Best Practices in Public-Private Partnerships Financing in Latin America: the role of innovative approaches
Best Practices in Public-Private Partnerships Financing in Latin America: the role of innovative approaches

Washington, DC
January 2012
Best Practices in Public-Private Partnerships Financing in Latin America: the role of innovative approaches
Latin America has seen buoyant investment in private infrastructure projects over the period since 2005, weathering the global financial crisis better than most regions and even seeing an upsurge in investment in the first half of 2011, according to recent figures from the World Bank-PPIAF Private Investment in Infrastructure database. Brazil and, to a lesser degree, Mexico and Peru have driven the recent increases in investment, which has been concentrated in energy and transport public-private partnerships (PPPs).

While all of this is positive, there remain serious challenges. Following the global financial crisis, the higher cost and lower availability of debt and an increase in risk aversion have meant governments have had to resort to increased support to PPPs to enable them to go forward. This has taken the form of subsidies or payments under PPP contracts as well as increased risk-bearing. While necessary to ensure projects reach financial closure, increased support raises questions about the value-for-money of doing projects as PPPs, the specific risks governments should bear and the type and the nature of grant and subsidy support that should be provided. Guarantee and or subsidy schemes have to be run to have the maximum impact and also satisfy the concerns of private sector investment. Governments are also looking to mobilize additional sources of financing in the light of reduced financing from traditional sources, including commercial banks. This may require looking at ways to “crowd in” financing from pension funds, including developing new investment vehicles and new approaches that can facilitate increased participation in PPPs by institutional investors.

This is one in a set of three reports looking at the three key areas – the design and use of subsidy schemes to promote PPPs, the use of guarantees to support PPPs, and innovative approaches to financing PPPs - which draw on recent experiences from Latin America and elsewhere. The reports look at actual case studies of programs, projects and approaches in these areas and evaluate their impact and their success. As such they provide a rich set of resources for policy-makers and practitioners in the field of PPPs. These reports were developed by consultants (subsidies – Castalia Strategic Advisors; guarantees - Sergio Alejandro Hinojosa, consultant; and financing - Sergio Bravo Orellana, consultant) under a work program managed by Lincoln Flor, Senior PPP Specialist in WBI. They were possible only with the generous support from and collaboration with the Ministry of Economy and Finance of the Government of Spain, as well as the World Bank teams of the LAC Sustainable Development Department (LCSSD). The reports benefitted from comments
from Shyamala Shukla (WBI), Miguel Almeyda (FOMIN-IDB), Issac Averbuch and Marcelo de Lima (Federal PPP Agency, Brazil), Mauricio Gutierrez (Project Finance Associates), Sebastian Quijada (The Royal Bank of Scotland RBS Global Banking and Markets) and Heinz Roque (IKONS ATN).

Clive Harris
Manager, Public-Private Partnerships
World Bank Institute
January 2012
# Table of Contents

I. **EXECUTIVE SUMMARY** ................................................................. 13

II. **INTRODUCTION** ........................................................................ 17

III. **CONCEPTUAL FRAMEWORK** .................................................. 20
   3.1. General aspects of PPPs .............................................................. 20
   3.2. PPP contractual system .............................................................. 22
   3.3. Creation of a special-purpose company ....................................... 24
   3.4. Economics of PPP contracts ...................................................... 26
   3.5. Models for PPP contract structuring ........................................... 30
   3.5.1. Cost model ................................................................................. 30
   3.5.2. Demand model ........................................................................... 34
   3.5.3. Mixed model ............................................................................... 39
   3.6. Self-sustaining and cofinanced PPPs ........................................... 40
   3.7. Conditions for a successful financial close ............................... 47
   3.7.1. Economic characteristics of the project .................................... 50
   3.7.2. Financing system ...................................................................... 51
   3.7.3. Project externalities ................................................................. 53
   3.8. Case studies ................................................................................. 54
   3.8.1. Selection of cases for study ..................................................... 55
   3.8.1.1. Purpose of the research ........................................................... 55
   3.8.1.2. Unit of analysis ..................................................................... 55
   3.8.1.3. Criteria for the selection of cases ........................................... 55
   3.8.1.4. Cases selected ........................................................................ 56
   3.8.2. Background to the cases studied ............................................ 58

IV. **COST-MODEL ECONOMIC AND FINANCIAL STRUCTURING** .......... 61
   4.1. Economic structuring ................................................................. 61
   4.2. Payment for investment and operating costs in Peru .................. 62
   4.2.1. Identification of payments for investment and operating costs ...... 62
   4.2.2. Payment for investment in Peru under the cost model ............... 63
   4.2.3. Payments for operation and maintenance in Peru under the cost model .......................................................... 74
   4.2.4. Revenue of self-sustaining and cofinanced PPPs ....................... 79
   4.3. Payment for Investment and Operations in Chile ....................... 80
   4.3.1. Total guaranteed revenue .......................................................... 80
4.3.2. Cofinancing in the cost model ................................................................. 82
4.3. Payment for Investment and Operations in Colombia .............................. 83
4.5. Financial Structuring under the Cost Model .............................................. 84
4.5.1. Financial structuring in Peru ................................................................. 84
4.5.1.1. Work progress certificate (WPC) ......................................................... 84
4.5.1.2. Certificate of recognition of payments for works (CR-PFW) ............ 89
4.5.1.3. Certificate of recognition of remuneration for investment – CR-RFI .... 96
4.5.2. Financial structuring in Chile ................................................................. 100

V. ECONOMIC AND FINANCIAL STRUCTURING IN THE DEMAND MODEL .... 106
5.1. Economic Structuring ............................................................................. 106
5.2. Financial Instruments ............................................................................ 112
5.2.1. Infrastructure bonds (Chile) ................................................................. 112
5.2.2. Ordinary bonds (Colombia) ................................................................. 113
5.2.3. Stock exchange certificates (Mexico) .................................................. 118
5.2.4. Development capital certificates (Mexico) .......................................... 121

VI. COMPARATIVE ANALYSIS OF FINANCIAL INSTRUMENTS ..................... 123

VII. INVESTMENT PROJECT FINANCING ALTERNATIVES ......................... 124
7.1. Traditional Financing ............................................................................ 125
7.2. Capital Market ...................................................................................... 125
7.3. Pension Funds ...................................................................................... 126
7.4. Public Initiative Investment Funds ......................................................... 128
7.4.1. Public initiative investment funds in Peru .......................................... 129
7.4.2. Public initiative investment funds in Mexico ...................................... 135
7.4.3. Public initiative investment funds in Colombia ................................... 138
7.4.4. Public initiative investment funds in Chile ......................................... 140
7.5. Private Initiative Investment Funds ....................................................... 142
7.5.1. Private initiative investment funds in Peru ........................................ 142
7.5.2. Private initiative investment funds in Mexico .................................... 145
7.5.3. Private initiative investment funds in Chile ....................................... 149
7.6. Financial Instruments for Investment Funds ......................................... 152

CONCLUSIONS: LESSONS LEARNED .......................................................... 155

References .................................................................................................... 160

Annexes ....................................................................................................... 161
Tables

Table 1: Types of PPP contract ................................................................. 21
Table 2: Peruvian cases studied ............................................................... 57
Table 3: Mexican cases studied ............................................................... 57
Table 4: Chilean cases studied ................................................................. 57
Table 5: Colombian cases studied ......................................................... 58
Table 6: Infrastructure private investment attractiveness index .............. 58
Table 7: Comparative Country Analysis ................................................. 60
Table 8: Minimum Guaranteed revenue ................................................ 81
Table 9: Ratings obtained by infrastructure bonds ................................ 101
Table 10: Status of concessions financed with INFRASTRUCTURE bonds 105
Table 11: Concessions structured with minimum guaranteed revenue .... 111
Table 12: Comparative analysis of financial instruments ...................... 123
Table 13: Participation of PFAs in principal infrastructure sectors .......... 131
Table 14: CAF projects in Peru ............................................................... 134
Table 15: Successful projects of BANOBRA S ..................................... 136
Table 16: Successful FONADIN projects ............................................. 137
Table 17: Investments of the PFAs by sector ....................................... 139
Table 18: Pension fund investment in stocks and bonds of the electric, telecommunications, natural gas, and water sectors (2009) .............. 141
Figures

Figure 1: Number of new projects launched in Latin America by type of contract (1990-2009) .............................................. 22
Figure 2: PPP contractual system ................................................. 23
Figure 3: Map of highway concessions in Peru .............................. 28
Figure 4: Net toll revenue and total expenditure .............................. 36
Figure 5: Economic cash flow .................................................. 36
Figure 6: System of cofinancing for road projects ......................... 41
Figure 7: Self-sustaining and cofinanced concessions .................... 42
Figure 8: Classification of PPP contracts ...................................... 43
Figure 9: Elements involved in financial close ............................... 49
Figure 10: Payments for investment and for operation ..................... 62
Figure 11: Contingent and non-contingent payment for investment .... 64
Figure 12: Supervision and backstopping for quality of work and service indicators ......................................................... 64
Figure 13: Contingent payment and non-contingent payment (hospitals in Peru) .............................................................. 65
Figure 14: Revenue inflow from the contract for the Mantaro–Socabaya transmission line ...................................................... 67
Figure 15: Revenue inflow for the IIRSA NORTE and IIRSA SUR contract ............................................................ 70
Figure 16: System of payment flows for investments in hospitals ........ 73
Figure 17: Payment for operation and maintenance (POM) – Mantaro-socabaya case ......................................................... 76
Figure 18: Payment for operation and maintenance (POM) – IIRSA Norte/Sur ............................................................ 76
Figure 19: Recovery of investments in the hospital concession .......... 78
Figure 20: Operational scheme for issuance of CR-PFWs for the IIRSA Sur ............................................................ 94
Figure 21: Functioning of the CR-PFWs ....................................... 95
Boxes

Box 1: Features of PPP contracts structured using a cost model ..................................32
Box 2: Mantaro-Socabaya electrical transmission line ....................................................66
Box 3: IIRSA Norte (road sections on the amazonas Norte intermodal highway) ...............69
Box 4: ESSALUD hospitals .........................................................................................72
Box 5: IIRSA Sur - (southern interoceanic highway – five connections in Peru, Brazil and Bolivia) ..............................................................................................................77
Box 6: Taboada waste water treatment plant (Taboada PTAR) ........................................79
Box 7: Concession for the Arturo Merino Benítez international airport ..............................80
Box 8: Bosa-Granada-Girardot highway project .............................................................84
Box 9: Penitentiary Group 3 Infrastructure Concessions Program ..................................102
Box 11: North coastal highway .......................................................................................109
Box 12: Melipilla bypass ...............................................................................................110
Box 13: Pereira–La Victoria highway project ..................................................................113
Box 14: Monterrey-Cadereyta highway .........................................................................118
Box 15: Red de Carreteras de Occidente (RCO) [Western highway network] ...............122
Box 16: Pluspetrol Camisea ..........................................................................................135
Box 17: Arriaga-Ocozocoautla highway ........................................................................138
Box 18: Autopista Interportuaria S.A. concessionaire ....................................................151
This report evaluates recent developments regarding public-private partnerships (PPPs) in Latin America, with particular emphasis on innovative schemes for financing large-scale projects combining private efforts and public backing.

These developments are taking place in conjunction with processes of Public Sector, in which the Government plays a guiding role and transfers the execution of public services to the private sector. Although public-private partnerships were originally a response to the limited financing available to the Government for the implementation of projects to benefit society, they actually represent a reform of the Public Administration. In this process, the Government concludes a contract with the private sector giving that sector the rights to new or existing infrastructure for a project to supplement or create a public service. The contract contains architectural and engineering specifications for development of the infrastructure, establishes pricing for the services and—most importantly—sets service indicators for the quality, continuity and efficiency of the service provided.

PPPs are created by means of special-purpose companies (SPCs); in order to fulfill their commitment to develop public infrastructure and/or a public service, the promoters and their partners form a company exclusively devoted to the project. The SPC provides the investments through construction companies and then outsources the operation and maintenance of the service. Since the SPC must recover the costs of its investment and the operating and maintenance costs incurred in each period, a risk-sharing relationship is established with the Government.

If the Government absorbs the risk of demand for the service (electricity, roads or hospitals), it will have to reimburse the private operators for the cost of the investment (regular payments at a specific rate of return over an investment recovery period) and the operating and maintenance costs incurred. Demand shortfalls and surpluses will be assumed by the Government. If, on the other hand, the private operator absorbs the demand risk, then in order to offset the possibility that demand will be lower than anticipated, causing losses for the operator, the private operator should also reap the profits at times when demand is higher than anticipated.

Consequently, the structuring of PPP contracts will need to specify how risks (principally demand risk) are assigned, since this will determine the project financing scheme. This report describes two typical models for structuring PPP contracts: a \textit{cost model} and a

\section*{I. EXECUTIVE SUMMARY}
**demand model.** In addition, a PPP contract may involve two or more business units, requiring two types of structuring, which we shall call a *mixed model.*

The type of PPP depends on the number of services provided to direct users and on the tariff or price that they pay for the service. If the users are able to cover the cost of the service, the PPP is *self-sustaining,* but otherwise the service will have to be cofinanced by the Government and the PPP is then *jointly financed.* It should be noted that cost-model PPP contracts may be self-sustaining or jointly financed and that the same is true of demand-model PPP contracts.

The report considers the structuring principles of a cost model, defining remuneration for investment (RFI) and remuneration for operation and maintenance (ROM). It should be noted that such remuneration may have different names. For example, in the case of investments, it may be called payment for works (PFW) or annual payment for new replacement value (annual NRV). We also find payment for operation and maintenance (POM) or annual payment for operating and maintenance costs annual (OMC). Despite their different names, these cost reimbursements have the same payment characteristics over time. The existence of stable inflows over time provides the necessary reassurance for leveraging large amounts of financing.

If the RFI is backed by the Government (sovereign risk) or by a sufficiently reliable income trust providing sufficient guarantees to creditors, it will be possible to structure PPP financing at costs that reflect the issuer’s risks or the repayment inflows to be used to reimburse investments.

One of the main problems with the development of PPPs was that the sizeable investments required large amounts of capital, which even businesses with strong financial backing were not able to provide. Even with stable inflows and an issuer acceptable to the financial institutions, significant capital inputs were required. This led Peru to introduce *work progress certificates (WPCs),* an innovative instrument for relieving the financial pressure created by the need for significant capital inputs.

The WPCs provided evidence of work progress and enabled the concession grantor to certify completion of a portion of the work conferring entitlement to a proportional amount of repayment of the investment within the time frame established in the PPP contract. This innovation transformed a $1,000 million financing problem into a problem
of working capital required, generally 10 percent of the investment. By the end of the work, 100 percent is leveraged and the working capital is recouped.

WPCs are widely used in PPP contracts in various sectors in Peru, including contracts for roads, sanitation and hospitals. Since these certificates confer entitlement to future investment reimbursements, they could not be freely transferred among investors or taken up by different investors. Accordingly, certificates of recognition of PFWs (CR-PFWs) were created, followed by certificates of recognition of RFIs (CR-RFIs).

While the WPC conferred entitlement to 30 semi-annual installments of investment reimbursement over 15 years, one CR-PFW was issued for each installment. For each WPC, 30 CR-PFWs were issued; their main feature was that they had a specific redemption value and a firm payment date. This means that the holder of the CR-PFW can expect payment without having knowledge of the PPP contract.

The CR-PFWs were issued by the Republic of Peru. Although this was an advantage because they could be placed on the international market relatively easily, the Ministry of Economy and Finance objected to their extensive use. In view of this objection, in the case of social security hospitals in Peru a new instrument was created with similar features but in this case it was funded by social security revenue set aside for the payment of PPP contracts. This is therefore a new generation of instrument, casting new light on this financial innovation.

Peru issued a debt instrument but Mexico issued a capital instrument: the development capital certificate (CKD). While the CR-PFWs or CR-RFIs were fixed-income instruments, the CKDs are variable-income instruments and their yield depends on the return on capital after reimbursement of the debt. Rights under PPP contracts are transferred to a trust; it issues the CKDs, which are backed by incoming revenue to the trust and established in the contracts. These instruments may be purchased by pension funds or insurance companies.

Using the same method as was used to analyze the CKDs, an analysis was also made of classical methods of financing demand-model PPP contracts, among which Chilean contracts are the ones most subject to structuring by banks. Chile also issued “infrastructure bonds” for purchase by pension funds and institutional investors that had previously been less inclined to assume the Government’s risk. These bonds were backed
by country risk insurers known as monoliners; unfortunately, following the financial crisis, they are no longer used, because these insurers have withdrawn from the market.

Lastly, the report analyzes investment funds holding infrastructure financing instruments both at the initiative of the Government and through private initiative and notes that these institutions are still evolving and need standardized instruments in order to expand their financing coverage.
II. INTRODUCTION

A consensus exists among academics and policy makers on the relationship between infrastructure investment and a country’s productivity (competitiveness and growth) and on the fact that, as stated in the Global Competitiveness Index (GCI), infrastructure is a basic requirement for international competitiveness. There is a two-way relationship between infrastructure investment and economic growth, and a kind of *virtuous circle* in which the investment triggers growth and economic development. This relationship between infrastructure and growth has been widely documented in the groundbreaking work of Aschauer (1989) and in the recent work of Égert and others (2009) for the OECD countries, and of Calderón and Servén (2009) for the Latin American countries. Yet countries—particularly developing countries—have considerable infrastructure deficits generally caused by their recurrent fiscal deficits and high level of indebtedness, which prevent them from providing the important financing needed for infrastructure investment. In this context, Governments promote private sector participation in public infrastructure investment through public-private partnerships (PPPs).

PPPs are initially promoted because of the need to involve the private sector in the financing and encouragement of infrastructure investment in a way that does not jeopardize the fiscal sustainability of the Government. However, the focus on PPPs has gradually shifted to their benefits for long-term infrastructure sustainability. The investment puts less pressure on Government finances but it also maintains the infrastructure and has a cumulative effect that makes the economy more competitive.

One of the main questions raised in this report is how to successfully promote investment projects implemented using PPPs. The report analyzes the various processes and concludes that there are two main methods: (i) PPP contracts with an appropriate risk allocation between concession grantors and operators; and (ii) contracts awarded that achieve financial close rapidly and at lower financial cost.

