once these risks are determined we aim to recommend strategies and instruments to hedge these risks, making the ^(diversifiable) systematic ~~(non-diversifiable)~~ risk of ~~the~~ investing in the project lower.

We will start our discussion on chapter 2 by a review of the current trends in infrastructure financing and the structure of project financing applied to infrastructure projects. Then, since development banks play a major role in sponsoring these projects and in presenting guarantees to investors, an in depth presentation of development banks

will be covered in chapter 3, focussing on their objectives and their catalytic role in mobilizing funds for these projects.

We will tackle on the main idea of risk analysis in chapter 4. A detailed study of each of the risk would be conducted. And when possible, we would suggest methods for quantifying the exposure of each risk. An in depth understanding of the risks combined with a quantitative measurement of the exposure would make hedging possible and easy. Chapter 5 will describe the available hedging techniques of each of the risks introduced in the previous chapter. These hedging techniques varies between familiar instruments to special guaranties by third parties, it is in this chapter that we would relate our previous discussion of development to risk management strategies.

Finally, we will present, in chapter 6, the survey we conducted with the major US commercial banks about their international project financing operations. A short comparison is conducted between the banks' actual risk management strategies and the theoretical strategies, previously described.

Chapter 2: Private Infrastructure Financing

2.1. Private Participation in Infrastructure Projects

After the 1980s debt crisis, developing countries significantly restricted public borrowing. While public funding has been reduced, requirements for infrastructure investments remain high. “Developing countries at present (1994) are spending about \$200 billion a year as a group on infrastructure. About 90% of that investment are financed by the public sector, either through tax revenues or by borrowing in ways that the public sector mediates”¹. These investment requirements tend to be mainly in the transportation sector, followed by energy, telecommunications, and water. Under fiscal constraints and the growing disenchantment with the performance of public infrastructure services, governments in many developing countries are giving the private sector a larger role in providing infrastructure services.

| | Volume (US \$bn) | No. of Companies | No. of Countries |
|------|-----------------------------|-----------------------------|-----------------------------|
| 1989 | 2.8 | 11 | 4 |
| 1990 | 6.0 | 32 | 10 |
| 1991 | 6.8 | 41 | 14 |
| 1992 | 9.8 | 63 | 22 |
| 1993 | 4.4 | 90 | 18 |
| 1994 | 10.1 | 75 | 30 |

Source: World Bank³

¹ *Financing Tomorrow's Infrastructure: Challenges and Issues*; Proceedings of a colloquium October 20, 1995; National Academy Press, Washington DC, 1996, page 28

| Table 2.2: Private Participation in Infrastructure Projects in Developing countries, 1990-95 | | |
|---|------------|----------------|
| Region/Sector | No. | US \$bn |
| Total | 361 | 150.1 |
| <i>By region</i> | | |
| Africa | 15 | 1.7 |
| Asia | 137 | 68.5 |
| CAMENA | 13 | 11.4 |
| Europe | 26 | 7.0 |
| Latin America | 170 | 61.5 |
| <i>By sector</i> | | |
| Gas | 23 | 10.0 |
| Power | 160 | 56.4 |
| Telecom | 46 | 41.4 |
| Transport | 114 | 32.0 |
| Waste/water | 18 | 10.2 |

Source: World Bank PPI database³

Private management and financing of infrastructure in developing countries is increasing rapidly; the main reasons for the shift towards private infrastructure services are³:

a) *Growing disenchantment with public monopoly ownership and provision of infrastructure services.* Under-investment and inefficient management of many state-owned utilities, has resulted in a significant unmet demand for infrastructure services. In many countries this is considered a principal constraints to economic growth. Another disadvantage is that government is not as efficient as the private sector, due to the lack of financial discipline and the overextension in the management of public entities. These inefficiencies make public financing costly.

Governments are dealing with these inefficiencies by providing increased opportunities for the private sector to participate in infrastructure services. There is increased evidence that the private sector is generally more efficient in terms of construction costs and time, operation, and provision of services that are consumer-oriented.

b) *Fiscal constraints on governments and external aids agencies.* These constraints have led to an increasing realization that private financing is necessary to meet the capacity shortage. On the extreme side, private financing/management and privatization of infrastructure services could bring extra resources and improve public finances. “The Government of Argentina, for instance, moved from a budget deficit of 10.5% of GDP to a surplus of 1.5% in 1992, due to a set of policies that included public enterprise privatization”¹.

c) *Technological developments.* Technological changes are facilitating competition, by reducing natural monopoly characteristics and allowing unbundling, private entry, and competition into many infrastructure services. For example, falling cost of wireless telecoms have enabled small operators to compete with wire-based networks; independent power producers can construct and operate relatively small power plants at unit costs comparable with larger operators.

d) *Innovative financing techniques and globalizations of financial markets.* Venture capital and institutional investors in developed countries want to diversify their portfolios and achieve higher returns. On the other hand, large size and long payback periods of infrastructure projects have demanded the creation of

¹ Financing Private Infrastructure – 4 Lessons of Experience; International Finance Corporation, the World Bank, Washington DC, 1996, p 45

new innovative financing techniques, such as project financing (which would be explained in the next section). The volume of transactions and the range of instruments used on the international capital markets increased the supply of funds offering more infrastructure financing options.

2.2. Project Financing

Generally speaking, there are two methods for raising capital (especially debt) in order to develop infrastructure projects, either through traditional corporate financing, or project financing. Under corporate financing structures, irrespective of the project's cash flow, lenders look at the cash flow and assets of the whole company to service the debt and provide security.

Recently we have seen a rapid growth in the project financing arrangements. Project financing is a method of financing projects and capital-intensive industries where the lenders look to the project's cash flows to repay the debt, and to the project's assets for security⁶. In project financing, the project, its asset and its cash flows "are segregated from its promoters or sponsors in order to permit a credit appraisal and loan to the project, independent of the credit sponsors"ⁱ. However lenders require some sort of credit support from some source, it is very unusual to have a project without any guarantees from the sponsors or the government to the lender for the project (non-recourse financing). What is very common in project financing is the limited recourse financing, where the sponsors commit to provide contingent financial support, to give lenders extra

ⁱ Peter K. Nevitt; Project Financing; 4th Edition, Euromoney Publications, London, 1983, p 1

comfort, by committing up-front equity in the project⁶. According to P. Nevitt, “the key to a successful project financing is structuring the financing of a project with as little recourse as possible to the sponsor, while at the same time providing sufficient credit support through guarantees or undertakings of the sponsor or third party, so that lenders will be satisfied with the credit risk”¹.

Project financing requires intensive planning in its early stages in order to reconcile the different objectives of the main players involved. The *host government* objectives are to protect and promote the public interest; to reduce and if possible eliminate any public funding or borrowing; to return the project into public ownership once the private sector achieved an acceptable return; to shift as much as possible risk into the private sector. On the other hand, *private developer* or the sponsors, are aiming to make a good return on their investment; to share the risk in carrying out the project; to retain control of the project as long as possible in order to protect their investment; and most importantly to perform the project “off balance sheet”. *Commercial lenders*, who have relatively risk-averse attitude, do not share any potential upside of the project, thus they want to assume only a well-defined measurable risk and make a profit by lending at attractive spreads.

When we talk about project financing, we may in general tend to think of large complex projects. However the concept of project financing can and is also applied to small ordinary projects. The same principles used to finance a major pipeline or a power plant can be used to finance a hotel or a processing plant.

¹ Peter K. Nevitt; Project Financing; 4th Edition, Euromoney Publications, London, 1983, p 3

2.3. Mobilizing Finance

Theoretically speaking, investors should be indifferent to a company's financial structure. According to Modigliani-Miller theorem, if the company is highly leveraged, investors can offset the risk by adjusting the composition of their portfolios. However this result doesn't hold in the case of project financing for several reasons such as the problem of asymmetric information, barriers to entry, adverse selection and moral hazard. In many developing countries information is asymmetric, and the conditions of a weak effective regulations for financial foreclosure favor adverse selection and moral hazard. Under these conditions, a risky but potentially profitable project will rely more on the sponsors' own funds. The more limited the lender's information the more capital has to be contributed from the sponsors before mobilizing external finance.

2.3.1 Debt-Equity Structures

Coming up with the project-financing package requires a decision on the proportions of the different type of capital used to finance the project. Funds for financing projects come in the form of equity, senior debt or quasi-equity.

Equity refers to funds put into the project by the owners, also called shareholders. Owners include project sponsors as well as "passive" investors who are not involved in the project promotion⁸. Equity investors receive dividends and capital gains based on net profits, so they are the last in priority for repayment but the upside potential is

substantial. “Lenders look to the equity investors as a margin of safety”ⁱ, so a higher equity ratio means a higher commitment by project sponsors and a lower risk for lenders.

Quasi-equity consists of subordinated loans or advances to the project or preferred stocks. It is senior to equity capital but junior to senior debt. This special type of funding is occasionally used to attract risk-averse investors. Quasi equity has the several advantages over equity contribution⁴: Subordinated loans have specific schedule of interest and principle repayment, whereas dividends on a stock are optional. Interest paid on debt is deductible for income tax purpose. Quasi-equity may have limited downside, and if combined with conversion rights could still be able to benefit from the upside. Another instance, where the use of subordinated loans is favorable, is when a government agency cannot take an equity position in a project for policy reasons, so by providing subordinated debt the government is encouraging the project and building a the base for attracting senior debt.

Most borrowing from commercial lenders for the project is done in the form of senior debt. Senior debt is debt that is not subordinated to any other liability. Lenders receive payment in according to a predetermined rate and period, and these payments do not depend on the profit of the project. Senior debt could be under the category of unsecured loans or secured loans⁴. From a lender point of view, the distinction is important since secured senior debt have an advantage over unsecured senior loans. Secured loans are loans that have as collateral the assets of the project; these could be in the form of a single asset, a pool of assets, accounts receivable, or contractual rights. On the other hand unsecured loans are only backed up by the general credit of the borrower and not secured by any type of asset. Lenders regard the loan securities as a way out in case an excessive

¹ Peter K. Nevitt; Project Financing; 4th Edition, Euromoney Publications, London, 1983, p 29

default occurs. However, lenders sometimes face some difficulties while enforcing the security agreement, especially in developing countries with underdeveloped legal systems.

| | No. of projects | Debt (%) | Equity (%) |
|---------------------|------------------------|-----------------|-------------------|
| Power generation | 36 | 65 | 35 |
| Pipelines | 8 | 65 | 35 |
| Telecoms | 34 | 51 | 49 |
| Transportation | 25 | 53 | 47 |
| All projects | 115 | 58 | 42 |

Source: IFC³, 1996

Note: underweighted averages, sectors with fewer than eight projects are not shown, but are included in the total

2.3.2 Sources of Equity and Debt

The possible sources of equity include⁸:

- Sponsor's own capital and subordinated loans.
- Investment funds; still a limited source of equity.
- International equity markets; project sponsors can either issue shares to the public, or place shares privately with institutional investors
- Local capital markets; sponsors can issue shares to the public or local institutional investors.