In order to achieve balanced PPPs, use must be made of techniques and tools such as project finance, allowing the contract to be designed and structured on the basis of an efficient allocation of the risks involved in this type of investment project. Financial

---

1. Developed by the World Economic Forum. The latest edition was prepared with the participation of Xavier Sala-i-Martin, Kemal Dervis, Ricardo Hausmann, Felipe Larraín and Mari Elka.

2. It is noteworthy that some financial closes have been conditionally certified despite certain pending activities of the concession grantor or the operator, which means that financial close is not achieved. This may be the fault of the concession grantor, in which case the deadline for financial close could be extended; if it is the fault of the operator, close will not have been achieved.
close depends on risk management, the sponsors, the nature of the project and project revenue, inter alia. To sum up, it may be said that the key to achieving good financing is good design and structuring of PPP contracts.

In an ideal situation, financial close and commencement of work can be expected to occur rapidly if: i) incoming payments of investments—subject to financing—can as far as possible be kept separate from any occurrence in the PPP contracts; and ii) such incoming payments are predictable, stable and independent, such that they could be securitized.

The experience of Latin America—and especially Peru—shows that it is possible to create standardized financial instruments acceptable to investors and project financiers and thus to achieve financial close when the contract is appropriately structured. Such instruments can be traded on secondary markets regardless of the projects to which they relate.

A review of good practices for financing PPPs shows that certain criteria for structuring a financing system can be used as a model to be followed in the development of infrastructure and public services. In order to achieve this, in certain processes financial instruments played a crucial role, because they were the means of achieving speedier financial closes at lower cost, especially if they could be replicated and thus recognized by the market, with a consequent decrease in the length of subsequent processes as well as a gradual decrease in costs.

Indeed, the goal of this study is to identify the main (innovative) financial instruments that were efficient mechanisms for the development of infrastructure for the delivery of public services in Latin America. Another goal is to describe the role and use of infrastructure funds and pension funds in the financing of projects by PPPs. Financial instruments would not be useful unless there was a demand for them, in this case from investment funds.

The report provides a comparative analysis of case studies of Latin American experience with the use of these mechanisms in the economic and financial structuring of PPPs. This analysis could provide lessons for the replication of these mechanisms in different contexts, sectors and countries.

The report also attempts to describe and evaluate the role of Governments in the development of the capital market through the creation of private funds, public funds and/or public-private funds.
The report tries to answer the following analytical questions:

What are the different models of economic and financial structuring for infrastructure projects allowing good design and subsequent implementation?

How did good design of the economic and financial structuring of PPPs allow the financing of infrastructure investment by the introduction of innovative financial instruments?

What is the role of infrastructure funds in financing infrastructure investment projects?

And what is the interaction between financial instruments and infrastructure funds?

What is the role of the Government in the development of the capital market?

How can innovative financial instruments be most effective and be replicated in various specific contexts?
3.1. General aspects of PPPs

The participation of private investors in the provision of public service infrastructure, through public-private partnerships (PPPs), is a new trend adopted by various countries almost two decades ago. PPPs consist of a contract between the public authorities and the private sector that takes advantage of the efficiency of each of the partners in managing the particular risks involved in an infrastructure project.

Simply put, PPP contracts broaden the private sector’s traditional participation—often limited to construction—to possibly include design, construction, operation and maintenance of the infrastructure or even provision of the public services.

The main reasons for promoting this type of private investment through PPPs are:

- To address existing shortcomings in public services infrastructure and thus lay the foundations for economic growth.
- To introduce new ways of financing infrastructure investments, transferring the obligation to manage financing to the private sector and alleviating—partially or completely—fiscal pressure on the Government.
- To improve the quality and efficiency of the service provided, because the private operator has more experience in the construction and operation of the service, as well as greater autonomy.

The principal types of PPP contract are: BOOT (Build-Own-Operate-Transfer) contracts and BOT (Build-Operate-Transfer) contracts. The only difference between them concerns the rights to the public infrastructure to be constructed.

---

3. In recent decades, PPPs have been gradually formalized in institutions promoting this type of contract. However, there are very old examples of PPPs, such as the arrangement between the Church and the Government for the provision of educational services or the real eGovernment investors that developed infrastructure, for example, as part of the urban developments they were constructing.

4. According to the most recent competitiveness ranking of the World Economic Forum, as regards infrastructure Chile is in 30th place, followed by Brazil in 58th place, Mexico in 66th place, Colombia in 76th place and finally Peru in 73rd place. It should be noted that both Peru and Colombia improved their competitiveness ranking compared with the period 2009-2010. Lastly, in all cases, the Latin American countries have a much lower ranking as regards infrastructure compared with their position on the global index.
In BOOT contracts, one of the parties (hereinafter “the concession grantor”) transfers rights of ownership over the infrastructure (to be constructed) to the other party (the concessionaire), so that the latter can operate and run the infrastructure for a period of time (concession period), after which both the assets and the infrastructure works are transferred to the concession grantor. In a BOT contract, on the other hand, the right of exploitation of the infrastructure (to be constructed) is granted for a period of time and will later be transferred back to the concession grantor.

It should be noted that, in PPP contracts, it is the private sector that makes the investment, operates and maintains the infrastructure, so that at the time of the transfer not only assets and works but also the know-how of the private operator are transferred to the public authority.

However, there are other PPP contracts with special features to accommodate an infinite number of goals, as shown in Table 1.

<table>
<thead>
<tr>
<th>Index</th>
<th>Types of PPPs</th>
<th>Acronym</th>
<th>Mode of Entry</th>
<th>Investment</th>
<th>Ultimate Ownership</th>
<th>Market Risk</th>
<th>Duration (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Management contract</td>
<td>Contract</td>
<td>Private</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
<td>3-5</td>
</tr>
<tr>
<td>2</td>
<td>Leasing</td>
<td>Contract</td>
<td>Private</td>
<td>Public</td>
<td>Public</td>
<td>Semi-private</td>
<td>5-15</td>
</tr>
<tr>
<td>3</td>
<td>Rehabilitate, Operate and Transfer</td>
<td>ROT</td>
<td>Concession</td>
<td>Private</td>
<td>Private</td>
<td>Public</td>
<td>20-30</td>
</tr>
<tr>
<td>4</td>
<td>Rehabilitate, Lease-Rent and Transfer</td>
<td>RLRT</td>
<td>Concession</td>
<td>Private</td>
<td>Private</td>
<td>More-private</td>
<td>20-30</td>
</tr>
<tr>
<td>5</td>
<td>Merchant</td>
<td>Greenfield</td>
<td>Private</td>
<td>Private</td>
<td>Public</td>
<td>More-private</td>
<td>20-30</td>
</tr>
<tr>
<td>6</td>
<td>Build, Rehabilitate, Operate and Transfer</td>
<td>BROT</td>
<td>Concession</td>
<td>Private</td>
<td>Private</td>
<td>Public</td>
<td>20 x 30</td>
</tr>
<tr>
<td>7</td>
<td>Build, Own and Transfer</td>
<td>BCT</td>
<td>Greenfield</td>
<td>Private</td>
<td>Semi-private</td>
<td>Private</td>
<td>20-30</td>
</tr>
<tr>
<td>8</td>
<td>Build, Own, Operate and Transfer</td>
<td>BCT</td>
<td>Greenfield</td>
<td>Private</td>
<td>Semi-private</td>
<td>Private</td>
<td>30+</td>
</tr>
<tr>
<td>9</td>
<td>Build, Lease and Own</td>
<td>BLO</td>
<td>Greenfield</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>30+</td>
</tr>
<tr>
<td>10</td>
<td>Build, Own and Operate</td>
<td>BOO</td>
<td>Greenfield</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>30+</td>
</tr>
<tr>
<td>11</td>
<td>Partial Privatization</td>
<td>Divestiture</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>30+</td>
</tr>
<tr>
<td>12</td>
<td>Full Privatization</td>
<td>Divestiture</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Indefinite</td>
</tr>
</tbody>
</table>


Based on World Bank information, Figure 1 shows all new infrastructure projects for the provision of public services (electricity, telecommunications, transportation, and water and sanitation) by type of contract commenced in the countries of Latin America and the Caribbean during the period from 1990 to 2009.
3.2. PPP contractual system

A PPP contract represents a contractual relationship between the Government—through its various legal embodiments (ministries, regions, states, municipalities, decentralized agencies) as concession grantor—and the private sector as concessionaire.

Contracts of this type grant to the private sector the concession to invest in infrastructure—new or supplementing existing works—and to operate and maintain the public service, fulfilling service indicators established in the contract.
In most cases, PPP contracts are concluded for a specific period, although there are exceptions. One of the purposes of BOT or BOOT contracts was to provide regulatory frameworks for the development of a public service that was not yet properly regulated. As in the case of the electricity sector in Peru and Chile, when the regulatory framework is sufficient to allow the infrastructure investments and when the investments in infrastructure renovation or expansion are eventually governed by the regulatory framework, the concession period may be left open. The contracts for the promotion of renewable energy plants being promoted in Peru are examples of this transition: they include special conditions when regulatory frameworks are still inadequate, ensuring recovery of the investment and the operating and maintenance costs, and they are subsequently covered by the general regulatory framework, meaning that the concession period will be left open.

These contracts include a revenue system for the recovery of the investments and associated costs for the service provided. Incoming revenue is provided by the users or, when the cost exceeds users’ capacity to pay, is cofinanced by the Government. The contract sets service indicators reflecting the requirements of the service to be provided to users and its price; it also specifies arrangements for evaluating the service provided by setting levels of service. On the basis of these relationships and of the features of the project, the risk allocation between the concession grantor and the concessionaire is established.

**Figure 2: PPP contractual system**

![PPP contractual system diagram](source: sergio Bravo.)
The contract includes the following:

- Description of the service to be provided, particularly the service indicators to be fulfilled within the period covered by the PPP contract.
- Arrangements for expected recovery by the operator of the investment and of the operating and maintenance costs.
- Financial arrangements, including the tariffs to be charged, which will affect demand. In the case of subsidized projects, the amount of cofinancing needed to enable the user to pay for the service. In the case of a self-sustaining project, levels of obligations and remunerations for the benefit of the concession grantor, inter alia.
- The system of guarantees for both the concessionaire and the concession grantor.
- The clauses concerning contract termination.
- Asset regulation, including the procedure for transfer of assets to the operator, asset monitoring mechanisms and the procedure for return of assets to the concession grantor.
- Arrangements for the purchase of insurance policies, inter alia.

3.3. Creation of a special-purpose company

For the purpose of a PPP, a special-purpose company (SPC) is created, comprising at least one strategic partner with the necessary construction and operation experience for the project and other partners providing financial backing for the SPC.

This SPC will be responsible for performing the contractual obligations, both during the construction phase and during the operational phase. These obligations will be performed directly or by outsourcing the infrastructure investment activities specified in the PPP contract to a construction company.

---

5. Project finance literature also calls this a special-purpose vehicle (SPV).
company and outsourcing the public services specified in the PPP contract to a specialized operating company.

If the SPC decides to outsource activities to a construction company and an operating company, it will play the role of contract manager, responsible for ensuring compliance with the obligations in PPP contracts. In this case, the SPC is an operator or manager performing activities different from those of the construction company or the operating company. Usually this difference is not clear in the role of the SPC.

The SPC operator manages the contract in the construction phase, ensuring that it is executed in the financial conditions and time frame established in the PPP contract. It also manages the operation of the public services and maintenance of the infrastructure, in the light of the costs and service indicators agreed to in the PPP contract.

The SPC operator is responsible for organizing the financing of investments so as to ensure the recovery of investments in the pre-operational phase, as specified in the contract and as expected by the creditors. In general, investments are recovered when operations start, but variations exist.6

Similarly, the SPC operator is also responsible for organizing the recovery of operating and maintenance costs, since each month various costs are incurred for the actual provision of the public service, separately from the investment phase. These are for operation of the public service,

---

6. Some concession grantors prefer, when they have the liquidity, to pay part or all of the investment in the pre-operational phase. This was the case in Peru for the concession for the Buenos Aires – Canchaque section junction 1B and the Majes concession. A similar situation exists in Mexico, when Government cofinancing is needed. There are instances in which existing tolls have been used to finance the initial works or part thereof, for example Highway Network 5, Highway Network 6, or the Autopista del Sol (also in Peru).
infrastructure maintenance and management of the SPC. These costs must be recovered in order to make the service sustainable throughout the duration of the PPP contract.

In general, the SPC has to make the PPP contract self-sustaining by managing the revenue to be used to recover the investment and the operating and maintenance costs in order to sustain the agreed public service.

This structure has many advantages, because it manages many risks. If the SPC manager uses a good construction company, the work quality risk is reduced (by using an experienced company). Similarly, if it uses a good operating company, management will be improved (management risk). This structuring allocates risks to different agents, which in theory are better able to manage them.

3.4. Economics of PPP contracts

A well-designed contract can facilitate financing, although it can also complicate or hinder it. The costs of financing and the time needed to amass it (financial close) are the main aspects affected by the design of the contract.
Although PPP contracts have a similar general structure, they do not all follow the same system of economic and financial structuring. These systems identify which entity—Government or private sector—is to manage demand risk. In accordance with risk allocation criteria, demand risk management should be the responsibility of the entity best prepared to assume or manage it. This may seem too obvious to mention but it is sometimes not clear in the case of public services.

There are PPPs in which the SPC has few opportunities to create variations in demand, because it is the provider of capacity, as in the case of firms generating electricity or transporting gas. The Mantaro-Socabaya electrical transmission line was one of the first lines to use a BOOT contract, structured so as to transfer the demand risk to the users, who, by paying their electricity bills, assumed the payment for capacity regardless of the level of use of the line. The Camisea gas pipeline project, constructed under a BOOT contract, had a system called the “Main Network Guarantee,” which guaranteed sufficient revenue for the concessionaire to cover its costs, even if actual demand was not sufficient to cover the costs in question.

It is debatable whether road concessions are a cost system or a demand system. If the Government can influence demand for a road concession positively or negatively, this is a case in which the Government should manage the demand risk. If a main road is constructed that connects to a highway granted as a concession, demand will increase, so that the operator of the concession will benefit without having made any investment. If the opposite occurs and the Government develops a new alternative road that has the effect of reducing demand for the concession road, then the operator would suffer without having participated in the decision to build the new main road.

In order to provide guidance as to which entity should manage the demand risk, we shall describe a hypothetical but possible case in which a concession is granted for a main road in a highway network and it is necessary to determine whether the SPC or the Government should manage demand for the main road.

Figure 3 illustrates a situation in Peru in which it will be seen that the development by the Government of the project “Rehabilitation and Upgrading of the Huaura–Sayán–
Churín–Oyón Highway, an alternative route to the Central Highway linking the Peruvian coast and mountains, will generate more traffic on the Panamericana Norte highway in the section covered by Highway Network No. 5, which will mean more toll revenue and higher operating and maintenance costs. All this without any investment by the concessionaire.

Figure 3: Map of highway concessions in Perú

Source: Ministry of Transport and Communications (Peru).

As demonstrated above, the answer is that, if the SPC cannot engage in activities resulting in changes in demand because these activities are performed by the Government, then changes in demand should not affect its revenue. In this scenario, the SPC should recover its investments and its operating and maintenance costs regardless of demand fluctuations. This is the basic principle of a cost-model PPP contract.\(^9\)

With a cost model, the investment is recovered by means of an equivalent regular inflow of revenue (remuneration for investment). Similarly, operating and maintenance costs will also be recovered by means of a regular inflow (remuneration for operating and

---

9. Although concessions for roads in Mexico, Chile or Peru generally transferred the demand risk, relief was provided and concessionaires were protected against declining demand by establishing a minimum guaranteed revenue or somehow guaranteeing repayment of the financing, making the contract into a cost model. However, with the exception of some Chilean contracts, no provision was made for cases in which demand increased as a result of Government activity beyond anticipated growth. It would be reasonable to set a ceiling for anticipated growth above which the concession grantor would also enjoy the benefits of the extra growth.
Together these two inflows constitute payment for the services provided (remuneration for the service).

There is another possible scenario in which the purpose of a PPP is to outsource a dock or port to an operator. In this case, the SPC can take action to modify demand, such as promoting contracts with shipping companies, adjusting prices (respecting the top prices specified in the contract) in order to increase demand, or making additional investments over and above the minimum required by the concession grantor, so that more revenue can be obtained as a result of effectiveness or efficiency. This was done for the concession at the Callao south dock, and for the concessions at ports and docks in Chile.

In this case, clearly the SPC and not the Government should manage demand risk. This is therefore an example of a demand-model PPP contract.

With this model, the financial structuring will be different from that of the cost model. This is because it initially provides for recovery of the operating and maintenance costs in order to make the PPP contract sustainable. Then it establishes the free cash flow needed for recovery of the investment made. It should be noted that the anticipated free cash flow must be greater than that needed for investment recovery under a cost model. Since it is only anticipated, it is subject to fluctuations in demand. In an optimistic scenario, it may be higher than anticipated, but in a pessimistic scenario (the one of interest to financiers) it could be lower than anticipated and may
therefore not be enough to pay for debt service.\textsuperscript{10} As a consequence, there will be a minimal cover ratio between the anticipated free cash flow and debt service flows, known as the debt service cover ratio (DSCR). If this ratio is not achieved, the SPC will be required to provide more capital until the financier’s coverage requirements are met.

There may also be cases of mixed-model PPP contracts. This occurs when the concessionaires’ revenue is derived not from a single source but from several sources. For example, the concession for the passenger and cargo terminal at the Diego Aracena Airport in Iquique concerned airport services (embarkation and disembarkation systems, platform services, etc.) and used a cost model that established a maximum tariff per passenger embarked. Since commercial activities generally do not have regulated tariffs, a system was devised whereby 50 percent of the net surplus for extraordinary revenue is paid to the Chilean General Civil Aviation Directorate (DGAC). The concession for the regional airports in northern Chile used a cost model for the runway and passenger areas, whereas a demand model is used for the commercial areas, with a system known as the revenue generation incentive.

In general, there are two models frequently used and one model combining the two:

i) Cost model
ii) Demand model
iii) Mixed model

3.5. Models for PPP contract structuring

3.5.1. Cost model

As indicated in section 3.4, the financing of the PPP contract determines the design and type of structuring. A PPP contract is financially structured using a cost model when, because of the nature of the project, it is difficult for demand to be influenced (increased or decreased) by actions of the SPC or when the Government can make decisions or take actions whose direct or indirect effects may potentially alter demand. It is important to analyze this model, because it will then be easier to understand the financing system for cases using this model.

\textsuperscript{10} If the operation is financed using bonds or similar instruments, default may occur and pending flows may then pick up immediately afterwards. For this reason, the financing must—to the extent possible—be designed to avoid default.
The models tend to be applied, with minor variations, to different cases in various sectors, as was the case in Peru for the concessions for the Mantaro-Socabaya transmission line (1997), the North and South Interoceanic Highways (2005), and the social security hospitals of ESSALUD [Peru’s Government-run health care system] (2010).

a) Financial structuring of a PPP contract using the cost model

In a specific PPP project, in which we see that the pattern of demand does not depend on the operator but that the concession grantor has the ability to make both positive and negative changes in demand, it is logical to assume that the operator will request that the concession grantor provide the necessary guarantees to cover it for demand risk and make its financing viable.

In a case such as this, the financial structuring defines revenue in such a way as to adjust it to the costs incurred by the SPC; in other words, to allow the operator to recover its costs, including capital costs.

It should be noted that the revenue stream is repayment for an investment made by the SPC in the pre-operating phase, meaning that the sources of payment are remunerating investments already made, as a kind of refund. This is important because it defines the sources of risk to be managed in a PPP project using a cost model and the consequence of contract termination.

In practice, there may be simple systems whereby remuneration for investments is annualized as shown by using the economic cost of capital, as was the case for the Interoceanic Highways or the hospitals in Peru; or a more complicated system whereby an RFI is found that balances projected cash flows against the investment, using the weighted average cost of capital (WACC), as for example in the sanitation and drinking water projects in Peru.\(^{11}\)

One of the important points that emerges from this process is that, although it might seem that remuneration of investment at a rate of 10 percent could be considered adequate, after national taxation and, in some cases, workers’ participation in profits,\(^{11}\)

---

\(^{11}\) Electricity regulations in Peru use the economic cost of capital (KOA) to conduct a financial analysis of the project, regardless of the debt-to-capital ratio or the financing of the project, leaving the concessionaire to provide the financing and reap its benefits or potential harm. On the other hand, when structuring is based on the weighted average cost of capital, the idea is that the benefit of private financing—mainly the difference between the economic cost of capital and the lending rate—should be used for the RFI. In our view, it is better to calculate the RFI on the basis of the economic cost of capital, leaving financing to the operator.
this would be reduced to 7 or 6.7 percent, so that the financial return is not so significant, although much depends on tax rates in each country.

It is thus important to understand that cost models, like regulated businesses (electricity, sanitation, hospitals, etc.), have a very low economic rate of return, but that this is offset by the financial rate of return (returns to shareholders) with a relatively larger amount of leverage, with financing costs lower than the returns earned. For this reason, those who structure contracts must remember that they have a responsibility to isolate unnecessary risks from contracts that may create financing problems, because this is why such low-return operations are attractive.

The economic and financial structuring process differentiates between investment, on the one hand, and operation and maintenance, on the other. In this regard, the structuring process starts with an estimate of the investment budgets—for infrastructure and equipment—and of the operations budget for one year. This process requires the participation of experts who can make the right decision regarding the alternative technology that will be most efficient economically for users or for the Government.

Box 1: Features of PPP contracts structured using a cost model

- Demand risk assumed by the concession grantor.
- Low economic return.
- Considerable leverage.
- Guaranteed payment of investment at least equal to the cost of debt.
- Separation of investment costs from operating and maintenance costs.

b) Features of economic structuring of cost-model PPP contracts

A cost model assumes that:

- Predictable and stable revenue streams during the contract period will facilitate the introduction of financial instruments based on entitlement to remuneration for investment.

12. In this case, the pre-tax cost of capital K (for example, 10 percent) should be compared with a cost of finance Ki (for example 7 percent). With this difference, there will be possibilities of returns for shareholders. A cost of capital after tax KOA should be compared with the cost of debt after tax Ki (1-T).
• Investment revenue will be separated from operation and maintenance revenue, requiring clear terminology in cases where they must be differentiated, for example in case of termination. In this case, payments for investment must continue for as long as was foreseen and scheduled. On the other hand, payments for operation and maintenance may cease, because the operator will not continue to incur costs and there will therefore be no financial loss.

• Remuneration for investment will continue because the investment was already made and will remain the property of the Government, which must pay the balance of the investment not recovered or the pending RFI installments. Financing on this basis is therefore particularly robust.

• An important principle if PPP contracts are to function properly is “Do it first and pay for it later.” In other words, construction comes before remuneration of the investment and, if this principle is not observed, there are problems with contracts. It should be emphasized that remuneration for investment is largely a refund for investments made.

c) Relationship between the works and infrastructure quality in a cost model

One criticism leveled at the cost model is that it provides revenue to the operator at the start of construction with no proof of the quality of the infrastructure and services in the operating phase of PPP contracts.

For this reason, Mexico and Peru tested formulas for ensuring that the operator is bound to show results from its operations and construction activity.

Peru chose to separate the remuneration for investment (RFI or PFW) into two: one remuneration based on the cost of debt and another total remuneration based on the cost of capital, which is usually the cost of debt plus a spread of 1.5 percent or a similar percentage.

An *irrevocable RFI* is then calculated as a payment over n years, at the rate of the debt and the baseline investment \[=\text{Payment}(Ki, n, \text{Baseline Inv})\]. Because it is irrevocable and unconditional, this payment is very useful for financing projects,¹³ with its certain

---

¹³. If penalties are applied to the project, if penalties are not paid or even if there is a termination, this payment will still be made.
and predictable inflow. Its strength will depend on the chain of payments and on the bond issuer.

Otherwise, there is a Total RFI as a payment over n years, at the economic cost of capital and of the baseline investment \(\text{Payment}(K_{OA}, n, \text{Baseline Inv})\). This payment may be broken down into Total RFI = Irrevocable RFI + Revocable RFI, where \(K_{OA} = K + \Delta K\). The Revocable RFI is paid if, on each payment date, the operator is fulfilling the agreed service indicators.

Here there is a separation of RFIs: irrevocable RFIs that will back up the financing and revocable RFIs that will provide an incentive to meet quality standards, because payment is made on condition that they are met. In the case of the South Interoceanic Highway in Peru, the irrevocable payment was 85 percent and the revocable payment was 15 percent of the total PFW; in the case of the hospitals, the irrevocable payment was about 90 percent and the revocable payment about 10 percent.

Mexican PPPs also incorporate a level of secured debt and capital with controlled risks. This is a system with a range of tariffs (T1, T2 and T3) to cover the costs of operation and maintenance, the permitted debt service and return on capital. It is akin to a kind of irrevocable payment and payments contingent on delivery of the service. According to information obtained during interviews, between 70 and 80 percent of the investment is borrowed.

3.5.2. Demand model

There are other projects in which the operator can manage demand for the service: the Callao southern terminal and ports in general, as well as hotels, as in the current process of awarding of a concession for the Hotel del Cusco in Peru. This may also be the case for urban main roads and schools.

In Chile, projects are structured on the basis of demand models, even in cases such as road projects, for which a cost model would be more suitable. In Mexico, there is much

---

14. A subsequent addendum converted the revocable portion of the payment into an irrevocable portion and replaced it by a performance bond. Although financially the result would be somewhat similar, in case of non-performance execution of a performance bond is less likely than non-payment of a specific amount.
discussion about the first generation of PPP projects using models with guaranteed traffic. From the launch until the late 1990s, demand declined to levels that triggered the guarantees. Despite activation of the guarantees, revenue was not sufficient to cover the concessionaires’ operating costs and the Government had to step in. There is now a return to concession contracts better suited to the Chilean style, without demand guarantees.

a) Economic structuring of a demand-model PPP contract

In PPP projects where the demand risk is managed by the operator, demand volatility (number of containers expected in a port, number of students at a school or demand for roads in an urban road network) is absorbed by the operator. This means that anticipated demand will be established.

Figure 4 shows net operating income and expenditure for an urban road project to be implemented: the Javier Prado corridor in Lima, Peru. As can be seen, revenue grows over time and is limited mainly by congestion. Other works would therefore be needed to relieve congestion.

Revenue is only anticipated and the estimates then have to be refined in the light of possible variations and the creditors’ risk analysts will be concerned with the potential decline in demand.

Expenditure increases gradually at the same time as operating income, since higher usage will mean higher operating and maintenance costs. The sudden jump in expenditure is due to variation in the tax shelter for amortization of intangibles. This illustrates the importance of taxation in PPP projects, which generally take the form of BOT contracts, granting the concessionaire a concession right or an amount equivalent to the total investment. These rights are amortized over time and, like asset depreciation, this amortization of rights continues as long as a tax shelter exists. When the tax shelter ceases to exist, more tax will be paid, and this is what is shown by the sudden spike in expenditure in the figure.

For this road project, the difference between toll revenue and operating expenditure is the free cash flow (see Figure 5), which is a component of economic cash flow. This is the flow that makes it possible to obtain financing, because it will be the main source for repayment of the debt.
Figure 4: Net toll revenue and total expenditure

Figure 5: Economic cash flow
Based on this economic cash flow (free cash flow), the project financing is structured in the light of the debt service cover ratio (DSCR) required for the project to be bankable; in other words, the relationship between the anticipated economic cash flow and debt service. In the case of Peru, historically a greenfield-type project requires a DSCR of up to 1.6, while a brownfield-type project requires a DSCR of up to 1.4. On the basis of the proposed DSCR, an estimate is made of the maximum financing or debt required and thus of the amount of capital to be provided by investors.

A demand model involves the complete transfer of responsibility for demand variations in the future, with no minimum demand guarantees or minimum guaranteed revenue. In such cases, guarantee schemes would operate in the event of arbitrary intervention by the Government resulting in contract termination. This is how the new Mexican PPPs—and those that have been refinanced—are structured, and it is also the closest to existing Chilean concessions. In Peru, it has been observed that the Linea Azul private initiative did not require demand guarantees.  

In order to avoid termination clauses are included that allow the creditor to change concessionaire before termination takes effect.

In addition, a PPP project structured on the basis of a demand model requires that an appropriate study of demand should first be conducted (essential requirement). Combined with fixed prices or tariffs for the service provided, this will make it possible to estimate anticipated revenue to ensure bankability of the project.

After revenue has been estimated and definitive engineering studies have established the costs of investments and of operation and maintenance, the free cash flow needed to support financing for the demand-model PPP project is calculated.

**b) Demand models converted into cost models**

One way of supporting project financing is to incorporate the concept of *minimum guaranteed revenue*. The level of guarantee provided may be as much as 70, 80 or 90 percent of the revenue inflow corresponding to anticipated demand. The higher the minimum guaranteed revenue, the closer we come to a cost model, even if the contracts are structured on the basis of a demand model. One example is the concession for the

---

15. A private initiative concerning 150 kilometers of urban roads, half of which are new.
Puente Pucusana-Cerro Azul-Ica road section (Highway Section No. 6) on the Autopista del Sol in Peru. This trend was initially followed in Chilean and Mexican concessions.

It was initially thought in these countries that, despite the guarantee, the level of demand depended directly on management by the concessionaire, which should therefore enjoy the benefits (when demand was higher than anticipated) and suffer the losses (when demand was lower than anticipated). However, as shown by the Mexican experience, this was not the case and losses were eventually socialized. In Mexico, it was the economic situation, the high tolls and the existence of alternatives to the toll roads that finally caused the collapse of the Mexican concessions. Yet the concessions were structured with minimum guaranteed revenue and termination clauses allowing operators to terminate the contract and return it to the Government, together with clauses establishing that the assets being returned should be appraised at the value of the intangible asset or the value of the asset less what had already been recovered. With these clauses, the Government ended up paying roughly the cost of the unrecovered investment, although in the Mexican case tolls had been reduced to levels that would not enable the operator to recover its investment if the concession had continued.

The Federal Government step-ins in the first Mexican highway concessions illustrate the failure of the model that transfers risk to the concessionaire but basically provides some protection to ensure recovery of the investment, making it more like a cost model. The difference is that, with a cost model, the concessionaire assumes the cost of investment and the cost of operation and maintenance but then the resources obtained belong to the Government or are reinvested in projects of interest to the concession grantor. With the demand models used, the Government guarantees minimum profitability but does not benefit in the case of favorable scenarios.

If bankability problems make it necessary to have minimum guaranteed revenue, this must be mirrored by benefit to the Government if demand exceeds initial expectations or is increased as a result of Government intervention. The stability of the contract will be enhanced if it specifies that revenue above a certain level will be shared.

In any case, the system must provide for:16

- Definition of a maximum debt ratio (e.g. 70 percent of investment), ensuring that debt service will be covered by incoming revenue, usually channeled into trusts;
- The option for creditors to find a new operator (with similar prequalification) if the first one incurs losses that prevent it from continuing. This will give the creditor

---

16 The model described was used for the new concession for the Hotel del Cusco, Peru.
greater assurances that the next operator will be able to ensure revenue flows.

- Risking by the operator of up to a certain percentage of its capital (for example up to 30 percent of the investment). Logically, before reaching that percentage, it should give way to a new operator and thus ensure the continuity of the concession.

- A sufficiently large withdrawal penalty to encourage reorganization of the operation and a search for an alternative solution before the concession is terminated.

- If the concession is terminated, the concession grantor will be responsible for the debt and will pay off the debt principal on two conditions: (i) that it is not held responsible for principal share and that the performance bond is not executed until the loss reaches the level specified (30 percent, for example); (ii) that it takes over the debt principal to be recovered in annual installments based on the interest rate. Here the performance bond must be fully executed so that there will not be an incentive to terminate.

- If termination is initiated by the concession grantor, the operator must be compensated for its unrecovered capital at a rate equivalent to the cost of capital (cost of debt plus a spread).

3.5.3. Mixed model

The mixed model is found in concessions with different types of revenue source. In the case of airport concessions, for example, revenue can be divided into revenue corresponding to a cost model and revenue similar to a demand model. Airport operation (operation of aircraft, runway maintenance, upkeep and care of passenger areas) fits into a cost model. In other words, the airport operator can do very little to increase or decrease the number of aircraft, airlines or passengers. If demand cannot be managed by the operator, except in congestion situations, a cost model must be used. However, if the operator also has the opportunity to build hotels, commercial centers, parking lots and other facilities, it will assume the demand risk and a demand model is therefore required.

Thus, mixed models are possible, combining a cost model and a demand model.

In such cases, the contract will provide for remuneration for investment (RFI) and remuneration for operation and maintenance (ROM) in the case of the airport services and a demand model for the commercial services. This may also be the approach for a
basic primary health care unit (UBAP), where health care is based on the number of enrolled persons under the capitation system, under a cost model, but there may be a fee for service when the persons treated are different from the insured population.

3.6. Self-sustaining and cofinanced PPPs

PPP projects may have positive or negative private profitability. When the revenue from the PPP contract covers operating expenses and recovery of investment, the **PPP project is self-sustaining**. If, on the other hand, revenue from the PPP project is not sufficient to cover operating expenses or if the revenue covers them but the investment cannot be fully recovered, the PPP project shows a loss. This assumes that the users of the service provided under the project cannot make it profitable, so that the Government has to cofinance the user to make the project sustainable, in which case this is a **cofinanced PPP project**.

A common mistake in discussion of cofinanced projects is to consider that the Government is cofinancing the private operator. In fact it is supporting the users, who would otherwise have to pay a higher tariff, possibly beyond their capacity to pay, or would not have the service.

Cofinanced PPP contracts have mistakenly been described as cost-model contracts and self-sustaining projects have been incorrectly described as demand-model projects. Clearly some cost-model projects are self-sustaining\(^1\) and some demand models show a loss and need some cofinancing.\(^2\) The model to be used depends on the nature of the demand and not on the investment repayment sources and project costs.

As has been seen earlier, with a cost model payment has to be made for investments and for operation and maintenance, for example through RFI and ROM for the hospital and sanitation projects in Peru. These are fully covered by patient contributions in the case of the hospitals and by users of drinking water and sanitation services in the second case. Thus no Public Treasury funds are needed for the project to be self-sustaining and the users of the service pay directly or indirectly.

---

17. Private initiative combined with ESSALUD.
18. Examples are the ESSALUD hospitals and the sanitation projects for Taboada and La China in Peru. Such projects generally derive their revenue from tariffs and not from Treasury accounts. This is an important difference.
19. Examples are the ports of Yurimaguas and Pucallpa, where the Government will have to provide initial impetus in the form of an initial contribution or payments over time. These Government payments make the operation profitable and the demand risk can then be transferred to the concessionaire.
For other projects where users cannot pay for the service directly, such as the projects for the Interoceanic Highways, an effort will have to be made by Public Treasuries and it will obviously have to be justified by a prior positive social evaluation.  

Peru follows the same basic principles and for cofinanced concessions uses the concepts of payment for works (PFW) and payment for operation and maintenance (POM). The sum of the two represents the total cost of the concession and what the operator should receive.  

An example of a project in which the Government cofinances users could be a toll road for which the total annual cost of the concession service (PFW + POM) is US$20 million. Let us assume that in one year toll revenue is US$9 million, which does not cover the total cost of the concession. In this situation, the Government contributes by providing cofinancing, so that when combined with revenue this will cover the total cost of the concession. In this example, cofinancing of the user would amount to US$11 million (partly to finance the operation and partly to cover the investment).  

**Figure 6: System of cofinancing for road projects**

![Diagram of cofinancing system]

20. These evaluations are highly controversial. For example, the Interoceanic Highway was exempt from evaluation by the Sistema Nacional de Inversión Pública (National Public Investment System) because several evaluators considered that the investment was not commensurate with the benefits. Five years later, demand has reached the level projected for 2030 and so far the project has generated over US$2,000 million (measured as the commercial value of goods transported by trucks using the Highways).
In this case, the concession grantor provides a steady inflow of payments enabling the total cost of investments, operations and maintenance to be recovered. Revenue should cover concession costs for the entire duration of the concession and the level of cofinancing is determined for each period. With this payment system, the total revenue received by the operator does not depend on the number of highways used, which improves the bankability of the project.

Although the Government may have contributed at the outset, the project may later generate revenue in excess of the costs for each period. In this case, an initial cofinancing would be possible, to be offset by future remuneration, or at least a reprefiling of revenue in parallel to costs, with increasing repayment of the investment. It will then be necessary to evaluate whether current revenue will cover the costs of the concession at current value. If so, in order for the project to be bankable, there will have to be a suitable mechanism for management of funds and, if necessary, provision of non-financial guarantees by the Government.