- Multinational institutions, such as International Finance Corporation (IFC) and regional development banks. These institutions have recently started to participate in equity in private sector projects. (I would elaborate latter on in chapter 3 on the role of IFC and the World Bank in private infrastructure projects)
- Joint venture and partnership with other companies or sponsors.

On the other hand, mobilizing debt is becoming more complex. Debt is becoming more scarce as traditional sources of debt, commercial banks, cannot anymore meet the financing needs of the major projects. Moreover, after the 1980s debt crises, these debt sources are sensitive to project risks, especially in developing countries. The possible sources for debt capital can be divided into two main sources⁴:

1) Commercial lenders:

- International Commercial banks
- Institutional investors (pension funds, insurance companies, and mutual funds)
- International bond markets
- Local banks and bond market
- Individuals

2) Commercial sponsors:

- Companies requiring the product or the service of the project

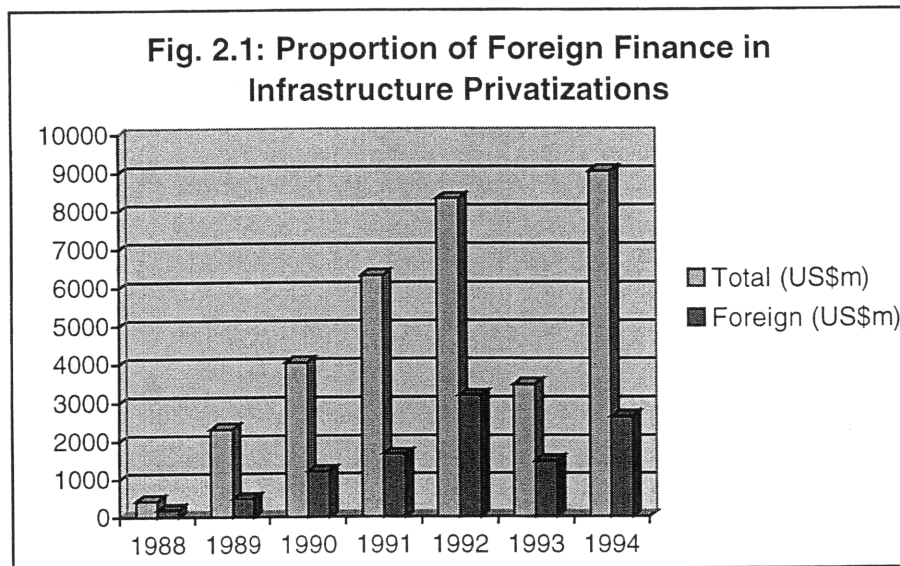
- Suppliers' credits (to finance supply of equipment and materials)
- International agencies (mainly IFC) and regional development banks
- Contractors
- Host government (government agencies, and the central bank)

| Table 2.4: Sources of Debt and Equity: IFC's Projects | | | | | |
|--|---------------------------|-----------------------|---------------------------------|---------------------------|-----------------------|
| Debt | Total (US\$bn) | % of total | Equity | Total (US\$bn) | % of total |
| Foreign | | | Foreign | | |
| Foreign commercial banks | 5.6 | 21 | Private foreign sponsors | 2.6 | 10 |
| Export credit agencies | 2.0 | 7 | IFC equity | 0.8 | 3 |
| Supplier credits | 1.7 | 7 | Other multi/bilateral | 0.1 | 0 |
| International bond | 0.5 | 2 | | | |
| IFC loans | 2.2 | 8 | Local | | |
| Other multi/bilateral | 1.3 | 5 | Private local sponsors | 2.8 | 10 |
| | | | Local publicly owned | 0 | 0 |
| Local | | | Internal cash generation | | |
| Local commercial banks | 2.7 | 10 | | 4.2 | 16 |
| Local publicly owned banks | 0.1 | 0 | | | |
| Total debt | 16.1 | 61 | Total equity | 10.5 | 39 |

Source: IFC³, 1996

International financing dominates infrastructure finance. As we can see in table 2.4, on average 67 percent of the financing in IFC's projects comes from foreign capital (these data could be a little bit biased towards international projects due to the nature of IFC). These international financial flows into infrastructure projects are also present in countries with high national saving rates², due to the benefits international investors gain from diversification, and partly because of local financial markets that cannot "match the

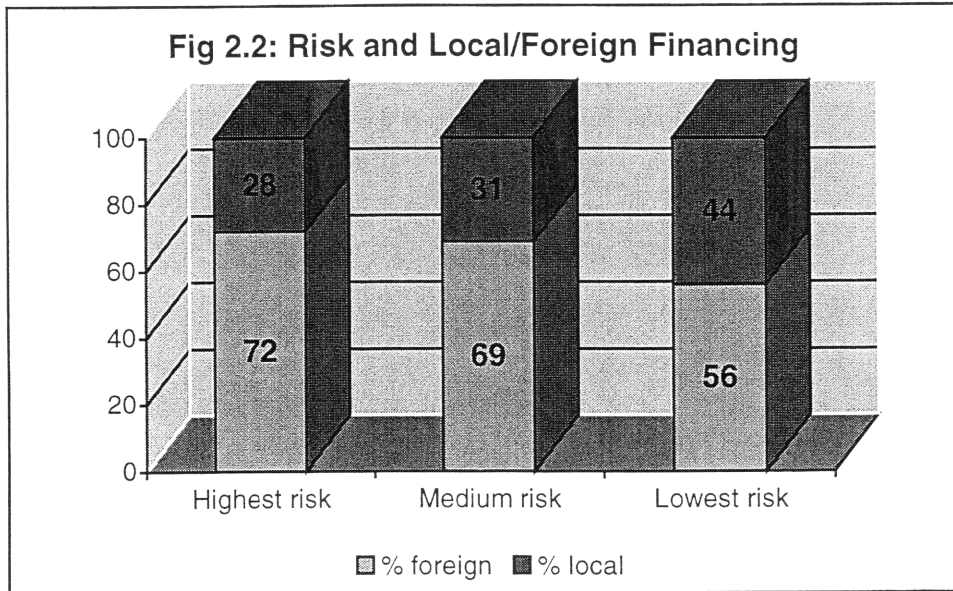
cost and tenor of financing provided by international markets”ⁱ. A better estimate of the proportion of foreign capital in infrastructure projects is given by the following data in figure 2.1.



Source: World Bank

An interesting thing to note here is that these data show that countries with higher risk have more foreign financing. This could be explained by the fact that international investor are willing to invest a portion of their money in high risk-high yield investment. Another explanation is that countries perceived as risky by foreign investors are countries with unstable economies or special conditions as war. These countries tend to have inefficient and undeveloped financial markets, which makes foreign capital the main source for project financing.

ⁱ Financing Private Infrastructure – 4 Lessons of Experience; International Finance Corporation, the World Bank, Washington DC, 1996, p 56



Source: IFC³

Note: Grouped by Institutional Investor scores. Under 25=highest risk (30 projects); 25-40=medium risk (52 projects); over 40=lowest risk (27 projects).

Chapter 3: Development Banks

3.1 The World Bank Group ⁱ

Through out the process of designing the financing structure of a project and mobilizing the required capital, the World Bank Group offers a great deal of policy advice and financial instruments to the governments of the developing countries in order to support infrastructure projects. The role of the World Bank support for private infrastructure development in developing countries is of extreme importance to understand project financing, especially if one is dealing with the management of risk in these projects. The World Bank Group's financial organization consists of the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA), together referred to as the World Bank; the international Finance Corporation (IFC); and the Multilateral Investment Guarantee Agency (MIGA). The Group through its different financial organizations offers several types of financial support for a project, including loans, equity, guarantees, and political risk insurance.

3.1.1 World Bank's Loans and Guarantees

The World Bank's financial support can be either to the private or to the public sector, however in both cases the financial backing is the government of the host country.

ⁱ Based on the World Bank Group chapter from The Private Sector in Infrastructure: Strategy, Regulation, and Risk, the World Bank Group, Washington DC, 1997

Generally speaking the IBRD support is for middle-income countries while IDA is for poorer developing countries. The financial support from the World Bank can come in different forms, as we will see below:

a) World Bank's Loans

IBRD provides loans under two possible structures, these loans are on a favorable market rate similar to the rate available for AAA-rated borrowers. The first loan structure is one where IBRD lends directly to the Project, and this loan would be guaranteed by the host government. Alternatively, the second structure would be one where IBRD would lend the host government, which then on-lend the funds for the Project (figure 3.1).

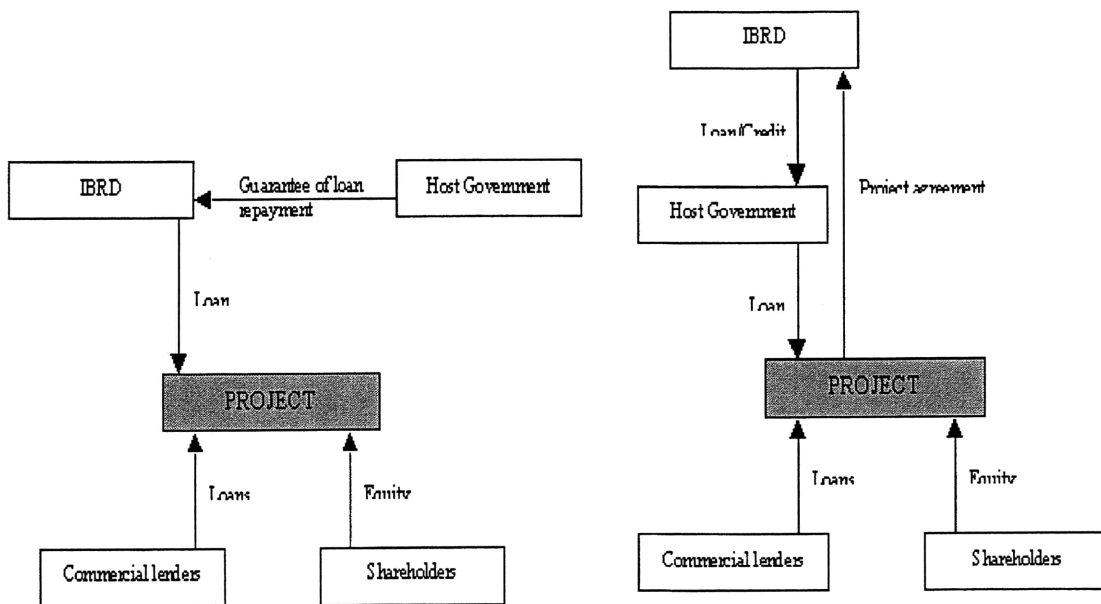


Fig. 3.1 IBRD direct lending vs. IBDR (or IDA) lending through the country

IBRD doesn't generally lend to projects in poorer countries (referred to as IDA-only countries) which are considered not "creditworthy enough to pay IBRD's market lending rates and thus eligible only for concessional IDA lending". However in the few cases where IBRD lends to projects on these countries, the IBRD loans would have as additional requirement the presence of an offshore escrow account for debt service payment and a third party guarantee to IBRD, such as the projects shareholders (figure .3.2).