**Figure 7: Self-sustaining and cofinanced concessions**
If this evaluation shows that revenue will not cover the concession costs at current value, the Government will have to contribute and the project will be cofinanced. Peruvian regulations provide that a project will be classified as cofinanced if it requires financial or non-financial guarantees and the probability of needing public funds is higher than 10 percent.

Lastly, to sum up and considering the two models of economic and financial structuring and the level of Government participation, a general classification of PPP contracts is given that will serve as a guide in this study.

**Figure 8: Classification of PPP contracts**

PPP projects may be self-financed or cofinanced, with co-participation by the Government and users in the project revenue, regardless of whether a cost model or a demand model is used. When demand-model contracts show a loss, there is usually bidding for the subsidy to make the project profitable, while the demand risk continues to be assumed by the operator. Examples are the Pucallpa and Yurimaguas ports and some roads in Mexico. In the case of
cost-model contracts, there is bidding for the RFI and the ROM and any cofinancing needed will be calculated by comparing revenue with concession costs in each period.

**Cofinancing, contingent liabilities and sovereign debt**

One of the most controversial questions concerning PPPs is whether contingent liabilities are created.\(^{21}\) The controversy centers on how the contingent liabilities generated by projects with cofinancing are recorded in the accounts and it is related to restrictions on indebtedness.

One related issue that has been discussed is whether cofinancing creates definite liabilities for the Government. Initially, the extreme approach was adopted of recording the entire future commitment of payment for investments and for operation and maintenance at its nominal value. Although the thinking has evolved, the issue is still open, because it affects the ability of Governments to develop cofinanced PPPs. Because of this inflexibility, situations were created by PPP promoters in which the recording of Government commitments goes to the opposite extreme. For example, Mexican PPPs record projects as current purchases of the Government, without establishing contingent assets or definite assets.

In the case of the Interoceanic Highways, two types of commitment existed: payment for investments (PFW) and payment for operation and maintenance (POM). The payment for investments (PFW), which is a firm commitment for the duration of the annual installments (15 or 20 years), must be distinguished from the POM, which becomes a payment obligation as long as the operator periodically engages in operation and maintenance of the works. In other words, the definite obligation that should be recorded in the accounts is the repayment of investments (derived from incoming PFWs) and not POM obligations, because these are typically current expenses that can conceivably be avoided.

Payment commitments derived from cofinanced PPPs evoke the same fears as sovereign debt: at a time of limited Government revenue, such as an economic crisis, it will be difficult to repay the sovereign debt, including PPP obligations. Yet these projects are usually the most vulnerable, because the accounts record not only investment repayment commitments but also current POM payment commitments, which is wrong. The latter are conceivably avoidable, because in times of crisis they can be temporarily suspended.

\(^{21}\) This issue was so important in Peru that it caused a slow-down in cofinanced projects and paralysis of private initiatives with cofinancing, resulting in a major setback for one of the most important engines of PPP development.
In conclusion, the basis for recording definite liabilities should be the current value of investment repayment commitments (PFWs) and POMs should not be recorded as definite liabilities.

However, definite liabilities should be defined as the net present value in each period of analysis of investment repayment commitments (PFWs), minus the present value of revenue obtained by the PPP project. In other words, the Interoceanic Highway has future commitments (PFWs) but this year it launched operations for which tolls will be paid. The revenue forecast for toll payments will initially be equal to the estimate for 2030. If this is projected for the concession period, a present value will be obtained that should be deducted from the payment commitments mentioned. This calculation should be performed periodically in order to give a better estimate of the definite liabilities of the PPPs.

In other contracts, the obligations of the Government are not clearly spelled out.

Contingent liabilities depend on the obligations assumed by the Government in the case of termination, since they refer to the value of the intangible assets or to a value to be calculated at the time of contract termination. If the calculations are balanced, they should give a value equivalent to the present value of the payment commitments (PFWs), with some variations. This means that the basis for calculating definite liabilities will be roughly the same. The manner in which payment systems and termination clauses are described may vary; this does not mean that there are no definite liabilities but simply that they are described differently. In order to determine the basis for calculating definite liabilities, the only question is how much, at present value, the Government would pay if the PPP contract is terminated during the review period. The result, minus revenue at present value, will be the amount of definite liabilities.

This controversy led promoters to devise the Mexican PPP system, whereby obligations are recorded from period to period as current expenditure, like payments for telephone service and other services. If now we ask the same question as was asked in the preceding paragraph, the answer will be that, in the event of a contract termination, the Government will be left with a definite commitment. Whenever investments are the result of repayment by any institution with a budget depending on the Public Treasury, these should be recorded as definite liabilities.

22. It has not yet been decided whether toll increases should be recorded over longer periods—even in perpetuity—but asset replenishment would have to be estimated for this purpose.
Tariffs and cofinancing

The dependence of PPP projects on Public Treasury resources is an obstacle to their development. However, a review of the history of the development of infrastructure and public services provides some answers.

Originally public services such as electricity, sanitation, telecommunications and roads were provided by Governments, using Public Treasury resources derived from taxation. The sectors gradually became independent and the electricity and telecommunications sectors established their own regulations and pricing, so that projects were financed from the tariffs paid by users of the services. Later, the sanitation sector adopted a similar system and its projects are now financed by sector tariffs.

The point of these tariff-financed systems is that a project is implemented (for example, the financing of the Private Southern Water Initiative, which will supply drinking water using a desalination plant in southern Lima, Peru) and a tariff is established that all users in Lima will pay. It is a network or club system, in which projects to benefit all concerned are financed by all the members of the network or club.

The electricity sector is even better organized at the national level and national projects in depressed low-income areas are being implemented and reimbursed through the Electricity Social Compensation Fund (FOSE). This is a shadow fund, but the payment made in each period is incorporated in the tariffs paid by all users of the service nationwide. The same situation exists for telecommunications, except that legal arrangements were made to convert the telecommunications fund into a public fund and it is now recorded in the accounts as part of the Public Treasury.

The important feature of these systems is that they are already governed by their regulatory bodies and could therefore be exempt from a second filter, such as the National Public Investment System in Peru. The project will be financed by the users and not by the Public Treasury.\(^{23}\) The same is true for a system of development of private initiatives, although in projects that may be financed not directly by users but by the system as a whole.

---

\(^{23}\) Although this would seem obvious, it is clearly difficult for the system to escape the filters and sometimes there are two or more evaluations. In the case of sanitation, although the investments are financed by users and evaluated by the regulatory body, the National Public Investment System (SNIP) is still involved.
This solves the problem of cofinancing, since tariffs allow cofinanced projects to become self-sustaining projects. In Mexico, instead of the Government paying for services, this obligation can be transferred to the users, decreasing tax pressure and increasing or establishing tariffs for the service that are paid by the users as a whole. Thus the question of definite liabilities is eliminated from government accounts.

This system, which is already benefitting the public services mentioned, is not fully developed in the transport sector. That sector still has a system in which projects are self-sustaining because users directly pay the cost of the project, while it could have a system similar to those mentioned. With a regulatory or pricing system, in which the road or transportation sector could be structured as a network or club, investments in these sectors could be provided more quickly. All users would make a payment for the road networks—for example, urban networks—in which the amount collected could be used to pay the costs of investment and of operation and maintenance. Then a system could be devised whereby a project would be developed in the north of the city and be financed by all users of the network, or in the south of the city and be paid by all. There would be a regulatory and pricing system similar to that established in other sectors. This could be a national club.

3.7. Conditions for a successful financial close

The financial close of PPP projects is the action by which financing contracts are finalized using funds from one of the sources mentioned in the preceding chapter. In this connection, there are more conditions required for finalizing PPP project financing than for corporate financing to fund an investment project that a business may be implementing or hopes to implement.

There are more conditions for a PPP project because of the nature of such projects and the characteristics of the project approach, in which financing basically depends on the cash flows to be generated by the project and is, as far as possible, not dependent on sponsor guarantees.

However, approval of any financing requires a period of analysis to evaluate debt repayment capacity; the intrinsic and extrinsic features of the project to be financed are analyzed to determine the risk to which the financier would be exposed. On the basis of
this analysis, the system of guarantees will, if necessary, be designed in order to reduce the risk of non-recovery of the capital loaned.\textsuperscript{24}

For corporate financing, this period is relatively shorter because sufficient information exists to evaluate the following aspects:

- The payment performance of the company, in the case of earlier financing obligations.
- The magnitude of the effects that any macroeconomic, sectoral or commercial event could have on the company or on the sector, particularly in the case of companies that have a track record on the market or operate in mature economic sectors.
- The company’s capacity to pay, evaluated using financial projections based on the past history of its performance, with real information on financing commitments already assumed and investment projects in the pipeline.
- The quality of the company assets, which would be the source of guarantees in the event of debt payment default.
- The willingness of subsidiary companies, associated companies, the parent company and the actual shareholders to endorse the required financing.

This is not the case for projects financed using the project finance approach, which have the following characteristics:

- No previous financing experience exists that could be used to give guidance regarding the company’s payment behavior.
- In the case of a new company, it will be necessary to evaluate the effects that external factors may have produced on similar firms; however, because of the magnitude of the investments, there will be few companies with similar characteristics. In addition, in the case of public infrastructure, consideration will have to be given to additional occurrences linked to social or political factors.
- The company’s payment capacity is also measured on the basis of economic projections; however, these are based solely on projected data derived from expectations regarding revenue, costs and investments.
- When the projects involve public infrastructure, the company has no assets to back the financing, since the infrastructure is public property; it therefore has to devise

\textsuperscript{24} One of the principles followed in drafting PPP contracts is to ensure that the contracts contain all necessary provisions to allow structured financing.
suitable systems to guarantee payment of the debt.

- The magnitude of the financing will limit the willingness of subsidiary companies, associated companies, the parent company or the actual shareholders to endorse it, because non-payment could seriously affect their balance sheets. And even if they were willing, this would probably not suffice because of the magnitude of the financing.
- In the case of PPP contracts, if there are no standardized and independent instruments, the contracts will have to envisage investment repayment schedules, possible payment interruptions due to costs not covered by the operation, penalties and contract termination.

In addition, since PPP projects are associated with large amounts of investment, the funds will have to come from more than one financial source, requiring syndicated financing or financing on the financial market. The conclusion of an agreement between the financing agents will require additional time. However, if standardized instruments such as CR-PFWs or CR-RFIs are available, it will be possible to reduce the time needed, because other projects can be used as models.

The project evaluation that determines the provision of project financing is based on the following pillars, representing the most important aspects to be considered:

**Figure 9: Elements involved in financial close**

![Financial Close Diagram]

Source: Sergio Bravo.
3.7.1. Economic characteristics of the project

The economic characteristics of the project determine its ability to generate predictable cash flows; these are the characteristics linked with revenue variables (price and volume) and those that determine project costs for operation and maintenance activities. As stated earlier, project revenue and costs can be defined using one of the structuring models explained (demand, cost or mixed model), depending on who assumes the demand risk.

Thus, if demand risk is assumed by the concessionaire, it will be necessary to conduct surveys to confirm anticipated demand, with qualitative and quantitative data, such as traffic surveys and market surveys. The financiers will select the firms to conduct these surveys. In a cost model, the survey of demand is less important, because the risk is assumed by the Government, but surveys will be needed to determine the definite or contingent liabilities created.

As far as operating costs are concerned, infrastructure projects will differ depending on the type of service to be provided. Electricity projects will be different from sanitation, road and telecommunications projects. Hospital or school projects will be even more different. For infrastructure projects, investment costs (equivalent annual costs) represent approximately 80 percent of total costs and operating and maintenance represent 20 percent. For service projects such as hospitals and schools, operating and maintenance costs represent 80 percent of total costs, while investment costs represent 20 percent. This is important, because in the second case contract regulation should focus on operation rather than on construction.

There are other types of risk that should be analyzed, such as the availability of the resources needed for the project in anticipated quantities and at anticipated costs, which will affect operating costs. A concession project for energy or mineral resources is dependent on the availability of reserves of such resources, but for projects involving a hospital or school it is also important to know whether resources are available for a commitment to a level of service quality that may not be available in the country. In this type of project, it will be necessary to create mechanisms to reduce the volatility of operating costs.

In addition, attention is paid to the operating company’s experience that would ensure compliance with service levels to be established and to information on its capacity to perform
within suitable operating ratios. The capacity to generate cash flows should correspond to the project’s investment needs. For this purpose, extremely reliable data must be available at the time of evaluation on the amounts of investment needed for the project. These data will be available when the engineering surveys have been completed. They should be clear, contain adequate justification and be prepared by specialists with experience of the type of infrastructure to be developed and the type of technology to be used.

Once the investments have been estimated, an evaluation is made of the possible impact of any variation in prices or metrics during the construction phase. It is also important to evaluate the quality of the company to which construction has been outsourced in order to check on its performance in constructing similar works and to form an idea of whether the works will be completed on time, within budget and in compliance with the minimum established technical requirements. Previously the usual method was to conclude turnkey contracts, but there are also cases in which geological or similar risks must be managed, which are transferred from the constructor to the operating society and from the operating society to the concession grantor.

### 3.7.2. Financing system

As indicated above, an important element to be evaluated when deciding on financing is the capacity of the project to generate predictable cash flows. In cases of demand models with controllable volatility, after an analysis has been made of the volatility of anticipated cash flows, debt capacity will be determined and the principle is that the minimum economic cash flows should cover debt service with a certain safety margin. In this connection, the level of financial leverage needed for the project should be defined in the light of the availability of funds to cover debt servicing. Otherwise there could be periods during which the project would not be able to cover debt service, creating a default situation in which this illiquidity problem could become an insolvency problem. Obviously, this is to be avoided in the structuring of financing.

One way of relieving the potential for illiquidity at any time is to establish guarantees to be triggered in the event of failure to service debt in a timely manner. Such guarantees can be provided by the Government, through minimum guaranteed revenue systems, or by insurance firms specializing in such guarantees, known as monoliners, which are now less common because of their high exposure during the recent economic crisis.
It should be noted that the financing agents hope that insurance companies will guarantee full debt service, rather than reduction of possible losses resulting from debt service default.

Another solution is to set up a trust to ensure the proper use of the project’s financial resources (revenue and expenditure), prioritizing debt service. Under this solution, project revenue is collected and used to pay for debt service and for the project’s operating costs, before any other obligation is met. In addition, as in the case of the ESSALUD hospitals in Peru, a contingency fund is incorporated in the project to relieve any illiquidity resulting from unforeseen or unlikely events.

There may be cases in which projects have made full provision for all these aspects but still are not eligible for financing. This will happen when it is found that all the project risks are not suitably allocated, especially when a risk is allocated to the concessionaire that it is not able to manage or when the amount of risk allocated to the concessionaire is considered to be very important. In some cases, a solution may be found in the phase between signature of the PPP contract and financial close.25

Concession contracts usually set deadlines for financial close—the phase during which financial resources are finalized for implementation of the project. This phase will be shorter if the PPP contract specifies all the conditions necessary for the financing, ranging from proper risk allocation to structuring of contracts with a view to their financing.

Prior to bidding for a PPP contract, potential bidders consult with their sources of financing, with banks. If the terms of the draft contract are not appropriate, all or some of them may withdraw, generally making way for more responsible bidders. Usually risk classifiers are consulted. After the award of the concession contract, the successful bidder starts to negotiate with financial institutions with a view to financial close. One criterion for a good PPP contract is that the financial close process should take as little time as possible. Sufficient time should be allowed for the operator to meet the economic and financial conditions of the project and to receive from the potential creditor any changes needed to make the project possible. In addition, the analysis by the financial agent will require prior evaluation of the data submitted, for which it may be necessary to engage external advisers to exercise due diligence regarding such data.

25. For example, Peruvian regulations allow changes to improve the bankability of the project to be made at the request of the allowed creditor that will be financing the PPP project.
7.3.7. Project externalities

The externalities associated with the project to be financed are usually reviewed in a certain order of priority. First, general consideration is given to the country risk rating at that time, which will give an indication of the country’s rating for the risk of default on payment of sovereign obligations.

Consideration is then given to the political risks to which the project is exposed. Projects that have goals that reflect the goals of the Executive, for which the political will exists for implementation and which are rated as important for the country’s development or are to be implemented in a climate of political stability will be more acceptable to financial agents. In addition, the legal context and regulatory situation in the country where the project will be implemented influence the financier’s decision. This is because financial agents move their capital to those countries that are best placed in this regard.

The goal of infrastructure projects is to produce social benefits by promoting competitiveness or promoting the economic growth of the zone of influence and by increasing commercial activity in the region. However, projects are always dependent on the receptiveness of the population in their zone of influence and of society as a whole, especially when different interest groups exist with different goals. In such cases, some motivational work may first be needed in order to explain the potential benefits for each of these interest groups. Otherwise the project will be exposed to the risk of social unrest preventing implementation, which would make it impossible to generate inflows for debt repayment.

These reviews indicate that the aspects needed to ensure successful financial close include the following:

1. Economic characteristics of the project:
   - Ability to generate cash flows
   - Structuring model: demand or cost
   - Characteristics of the infrastructure to be constructed
   - Economic foundations of the project
   - Construction, operational and financial capacity of the sponsor or its associates
2. System of financing:

- Quality of economic and financial structuring in the PPP contract
- Financing system implicit in the contract
- Commitments or financial guarantees from the Government or private insurers
- Mechanism for managing the project’s cash flows
- Arrangement for risk allocation envisaged in the project
- Deadline for financial close
- Negotiation of changes to ensure bankability

3. Externalities of the project:

- Country risk rating
- Degree of exposure of the project to political or macroeconomic risks
- Legal and regulatory framework within which the project is to be developed
- Social benefits to be generated by the project
- Effects of social decisions

3.8. Case studies

This chapter reviews some representative PPP projects implemented in Peru, Chile and Mexico that have already reached financial close.

The purpose of this review is to identify the contractual conditions established in these projects as regards economic structuring and to analyze the design of the financial instruments included in the financial structuring, as well as to review the conditions that determined the success of the instrument concerned.

It will be seen that all the financial instruments included in these contracts were designed to achieve the following goals:

To expand the concessionaire’s sources of financing, so that it is not limited to traditional bank financing but can use financial sources that are willing to place their resources in public infrastructure investment projects with long maturities.
To reduce financing costs for projects for which appropriate economic conditions are defined, so as to ensure optimal definition and allocation of all project-associated risks, and especially demand risk.