IDA, as discussed previously, lends on a highly concessional terms. IDA loans are referred to as credits since they have maturates of thirty-five to forty years and an interest rate of 0.75%. These IDA credits are given for the host government which then on-lends to the Project, so this structure is similar to the IBRD lending through the government.

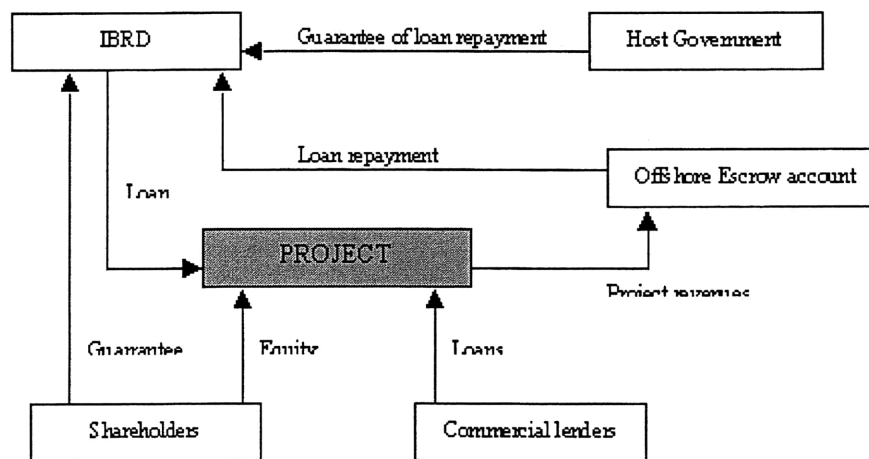


Fig 3.2 IBRD loan for the Project in an IDA-only country

b) Other World Bank support

Guarantees: IBRD offers two types of guarantees for commercial lenders. The partial risk guarantee protects lenders against payment defaults due to “breaches of sovereign contractual undertakings”, while the partial credit guarantee protects certain “debt service payment against all risks”. The later guarantee is generally used for longer maturity debt. Usually these two guarantees, especially the partial risk guarantee, have a counter-guarantee to IBRD from the host government.

Financing guarantees and debt refinancing: IBRD (or IDA) can provide loans (or credits) to a government to finance a guarantee issued by the government. IBRD could also provide these loans to the host government to cover an obligation towards the Project to refinance its debt.

Financial intermediaries, investment funds, and facilities: IBRD and IDA can lend to a government to finance financial intermediaries or investment funds or other financial facilities. These institutions would provide loans, equity, guarantees... to several projects, as described in figure 3.3.

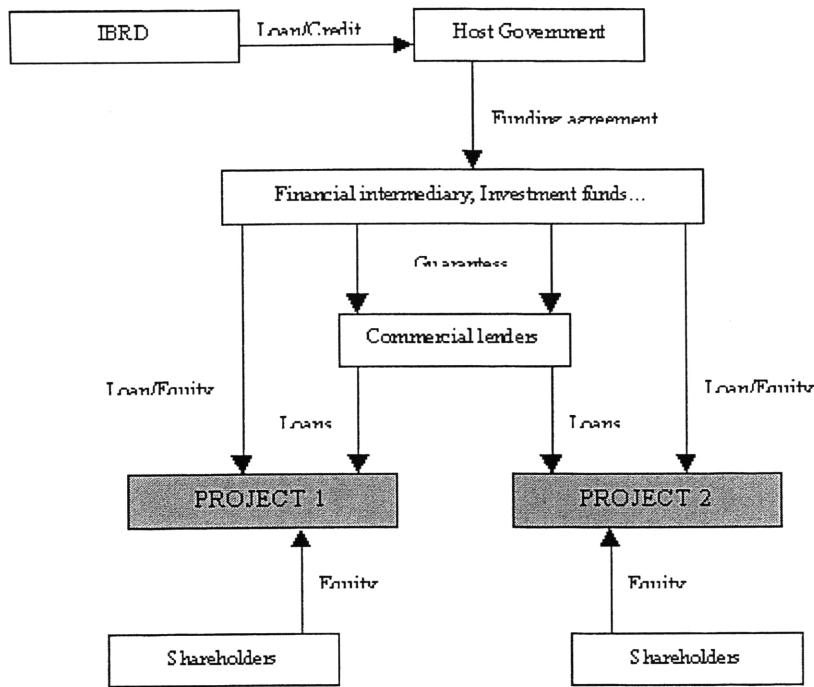


Fig. 3.3 IBRD or IDA lending for a financial institution

Equity financing: In general IBRD and IDA don't equity finance projects. However in very rare cases, equity financing is done in a similar structure as described in figure 3.3, however IBRD/IDA would lend the government which will on-lend to a company that will equity invest in the Project.

3.1.2 IFC's Loans, Loan Syndication, Equity, and Quasi Equity

IFC provides loan, equity, and quasi equity financing for private projects, and to the contrary to IBRD, IFC doesn't require any government agreement or guarantee. IFC loans (also called A-Loans) are at market rate. IFC most popular financial instrument are the B-Loans, these are syndicated loans, where IFC mitigate currency transfers and

political risks for the participating banks. Whenever IFC uses a B-Loan, it couples it with funds from its own resources (A-Loans), to increase the rating and credibility of the B-Loans. IFC support to a project could be from equity investment, plus A-Loans and syndicated B-Loans, using a structure similar to figure 3.4.

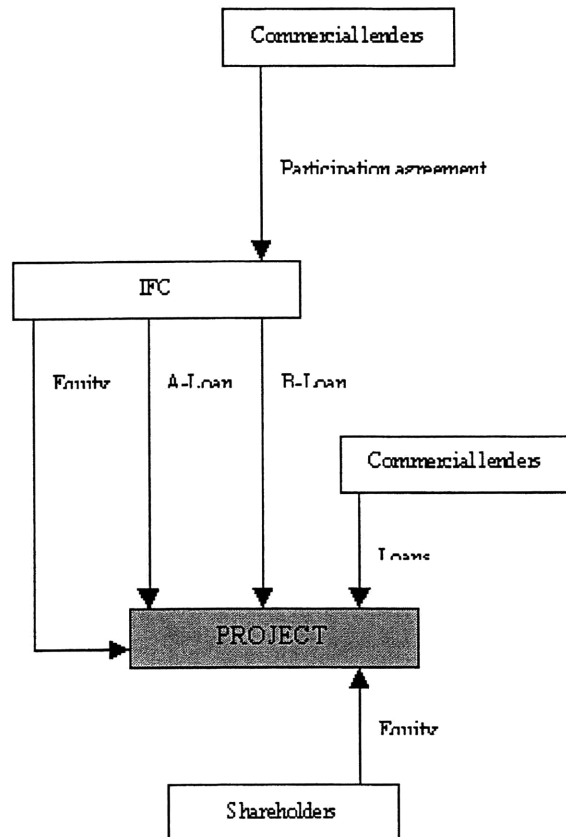


Fig 3.4 IFC equity and loan support

3.1.3 MIGA’s Political Risk Insurance

MIGA (Multilateral Investment Guarantee Agency) is one of the major supports that the World Bank Group provides to international project, this is one of the major

guarantees that we will discuss later on in this thesis. MIGA provide political risk insurance for foreign equity and debt investments. This insurance cover civil wars, expropriation, currency transfer risks, and “it can also cover breach of contract where the claimant is denied appropriate juridical” relief. MIGA’s insurance doesn’t require as a counterguarantee any insurance for the host government.

To end our discussion of the World Bank Group, it is important to note that its different organizations work together to provide the required financing support and a favorable insurance and guarantees framework. This is illustrated in the following figure 3.5 where all the organizations of the Group combine their effort to support a certain project.

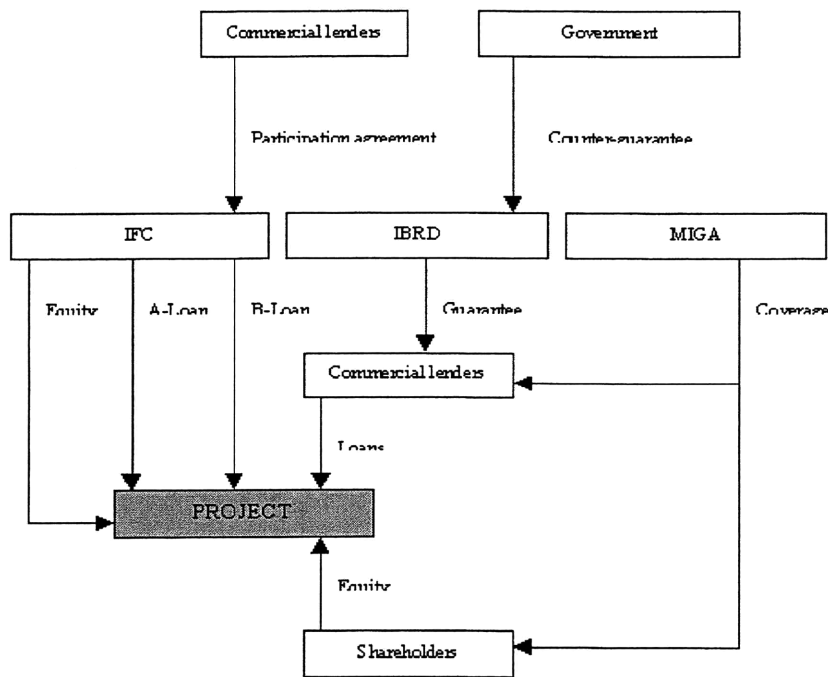


Fig 3.5 World Bank Group Combined Support

3.2 African Development Bank Groupⁱ

“The African Development Bank (ADB) is a development finance institution engaged in the task of mobilizing resources towards the economic and social progress of its Regional Member Countries (RMCs)”. The membership of the Bank comprised fifty-three (53) African countries and twenty-four (24) non-African countries. The latter have joined the Bank since the May 1982 Board of Governors decision to open up the capital to non-African participation. The Bank Group consists of three institutions:

The African Development Bank [ADB]

The African Development Fund [ADF]

The Nigeria Trust Fund [NTF]

3.2.1 African Development Bank

The African Development Bank is a regional multilateral development bank, aiming to achieve economic development and social progress of its Regional Member Countries (RMCs) in Africa. The financial resources of the Bank consist of ordinary capital resources, comprising subscribed capital, reserves, funds raised through borrowings, and accumulated net income

“The Bank's principal functions are: (i) to make loans and equity investments for the economic and social advancement of the RMCs; (ii) to provide technical assistance for the preparation and execution of development projects and programs; (iii) to promote investment of public and private capital for development purposes; and (iv) to respond to

ⁱ Based on the articles from the [African Development Bank Homepage, www.afdb.org](http://www.afdb.org)

requests for assistance in coordinating development policies and plans of RMCs. In its operations, the Bank is also required to give special attention to national and multinational projects and programs which promote regional integration”.