To lengthen the time allowed for debt repayment, so as to bring it into line with project capacity to generate cash flows.

To create conditions in which the financing needed for the start of work can be organized by, or better still, before the deadline.

### 3.8.1. Selection of cases for study

#### 3.8.1.1. Purpose of the research

The purpose of these case studies is to identify and validate, with the help of experts, successful cases of economic and financial structuring of PPP projects that achieved financial close in a satisfactory manner, as regards cost and time.

#### 3.8.1.2. Unit of analysis

The unit of analysis for this study is experience at the country level; cases were studied in Chile, Peru and Mexico involving public infrastructure investment projects using private capital through PPPs. The sub-unit of analysis are the contracts for PPP projects selected for each country.

#### 3.8.1.3. Criteria for the selection of cases

Several criteria were adopted for the selection of cases to be studied. These include:

**Economic character**

The cases to be selected should allow a balanced analysis of existing structuring models;
in other words, they should include both cost-model cases and demand-model cases. Earlier chapters of this report have described the theoretical framework depending on who assumes the demand risk. In addition, the cases selected must include self-financed, self-sustaining and cofinanced PPP contracts.

**Intersectoral character**

The PPP projects were implemented in various sectors, so that conditions and characteristics specific to the business models of each sector had to be included. Cases were therefore selected to cover various sectors, so that the lessons learned could be quite diversified.

**Greenfield and brownfield**

The PPP projects may involve development of completely new infrastructure (greenfield projects) or the improvement or expansion of existing infrastructure with existing revenue (brownfield projects). The cases selected had to be a sample including both types of project.

**3.8.1.4. Cases selected**

The Latin American experience of PPP projects included the cost model, demand model and mixed model described in Section 3.5. Using these models, this section will review the PPP projects selected in order to highlight their most important aspects, most striking advances and financial innovations.

On the basis of the criteria described above, a group of cases was selected. They are listed below, with an indication of the model used and whether they are greenfield or brownfield projects:
Table 2: Peruvian cases studied

<table>
<thead>
<tr>
<th>Concession contracts</th>
<th>Economic character</th>
<th>Type of concession</th>
<th>Economic sector</th>
<th>Infrastructure</th>
<th>Award of contract</th>
<th>Start of works</th>
<th>Amount of Investment (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway Network No. 4</td>
<td>Cost model</td>
<td>Self-financed</td>
<td>Transport</td>
<td>Brownfield</td>
<td>2008</td>
<td>2009</td>
<td>340,000,000.00</td>
</tr>
<tr>
<td>Waste water treatment Plant, Taboada</td>
<td>Demand model</td>
<td>Cofinanced</td>
<td>Sanitation</td>
<td>Greenfield</td>
<td>2009</td>
<td>2010</td>
<td>416,620,130.05</td>
</tr>
<tr>
<td>IIRSA Sur</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Greenfield</td>
<td>2005</td>
<td>2006</td>
<td>809,000,000.00</td>
</tr>
<tr>
<td>IIRSA Norte</td>
<td>Cost model</td>
<td>Self-financed</td>
<td>Transport</td>
<td>Greenfield</td>
<td>2005</td>
<td>2006</td>
<td>200,000,000.00</td>
</tr>
<tr>
<td>Mantaro-Socabaya transmission line</td>
<td>Demand model</td>
<td>Cofinanced</td>
<td>Energy</td>
<td>Greenfield</td>
<td>1998</td>
<td>1998</td>
<td>179,179,000.00</td>
</tr>
<tr>
<td>ESSALUD hospitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Mexican cases studied

<table>
<thead>
<tr>
<th>Concession contracts</th>
<th>Economic character</th>
<th>Type of concession</th>
<th>Economic sector</th>
<th>Infrastructure</th>
<th>Award of contract</th>
<th>Start of works</th>
<th>Investment (Mexican pesos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monterrey-Cadereyta</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Brownfield</td>
<td>1998</td>
<td>1998</td>
<td>60,000,000.00</td>
</tr>
<tr>
<td>Western road network – RCO</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Brownfield</td>
<td>2007</td>
<td>2007</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Chilean cases studied

<table>
<thead>
<tr>
<th>Concession contracts</th>
<th>Economic character</th>
<th>Type of concession</th>
<th>Economic sector</th>
<th>Infrastructure</th>
<th>Award of contract</th>
<th>Start of works</th>
<th>Investment (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program of concessions for prison</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Prisons</td>
<td>Greenfield</td>
<td>2004</td>
<td>2004</td>
<td>80,000,000.00</td>
</tr>
<tr>
<td>infrastructure, Group 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concession for the Arturo Merino</td>
<td>Demand model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Brownfield</td>
<td>1997</td>
<td>1998</td>
<td>175,545,348.00</td>
</tr>
<tr>
<td>Benítez International Airport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern coastal highway</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Greenfield</td>
<td>1999</td>
<td>1999</td>
<td>480,000,000.00</td>
</tr>
<tr>
<td>Melipilla bypass</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Greenfield</td>
<td>2003</td>
<td>2003</td>
<td>20,000,000.00</td>
</tr>
</tbody>
</table>
Table 5: Colombian cases studied

<table>
<thead>
<tr>
<th>Concession contracts</th>
<th>Economic character</th>
<th>Type of concession</th>
<th>Economic sector</th>
<th>Infrastructure</th>
<th>Award of contract</th>
<th>Start of works</th>
<th>Investment (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosa - Granada - Girardot road project</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Brownfield</td>
<td>2004</td>
<td>2004</td>
<td>80,000,000.00</td>
</tr>
<tr>
<td>Pereira - La Victoria road project</td>
<td>Cost model</td>
<td>Cofinanced</td>
<td>Transport</td>
<td>Brownfield</td>
<td></td>
<td></td>
<td>175,545,348.00</td>
</tr>
</tbody>
</table>

3.8.2. Background to the cases studied

This section will briefly describe the selected cases, grouped by country of origin.

The countries whose PPP experience was reviewed are the five most attractive to private investment out of a total of 12 countries. The World Economic Forum’s Infrastructure Private Investment Attractiveness Index (IPIAI)\(^\text{26}\) gives the following ranking.

Table 6: Infrastructure private investment attractiveness index

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chile</td>
<td>5.43</td>
</tr>
<tr>
<td>2</td>
<td>Brazil</td>
<td>4.40</td>
</tr>
<tr>
<td>3</td>
<td>Colombia</td>
<td>4.33</td>
</tr>
<tr>
<td>4</td>
<td>Peru</td>
<td>4.23</td>
</tr>
<tr>
<td>5</td>
<td>Mexico</td>
<td>4.04</td>
</tr>
<tr>
<td>6</td>
<td>Uruguay</td>
<td>4.02</td>
</tr>
<tr>
<td>7</td>
<td>El Salvador</td>
<td>3.97</td>
</tr>
<tr>
<td>8</td>
<td>Guatemala</td>
<td>3.64</td>
</tr>
<tr>
<td>9</td>
<td>Argentina</td>
<td>3.41</td>
</tr>
<tr>
<td>10</td>
<td>Venezuela</td>
<td>3.37</td>
</tr>
<tr>
<td>11</td>
<td>Bolivia</td>
<td>3.34</td>
</tr>
<tr>
<td>12</td>
<td>Dominican Republic</td>
<td>3.33</td>
</tr>
</tbody>
</table>

Source: Mia and others (2007)
Prepared by BBVA

---

\(^{26}\) This Index assigns a weight to various factors, such as the regulatory, institutional and fiscal environment, the political risk, macroeconomic factors and return on investment.
A comparative analysis made by the Andean Development Corporation (CAF) describes the main characteristics of PPP infrastructure projects in America and Spain. Table 7 gives the results for the countries analyzed in this document.

The most striking information in the table concerns the type of infrastructure in which investments were concentrated and the type of project (brownfield or greenfield), and this information was used in our analysis.
### Table 7: Comparative Country Analysis

<table>
<thead>
<tr>
<th></th>
<th>Peru</th>
<th>Chile</th>
<th>Mexico</th>
<th>Colombia</th>
<th>Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experience using PPPs</strong></td>
<td>Short</td>
<td>Medium</td>
<td>Long</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Importance of PPPs in public investment</strong></td>
<td>Moderately important</td>
<td>Extremely important</td>
<td>Important</td>
<td>Important</td>
<td>Moderately important</td>
</tr>
<tr>
<td>Growing</td>
<td>Stable</td>
<td>Growing</td>
<td>Stable</td>
<td>Growing</td>
<td>Growing</td>
</tr>
<tr>
<td><strong>Transport infrastructure with largest investments</strong></td>
<td>Roads</td>
<td>Roads</td>
<td>Roads</td>
<td>Roads</td>
<td>Roads</td>
</tr>
<tr>
<td><strong>Importance of PPPs in public investment</strong></td>
<td>Roads</td>
<td>Roads</td>
<td>Roads</td>
<td>Roads</td>
<td>Roads</td>
</tr>
<tr>
<td><strong>Transport infrastructure with largest investments</strong></td>
<td>Railways</td>
<td>Airports</td>
<td>Railways</td>
<td>Airports</td>
<td>Urban infrastructure</td>
</tr>
<tr>
<td><strong>Importance of PPPs in public investment</strong></td>
<td>Airports</td>
<td>Urban infrastructure</td>
<td>Airports</td>
<td>Airports</td>
<td>Airports</td>
</tr>
<tr>
<td><strong>Most projects</strong></td>
<td>Brownfield</td>
<td>Brownfield</td>
<td>Greenfield</td>
<td>Greenfield</td>
<td>Brownfield</td>
</tr>
<tr>
<td><strong>Specific legislation on concessions or PPPs</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Average concession period</strong></td>
<td>Legal maximum 60 years</td>
<td>Legal maximum 50 years</td>
<td>Legal maximum 30 years</td>
<td>Varying periods, anticipated revenue</td>
<td>Between 20 and 30 years</td>
</tr>
<tr>
<td><strong>Main source of payment</strong></td>
<td>Users</td>
<td>Users</td>
<td>Users</td>
<td>Users</td>
<td>Users</td>
</tr>
<tr>
<td><strong>Bidding system</strong></td>
<td>Open (technical and economic requirements)</td>
<td>Open (economic variable)</td>
<td>Open (less public contribution)</td>
<td>Open (economic variable)</td>
<td>Open (technical and economic requirements)</td>
</tr>
<tr>
<td><strong>Demand risk</strong></td>
<td>Transferred to the Government</td>
<td>Reduced in contracts</td>
<td>Reduced in contracts</td>
<td>Reduced in contracts</td>
<td>Transferred to concessionaire</td>
</tr>
<tr>
<td><strong>Remuneration based on quality indicators</strong></td>
<td>No</td>
<td>Only for road security</td>
<td>Yes, for shadow tolls</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Financing</strong></td>
<td>National banks</td>
<td>National banks</td>
<td>National banks</td>
<td>National banks</td>
<td>National banks</td>
</tr>
<tr>
<td><strong>Frequency of renegotiations</strong></td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Prepared by: Andean Development Corporation, “Public infrastructure and private participation: concepts and experiences in America and Spain.”
4.1. Economic structuring

In view of the large investment involved, projects for infrastructure development in Latin America with private sector participation using PPP contracts must be well structured economically and financially with high levels of leverage. It will not be possible to promote participation by private investment unless the design of the PPP contracts allows adequate financial close or if significant changes are needed in order for this to occur. While ensuring suitably balanced risk allocation, contracts should provide guarantees to private investors and meet the requirements of the evaluations conducted by debt providers.

The requirements specified by debt providers include:

• Ability of the project to generate adequate operational cash flows available to cover debt service. Certain metrics will be calculated, including: debt service cover ratio, project life cover ratio, and loan life cover ratio.
• Optimal predictability of project revenue, to be confirmed by demand surveys conducted by qualified firms.
• Contractual conditions concerning the effect on project revenue if the concession lapses before the end of the concession period.
• Degree of exposure to demand risk, both of volume and of price, evaluated at least during the life of the debt.
• Repayment period shorter than the concession period, in order to reduce the financial risks resulting from events affecting available cash flows, particularly during the last years of the concession. These risks include: 1) equipment obsolescence necessitating reinvestments in assets in order to recover operational capacity; ii) debt refinancing; and iii) decline in productivity.
• Degree of project exposure to volatile operating costs.

27. The process analysis reveals efforts to design structured contracts, as in the case of Peru and Mexico, but also some shortcomings. Some issues are left until the financial close and this may be complicated, because at this stage banks may request changes in the economic balance of the contract, representing an over-simplification of the task. In addition, there may be a lack of confidence in the private sector, to which risks are transferred unnecessarily, making investments more expensive in terms of budget and financial costs.
28. The debt service cover ratio is the ratio of the value of the cash flow available for debt service after operations and compulsory investments in fixed assets to the amount of debt service.
29. The project life cover ratio is the ratio of the net present value of the cash flow available for debt service after operations and compulsory investments in fixed assets over the remaining life of the project to the outstanding balance of the rated debt instrument.
30. The loan life cover ratio is the ratio of the net present value of the cash flow available for debt service after operations and compulsory investments in fixed assets during the life of the debt and the outstanding balance of the rated debt instrument.
31. These are called tail risks.
The economic structuring of the concession contracts studied for each country are reviewed below.

4.2. Payment for investment and operating costs in Peru

4.2.1. Identification of payments for investment and operating costs

The experience of Peru shows that, with a cost model, an initial factor taken into account for the economic structuring of projects was that project risks during the construction phase are different from project risks during the operating phase; the relevant remunerations were therefore separated.

Figure 10: Payments for investment and for operation

A second factor was that project revenue should be such as to: i) generate adequate available cash flows to allow recovery of the investments made by the private investor; ii) cover operation and maintenance costs so as to achieve adequate operational sustainability; and iii) give shareholders an adequate return on the capital invested.
Taking these factors into consideration, a revenue scheme was designed consisting of two inflows or components:

- One component associated with the investments made during the construction phase, originating in the provision of the investments and starting with the commencement of operations for a set period regardless of the duration of the concession. In this document, it will be called “payment for investment.”

- A second component associated with maintenance and operation costs during the operational phase and received as long as the service is provided, but not if the service is interrupted. In this document, it will be called “payment for maintenance and operation.”

4.2.2. Payment for investment in Peru under the cost model

As regards revenue for investment, the Government guarantees to the concessionaire a revenue stream exclusively for the recovery of investments. This way, in cases where demand does not depend on and cannot be altered by the concessionaire, the Government assumes the demand risk.

In Peru it has been found—with periodic successes and setbacks—that payment for investment can be divided into two concepts: (i) non-contingent payment and (ii) contingent payment.

With non-contingent payment, remuneration for investment must be paid even if the operator is being penalized and even if the contract is terminated. The concession grantor assumes responsibility for ensuring that revenue derived from the PPP contract continues to pay for the investment until the end of the investment repayment period, regardless of what happens with the operations. The reason for non-contingent payment is that the investment was already made in the pre-operating phase and is simply being returned in periodic payments.
Figure 11: contingent and non-contingent payment for investment

Of course, a non-contingent payment may mean that the operator is not responsible when the works are not continued for the duration specified, and so benchmarks are needed to ensure that the work is done properly. In order to deal with such events, the Government imposes a series of controls: (i) supervision and approval of final engineering surveys; (ii) supervision and approval of the work; and (iii) supervision of the quality of the service and infrastructure. There are performance bonds for each phase, including completion of surveys and works of the required quality in the time specified. In addition, during the operating phase, an evaluation will be made of the quality standards for the service and infrastructure, in accordance with the service indicators agreed in the PPP contract. Failure to meet the requirements specified in the PPP contract in each of these phases will result in penalties: execution of the performance bond and ultimately termination of the contract.

Figure 12: Supervision and backstopping for quality of work and service indicators
Contingent payment means that, by each payment due date, the service indicators must have been satisfactorily attained. This encourages good performance and attainment of the service indicators, since otherwise this payment, which may be sizeable, will be forfeited. Payment is based on a fixed interest rate but, since the investment involves greater risks to be assumed by the operator, provision is made for a risk premium payable if the operator meets the contract requirements, for which it may need to make unforeseen investments.

Figure 13: Contingent payment and non-contingent payment

There could conceivably be a payment of debt service equivalent to 100 percent of the anticipated investment, with non-contingent payment for the next 15 years (12.4 million in the example), theoretically sufficient to raise 100 percent of the resources for the investment. This goal could be met if the financial structuring provides guarantees of payment of this debt service funding.

Total payment, calculated at economic cost of capital \( K_{OA} \) amounts to 13.5 million, so that there is an extra amount to cover the additional risks assumed by the operator in the pre-operating phase. However, the operator will also receive the 1.1 million if it attains the service indicators in each period.\(^{32}\)

\(^{32}\) For IIRSA Sur, 85 percent of the total payment for the period (PFW) was non-contingent and 15 percent was contingent on attainment of the service indicators. A subsequent additional payment brought the amount to 100 percent of the PFW. This format is still followed in procedures of Proinversión and in sanitation projects, and was continued because it was assumed that bidders would not accept contingent payment. In the case of the ESSALUD hospitals (four concessions awarded with contingent payments), this was found to be acceptable to banks and potential concessionaires. As will be seen, this model allows speedy financial close and makes it easy to attract debt-financing assets generated in these procedures.
The first experience of predictable flows of this kind was with the contract for the Mantaro-Socabaya transmission line. For this reason, we refer to it as the first generation of concessions in Peru.

That contract defined revenue inflow as the annual rate of investment calculated on the basis of the new replacement value (NRV) determined by the regulatory body, which will always be equal to the concessionaire’s investment (US$179.179 million), adjusted in each review period to reflect variations in the United States wholesale price index.

Box 2: Mantaro-Socabaya electrical transmission line

In order to promote national energy integration, in January 1998 the Peruvian Government issued a public call for tenders for the design, construction and operation of the Mantaro-Socabaya transmission line to link the Central-Northern Interconnected System with the Southern Interconnected System, thus forming the National Interconnected System (SINAC). The contractual arrangement used was a BOO (Build, Own, Operate & Transfer) contract.