The Bank's involvement covers the major sectors, with particular emphasis on agriculture, public utilities, transport, industry, the social sectors of health and education, and concerns cutting across sectors, such as poverty reduction, environmental management, gender mainstreaming, and population activities. The Bank actively pursues co-financing activities with bilateral and multilateral institutions. The Bank also finances nonpublicly guaranteed private sector operations, which we will focus on later on in the discussion.

3.2.2 African Development Fund

The African Development Fund (similar to IDA) provides development finance on concessional terms to low-income RMCs which are unable to borrow on the non-concessional terms of the Bank. In accordance with its lending policy, poverty reduction is the main aim of Fund development activities in borrowing countries. The Fund was established in 1972, currently its members consist of 24 non-African countries and the African Development Bank. Its sources of funds are mainly contributions and periodic replenishments from its members countries. The total subscriptions, at the end of 1996, amounted to US\$12.58 billion. “The Fund finances projects and technical assistance as well as studies. It lends at no interest rate, with a service charge of 0.75 per cent per annum, a commitment fee of 0.50 per cent, and a 50-year repayment period, including a 10-year grace period”.

3.2.3 Nigeria Trust Fund

The Nigeria Trust Fund was established by the Government of Nigeria in 1976, its purpose is to assist in the development efforts of the poorer ADB members. The NTF provides financing for projects of national or regional importance “which further the economic and social development of the low-income RMCs whose economic and social conditions and prospects require financing on non-conventional terms”. The NTF is under ADB management and, as at 31 December 1996, had a total resource base of US\$432 million. It lends at a 4 per cent interest rate, with a 25-year repayment period, including a five-year grace period.

3.2.4 AFDB’s Private Sector Development

The Bank offers assistance to the private sector in Regional Member Countries (RMCs) to promote “efficient use of resources and to help accelerate economic development”. The Bank role, which is the same for most development banks, is to catalyze the flow of domestic and external resources to private enterprises and to financially and economically viable projects. Bank assistance is provided directly to private enterprises and financial institutions through term loans, equity participation, quasi-equity investments, guarantees, underwriting, and advisory services. This assistance may be considered for projects in various sectors including “energy, manufacturing, transportation, infrastructure, extractive industries, banking and finance, tourism and other service industries, as long as the investment is beneficial to the economy of the host country”. However, the major focus of the Bank's private sector

assistance remains in areas that predict long-term development prospects for the private sector, such as: advisory services, infrastructure financing, privatization and small and medium size enterprises.

In Africa, the demand for infrastructure is huge and growing. The Bank assistance in promoting infrastructure projects is in the form “(i) financial support through direct equity investment and the provision of loans; (ii) advice to enterprises on the structuring of such projects to minimize financial risks; and (iii) advice and assistance to governments to introduce a conducive legal and regulatory framework”. While the Bank's financing may be modest in relation to the total financing needs of these projects, the Bank's association will provide confidence and comfort for other lenders and investors, who may hesitate to participate otherwise, due to perceived risk or lack of familiarity with conditions in the host countries. In selecting infrastructure projects, the Bank pays particular attention to the process and the terms of selecting the BOO/BOOT developers and suppliers. An important role of the Bank in these infrastructure projects, is that the Bank assure that the host governments are committed and have the political will to fulfill their contractual obligations. This last idea is of extreme importance when dealing with the project risks, we will capitalize more on it later on our discussion of the project risks.

The Bank offers loans denominated in the major currencies as well as local currencies, depending on fund availability. The Bank charges market rates of interest to its borrowers. These interest rates and other charges are set to reflect the risks and other characteristics of specific projects being financed, Bank loans generally run for terms of 5 to 12 years with suitable grace periods. The Bank charges a standard one percent front-end fee on all loans or other credit commitments to private enterprises to compensate the

Bank, at least in part, for costs associated with project appraisal and investment processing. Added to that, the Bank also charges a legal fee for expenses incurred by the Bank for services rendered by legal counsel to the Bank in connection with the appraisal and the preparation of loan and other documents. The Bank also charges a commitment fee of one percent per annum on undisbursed balances of loans. The Bank will seek various security mechanisms to safeguard its investments. The nature and extent of the security is determined on a case by case basis. "Security may take the form of any or all of the following: a mortgage on real property, a chattel mortgage or industrial pledge on movables and a floating charge on cash, inventories and other current assets".

The Bank also offers guarantees to cover the payment of principal and of interest for loans extended by others. The beneficiary of the Bank's guarantees, i.e. the funding source, may be local or foreign financial institutions, commercial firms and individual investors. In addition to the guarantee fee, the Bank will also charge a front-end fee, a legal fee, and commitment fee.

Bank equity investments may take a variety of forms, including common shares, preferred stock, with or without participating features. The Bank will not assume responsibility for managing an enterprise in which it invests but will closely monitor the activities of the company. Once the objective of the Bank investment is considered achieved, the Bank will withdraw its equity investment in the project.

Loan Syndication is another form of financial assistance where the Bank acts as arranger of financing, whereby banks and other financial institutions are offered participation in a Bank loan, with the banks taking the same project risk as the Bank on a pro-rata basis.

The Bank cofinancing gives priority to projects in which other reputable institutions are involved. The Bank will assist enterprises in arranging financing by mobilizing the required domestic and external financing from other multilateral and bilateral agencies and private financial institutions.

Finally, the Bank can act as an underwriter of a portion of the securities issued by private sector entities and by country or regional investment funds. “When acting as underwriter, the Bank takes responsibility to purchase any shares not sold and the decision to and how much to underwrite an equity issue involves the same decisions and limits as applied to equity investments”.

3.3 Inter-American Development Bankⁱ

The Inter-American Development Bank (IDB) is an international financial institution composed of 46 member countries, of which 20 are non-borrowing countries and 26 are borrowing countries in Latin America and the Caribbean. The main objects of IDB are the support of economic development in the region. Historically, (IDB) has supported projects carried out by the public sector in the borrowing countries of the region. “However, the Bank has begun to work more directly with the private sector, to which end the Inter-American Investment Corporation (IIC), the Multilateral Investment Fund (MIF) and the Private Sector Department (PRI) at the Bank have been established”.

ⁱ Based on the articles from the [Inter-American Development Bank Homepage, www.iadb.org](http://www.iadb.org)

3.3.1 Private Sector Department

To help meet the need for long-term finance for private-sector operations, IDB created in 1994 the Private Sector Department, “a specialized operational department within the Bank, to provide long-term financing and guarantees for private infrastructure projects in the region”.

The Bank can lend directly to the private sector without government guarantees for infrastructure projects as a means to encourage other investors and lenders to participate in energy, transportation, water supply, waste management and telecommunications. The Bank's participation in a single project is limited to \$75 million or 25 percent of the project's total cost, whichever is lower. These loans are usual at the market rate however they can have up to 20-year maturity.

Infrastructure projects often involve government entities, which could be regulators or suppliers of inputs or purchasers of outputs. These contractual undertakings are often determining factors in whether equity investors and lenders participate in an operation. “The guarantee program of the Bank is designed to address these risk factors. Both public and private projects are eligible for IDB guarantees, which are provided to lenders (not to equity holders)”. The Bank has established two guarantee structures, namely, partial risk guarantees and partial credit guarantees. The Partial risk guarantees may cover up to 100 percent of a loan for specific risks. These guarantees require a government counter-guarantee. Partial credit guarantees may cover a portion of financing provided by private financiers; “up to 50 percent of a loan can be guaranteed, with or without a government counter-guarantee.

3.3.2 Inter-American Investment Corporation

The Inter-American Investment Corporation (IIC) began operating in 1989. Supporting the overall development goals of the IDB, “its activities are directed to small and medium enterprises in the private sector of Latin America and the Caribbean”. The IIC's lending activities differ from those of the Private Sector Department of the IDB in that the IIC focuses on small and medium projects in all economic sectors as opposed to large-scale infrastructure projects. IIC-funded projects must be commercially viable and preferably majority-owned by nationals of Latin America or the Caribbean.

The IIC provides financial assistance in the form of direct equity investments. These investments can represent up to 33 percent of the targeted company's capital. Typically, once a project in which the IIC is involved has matured, the IIC will exit the company to revolve funds for another investment.

The IIC makes loans between \$2-\$10 million directly to project companies and indirectly through financial intermediaries that make subloans that are smaller than those the IIC could provide directly. The IIC can debt finance up to 33 percent of the cost of a new enterprise. “Most IIC loans are priced to float at six-month LIBOR plus a spread of three to six percent, and loans at fixed term may be made when appropriate. The maximum loan term is 12 years, with a grace period not to exceed five years. The IIC neither seeks nor requires government guarantees for its loans”.

The IIC cofinancing program is an effective mechanism for mobilizing additional resources from international commercial banks for projects that require funding in excess of the IIC's direct lending commitment.

3.3.3 Multilateral Investment Fund

The Multilateral Investment Fund (MIF), the third member of the IDB Group, targets activities that promote broader private-sector investment in the economy. The MIF has a very specific mission to implement strategies that will encourage private sector activities. The MIF approves operations worth about \$100 million per year, from grants to equity participation, in amounts ranging from below \$1 million up to \$5 million. All MIF finance is provided without government guarantees. The basic criteria for MIF projects are that they foster private sector participation in the economy, that they be innovative and replicable and that they be self-sustaining in the long term. The projects must fall within one of the three windows of MIF activity: technical cooperation for policy reform, human resources development and small enterprise development.

The technical cooperation facility funds projects that will provide “a legal and institutional framework amenable to private investment. This includes projects, such as assisting privatization efforts, developing a modern financial sector, harmonization of capital markets, launching employee stock-ownership programs, modernizing mediation and arbitration systems”. Projects under the human resources facility are designed to help countries adapt their training services to meet the demands of the changing private sector. And finally the small enterprise development facility offers technical assistance and finance to the small business sector by promoting innovative financial services, business advisory services, technical training and technology transfer.

3.4 Asian Development Bankⁱ

The Asian Development Bank (ADB), a multilateral development finance institution, was founded in 1966 to promote the social and economic progress of the Asian and Pacific region. The shareholders of the Bank, as of 31 December 1997, consist of 57 members, of which 41 are from within the region and 16 from outside the region, with Japan and the United States being the two largest shareholders.

3.4.1 Objectives

The ADB's strategic development objectives are to promote economic growth, reduce poverty, support human development (including population planning), improve the status of women, and protect the environment. The mix between social and economic development of ADB's projects is in a way that at least 50 percent of the total number of projects will have social or environmental objectives either as primary or secondary objectives; the remaining will support projects with economic growth as the primary objective. Operating objectives in each developing member country (DMC) fall within four areas: policy support; capacity building for development management; creating and strengthening productive capacity, infrastructure, and services; and regional cooperation.

3.4.2 Functions

ⁱ Based on the articles from the [Asian Development Bank Homepage, www.adb.org](http://www.adb.org)

The previously discussed objectives are materialized in the Bank's principal functions. The functions are: (i) to extend loans and equity investments for the economic and social development of its developing member countries (DMCs); (ii) to provide technical assistance for the preparation and execution of development projects and programs, and for advisory services; (iii) to promote and facilitate investment of public and private capital for development purposes; (iv) to respond to requests for assistance in coordinating development policies and plans of its DMCs.

The Bank gives special attention to the needs of the smaller or less-developed countries and priority to regional, subregional, and national projects and programs. "The Bank's operations cover a wide spectrum of activities and have been classified according to the following sectors: (i) agriculture and natural resources; (ii) energy; (iii) industry and non-fuel minerals; (iv) finance; (v) transport and communications; (vi) social infrastructure; and (vii) multisector, combinations of some of the sectors (i) to (vi)".

3.4.3 Private Infrastructure Financing

Our interest in the Bank's support to private infrastructure projects comes under the Bank's general objective of private sector development. The Bank helps selected private enterprises undertake financially viable projects that have significant economic merit and for which normal sources of commercial finances are not available. Bank support is provided directly to private enterprises and financial institutions through loans, underwriting, cofinancing, investment advisory services, guarantees, and investment in equity securities (rarely). The Bank's private sector operations focus primarily on assistance to (i) infrastructure projects such as in the power, water supply, transport and

telecommunications sectors, including build-own-operate/build-operate-transfer projects; (ii) financial intermediaries involved in leasing, venture capital financing, merchant banking, mutual funds, insurance, securitization, credit enhancement, and credit rating; and (iii) in limited cases, industrial, agribusiness, and other projects with significant economic merit. The main supports to these projects are mainly in the form of lending and cofinancing, along with technical and advisory support.

Lending: “The Bank is authorized to make, participate in, or guarantee loans to its DMCs or their governments or any of their agencies, public or private enterprises operating within such countries, as well as to international or regional entities concerned with economic development in the region”. The member governments that have attained a somewhat higher level of economic development generally get their loans from the Bank’s ordinary capital resources (OCR). While on the other hand, DMCs with a low per capita gross national product and limited debt-repayment capacity get their loans from the Asian Development Fund (ADF), on highly concessional terms. The Bank has three lending windows for OCR loans. These are (i) the pool-based multicurrency loan window where loan disbursements are in a variety of currencies of the Bank's choice; (ii) the pool-based single-currency loan window in US dollars; and (iii) the market-based loan (MBL) window which provides single currency loans to private sector borrowers and to financial intermediaries in the public sector. The MBL window provides single-currency loans in US dollars, Japanese yen, or Swiss francs to private sector borrowers and government-guaranteed financial intermediaries at current terms prevailing in international financial markets.

Cofinancing: The basic objective of cofinancing operations is to help leverage the Bank's resources and increase the Bank's encouraging role in directing official and

private financial flows to its DMCs. The Bank's cofinancing operations include increasing emphasis on commercial cofinancing and the use of credit enhancements such as the Bank's Complementary Cofinancing Scheme, guarantees, and related services. The Bank mobilizes its cofinancing funds from (i) official aid agencies, (ii) export credit agencies, and (iii) market institutions. For every dollar lent by the Bank, an additional 49 cents have been mobilized by way of cofinancing.

Technical assistance: The basic objective of the Bank is to maximize development impact not only in terms of lending volume but also through technical assistance that is not directly related to lending. "The emphasis is on support for various DMC programs in terms of policy reforms, fiscal strengthening, support for good governance, capacity building, promotion of financial and capital markets, subregional economic cooperation, environmental protection, and natural resource management".

| Loans by sector (1 January - 31 December 1997) | | |
|---|---------------------------|---------------|
| | (US\$ million) | % |
| Financial | 4,663.00 | 49.53 |
| Social Infrastructure | 1,774.82 | 18.85 |
| Agriculture and natural Resources | 1,004.02 | 10.67 |
| Transport and Communications | 933.00 | 9.91 |
| Energy | 668.40 | 7.10 |
| Industry and Nonfuel Minerals | 40.00 | 0.42 |
| Multisector | 0.80 | 0.01 |
| Others | 330.00 | 3.51 |
| Total | 9,414.04 | 100.00 |

| | Lending | Cofinancing |
|-------------|-----------------------|-----------------------|
| Year | (US\$ million) | (US\$ million) |
| 1997 | 9,414 | 2,703 |
| 1996 | 5,545 | 2,663 |
| 1995 | 5,486 | 2,463 |
| 1994 | 3,679 | 1,560 |
| 1993 | 5,210 | 3,230 |
| 1992 | 4,961 | 3,007 |

Table 3.1: ADB's Lending and Cofinancing

Chapter 4: Risks Analysis in Infrastructure Project Financing

The most important process in bringing infrastructure projects to financial closure is a rigorous and efficient risk allocation and management. Mobilizing the project financing, especially debt is very sensitive to having a well efficient risk management mechanism. Efficient risk allocation occurs where risks are assumed by the party that is best able to manage the risk, i.e. the party that has the power to control or to hedge the risk. If the risk is not well allocated, project debt would be difficult to mobilize and would result in a higher financing cost, and ultimately higher tariffs. Before allocating and managing the project's risks, we have to identify and assess the impact of the different risks. This chapter identifies and explains the different risks, but given the important of debt mobilization, we will focus on the risks from a lender's perspective.

Lenders are concerned with all the project's risks, however the major risks can be categorized in three general categories: financial risks, political risks, and the project performance/appraisal risks.

4.1 Financial Risks

Financial risks are risks related to the loan payment or the loan future cash flows fluctuation due to financial factors. These factors are interest rate risk and currency risk. These two risks are the most "popular" risks when dealing with foreign investment.

Investors pay a lot of attention to these two risks since they are the most obvious and they directly affect the investors cash flows.

4.1.1 Interest Rate risks

The problem of interest rate risk occurs primarily when debt financing of a project consists of fixed-rate debt. And since the maturity of infrastructure projects and their loans are generally long (10-30 years), the problem becomes more serious. Any variability in interest rate can have devastating consequences for the lenders, especially if the lenders are financial institutions, where an interest rates movement could be devastating if the institution's assets and liabilities do not have matching maturities. However, most of the projects have a significant portion of their loans in the form of floating-rate debt. This would shift interest rate risk exposure from the investors to the project company.

4.1.2 Currency risks

Currency is exposure of the loan payment when the loan is made in foreign currency or in a foreign country. These risks could be one of the following risks:

4.1.2.1 Transfer Risk

In some countries, investors and lenders are not allowed to take their revenues from their investments (projects) outside the country. The investors are allowed to exchange

their money to foreign currency through national banks however they are not allowed to repatriate outside the host country.

4.1.2.2 Inconvertibility Risk

Some countries block or control local money conversion. In this case, the lender won't be able to convert its loan revenues from local currency to its own currency. And even if the loan isn't denominated in local currency, the lender is still exposed to this risk indirectly, because the project company won't be able to convert its revenues to pay its debt obligations.

4.1.2.3 Foreign Exchange Devaluation

The two other risks are becoming less common especially with the future trend in most country for open or free trade policy. However foreign exchange is a major factor that every investor should consider seriously. We will start our discussion by distinguishing between exchange risk and exchange exposure. The first is just the uncertainty about the future spot rate, and it is measure by the standard deviation of the future spot rate change. On the other hand a firm's exposure to exchange rate risk is the impact of change in exchange rate on the firm value, in other word it is the firm sensitivity to foreign exchange rate. Adler and Dumas (1983) define exposure to the time T exchange rate as:

Exposure = Total unexpected effect on financial position of a firm at time T, in home currency / unexpected change in the spot exchange rate (S_T)

In order to come up with a sound hedging strategy, we need first to understand and then quantify the exposure. The firm's exposure could be divided into two types, economic exposure and accounting exposure¹³.

- *Economic exposure* is the effect of unexpected change in the exchange rate on the firm's future cash flows, and indirectly on the firm's value. Economic exposure is further more divided into two categories:

- *Contractual exposure*, also called transaction exposure, is the effect of past contracts that have future cash flow obligations. Contractual exposure arises if there are assets or liabilities that are denominated in foreign currencies and whose value in home currency depends on the future exchange rates. The assets and liabilities could be accounts receivable, account payable, foreign loans or foreign deposits.

Measuring the firm's contractual exposure is fairly simple. If the exposure arises from a single contractual foreign currency, the exposure value is the value of the contract at maturity. "Since a unit change in the exchange rate affects the cash flows of a firm by the amount of the contract, it follows that contractual exposure is given by the contract amount"ⁱ. The other more general case is when the contractual exposures have different maturity. In this case we have to aggregate the exposure taking into account the time value of the cash flows. One can calculate the total contractual exposures across different maturity by computing their present value.

ⁱ Piet Sercu and Raman Uppal, International Financial Markets and The Firm, South Western College Publishing, Cincinnati, Ohio, 1995, p 472

- *Operating exposure* refers to the effect of changes in the exchange rate on the future cash flows of the firm through the effect on the future operational or strategic decisions. Changes in the exchange rate may affect the firm's competitive position through, perhaps, a change in prices, costs, or sales volume. In contrast to contractual exposure, operating exposure is hard to quantify, it requires a good understanding of the competitive forces and of the macroeconomic environment in which the firm operates. For many firms, operating exposure is more crucial than contractual exposure, and it is critical that firms make an attempt to identify and measure this exposure. One way of doing that is the use of simulations or regressions. The simulation requires that we come up with a number of possible future spot exchange rate and compute the value of the firm cash flow, in home currency.

$$V_T(i) = a_{t,T} + b_{t,T} S_T(i) + e_T(i)$$

where $V_T(i)$ is the home-currency value of the cash flow of the firm if the exchange rate is $S_T(i)$, and $S_T(i)$ is one of the possible time-T exchange rates in terms of home currency per unit of foreign currency. The term $e_T(i)$ is the residual and is by definition uncorrelated with $S_T(i)$.

From the above linear regression, we can notice that the term $b_{t,T}$ measures the change in the cash flow for a unit change in the exchange rate. Thus $b_{t,T}$ is the exposed amount of cash flow or the operating exposure. The above analysis is generally used in a slightly different form. Since predicting or coming up with the expected future value of the cash flows is rather difficult, we can use historical data from the firm's previous operating years.

Two common fallacies are generally committed when dealing with operating exposure. First it is wrong to assume that a firm is not exposed to exchange rate if has no foreign operations. For example, if the firm's competitors are abroad, then changes in the exchange rate will effect the firm's competitive position and its cash flows. The other fallacy made is the presumption that a policy of systematic hedging of all transaction exposure suffices to protect the firm against all exchange rate effects. As explained above, even if a firm perfectly hedges all contractual exposure, its operations are still exposed to exchange rate fluctuations.

“Thus, while contractual exposure looks at the effect of changes in the exchange rate on the firm's current portfolio of binding commitments denominated in foreign currency, operating exposure considers the effect on a firm's future cash flows from operations”¹.

- *Accounting exposure*, also called translation exposure, refers to the effect of unexpected changes in the spot rates on a firm's consolidated balance sheet and income statement. Accounting exposure is not that important and firm's management shouldn't give it too much importance. And in our case, private infrastructure financing, accounting exposure is irrelevant. The reasons for the limitations of accounting exposure are many. First accounting data are by nature not forward looking, they focus on financial decisions made in the past and ignores decision that have future implications. Second, accounting exposure is an incomplete measure of the risks that a firm faces because accounting exposure ignores operating exposure.