- An investment of US$300 million had been planned but the bidding process came up with a cost of just under US$179 million. This includes:
  - A transmission line 603 kilometers long, with a capacity of 300 megawatts and a double circuit between the Mantaro (Huancavelica) substation and the Socabaya (Arequipa) substation.
  - A compensation substation at Cotaruse, with four series capacitor banks and four shunt reactors.
  - A transmission control center.
  - A microwave communication system linking the three substations (Mantaro, Cotaruse and Socabaya).

The contract also has the following features:

- It is a BOO (Build, Own, Operate & Transfer) contract.
- It will be financed by the electricity tariff paid by users of the National Interconnected System (SINAC).
- The concession period is 30 years from the date of signature of the contract.
- It specifies service indicators (quality, continuity and efficiency of electrical energy carried over the transmission line).
- It uses a cost model: payment for investment (annualized rate of investment in the sector at new replacement value (NRV) and a percentage of the investment (NRV) to cover the costs of operation and maintenance.
- The real discount rate in dollars for establishing revenue was 12 percent.

Bids were submitted by ENEL (Italy), REDES (Spain), National Grid (United Kingdom) and Hydro Québec (Canada). The concession contract was awarded to the consortium Transmantaro S.A., a subsidiary of Hydro Québec of Canada.
Article 76 of the Law on Electrical Concessions\(^3\) defines new replacement value as the cost of renewing the works and physical assets needed to provide the same service with current technology and prices. It also considers:

- Financial expenditure during the construction period, calculated using an interest rate that may not exceed the real annual discount rate of 12 percent established in Article 79 of the Law.
- Expenditure and compensation for the easements used; and
- Expenditure on surveys and supervision.

Annualized investment costs are also calculated over a period of 30 years at an annual discount rate of 12 percent.

The following figure illustrates this inflow.

**Figure 14: Revenue inflow from the contract for the Mantaro–Socabaya transmission line**

In these cases, there was no clear separation between the concession contract and the system of payments for investment and no clear division between contingent and non-contingent payments.

\(^{33}\) Legislative Decree No. 25844.
The second generation of concession contracts started with the IIRSA Norte contract.\textsuperscript{34} That contract established the obligation of the Government to pay a semi-annual amount for a period of 15 years as an annual payment for works (PFW), which represented revenue connected with the investments made by the concessionaire.

The amounts pledged as PFW are specified in the General Budget Law of the Republic. The concession grantor pledges to provide each year the necessary resources for payments to be made to the concessionaire on time and in due form. In other words, there is a firm payment pledge by the Government and a fundamental obligation to make the payments, which will not be affected or invalidated by any occurrence.

This revenue inflow is related to the debt repayment period, since the debt will be paid off with the return on the investment, as both are connected with the financing of investments. Thus the revenue period should coincide with the debt repayment period.

\textsuperscript{34} The IIRSA Norte concession contract was concluded on June 17, 2005.
Box 3: IIRSA Norte (road sections on the amazonas Norte intermodal highway)

The IIRSA Norte concession contract was concluded in June 2005. It makes the private sector responsible for the rehabilitation, operation and maintenance of the sections of the IIRSA Amazonas Norte Intermodal Highway over a length of 955 kilometers. The following table shows the road sections concerned:

<table>
<thead>
<tr>
<th>National Road</th>
<th>Section</th>
<th>Length (Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08A Y 05N</td>
<td>Yurimaguas-Tarapoto</td>
<td>127.20</td>
</tr>
<tr>
<td>05N</td>
<td>Tarapoto-Rioja</td>
<td>133.00</td>
</tr>
<tr>
<td>05N</td>
<td>Rioja-Corral Quemado</td>
<td>274.00</td>
</tr>
<tr>
<td>04, 03N</td>
<td>Corral Quemado-Olmos</td>
<td>196.20</td>
</tr>
<tr>
<td>01B</td>
<td>Olmos-Piura</td>
<td>169.90</td>
</tr>
<tr>
<td>02 Y 01N</td>
<td>Piura-Paita</td>
<td>55.80</td>
</tr>
<tr>
<td><strong>Total Length</strong></td>
<td></td>
<td><strong>955.10</strong></td>
</tr>
</tbody>
</table>

The projected investment at the start of the concession was US$280 million (plus general sales tax) and the maximum construction period was 48 months, divided into two phases. The highway existed but needed redevelopment, rehabilitation and regular maintenance.

The contract also has the following features:

a. It is a BOT (Build, Operate & Transfer) contract.

b. It will be paid for by the Public Treasury, supplementing the tolls to be collected on the highway.

c. The concession period is 30 years from the date of signature of the contract.

d. It specifies service indicators (quality, continuity and efficiency of the road service).

e. The project has a cofinanced cost-model structure, separating payment for investment (PFW) and payment for operation and maintenance (POM).

f. It provides for partial risk guarantees (four semi-annual payments for investment – four semi-annual PFWs). IDB project risk management.

It used financial devices such as work progress certificates (WPCs) and certificates of recognition of payment for works (CR-PFWs).
The commencement of payments was contingent on the works having been concluded as agreed by and to the satisfaction of the concession grantor and on the works having been delivered, but they would be delivered as percentages of work completed. In addition, the amount of the PFW could be adjusted to reflect variations in prices of construction inputs.

In addition, since a reasonable amount of time elapses between the end of the inflow of revenue associated with the investments (and therefore the end of the debt payment) and the end of the concession, there is less tail risk, and this is a factor evaluated by bodies financing resources via debt.

The contract included a bridge loan from the Andean Development Corporation (Guarantee / $60 Million / 2006) and the IADB (Guarantee / $60 Million / 2006), but it was not necessary to use them for financial close.

Since the main feature of PPP project financing is the long debt repayment period, one important goal was to improve the predictability of cash flows so as to allow appropriate and timely debt service.

In the case of Peru, mention may also be made of the concession contract for the Taboada Waste Water Treatment Plant (Taboada PTAR), which is the first concession resulting from a private sector proposal (private initiative project).
That contract establishes an unconditional and irrevocable payment obligation to repay the investments made in the project (remuneration for investment or RFI), representing the revenue component for recovery of the capital invested and servicing of the debt contracted.

In addition, the ROM component represents the inflow covering costs of operation and maintenance, determined on the basis of the project cost estimates.

The name was changed from PFW to RFI because the PFWs were associated with cofinanced projects whereas the RFIs are being used for self-sustaining projects.

Indeed, it was the PPP project for the Taboada PTAR that departed from the principle of non-contingency in ProInversión projects. The Government is trying to follow the principle advocated by the author of this document: “Do it first and pay for it later.” Following this principle, this project—and other, later ones—makes the commencement of RFI payments contingent on completion of the works. It is thought that this maintains the private incentive to conclude the assigned works by the deadlines set, so that the deadline for delivery could even be advanced. Otherwise, in the case of public works, experience shows that construction and equipment deadlines are missed, frustrating the Government’s desire to obtain the public services as soon as possible, since the works are being constructed using advance payments. However, as will be seen later, the Taboada PTAR project accepts partial deliveries triggering payments for works already delivered. Thus, if payment for works is made contingent on complete delivery, the principle of non-contingent payment is abandoned and the financial system becomes inflexible. Financial instruments are issued with firm payment dates, but this was not done in this project. There could be alternative solutions, which will be analyzed when the financial structuring of these projects is considered.

The third generation of concessions starts with the hospital concessions. This contract specifies that RFI payment inflows, considered as the debt flow, are non-contingent. In other words, only the financial close rate of interest is considered, leaving a differential amount outside this category that is subject to compliance with the Global Service Indicator. This creates an irrevocable RFI, which is the part of the RFI that is unconditional and covers the entirety of debt servicing. This also guarantees quality of service over time, since the differential amount is contingent on compliance with quality standards. The differential amount between the PFW or total RFI and the debt flow (irrevocable RFI) was called a compliance bonus.
In addition, the Peruvian hospital concessions provide for a trust. As well as ensuring the total flow of resources needed for the PPP, the trust differentiates between each category of payment. Thus, payment for investments is defined as being irrevocable—not contingent on any event—and has greater coverage.

**Box 4: ESSALUD hospitals**

The ESSALUD hospital program consists of the Villa María del Triunfo Level III Hospital and the Callao Level III Hospital. The only difference between these projects is that the Callao Hospital also includes a primary health care unit. Since both projects follow the same model, they will hereafter be referred to as the ESSALUD hospitals.

Another basic feature of these projects is that 250,000 persons with insurance coverage are registered with the hospital and that payment is by capitation, covering the cost of any medical care needed by a registered insured person, up to the third level of care. The aim is to improve the health of the population; if the operator practices preventive medicine, the cost of recovery benefits (the most expensive) will be reduced. This is the most important advantage of the model applied in the hospitals: instead of payment per service, which increases health costs, payment is made to keep people healthy. The goals of the Government are thus consistent with the goals of the population. And if the operator focuses on its preventive activities, its economic interests will also be served.

Work progress certificates are used as a way of reducing capital requirements. The economic structuring provides for reimbursement of investments to be treated differently from remuneration for operation and maintenance.

For financial management, an institutional trust was created to cover payment requirements of all PPP processes performed by the institution. The trust had reserve accounts both for repayment of investments and for payments for operation and maintenance. Finally, the process is designed to include the award of certificates of recognition of RFIs.

The contract also has the following features:

a. It is similar to a BOT (Build, Operate & Transfer) contract.
b. The source of payment is the social security contributions of ESSALUD users, channeled through a trust that gives priority to PPP payments, up to a coverage factor agreed with the financing sources.
c. The concession period is 30 years from the date of signature of the contract.
d. It specifies service indicators (quality, continuity and efficiency of medical services, support services and hospital infrastructure).
e. It uses a self-sustaining cost model: remuneration for investment (RFI) is differentiated from remuneration for operation and maintenance (ROM).
f. It uses financial devices such as work progress certificates (WPCs) and certificates of recognition of payment for works (CR-PFWS).
In these projects, both PFW and RFI flows reflect revenue paid to the concessionaire that is uniform, unrestricted and unconditional. The period over which such payments are made is usually shorter than the concession period. In the special case of hospitals, there are two categories of payment for investment: (i) remuneration for investment in infrastructure (RFI-I) and (ii) remuneration for investment in equipment (RFI-E). The first commitment of payment for hospital infrastructure covers a period of 15 years, although its useful life is longer, while payment for investment in equipment covers the average useful life of sets of equipment.

Figure 16: System of payment flows for investments in HOSPITALS

To sum up, in the case of Peru, the revenue inflow which reimburses investments has the following characteristics:

• Some of the revenue involves little or no uncertainty because it has minimal risk distribution. Risks are managed in the operation by performance bonds that cover non-compliance.
• They are homogeneous: all payments have similar characteristics.
• The economic structuring and payment system and their adjustment over time are established contractually.
• In cofinanced concessions, in which there is a commitment by the concession grantor, the risk of non-compliance is low or historically unlikely, although it will of course depend on future political scenarios.
4.2.3. Payments for operation and maintenance in Peru under the cost model

Cost-model concession contracts in Peru include revenue inflow to reimburse costs of maintenance and operation of infrastructure and equipment, which corresponds to the annual budget required for those activities with the relevant profits for the services. The concepts included in remuneration of operation and maintenance costs are the following:

- Operating costs
- Administrative costs
- Routine maintenance costs.
- Periodic maintenance costs

The first three can be calculated by considering the profit corresponding to administration by the operator in the operating phase, considering the profit and corresponding general expenses. This is important, because there have been cases where the calculation did not consider these concepts. In practice, this discourages participation by a specialized operator.

The example shows a periodic inflow of $8.2 million during the concession period. However, we must consider the treatment of periodic maintenance. The difference is that this concept covers periods longer than one year, so that there would be an annual cost to be covered and every so often (every five years, in the example) an additional amount to be covered.
This case, illustrated in the attached figure, leads us to consider two alternative types of remuneration: (i) Payment of routine ROM during the validity of the concession and payment of the relevant periodic ROM whenever periodic maintenance is performed; or (ii) making an average payment based on present value of projected payments and then spreading them over time. This is the option chosen in the various PPP processes. It has the great advantage of persuading operators to innovate in order to standardize their maintenance costs, avoiding periodic maintenance peaks as far as possible.

In the case of the IIRSA Norte and IIRSA Sur contracts, this flow was called the annual payment for maintenance and operation (POM), while for the Taboada PTAR contract and hospital contracts it was called remuneration for operation and maintenance (ROM).35

35. The IIRSA contracts are cofinanced and the Taboada PTAR and hospital contracts are self-sustaining.
In the case of the Mantaro-Socabaya line, it was decided to reimburse investment (annualized NRV) over a period coinciding with the concession period. Over this time, payment of operation and maintenance costs (annualized O&M) was established as 2.5 percent of the benchmark investment, which after four years was subject to the electricity sector tariff review. Figure 28 shows that both types of payment evolve over time during the concession period.

Figure 17: Payment for operation and maintenance (POM) - Mantaro-Socabaya case

![Mantaro-Socabaya transmission line](image)

However, PPP contracts may specify that payment of investments may be made at intervals shorter than the concession period, while operation and maintenance costs are covered during the validity of the concession. As can be seen in Figure 18, this difference can be observed in the IIRSA contracts.

Figure 18: Payment for operation and maintenance (POM) – IIRSA Norte/Sur

![IIRSA North / South](image)

36. In the electrical transmission sector in Peru, operation and maintenance costs are reviewed every four years and in the interval tariffs are adjusted by indexation.
It is assumed that the concessionaire will receive the revenue reimbursing maintenance and operation costs during the validity of the concession contract. This does not happen in the case of revenue for investment, dealt with earlier, which is received over a period shorter than the concession period and is independent of the validity of the concession. Thus, if the contract is terminated in operating period 5, the PFW will have to continue to be paid until period 15 so that the operator can recover the investment made in the pre-operating phase and the POM would be suspended because this would not be expenditure incurred by the operator.

Box 5: IIRSA Sur - (Southern Interoceanic Highway – five connections in PERU, Brazil and Bolivia)

The Southern Interoceanic Highway was considered by the Peruvian Government to be a strategic project, since it connects the country’s three natural regions (coast, mountain and forest) and because it would bring the country closer to its neighbor Brazil. For this reason, the project was cofinanced and has received demand guarantees for its implementation. The total length of the highway was 2,800 kilometers.

There was an initial call for tenders for three connections: IIRSA Sur No. 2: Cusco–Iñambari (Puerto Maldonado); IIRSA Sur No. 3: Iñambari (Puerto Maldonado)–International bridge (Peru-Brazil frontier); and IIRSA Sur No. 4: Iñambari (Puerto Maldonado)–Juliaca (Puno). These connections totaled about 1,500 kilometers of new roadway with asphalting. The initial investment for the project was estimated at US$892 million. However, 1,500 kilometers of roads in the mountains and forests were to have a higher investment cost that was not reflected in the surveys but was discovered in the course of implementation. A feasibility study was conducted and then a balance was found through a system whereby metrics could be adjusted but prices were pegged to the prices in the study with a polynomial adjustment factor, so that the actual cost would be apparent during project execution. This is what happened. The resulting costs at the conclusion of the project are within the prices per kilometer for other contracts that the Ministry of Transport and Communications (the concession grantor) concluded under the public investment system.

Later there was a second call for tenders for the two existing transcontinental roads, which needed additions, rehabilitation and periodic maintenance: IIRSA Sur No. 1: Puerto de Matarani (Arequipa)–Cusco; and IIRSA Sur No. 5: Moquegua/Tacna–Juliaca (Puno). These existing roads covered about 1,200 kilometers, added to the 2,800 kilometers of the new Southern Interoceanic Highway.

37. One of the major problems with the system of public investment in Peru is that evaluators deliberately under-estimate investment costs, because the social evaluation systems consider very limited economic and social benefits and very conservative demand projections. Similar evaluations are made for small roads and for large highways. Then a small budget is established, which does not provide for enough bridges or for the extensive earthwork required for a new roadway. As a result, during implementation the metrics were adjusted and a new budget prepared with the same—or lower—cost per kilometer as for other projects implemented using public investment. If the benefits and costs of investment are calculated at today’s rates, this development soon to be commenced will be one of the largest investments in Peru, to which there is now no opposition. The benefits in terms of demand are that, even before the official inauguration, the demand originally projected for 2030 has already been reached. The commercial benefits in these years exceed the cost incurred. This is one of the cases in which we see the limitations of the systems of investment oversight: the staff are ill-equipped to evaluate a transcontinental highway. They are not often called upon to do so and are more accustomed to evaluating small roads.
The contract also has the following features:

- It is a BOT (Build, Operate & Transfer) contract.
- It will be funded by the Public Treasury and by tolls collected over the highway. However, here there was a variant, because the two accounts go their separate ways. Tolls go to the Public Treasury, which pays the concessionaire.
- The concession period is 30 years from the date of signature of the contract.
- It specifies service indicators (quality, continuity and efficiency of the road service).
- It is based on a cost model and cofinanced. Payment for investment (PFI) is differentiated from payment for operation and maintenance (POM).
- Partial risk guarantees are established (four semi-annual installments of investment payment - four semi-annual PFWs) Andean Development Corporation project risk management, but not activated.
- It used financial devices such as work progress certificates (WPCs) and certificates of recognition of payment for works (CR-PFWs).

As a result of the application of the two components mentioned, from the viewpoint of the Government, the total cost of the concession is the sum of the flows reimbursing the investment and the flows reimbursing maintenance and operation costs.

Thus, the total cost of the concession is divided into a first period during which both concepts apply and a second period during which only flows for reimbursement of maintenance and operation costs are received. This has been illustrated in the case of the IIRSAs and is also shown in the following figure concerning the case of hospitals:

**Figure 19: Recovery of investments in the hospital concession**
4.2.4. Revenue of self-sustaining and cofinanced PPPs

The PPPs for the Mantaro-Socabaya transmission line, the Taboada PTAR project and the ESSALUD hospitals have one element in common: they are all considered to be self-sustaining. The users directly and indirectly repay the cost of investment (RFI) and the cost of operation and maintenance (ROM). The costs are paid for, in the first case, by the users of the national electrical system, in the second case by the users of potable water and the sewer system in the city of Lima, and in the case of hospitals by the contributors to the medical insurance system.

In the case of the IIRSA Norte concession, the total cost of the concession to the Government is the sum of the PFW and POM payments. However, since some of the revenue comes from tolls, the Public Treasury payment should be deducted, if only for accounting purposes. The same system is used for IIRSA Norte and IIRSA Sur.

There is thus cofinancing by the Public Treasury and users to cover the cost of the PFW investment and also cofinancing of the POM operation and maintenance.

Box 6: Taboada waste water treatment plant (Taboada PTAR)

The drainage system in the city of Lima is over 135 years old and the average flow of used water is 17 cubic meters per second, with a maximum of 24 cubic meters per second. Effluent drainage into the sea is creating serious environmental problems.

The project awards to the private sector a concession for public infrastructure works for treatment of sewage waste water collected by the North Interceptor at a rate of 14 cubic meters per second. The proposed concession period is 25 years from the close date.

This is a cost-model, self-sustaining project. It includes remuneration for investment (RFI) and for operation and maintenance (ROM). It also provides for work progress certificates (WPCs).
One of the main problems with the design of the IIRSAs was the separation of PFW payments from toll revenue. This was done basically for tax reasons. However, it was—and still is—understood that this separation makes PFW payments a sovereign debt, because they basically come from the Public Treasury.

4.3. Payment for Investment and Operations in Chile

4.3.1. Total guaranteed revenue

The total guaranteed revenue mechanism mitigates demand risk by guaranteeing that the present value of revenue for the concession’s duration will be a set amount. Under this mechanism the concession is granted for a variable term that will end when it reaches the level of total revenue guaranteed.

The total guaranteed revenue mechanism follows the cost model because the present value of revenue from the project required by the concessionaire will be that which permits it to cover its costs for operation, maintenance, and recovery of investments made with a given level of profit.

Chile used this mechanism in the concession for the Arturo Merino Benítez International Airport, reducing the uncertainty regarding possible variations in the flow of passenger traffic.

Box 7: Concession for the Arturo Merino Benítez International Airport

The Arturo Merino Benítez International Airport is the country’s principal airport. It is located to the west of the city of Santiago, in the administrative district of Pudahuel. It is one of the most modern and efficient airports in Latin America, as a connection center for flights from South America to Oceania, North America, and Europe. It was granted in concession with the concessionaire required to construct, preserve, and operate the infrastructure, and to provide its aeronautical and commercial services.

The anticipated investment is US$175.5 million and includes the following works:

- Expansion of the current international passenger terminal
- Construction of a new control tower
- Demolition of the existing control tower, administration building, and protocol lounges
- Remodeling of the current international passenger terminal building
- Upgrading of the aircraft parking pads and taxiways of the passenger terminal
- Improvement of the passenger terminal’s vehicle parking area
• Construction of the airport’s internal roads
• Airport equipment
• Construction of an electric power substation and expansion of the thermal plant
• Access to a new supply source for the potable water network
• Expansion of the drainage system
• Diversion of the Gonzáles Canal
• Planned upgrading of the concession area
• Demolition of existing buildings and construction of new ones in the terminal cargo area
• Construction of access roads to the cargo terminal
• Construction of the parking area for the cargo terminal
• Construction and expansion of the aircraft parking pads with taxiways, runways, and push-back area at the cargo terminal
• Other minor works, such as pedestrian walkways and perimeter closings

The concession’s original term was 15 years, but as stipulated in Supplementary Agreement N° 2 it can be extended for a maximum of 78 months.

This concession was originally structured to give the concessionaire minimum guaranteed revenue\(^{38}\) for each year of the contract (see Table 7). However, this was changed\(^{39}\) to a mechanism for total guaranteed revenue.

Table 8: Minimum Guaranteed revenue

<table>
<thead>
<tr>
<th>1 - Calendar year of execution</th>
<th>Y - Minimum guaranteed revenue (in U.F.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>96,892</td>
</tr>
<tr>
<td>2</td>
<td>103,675</td>
</tr>
<tr>
<td>3</td>
<td>110,942</td>
</tr>
<tr>
<td>4</td>
<td>118,693</td>
</tr>
<tr>
<td>5</td>
<td>127,017</td>
</tr>
<tr>
<td>6</td>
<td>135,913</td>
</tr>
<tr>
<td>7</td>
<td>145,426</td>
</tr>
<tr>
<td>8</td>
<td>155,600</td>
</tr>
<tr>
<td>9</td>
<td>166,478</td>
</tr>
<tr>
<td>10</td>
<td>178,149</td>
</tr>
<tr>
<td>11</td>
<td>190,613</td>
</tr>
<tr>
<td>12</td>
<td>203,958</td>
</tr>
<tr>
<td>13</td>
<td>218,228</td>
</tr>
</tbody>
</table>

\(^{38}\) We shall deal with this concept in the demand models.
\(^{39}\) Amended by the signature of Supplementary Agreement No. 2 in 2004.
Initially the concession term was 15 years. When total guaranteed revenue was incorporated, it was decided that this term could be shorter or longer, and extended up to an additional 6.5 years from July 2013. The concession will end when the total guaranteed revenue is reached.

Revenue is calculated as follows:

“It is the revenue from passengers embarked by the concession in calendar month i, as defined in paragraph 5.2 of this agreement. The amount is expressed in Units of Account (UF) to two decimal places, using for conversion the value of said unit on the last day of each calendar month.

For this purpose the basis will be the number of embarked passengers that the DGAC [Civil Aviation Directorate] reports and uses to determine payment for embarked passengers to the concessionaire, converted to Units of Account as provided in paragraph 5.2 of this agreement.”

The following formula is used to calculate the cumulative YC:

\[
\sum_{i=1}^{m} \frac{YC_i}{(1 + 0.7592\%)^i}
\]

The previous formula will be used until September 2013. If the guaranteed revenue is not received by that date, there will be compensation for recovery of the monthly costs for maintenance, conservation, operation, and use for month i. The formula for the calculation is as follows:

\[
\sum_{i=1}^{m} \frac{YC_i}{(1 + 0.7592\%)^i} + \sum_{i=t+1}^{m} \frac{YC_i - C_i}{(1 + 0.7592\%)^i}
\]

4.3.2. Cofinancing in the cost model

In the Program for Infrastructure Concessions for Penitentiary Group 3, the Government, through the Ministry of Justice, pays the concessionaire a fixed construction subsidy (SFC) that permits it to recover the investment, and a fixed operation subsidy (SFO) along with
a variable payment of internal subsidy for provision of basic services. The SFC is paid in 21 semi-annual quotas, with the first quota variable and the last quota reflecting the difference between the amount of the semi-annual SFC and the value of the first payment.

Once the concessionaire has received the definitive service certification (DSC) from the three establishments, it has the right to receive all the SFC, pursuant to the calendar, amounts, and general conditions established in the concession contract.

4.3. Payment for Investment and Operations in Colombia

A second application is the case of Concesionaria de Occidente S.A., whose contract is part of the group of third-generation concessions, in which the contract’s duration depends on the amount of expected revenue offered by the concessionaire. The amount is $367,809,000.00 expressed in constant pesos of December 31, 2003.

As provided in the concession contract, the cumulative value of revenue generated in constant pesos of December 31, 2003, is calculated monthly with the following formula:

\[
I_{C_n} = \sum_{i=T+1}^{i=m} \frac{Y_i - C_i}{(1 + 0.7592\%)^i}
\]

Where:

- \(I_{C_n}\): Revenue generated by the end of month \(n\) in pesos of December 31, 2003.
- \(I_{G_n}\): Revenue generated in month \(n\) in current pesos.
- I.P.C.\(_{i-1}\): Consumer price index of the month before month \(n\).

When the cumulative value of revenue generated in constant pesos of December 31, 2003, is equal to or greater than the expected revenue in any month during the execution of the contract, it is terminated.

The Bogotá–Girardot contract is similar to the contract of Concesionaria de Occidente S.A. In this case the amount of expected revenue offered by the concessionaire is $882,000,000,000 in constant pesos of December 2002.

Box 8: Bosa–Granada–Girardot highway project

On July 1, 2004, a concession contract was signed with the corporation Concesión Autopista Bogotá – Girardot S.A. for construction of a second roadway and/or rehabilitation of the Bosa–Granada–Girardot Highway Project that is part of the National Trunk Network of the Bogotá–Buenaventura corridor.

Estimated investments for the project are 225 million euros for construction of a second two-lane roadway and 14 vehicular bridges at the principal river and stream crossings parallel to the existing ones, with lengths of between 10 and 50 m.

The contract is part of the group of third generation contracts. The duration of the concession contract is estimated at 30 years from the signature of the document confirming start of execution; however the actual duration will be until the expected revenue offered by the concessionaire is reached.

4.5. Financial Structuring under the Cost Model

4.5.1. Financial structuring in Peru

We will start by reviewing the administrative and financial instruments used in the cost model. Then we will present the financial structuring based on these models.

4.5.1.1. Work progress certificate (WPC)

The work progress certificate, called the WPC,41 is an administrative document that confirms that the concessionaire has executed a percentage of the total works for which it is responsible. The percentage is the quotient of the value of progress in the works with respect to the total amount of investment in them.

Issuance of the document requires prior technical verification that the progress has complied with: i) the standards and the technical and socio-environmental parameters

41. ANNEX 1 presents the model of the WPC for the IIRSA Norte concession.
specified in the definitive technical plans and detailed engineering approved by the concession grantor, and ii) the terms of the concession contract.

This technical verification is done by a supervisory entity that guarantees an independent view from the interests of the parties to the concession contract.\textsuperscript{42}

Issuance of the WPCs is linked to the payment system of the cost model. With traditional financing systems it was necessary to finish investment in a highway or hospital (e.g. $100 million) to be entitled to the respective annual payments (e.g. $13.1 million). This was the case with the Mantaro-Socabaya transmission line.

Later, large-scale PPPs began to be structured, such as IIRSA Sur, which cost nearly US$1 billion, calling for financing systems to alleviate the financial pressure.\textsuperscript{43} Progress in works was certified in instruments that did not modify the payment schedule of the PPP contract, but could be used to facilitate financing.

One aspect reviewed extensively was whether the use of these certificates upset the economic balance of the contract; the conclusion was they did not. Lawyers say contracts should allow for the most extreme scenarios even though they do not occur; the scenario chosen for analysis was to compare the values of payment to the operator in the case of

\begin{figure}
\centering
\includegraphics[width=\textwidth]{chart}
\caption{Investment: $100\%}
\end{figure}

\begin{itemize}
\item \textsuperscript{42} This entity could be the regulatory organ (OSITRAN) or some independent supervisory entity hired for the purpose (in the case of the hospitals of ESSALUD).
\item \textsuperscript{43} A conversation with a financial specialist led to the conclusion that work progress certificates could be used in some way to facilitate financing.
\end{itemize}
termination of the contract for investments made. Prior contracts were compared with those of the new scheme, and the conclusion was that under both formulas the payment would be the same (in a lump sum or payments) at the time of termination.44

It is arbitrary for the contracts to provide that the WPCs cannot be less than 10 percent of the investment, because if the economic balance is not changed, the percentage could be less. Perhaps the ideal would be to avoid greater administrative burdens on small amounts, but it could be 5 percent or the figure that permits processing at least monthly.

The idea is to divide the work into construction milestones when preparing the definitive engineering study, marking progress in a sum of construction items.45

Supposing in the example that the investment of $100 million is divided into several milestones, the first of which is valued at $10 million and the second at $15 million. When the operator reaches the first milestone, progress of 10 percent of the work is confirmed by issuance of a work progress certificate 1, with a face value of $10 million. However, the Government (IIRSA) or the source of payment of the concession grantor (hospitals) has pledged to start payment in period 1. All it does is issue the certificate, which confers the right to receive a flow of payments equal to 10 percent of the periodic payments.

An important aspect of the WPC is that, since it certifies a percentage of progress in the work, it is the instrument that generates the irrevocable right to collect the PFWs or RPIs proportional to the percentage of progress. In other words, it generates the right to payment for WPC 1 of 10 percent of the PFW or RFI ($13.1 million), which is equivalent to $1.31 million for the next 15 years (PFWWPC or RFIWPC). Using this right to future inflows, the operator can obtain the present value of these 15 payments and receive $10 million of the face value of the WPCs.

The operator can then use this $10 million to finance the execution of the second milestone, 2. When reaching milestone 2 equivalent to 15 percent of the reference investment, this generates the right to 15 annual payments of $1.97 million which is 15 percent of the PFW or RFI. This right to an irrevocable flow of payments is placed on the market and the operator can

44. This analysis must be part of the system, because it will dispel doubts concerning the use of this type of instrument.
45. Initially it was thought that there should be physical construction milestones, such as kilometers of highway completed, or, in the case of hospitals, the number of floors completed. This could be ideal and easy to document, but it is not the way a work is programmed. Final touches may occur at the end of the whole work, with partial activities or gradual execution of items.
get the face value of $15 million. It can continue to do this as the work advances, obtaining the WPCs and granting them to the investors, who provide capital for the work.

Note that a problem of financing risk of $100 million becomes a problem of financing risk of the largest milestone; in the example it is $15 million. If there are delays in issuance of the certificates, additional capital may be needed.

We said that one principle of the PPP contracts is “do it first and pay for it later,” which is reflected in the WPC system. The operator has to provide initial resources before the issuance of the first $10 million, the same amount needed to reach the first milestone, and then may need more capital. But the operator always needs to reach a milestone—with investment of previous financial resources—before generating the right to have irrevocable payment inflows.

Another aspect to point out is that, if the contract is terminated at the end of milestone 2, under traditional contracts the operator would have to be paid for the value of progress of the work—$25 million in the example. With the WPC system it would also be paid, but with a system of inflows. In addition, and simultaneously, the party responsible for terminating the contract would pay penalties. If the operator were responsible, the performance bond guaranteeing performance would be executed; if the concession grantor were responsible, the penalties would be as established in the contract.
This document can be used to design financing mechanisms that need to be backed by certain revenue inflows. For convenient and low-cost financing they must be certain inflows and irrevocable. Recently the MEF has added a requirement for PPP investment processes to begin payment of the PFWs or RFIs at the end of the work, considering that this would encourage operators to finish the work as quickly as possible. The intention is good, but inclusion of the requirement for starting payments causes static in the financing, because it adds an unnecessary condition. It would be hard to issue bonds or paper on these rights because there is no date certain for payment of the obligations and it is undesirable to issue obligations without a date certain.46

In this regard, the WPC is an instrument that enhances the prospects for financial structuring of infrastructure projects, so it is has been included in most of the concession contracts. We can see its operation graphically as regards the IIRSA Norte highway.

In summary, the concession contract contains the concessionaire’s right to a flow of the PFWWPC (the percentage of progress of the work in the PFW). This right is formalized in the work progress certificate (WPC), which indicates the percentage of the total work completed and recognizes the right to the corresponding PFWWPC. Although the WPC

46. This conditionality is actually changing in the addenda being negotiated between the concession grantor and the operator at the request of the banks that finance the process. This requirement therefore becomes unnecessary.
contains the right, which can be an underpinning and serve temporarily for CAF funding, it is not a financial instrument per se. It is necessary to have other instruments such as bonds or the CR-PFWs, as we shall see below.

The benefits afforded by the WPC to each of the contracting parties include the following:

• It gives the concessionaire the unconditional and irrevocable right to collect the share of the PFW or RFI equivalent to the percentage of progress certified in the WPC. The result is an amount called PFWWPC or RFIWPC, as the case may be.
• For the concession grantor, this document facilitates oversight and control of the progress in the works, detecting cost overruns that could affect all the investors’ financial calculations.
• If the contract is terminated before total acceptance of the works for causes specified in the contract, the WPCs issued establish the obligation of payment for the portion of the PFW or RFI based on the certified total percentage of work progress.
• Increasing the opportunities for financial structuring facilitates the attraction of more potential investors interested in obtaining the concession, which stimulates competition before it is awarded.

Nearly all of the infrastructure projects have incorporated WPCs because of their great contribution to the financing of PPP projects.

### 4.5.1.2. Certificate of recognition of payments for works (CR-PFW)

As seen above, the work progress certificate establishes the operator’s rights to inflows equivalent to the face value of the work progress; if it advanced $10 million, in theory it will have inflows equivalent to that $10 million.47

---

47. We say “in theory” because the value can change depending on whether the project is programmed and executed. However, the percentages of advance are calculated on the value of the reference investment and the PFW in the bidding, with adjustments permitted by the contract.
In addition to the WPC, it is necessary to structure a financial instrument that the operator can turn over to its investors in exchange for the agreed disbursements, and that can be traded on the secondary market. This instrument has been created is called the certificate of recognition of annual payment for works (CR-PFW).

The following figure shows how the instrument originates. Upon completion of the first milestone WPC 1 is issued, which gives the right to an annual flow of $1.31 million, which is converted into semi-annual payments (CR-PFW) by a simple formula, dividing the annual flow by two, so 30 CR-PFWs are issued (two each year in 15 years), worth $0.655 million each. Each semi-annual period after the first year of operations, with date certain for payment, semi-annual inflows are programmed to fulfill the obligation to pay for the first certified advance.

The original idea was to issue a bond with 30 coupons, initially to be assumed by an underwriter and later to be placed in whole or in part in the market. However, potential investors had different interests. For example, banks could take inflows for up to five or seven years, insurance companies could take intermediate inflows, and pension funds longer ones. It was then decided to issue each CR-PFW separately from the rest, as a sort of zero coupon bond.

In this case the CR-PFW was linked to a cofinanced project, so it was necessary for the document to be issued by the Peruvian Government to facilitate the private investor’s access to sources of financing that invest for longer periods and seek lower yields.

Through this document, the Government, as concession grantor, is required to pay the bearer a specific amount on a given date.
In the example shown, upon attainment of the first milestone a WPC was issued for 5 percent of the reference investment, and this gave rise to a flow of 30 CR-PFW, of which the first is presented for $1 million, which has a date of issue and maturity (date certain). The important thing is that the obligation is direct, general, irrevocable, unconditional, not subordinated, and guaranteed by the concession grantor. The issuer is the Republic of Peru, so this instrument is a sovereign commitment.

The latter condition has generated an accounting debate about consideration that the balance due on the CR-PFWs is sovereign debt. Alternatively, the principal source of payment of the CR-PFW could have been tolls, supplemented by the concession grantor and the Ministry of Economy and Finance, thus clearly reducing the duration of the commitments. In the end this was not done because of tax issues.