¹ Piet Sercu and Raman Uppal, International Financial Markets and The Firm, South Western College Publishing, Cincinnati, Ohio, 1995, p 472

Finally, since no matter which translation method one uses, assets and liabilities value are translated in the historical value, thus accounting exposure does not reflect reality, even if the translation is done at the current exchange rate.

4.2 Political Risk

Defining political risk is hard to do, and analyzing and quantifying it is ever harder. Political risk is the probability or possibility that events that are unfavorable to the project's interest will be made at the political level. There is no general agreement or concession on what constitute political risk, however we can make a distinction between three general categories of political or country risk¹⁴. These categories are hard political risk, administrative risk, and soft political risk.

- Hard political risk includes events or decisions that result in partial or total loss of the foreign investments. This group of risk includes expropriation, nationalization, confiscation, forcing local shareholding, war ...
- Administrative risk on the other hand result in decrease in profitability, this category encompasses change in regulations, improper legal framework, control of prices, remittances ...
- Soft political risk effect also profitability and include events as strike, lack of experience labor force, riots and sabotages ...

Political risk is an important aspect in the decisions of financial institutions in infrastructure financing or in any international business decision. Thus comes the need

for analysis and if possible to quantify this risk. However since there is no consensus on the exact definition of political risk added to that the inability to measure or quantify the component of this risk, we can't expect political risk analysis to give us accurate forecast. What political analysis could achieve is reducing the uncertainty surrounding the foreign political and social developments that can affect foreign business transactions. There exist a lot of techniques and methods for risk analysis, each consulting firm and financial institution has its own way of political risk analysis. Some of these most commonly used methods are the comparative techniques, analytical techniques, and econometric techniques¹⁴.

4.2.1 Comparative techniques

Comparative techniques' aim is to compare a subset of countries based on a set of relevant parameters. Due to the nature of political risk, the set of these relevant parameters is wide-ranging and often includes elements that are difficult to measure. The most used method in the comparative techniques is the weighted checklist¹⁵. This method consists of first grading a country on parameters selected as judgmental criteria. Then the results are weighted into a global rating which make it possible to compare all countries on the same scale. The overall accuracy and success of this method depend on the relevance of the chosen parameters and the weights assigned as well as the accuracy of the grading exercise.

An example of the use of this method is the method adopted by Credit Risk International. This method use 4 parameters to assess the degree of a country risk, then each parameter is divided into criteria and sub-criteria in determining the score for each

parameter. The process involves submitting a series of identical questions to a group of experts. “The experts, who remain anonymous to each other, receive continual feedback on the responses of the other members of the group. The goal is to reach a group position on a particular issue”ⁱ and give a score on the asked sub-criterion. This is a sample of the parameters and criterion used:

Parameter 1: market prospects and flexibility in coping with changes

Criterion 1: economic size (weight 30%)

Criterion 2: level of economic development (40%)

Criterion 3: standard of living (30%)

Parameter 2: financial risks

Criterion 4: financial vulnerability (30%)

Criterion 5: external debt (30%)

Criterion 6: financial rating (40%)

Parameter 3: political instability

Criterion 7: homogeneity of social fabric (30%)

Criterion 8: government political regime stability (50%)

Criterion 9: foreign relationships (20%)

Parameter 4: business environment

Criterion 10: management of the economy (40%)

Criterion 11: foreign investment (40%)

Criterion 12: working conditions (20%)

Further more these criteria are divided into sub-criteria; for example criterion 11 foreign investment is divided into 11 sub-criteria:

1. market share of foreign direct investment in the local economy (7%)
2. legal restrictions to foreign control of local firms (5%)
3. legal restrictions to capital flows (3%)
4. stability of business law (3%)
5. frequency of intervention of local government in business life (3%)
6. availability and cost of local financing (4%)
7. cost of labor (4%)
8. cost of energy (3%)
9. cost of local transportation (3%)
10. price level of local real estate (3%)
11. degree of modernism of distribution channels (2%)

ⁱ. Clark and B. Marois, Managing Risk in International Business – Techniques and Applications, International Thomson Press, Boston, MA, 1996, p 71

Many other rating systems exist and include economic and financial indicators along with estimates of political risk. For example, Euromoney publishes credit rating and its rating is based on the following rates: 25% economic data, 25% political data, 10% financial data, 10% default performance, 10% credit rating, 5% access to bank financing, 5% access to short-term financing, 5% access to capital markets, and 5% access to forfeiting¹⁶.

4.2.2 Analytical techniques

The main difference between comparative and analytical methods is that comparative methods focus or compare all countries at the same time whereas analytical methods focus on one country at a time. The most used and commonly know analytical method is the probabilistic approach. This approach tries to come up with all possible political outcomes and occurrences that could affect the project's performance. Then the severity of each outcome on the project is calculated. Finally the outcomes are allocated with a certain probability of occurrence. The final result of this exercise is to calculate the value of the project or investment taking into account or adjusting for political risk, this is done by multiplying the joint probability by the investment's value of that outcome and then summing up. This method is actually used on very large complicated project, however the main difficulty is to estimate the probabilities and the effect of the various political occurrences in the project. This is why this method is generally used in parallel with other methods that help identify the possible political outcome and calculate their probabilities. One of these methods is the special report approach, where several experts examine key variables that suppose to describe a given country main characteristics. Then their finding

is communicated in a report that analyses the political, sociological and economical outlook of that country.

4.2.3 Econometric techniques

The econometric techniques are to the contrary of the above methods, completely objective. These techniques have been adopted by several central banks including the World Bank, however they serve political risk in a very specific way that is they only concentrate on debt defaulting and rescheduling.

Econometric techniques have many limitations but they serve as a powerful complementary tool to the comparative and analytic techniques. Econometric techniques are statistical techniques that make it possible to classify an observation into a priori grouping, i.e. in the case of political risk analysis, the idea is to classify country into two groups (default and no default). These methods are generally developed to quantify countries default risk, using economic indicators as discriminating variables. However unfortunately, these models are not adopted for project risk analysis or project defaulting they are generally used for macroeconomic analysis of countries.

To finalize on political risk analysis, we can say it is a difficult process, it require continuous monitoring and assessment of counties variables. Country risk analysis demands updated information added to a quick understanding and assimilation system of political and social events, before it would be too late.

4.3 Appraisal and Performance Risk

Appraisal and performance risk is the risk inherited from the project itself. This is the risk or the uncertainty of the performance and profitability of the project. All investors in the project bear this risk especially the shareholders. Lenders are also affected by this risk since a low performance could lead to loan defaulting. These risks should be addressed seriously since they could be easily controlled and prevented. Some of these risks include:

- Construction completion and cost overrun risk. Delays in construction would dramatically reduce the expected project return. And any unexpected increase in the construction cost would some times make the project unfeasible. Generally these situation happen from unexpected events or condition coupled with weak planning and bad appraisal and estimation during the project's feasibility and design periods.
- Performance risk. The project construction could be completed on time and within the estimated budget, however the performance or the quality of the project is not as expected and hence it would erode the project return. An example of this is when the quality of the project facility is such that a higher operation and maintenance cost is required, which would reduce the profitability and in sever cases could result in defaulting on the project financial obligations.
- Commodity/input price risk. Many private infrastructure projects have been made with an agreement with the host government on a fixe price of the delivered utilities. Thus any increase in the price of the inputs of the project that could not be meat with an increase in the sale prices would jeopardize the returns. An unexpected increase in the labor force or the raw materials is such a case. An example would be a dramatic

increase in the fuel price in a fuel power generation project, this event would certainly make the project unfeasible. It is important to note that a high and unexpected increase in these factors could not be forecasted up front, and if so this would reduce the sponsor or contractor position competitiveness and its likelihood to be awarded the project.

- Market risk. This type of risk is the result of bad prediction or estimate of the future market condition. A bad market analysis could fail in predicting the future market price or the market size. These types of risk are very crucial in determining the project overall risk. Since once the market price of the project's output or the demand on the services of the project turned out to be less than predicted, a solution is difficult to implement and the result is quite irreversible.

In this chapter we have exposed the major risks in private infrastructure financing faced by investors, especially lenders. We have tried to breakdown these risks in order to analyze them and quantify their exposure. A final but very crucial point should be noted here; even if it is easy to quantify the exposure of the lenders or the project to a certain risk this is not enough. Many of the risk listed above are interrelated and the correlation between them should be considered. Thus rise the need for an integrated analysis. For example, exposure from exchange rate could not be tackled alone, it should be studied in conjunction with interest rate changes and commodity price changes.... Such an analysis could reveal unexpected correlation between these risks. So if two risks were inversely related then the use of conventional hedging would be unwise.

Chapter 5: Risk Management

We have seen in the previous chapter that the higher the volatility of the variables, the more pronounced the effect on the balance of payments and the cash flows of the project. Risk management tries to introduce some certainty in these variables, trying to minimize adverse changes in future cash flows. In other words risk management or hedging is a tradeoff between current cost against future price movement that may result in either gains or losses.

5.1 Managing Interest Rate Exposure

Managing interest rate risk is relatively an easy thing to do especially with the availability of various types of derivatives. The main instrument that could be of use with long term exposure such as infrastructure project loans is interest rate swaps. Whether it is the lenders or the project company that faces this exposure, the floating-rate obligation could be exchange into a fixed-rate obligation. An interest rate swap contract is an agreement between two parties (usually one of the parties is a financial institution) to exchange floating-rate payment obligations with fixed rate obligations. The project company, for example, would pay the financial institution fixed-rate payments and receive floating-rate payments equal to the floating-rate obligations of its debt. Some lenders, such pension funds and life insurance companies prefer fixed-rate loans, so swaps could be used to accommodate the preferences of these institutions, when investing in infrastructure projects with floating-rate loans.

5.2 Managing Foreign Exchange Rate Exposure

The question of foreign exchange exposure affects investors (lenders) in two different ways. First investors are exposed to foreign exchange rate risk in a direct manner if their loans are denominated in a foreign currency. And they are exposed, in an indirect manner, if the firm or the project revenues are exposed to exchange rate risk. Even if the investors have their loans denominated in their home currency, the firm's exposure to this risk could lead to a change in profitability making the payment to the investors more volatile and riskier. Hedging at the firm's level is more important for equity holders than debt holders, since lenders are only affected in severe cases. First we will start our discussion by considering foreign exchange risk at the project level.

5.2.1 Project's Level

Before starting to discuss how firms should deal with foreign exchange risk, we need to see if it is relevant for firms to hedge foreign exchange risk. Hedging is relevant if it can increase the firm value. From basic finance theory, applying the Modigliani-Miller to the firm's hedging decision would not affect the firm's value. The reason of this is that shareholders could achieve the same level of risk reduction through a transaction in the exchange market. "For instance a corporate decision not to hedge a particular exposure that the shareholders would like to hedge will merely shift the hedging from a corporate level to the personal level"ⁱ. However this result is only true in perfect markets, factors as

ⁱ Piet Sercu and Raman Uppal, International Financial Markets and The Firm, South Western College Publishing, Cincinnati, Ohio, 1995, p 456

agency costs, costs of financial distress... create market imperfections and make hedging relevant and can increase the firms' value.

Hedging at the firm level reduces costs of bankruptcy and financial distress. Large operations exposures combined with adverse exchange rate movement, may send the firm into insolvency and bankruptcy, or at least may increase the operating and financing costs of the firm. For example, risk-averse employees are likely to demand higher wages if their future job prospects are very uncertain. And loan covenants can demand repayment if the firm's income falls below a stated level. Thus firms should minimize the volatility of their cash flows in presence of financial distress costs.

"Home-made" hedging is not an efficient substitute for corporate hedging for many reasons. One of these reasons is that shareholders have far less information than the managers do about the firm exposure. Second, because of the economies of scale firms obtains better terms for forward and money-market tools than individual do. We can easily conclude that firms should hedge since "home-made" financial decisions are an imperfect substitute for corporate decision.

Another new factor (following Jensen 1986) that argues for hedging at the corporate level, is agency costs. By hedging and reducing variability of the firm's cash flows, one can reduce the potential conflict of interest, between shareholders/bondholders and managers of the firm induced by financial distress conditions.

Finally and most importantly, hedging may provide a better information for internal decision making. Multidivisional multinational firms need to know the operational profitability of their divisions. By having each division hedging its cash flows, the multinational can know the profitability of each division without the noise introduced by unexpected exchange rate changes. This argument is true especially that purchasing

power parities (PPP and RPPP) don't hold. Thus hedging could lead to a better decision making and then to it would lead to an increase in the expected cash flows.

Managing foreign exchange risk is generally done through the use of traditional financial instruments as forwards, option, swaps, or through the use of exotic instruments that are combinations or modifications on the traditional instruments. However before using these external hedging techniques, firms should implement internal hedging, which is generally less costly and easier to implement After that the remaining exposure could be hedge using the external hedging techniques, i.e. the financial instrument.

5.2.1.1 Internal Hedging Techniques

Internal hedging techniques are changes or adjustment of the firm's asset and liabilities in order to reduce the exposure to currency exchange risk. These measurements are generally firm or project specific, however these are general guidelines of the most used adjustments.

Exposure netting is not much a technique as an acceptance of an open positions in two or more currencies, which are considered to balance each other and, therefore, requires no further internal or external hedging. There are some currencies that have tended to move in close conjunction. Historically the Deutsche mark and the Dutch guilder have agreed to keep their spot rates within a narrow range. Now with the implementation of the European Currency Unit (ECU), and the European Monetary Agreement, major European currency have to keep within the same range of fluctuation. Thus an exposure in French francs payables and Deutsche marks receivables, could be considered as a position where the two exposures cover each other, and that forward or

any other external covering is not necessary. However it should be noted that this tactic is a little risky, as it entails a degree of speculation.

Asset/Liability Management is the major and the most widely used practice to internally cover the exchange exposure. The goal is to reduced assets (increased liabilities) in currencies likely to depreciate, and to increase assets (reduced liabilities) in strong currencies. Or another practice in assets / liabilities management is trying to match the receivables and the payables at the same time, thus reducing the risk of being long in a currency that is likely to depreciate. As we know a 100 % match is impossible, however this technique will reduce the amount of cash that need to be covered using the external methods.

Borrowing in foreign currency is another measurement that is similar to exposure netting. When firms are exposed to foreign exchange risk due to a short position in a certain currency, a good hedge is to take a long position in that same currency. This could be done by restructuring the debt of the company; prepayment of some home currency loans and simultaneously taking equal amount of loans denominated in the foreign currency.

5.2.1.2 External Hedging Techniques

The second type of hedging involves a variety of techniques available in financial markets or through financial institutions. They are clearly delineated and their cost usually can be precisely determined in advance. The traditional ones are forwards, options, and swaps. One could varieties of these instruments as dual currency loans, dual currency loans with an option... As explained in the previous chapter, foreign exchange exposure has two different aspects, contractual exposure and operating exposure, while

accounting exposure is not an important exposure. Once we have analyzed the exposure and quantified it we could then use any of the previous instrument to hedge it.

Contractual exposure as we have said is the result of future contract obligations. The general case is when we have several transactions in the future for a particular currency. The exposure as explain previously is the aggregate net present value of the different maturities. Since in general interest rates are uncertain, a good hedge should have the same maturity of the series of transactions. We can hedge the exposure by either hedging each of the transactions in the series, or by hedging the whole series of transactions by one single hedge that has the same net present value and maturity of the series. This second method is a better hedge since it also hedges for small interest rate changes.

Let's now consider operation exposure, in the previous chapter we discussed how to measure this exposure and we noted it as $b_{t,T}$. Hedging this exposure is easy using any of the financial instruments. For example hedging a positive exposure to a certain currency can be achieved by buying forwards, of it the obligation of forward contract is not desired one can hedge using option. It should be noted that forward contract are easy to create if they are not readily available, a forward contract is a simultaneous transaction in the money market consisting of borrowing in a currency, exchanging to another currency and reinvesting the proceedings.

5.2.2 Investors' Level

Investors are directly exposed to currency devaluation when the returns from their investment are in a foreign currency. For example when loans are denominated in a foreign currency lenders are directly exposed to the foreign exchange fluctuation. Usually

this exposure is easy to hedge if money markets are well developed, using the financial instrument explained above. And in the case where the market doesn't offer these tools, investors can "homemade" these instruments, but of course, at a higher premium.

The main instrument used is the forward contracts, which is an agreement to buy or sell a currency a certain predetermined price on a future date. Generally forward contracts are available for maturities up to one year. Lenders can use forwards if they want to hedge a certain payment transaction, but if they decide to hedge the whole loan payment throughout the maturity of the loan, forwards are inadequate and can't be used. Thus come the use of currency swaps, which is a series of forward contracts lined up on a schedule. Since each loan payment would be exchanged from foreign currency to the home currency, at a predetermined rate. This longer maturity of the currency swaps makes the credit risk of these contracts higher, which might result, depending on the loan type, in a higher risk premium reflected in the predetermined exchange rates. Option might also be used to hedge against adverse exchange rate movements, however their advantage of being a "right not an obligation" make their premium high and thus costly, since investors can still benefit, contrary to forwards and swaps, from favorable movement in the currency exchange rate.

One good aspect of hedging using these financial instruments (and latter on using insurance for political risk hedging) is that investors can know a priori the cost of hedging their investments. In the case of lenders, once they know the cost of hedging their exposure, they can build it into their required return and hence into the project cost of debt.

5.3 Managing Exposure to Political Risk

Managing political risk exposure is not a clear and systematic procedure, as managing foreign exchange exposure. Hedging against political risk could be done in different ways, however the best hedge is to use a combination of all the available techniques.

5.3.1 Enhancing Operating Earnings

This is an internal hedging technique that aims to reduce political risk exposure by increasing operating earnings. After rating the country where the project is located, the investor would add a cash premium to the required return based on perceived political risk¹⁴. For example lenders would require a yield of 10% on a middle risk project whereas a high risk project might increase the yield to 15%... This strategy has obviously a lot of limitations, it can only work in situations when there is little competition, and most infrastructure projects could become unfeasible if the cost of financing increases dramatically.

5.3.2 Introducing ‘Sleeping Partners’

Most of the international and regional organizations and developing banks, as those described in chapter 3, can go into a project by taking a small amount of equity investment. They usually go into projects for 10 to 15% of the equity but without exercising their voting rights. This small contribution from these developing banks, would reduce political exposure of the project investors (debt or equity), since investors

would take some comfort in the knowledge that an important international institution may shield their investment from the worst abuse of the local authorities. As we have said in Chapter 3, most developing banks and their institution, use equity investment or cofinancing, just to encourage and promote foreign capital to invest in developing countries.

A variation of the previous strategy is to “internationalize” the financing of the project. Investors would be more willing to go into a project when multilateral or bilateral agencies are promoting the project or when prominent banks are syndicating loans for the project. In this case host governments would be very reluctant to abuse the project or to expropriate it, since they would have to deal with several institutions and governments, and they might lose most their sources of raising capital for infrastructure projects¹⁷.

5.3.3 Insurance Policy

The most effective, and also straightforward techniques to cover foreign investment against political risk, is insurance policy. Insurers for political risk could be multilateral or national institutions such as MIGA, OPIC, MITI...or they could be private institutions such as Lloyd's of London, American Insurers Guarantee (AIG)...

MIGA, as described in chapter 3, is a member of the World Bank Group. MIGA offers political risk guarantees (insurance, coinsurance and reinsurance) to private infrastructure companies, as a supplement to the activities of IBRD, IDA, IFC and other international development institutions, all in the same purpose of encouraging investments in developing countries. MIGA offers coverage for equity, loans,

management agreements... and the maximum amount of coverage per contract is set at \$50 million and the standard contract term could be as high as 15 years. These contract can be written in Japanese yen, French francs, US dollars, German marks, or British pounds. MIGA's political risk insurance covers four specific political risk:

- Currency inconvertibility/transfer: the policy protects against losses arising from the investors inability to convert local currency returns from the project into foreign currencies or from the inability of investors to export foreign exchange from the host country. Any government change in the exchange control laws, which could result in losses or delays for the investors, is also covered by the policy.
- Expropriation: MIGA policies protect against losses due to actions such as direct nationalization as well as creeping expropriation. Equity compensation is based on the net book value of the insured investment as of the date of expropriation, loans are compensated for the outstanding principal and any accrued and unpaid interest.
- Political violence MIGA's insurance protects against tangible assets and income losses caused by politically motivated acts of war or civil disturbance in the host country. Political violence insurance has two types of coverage, assets coverage and business income coverage. The first will compensate investor for the loss in the tangible property caused by political violence. The second would compensate for what the project would have realized in net income if the project has continued normally, while the damage is being repaired.
- Breach of contract: Under these circumstances, the insurance is effective if investors are denied a decent juridical claim or the right to apply a favorable judgement (being juridical or from an arbitrage) regarding the government breach of a contract¹⁸.

| Annual Base Rates (for US dollar coverage) | | |
|---|----------------|----------------|
| | Current | Standby |
| Manufacturing and services | | |
| Currency transfer | 0.50% | 0.25% |
| Expropriation | 0.60% | 0.30% |
| War and civil disturbance | 0.55% | 0.25% |
| Brach of contract | 0.80% | 0.40% |
| Natural resources | | |
| Currency transfer | 0.50% | 0.25% |
| Expropriation | 0.90% | 0.45% |
| War and civil disturbance | 0.55% | 0.25% |
| Brach of contract | 1.00% | 0.50% |
| Oil and gas | | |
| Currency transfer | 0.50% | 0.25% |
| Expropriation | 1.25% | 0.50% |
| War and civil disturbance | 0.70% | 0.30% |
| Brach of contract | 1.25% | 0.50% |

Table 5.1: Premium rate of MIGA¹⁸

Similar political insurance policies could be offered from national institutions. The most famous of these institutions are: the Overseas Private Investment Corporation (OPIC), this institution covers American investors and investments in developing countries; COFACE the French insurance for French investors investing in French-speaking African counties; ECGD for UK investors; MITI Japanese investors... It is important to note that MIGA does not compete with these institutions however its objective is to complement national programs, if they exist...

These institutions are very similar with minor differences; each covering its national investors when venturing in foreign projects. One main difference between MIGA and OPIC is that MIGA would not insure lenders if the investors or equity holders are not insured too, whereas OPIC would cover American lenders irrespective of the investors

position. This difference is due to the fact that OPIC is for American investors only and it could be that the investors aren't American whereas the lenders are.

The other source of seeking political risk insurance policy is private insurance companies. Private insurers cover investments consisting of net asset values, loans, equipment and inventories. Private insurance policies have greater advantages over government sponsored ones, since they provide greater flexibility in terms of the adequacy and scope of the risk covered, for example leased assets could be insured. Another advantage is that the guarantee can cover up to 100% of the amount invested. And contrary to the previous institutions, existing projects can be covered, whereas in the previous case only new projects are insured. In case of a nationalization the reimbursement is made according to the market value of the appropriated assets and not according to their book value. Finally, and most importantly, when seeking an insurance from a private institution, the investors would benefit from the coverage while keeping their business confidential. On the other hand, private insurance coverage has some drawbacks. Damage caused by wars can not be covered more than a year, and the duration of the whole policy usually does not exceed the period of three years. The most important disadvantage is that premium, of course, depends on the country rating and is project specific, and the premium could increase if the country risk increases (contrary to MIGA or OPIC's rates which are fixed irrespective of the country or the project).

5.3.4 Other Measurements for Reducing Political Risk Exposure

Escrow accounts are good preventive steps that enable debt servicing to continue in case a temporary fall in revenue or stoppage in operation... However a better use of

escrow account is for currency convertibility and transfer risk hedging. By using an offshore escrow account in foreign currency, earnings from the project are exchanged into a foreign currency and deposited into the escrow accounts, securing debt service payment from some currency risk and giving lenders a certain safety margin in case the project stops for a short time.

As we have seen in the previous chapter, legal risk is an important component of the country or political risk. Legal systems, of the host country and the sponsors could be incompatible and foreign investors should have a definite legal system they could resolve to in case of disputes. The legal system in some developing countries could be inadequate either due to the length of the legal procedures or simply due to corruption problems. In these cases investors can rely on an international organization as arbitrator if any dispute occurs. Such an example is the International Center for Settlement of Investment Disputes (ICSID), which is a part of the World Bank Group. 123 countries are part of the Convention of Settlement of Investment Disputes, which the ICSID is supposed to enforce. ICSID can provide binding arbitration for investor if a dispute arises between them and the host country. As a result ICSID is becoming recognized as the international arbitration tribunal of business disputes.

5.4 Reducing Project's Performance Risk Exposure

As we have discussed in the previous chapter, appraisal and performance risks are risks specific to the project. Lenders don't like to bear this risk, they prefer to lay it off to

the projects sponsors and the contractors, who have a better understanding and a higher control on that risk.

Lenders are generally sensitive to *completion and cost overrun risk*, they are afraid to become “creditor to a dead horse”. Lenders should make sure to transfer these risks to the sponsors and to the contractor. There are two main steps that lenders should check to mitigate this risk. First they should make sure that the sponsor have a fixed-price, date-certain turnkey construction contract with the contractor. This contract should contain also provision for liquidated damages if the contractor fail to perform. Second, they should check that the sponsor has built in a contingency amount in the financial plan of the project. Usually a 25% cost overrun in big infrastructure project is something usual²⁰. This contingency anticipation is not sufficient to hedge the lenders from cost overrun risk, they should also require that the sponsors retain their ownership in the project company. This is called Share Retention Agreement to tie original sponsors to the project. The higher the amount of equity from the sponsor the lower the risk to the lenders. By having higher equity contribution from the sponsors, the sponsors would be more prudent in dealing with these risks, and since debt is senior to equity, lenders would be in a safer position.

Reducing the *project performance or quality risk* could be achieved in similar manners as in the cost overrun and completion risk. The lenders should require that the sponsors have a decent equity contribution in the project. And lenders should undertake independent reviews of the contracts between the project company and the contractors/suppliers. Some of these contracts’ requirements could include: performance bonds or guarantees from the contractors on the quality and quantity; operation

agreement linking operating performance to compensation; insurance policies and force majeure provisions...

In the previous chapter we have seen that an increase in the price of the project inputs could lead to unfavorable effects on the profitability of the project (*input risk*). Some of these inputs could be commodities, as fuel in the case of a power plan, or steel in case of a structural engineering project... or it could be the case that the project output is a commodity, as gold in a mining project. In both cases investors and sponsors would like to have predictable costs or returns, and thus would like to hedge this risk by reducing the volatility of these inputs (or outputs). Commodities are well traded on major markets, this sort of liquidity has made possible the use of financial derivatives or instruments applied to commodities (actually, historically financial instruments as futures and forwards started in the commodity market). Commodity hedging could be easily achieved by using future or forward commodity contracts, or commodity options, once the exposure has been analyzed and quantified. Another way to hedge this risk is by the use of commodity-linked loans. These loans tie the interest and/or principal repayment to the price of a commodity or a basket of commodities²⁰. For example in a gold mine project the sponsor could take a gold-linked loan or a gold loan, which would reduce the volatility of its expected revenues and hedge its gold-price related risk¹⁹.

Finally *market risk* requires different kind of hedging measurements. Lenders would like that the project be hedged from market size risk, price risk, payment risk... so not to jeopardize the project returns and ultimately their returns. Lenders, especially those that are performing loan syndication or those that are taking a significant proportion of the project debt, use several strategies to reduce their exposure to market risk. They may require an independent appraisal of the project and its market assessment. Or they might

require conservative financing structure by reducing debt-equity ratios of the project. In some cases lenders may require partial sponsor support to service the debt until the project is certified as physically and financially feasible (limited recourse guarantee) or full sponsor guarantee (corporate financing)³. This risk could be also hedged from the demand side by acquiring government guarantees of contractual performance, where payment risk is due to noncreditworthy state-owned entity; or in case of private sector clients, a letter of credit issued by the purchaser of the project's output would reduce market risk exposure.

Chapter 6: Survey Results and Analysis

In the previous two chapters we have discussed risk analysis and management. In order to illustrate the previous discussion and to verify the strategies and tools of risk analysis and management, we have conducted a survey targeting the major commercial banks.

The sample of the targeted population (commercial banks) consists of 51 banks identified by Fortune 500 magazine (1998). The range of revenues of these banks varies between \$34b to \$1b. The survey targeted only US based banks. Out of the 51 banks, 15 have responded to the questionnaire. Out of the 15 responses, only 14 are usable, representing 27.4% of the targeted population.

The questionnaire was designed to analysis two main issues, the identification of risk and risk management practices. The questionnaire covered 1) financing methods, 2) construction risk, 3) market risk, 4) payment risk, 5) political risk, and 6) currency risk.

The participants in the questionnaire were asked to rate some items on a 1-to-5 scale. Then the results obtained have been standardized to eliminate participants falling into a particular pattern. For example some participant may tend to give higher or lower scores to all questions than may others.

Five out of the fourteen banks that participated in the survey, didn't have any international operations or didn't participate in infrastructure or construction finance projects. This represents about 35% of the participating banks. We should note that these banks that do not undertake infrastructure finance tend to be located in the lower range of the top 51 banks identified by Fortune 500.

Concerning financing methods, the survey results show that none of the participating banks favor equity participation in infrastructure project financing. However they all were very favorable to debt participation. Although quasi-equity scored negatively, it isn't as negative as equity's score. None of the banks in the sample was favorable of performing loan syndication for international infrastructure project financing. The results are not very clear whether banks would be more favorable to participate in the financing of a project where there is: i) IBRD or IDA loans, ii) IBRD or IDA equity, iii) IFC investment, iv) loan syndication from another major financial institution. However it seems that there is a slight preference to IFC investments and loan syndication by other banks. It seems that sponsor's equity contribution is a necessary step for banks to invest in an infrastructure project.

For the construction risk aspect of the survey, participants were asked to answer how likely they would go into a project during each of the three different phases of the project (feasibility, construction, and operations). The results show that it is unlikely that banks go during operations and even more unlikely during feasibility phase; however they would finance the project for construction. An explanation for this result, is that during feasibility the project is still in the uncertainty phase, and it would too risky to debt finance a project who hasn't "come to life" yet. Banks would be reluctant to enter a project during operations phase, because the maturity of this phase in infrastructure projects is generally long (10-30 years), and banks generally have liabilities with short maturities thus they would prefer assets with short maturity. Since most banks would go into a project as early as the construction phase, they all require guarantees for construction quality, cost and completion time, from either the sponsor or the contractors, as shown on the survey.

Concerning market risk, most participants answered that they are concerned by this risk, and when asked about the method prevent or hedge this risk, independent project appraisal had the highest score, followed by government agreements or guarantees.

The next risk that the survey addressed is payment risk (debt servicing risk). The result shows that almost all participants considered this risk seriously. But the results of the hedging techniques seemed a little surprising since only 2 answered in favor of escrow accounts, while most of the favored government guarantees, and all favored standby letters of credit.

When participant were asked to score the different aspect of political and country risk, the result was that the two main factors that really weighted more are legal and regulation risk, while political violence and wars were less scored and expropriation risk scored even less. The participant seemed familiar with political risk insurance policies, they all favored OPIC more than MIGA, some also mentioned the use of private insurance to hedge political risk. It seems that banks don't use these insurance policies frequently when they go into international infrastructure projects.

The final risk addressed by the survey is currency-related risk. The participants were asked to score the three different aspect of this risk (currency devaluation, inconvertibility, and transfer). The results indicated that currency devaluation or exchange rate risk is the main factor considered, the results also shows that the use all different financial instruments to hedge this risk in addition to internal hedging strategies as foreign cash flow matching. On the other hand, the two other factors (inconvertibility, and transfer risk) are not weighted heavily by the participant, and it seems that they don't hedge this risk.

To summarize the survey results briefly, it seems that only few commercial banks engage in financing international infrastructure project financing. The banks that do engage in these projects seem to assess risk as expected. However some of the most extreme or severe risk seem to be relatively neglected when assessing the financing risk. These risks are expropriation risk, convertibility risk, and transfer risk. One could explain this behavior, by saying that giving the current economic trends, most developing countries are seeking and aiming to achieve open economies and free trade, which would make expropriation and other severe closed economy or nationalization steps quite improbable.

To complement this survey, I suggest for further studies to conduct a similar survey including non-American banks especially European banks. It seems that European and Asian banks are more involved in infrastructure project financing. And also, one should investigate the financing decisions and risk practices of other institutions such as insurance companies and pension funds. These institutions have different requirements for their investment maturities, and hence can approach infrastructure projects in another manner.

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