The conversion of PFWs to CR-PFWs in the IIRSA Norte project occurred as follows. The PFW of the offer was in two stages, the first equivalent to 70 percent of the work and the second to 30 percent. The PFW was $29.45 million, if we calculate the CR-PFWs of the first stage it would also be 70 percent of the PFW, or $20.61 million.
If a WPC had reported 5 percent of the reference investment in the first stage, then there would be 5 percent of the PFW for the first stage (5 percent * $20.61 million) which would represent $1.03 million in annual inflows called PFWWPC, and since the payments are semi-annual the figure is divided by two, resulting in a CR-PFW of $515,000. Thus, there are 30 semi-annual payments of $515,000.

The CR-PFW was included in the concession contracts for the IIRSA Norte and IIRSA Sur highways with the following additional features:

- Government guarantee for compliance with the payment obligations contained in the CR-PFW. Payment is made from the concession grantor’s annual budget.
- They are issued in U.S. dollars, which mitigates exchange fluctuation risk.
- They are issued in compensation for work progress recognized in the WPCs. This way, the owners of the CR-PFWs are not exposed to any construction risk.
- Once issued, they are not subject to any condition or performance evaluation.
- They are transferable to third parties, in whole or in part, at the exclusive discretion of the owner and in accordance with applicable legislation.
- Unconditional and irrevocable payment by the concession grantor to the owner in the event of any contract dispute that may arise.
- Priority for payment, according to which the CR-PFW has the same standing as all other existing or future non-guaranteed and non-subordinated obligations of the concession grantor regarding any other CR-PFW issued and any other similar obligation. Therefore, the Government may not select which obligation to pay and which not to pay.
- Annual acceleration of payments, which means that, if there is failure to pay any of the instruments issued, all outstanding amounts shall be considered immediately due and payable, without diligence, presentment, demand or payment, protest, or notification of any type, all of which the concession grantor expressly renounces.
- Intangibility of the amounts payable that are indicated in the CR-PFWs. If the law requires the concession grantor to make withholdings or deductions, it shall adjust the payments to be made in order to ensure that the net amounts received by the owner after withholdings and/or deductions are equivalent to the amount that would have been received for this certificate in the absence of said withholding or deduction.
- They are subject to the laws and court of the State of New York.
The financial instrument that had been designed would be submitted to a financial closing scheme, according to a design proposed by the banks. Initially, there was a complex financing system for the IIRSA Norte project with various parties involved. Subsequently, placement was simplified based on experience.

Here is the operational scheme for issuance of the IIRSA Norte CR-PFWs:

1. The concession agreement governs the relationship between Peru and the company, in which dollar-denominated unconditional obligations (CR-PFWs) are delivered upon reaching highway construction goals.
2. The certificate buyer, an entity in Delaware, purchases them from the company under the CR-PFW purchase agreement.
3. The Peruvian Government will pay the corresponding debt from the CR-PFWs to the CR-PFW buyer through the Peruvian trust; this transfer is governed by the Peruvian trust agreement.
4. The trust will regulate the issuance of the notes and the disbursements between the issuer and purchaser of the CR-PFW.
5. The underwriters will offer support during the period of availability by a letter of credit to compensate the investors.
6. The remaining sums will be invested in the structured bond to compensate the remaining negative (financial) cost.
Here is the operational scheme for the issuance of CR-PFWs for section I of the IIRSA Sur project:

**Figure 20: Operational scheme for issuance of CR-PFWs for the IIRSA Sur**

The CR-PFW design incorporated the minimum requirements for treatment as a negotiable instrument in the capital market, similar to issuance of bonds for securitization of inflows.

In addition to the characteristics of the PFW (consistent inflows, no uncertainty, with defined pattern and payment scheme, and low risk of default), the CR-PFW has the following features:

- Independence from the concession contract.
- Total amortization of the credit upon maturity.

The CR-PFW is supported by the WPC, since the rights that may be granted through the CR-PFWs are those that the concessionaire gets based on the percentage of work progress that is recognized in the WPC.
As explained in the previous examples, issuance of 30 CR-PFWs creates an independent opportunity for payment of a CR-PFW. This makes it a fixed revenue instrument that can be offered to various types of investors according to the maturity (the date on which the capital or principal will be paid) that suits them best.

Each CR-PFW is therefore like a zero coupon bond, with the following characteristics:

- They are sold at a discount from their face value
- They do not pay interest
- The principal is repaid, at face value, upon maturity

**Figure 21: Functioning of the CR-PFWs**

In summary, the primary advantages of the CR-PFWs are:

- They can be placed on capital markets, facilitating access to long-term financing needed for comprehensive execution of the projects.
- They widen the segments of investors that can participate in the project—such as investment or pension funds, or insurance companies—that want to place their funds for a very long term.
- They are government-backed.
• They permit access to lower-cost sources of financing, which translates into better economic offerings, i.e., less government cofinancing contributions.

To make this instrument more dependable, the IIRSA Norte contract considered inclusion of the following elements:

• Partial credit guarantee granted by the IDB for US$60 million. This is to guarantee the concession grantor’s obligation to make the PFWs.

• A bridge loan from the CAF [Andean Development Corporation], a revolving line of credit of up to US$60 million subject to a rate of libor + 1.55 percent, whose purpose would be to facilitate the necessary financing to start works in order to get the first WPCs. The bridge loan could be prepaid partially or in full at any stage of construction and then be reactivated. It was to give the private investor short-term financing payable when long-term financing was obtained through the CR-PFWs.

In practice, the market saw the CR-PFWs as secure, so the partial credit guarantee was not used. The bridge loan was repaid early.

The financial structure designed for this project made it possible for construction to begin six months after the concession was granted, and the total financing for the three stages of the investment was completed in the following 18 months. The financial structures with the CR-PFWs were well received, with high ratings for each issue, but as of this date the Government has not used this instrument again because it is treated as part of the annual obligations and affects the country’s macroeconomic profile.

Its application should be redefined, with the Government acting as an agent to supplement the primary source of payment: tolls or revenue from rates in other sectors.

4.5.1.3. Certificate of recognition of remuneration for investment – CR-RFI

When there were no more opportunities to issue CR-PFWs in infrastructure projects, we were advisers on transactions in the PPP projects initiated by ESSALUD for hospitals, logistics, and other services.
These projects incorporated the work progress certificates (WPCs) established in the four projects already approved by ESSALUD: two hospitals, the logistic system of the Lima networks, and a medical office tower.

The principles and characteristics of the WPCs are the same as noted in Section A, but the issuing mechanism was improved. The problem of issuing the WPCs in a timely manner for the IIRSAAs was corrected in the hospital contracts.

These PPP contracts are a mixture of contracts of surface rights, usufruct, works contract, and service contract, called the PPP contract. This could be brought together under a concession contract, but that was not possible because the concession grantor was not an entity of the National Government but a decentralized entity: ESSALUD.
ESSALUD will issue the work progress certificates that grant rights to unconditional proportional inflows of the RFI in the future. The new certificate of recognition of remuneration for investment is a document based on the concepts of the WPC and RFI, in effect at the time, which made the operation of the CR-PFWs sustainable.

The adjustments in this document with respect to the CR-PFW concern who is the issuer. Unlike the CR-PFWs, the CR-RFIs are issued by the private investor against the issuance of the respective WPCs, but the soundness of the structuring is based on the fact that the backing of the CR-RFI payments comes from payments made by social security users, which are ample under the obligations arising from the PPP contracts.

An additional document backing this operation is the concession contract, which indicates opportunities for payment of the RFIs, and the annex contains a CR-RFI with the characteristics of unconditionality, along with penalties that the concession grantor must pay in the event of any delay in payment, etc. The structuring agent must review and perfect the text of the CR-RFI and convert it to an autonomous financial instrument.

The operation calls for the issuance of the CR-RFIs with the WPCs as underlying assets, so they are negotiable on the capital markets. The issues can be individual or bundled (a group of CR-RFIs), depending on economies of scale of the issue and the start and maturity of each CR-RFI. The risk of the securities issued depends on the qualification of the payment source, which, to ensure liquidity, is taken from an account before the ESSALUD funds come in, making it possible to isolate risks related to the entity’s economic and financial operation.

The process is also based on the use of trust contracts that have clear instructions for payment in a certain priority: first, the holders of CR-RFIs, then the remaining balance to the concessionaire’s other commitments. There are also back-up accounts for the CR-RFI’s liquidity, which are the equivalent of a monthly RFI deposited in the reserve account in the event of any liquidity problem.

The benefits offered by this document are similar to those of the CR-PFW. The operating entity assumes all the obligations that the concession grantor assumed under the CR-PFWs, but where there is a liquid payment source. The CR-RFI contains an obligation by ESSALUD (the concession grantor) to guarantee payments by the operating company and undertakes to make the payments in the event of total or partial default by the operating company.
One improvement in the CR-RFI is introduction of an incentive for quality and completion of the work. It provides for a compliance bonus contingent on the quality of services and the work over time. For example, if the work is not completed, there is only an obligation to repay the debt for the investments made.

The financial structure for the hospital concession contracts is shown in the following diagram:

Figure 22: Structure of the trust for the hospitals in Peru

Source: Sergio Bravo.
4.5.2. Financial structuring in Chile

We will start by reviewing the administrative and financial instruments used in the cost model. Then we will present the financial structuring based on these models.

Chile has had the most experience with application of infrastructure bonds. As of June 2006 they had been used in 14 projects. The concessionaires issue these bonds and their financial structure is designed to obtain an investment-grade rating.

The concession system has expanded the long-term capital market in Chile, contributing greatly to the stability of pension fund portfolios.

According to the Asociación de Concesionarios de Obras de Infraestructura Pública A.G. (COPSA) [Association of Concessionaires of Public Infrastructure Projects], 54.7 percent of the concessions’ debt is through long-term bonds, of which 86 percent are owned by the pension funds and insurance companies. Infrastructure bonds of the concessionaires account for more than 20 percent of Chile’s fixed revenue market.

48. According to data from the Asociación de Concesionarios de Obras de Infraestructura Pública A.G. (COPSA) [Association of Concessionaires of Public Infrastructure Projects].
Table 9: Ratings obtained by infrastructure bonds

<table>
<thead>
<tr>
<th>DATE</th>
<th>I SSUER</th>
<th>RATING</th>
<th>TERM (Years)</th>
<th>AMOUNT PLACED (UF)</th>
<th>RECURSIVE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov-98</td>
<td>Talca – Chile, S.</td>
<td>AA</td>
<td>9.8</td>
<td>4,870</td>
<td>8.15%</td>
</tr>
<tr>
<td>Dec-98</td>
<td>BCL</td>
<td>AA</td>
<td>14.0</td>
<td>213</td>
<td>6.95%</td>
</tr>
<tr>
<td>Aug-00</td>
<td>Ruta de la Aucanía</td>
<td>AA</td>
<td>20.0</td>
<td>7,251</td>
<td>7.42%</td>
</tr>
<tr>
<td>May-01</td>
<td>Autopista, Bocas</td>
<td>AA</td>
<td>20.5</td>
<td>7,800</td>
<td>6.38%</td>
</tr>
<tr>
<td>Aug-01</td>
<td>Autopista, Mendoza</td>
<td>AA</td>
<td>21.0</td>
<td>421</td>
<td>7.87%</td>
</tr>
<tr>
<td>Apr-02</td>
<td>Rutas, Recinto, S.</td>
<td>AA</td>
<td>12.0</td>
<td>1,000</td>
<td>5.80%</td>
</tr>
<tr>
<td>Apr-02</td>
<td>Rutas, Recinto, S.</td>
<td>AA</td>
<td>23.0</td>
<td>10,424</td>
<td>6.02%</td>
</tr>
<tr>
<td>May-02</td>
<td>Autopista, Bo.</td>
<td>AA</td>
<td>16.0</td>
<td>5,540</td>
<td>6.35%</td>
</tr>
<tr>
<td>Apr-03</td>
<td>Los Usuárias</td>
<td>AA</td>
<td>14.0</td>
<td>2,069</td>
<td>5.78%</td>
</tr>
<tr>
<td>Apr-03</td>
<td>Los Usuárias</td>
<td>AA</td>
<td>7.0</td>
<td>1,900</td>
<td>4.00%</td>
</tr>
<tr>
<td>Jun-03</td>
<td>Vialidad, Medellín</td>
<td>AA</td>
<td>21.8</td>
<td>660</td>
<td>6.49%</td>
</tr>
<tr>
<td>Dec-03</td>
<td>Autopista, Central</td>
<td>AA</td>
<td>23.0</td>
<td>13,000</td>
<td>5.30%</td>
</tr>
<tr>
<td>Dec-03</td>
<td>Autopista, Central</td>
<td>AA</td>
<td>23.0</td>
<td>280</td>
<td>6.32%</td>
</tr>
<tr>
<td>Dec-03</td>
<td>Costanera, Norte</td>
<td>AA</td>
<td>21.0</td>
<td>7,800</td>
<td>5.87%</td>
</tr>
<tr>
<td>Dec-03</td>
<td>Costanera, Norte</td>
<td>AA</td>
<td>12.0</td>
<td>1,700</td>
<td>5.22%</td>
</tr>
<tr>
<td>Jun-04</td>
<td>V. Norte Expres</td>
<td>AA</td>
<td>24.5</td>
<td>16,000</td>
<td>5.22%</td>
</tr>
<tr>
<td>Oct-04</td>
<td>Autopista, Mendoza</td>
<td>AA</td>
<td>21.0</td>
<td>8,700</td>
<td>4.69%</td>
</tr>
<tr>
<td>Nov-04</td>
<td>Vialidad, Buc.</td>
<td>AA</td>
<td>24.0</td>
<td>4,900</td>
<td>4.60%</td>
</tr>
<tr>
<td>Nov-04</td>
<td>BCL</td>
<td>AA</td>
<td>15.0</td>
<td>2,900</td>
<td>4.19%</td>
</tr>
<tr>
<td>Jun-06</td>
<td>Talca – CUNSA, S.</td>
<td>AA</td>
<td>14.6</td>
<td>5,650</td>
<td>3.04%</td>
</tr>
<tr>
<td>Jan-06</td>
<td>Autopista, Bocas</td>
<td>A-</td>
<td>24.5</td>
<td>990</td>
<td>4.25%</td>
</tr>
<tr>
<td>Jun-06</td>
<td>Autopista, Bo.</td>
<td>AA</td>
<td>12.0</td>
<td>970</td>
<td>4.15%</td>
</tr>
</tbody>
</table>

**TOTAL** | **17,33** | **100,884** | **904** | **6%**
The Penitentiary Group 3 Infrastructure Concessions Program was financed by the issue of securitized bonds that used as a repayment source the underlying assets of the inflows of the fixed construction subsidies (FCS), backed with the credit of the Chilean Government and the established contractual conditions.

**Box 9: Penitentiary Group 3 Infrastructure Concessions Program**

The Penitentiary Group 3 Infrastructure Concessions Program, spearheaded by the Ministry of Public Works by mandate of the Ministry of Justice, was started as a means of solving the penal population problems. In this program the private investor undertakes to design, build, equip, operate, and maintain the following three detention centers:

- Santiago High Security Prison 1, Metropolitan Region. Designed for 2,568 inmates.
- Valdivia Medium Security Prison, de los Ríos Region. Designed for 1,248 inmates.
- Puerto Montt Medium Security Prison, de los Lagos Region. Designed for 1,245 inmates.

According to the RFP, the estimated official budget for the entire project is UF 2,750,000, exclusive of VAT. The Chilean Government will give the concessionaire two subsidies, a fixed construction subsidy (FCS) of 20 semi-annual payments, and a fixed operating subsidy (FOS) paid in semi-annual quotas for the duration of the concession period. The investment in the project is about US$10 million. The deciding factor in the competitive bidding was the lowest Government subsidy.

On April 2, 2004, the concession contract was awarded to the firm Vinci Construction Grands Projets (VCGP), which formed the concessionaire corporation called “Sociedad Concesionaria Infraestructura Penitenciaria Grupo Tres S.A.”

The concession is for 40 half-years from the placement in service, with a maximum of 273 months from the date the contract was signed.

Since the bonds were issued during the construction phase, the concessionaire granted the following guarantees according to the ratings agency Feller Rate:

- Special public works concession surety. This guarantee was established as provided in the concessions law, covering all concession assets except for VAT payments.
- Performance bond insurance, which guaranteed faithful compliance with all obligations assumed in the works construction contract. This insurance policy was signed by Constructora VCGP Chile S.A. and AXA Corporate Solutions Assurance, in favor of the concessionaire.
- ALOP [Advance loss of profits] insurance policy, as an additional guarantee against catastrophic loss of profits in construction of the prisons covered by the concession. The policy was signed by the concessionaire and Mapfre Seguros Generales de Chile S.A.
- Business surety contract on contractual rights, in which the concessionaire provided surety and none of the rights emanating from the works construction contract could be encumbered or alienated.
• Business surety contract on actions by the concessionaire company, in which the concessionaire’s stockholders provided surety and none of the rights emanating from the works construction contract could be encumbered or alienated.

This issue generated resources of UF 4,140,535 at an average interest rate of 3.1 percent with an AAA rating based on the following three elements:

i. Establishment of a set of safeguards to mitigate all risks during the engineering and construction phases.

ii. Allowance of a six-month interval in FCS payments. This strengthened the element of timeliness in payment of the securitized debt instruments.

iii. Inclusion of a mechanism in the concession contract to separate the right to receive FCSs from the concession operation risk.

The third element mentioned is related to payment of the bonds in the event the concession is terminated for serious breach of the concession contract obligations. In this scenario, bondholders are assured of a payment equivalent to the present value of the remaining unpaid FCSs.

Figure 23: structure established for the emission of construction bonds

Prepared by: Banco Santander Santiago S.A.

49. Weighted average. The issue had three series. Series A for UF 3,660,000 with a rate of 3 percent. Series B for UF 479,000 with a rate of 4 percent. Series C for UF 1,535 with a rate of 10 percent.

50. Banco Santander Santiago S.A.
Depending on the nature of the concession, this instrument has been issued in both the construction phase (pre-operational bonds) and the operating phase (operations bonds). The underlying asset is the anticipated revenue from the concession, for which the potential to generate cash flows is evaluated, based on the demand for the project, the costs associated with the concession, and the terms of the concession contract: subsidies and financial guarantees by the Government.

For the pre-operational bonds, it is also necessary to evaluate construction risks and establish appropriate mechanisms for their mitigation, e.g.: making contracts and/or guarantees with third parties or signing lump-sum or “turnkey” contracts in an effort to transfer this risk to the entity that is building the works.

The operations bonds are issued after the executed works have been approved or the start of operations or exploitation of the project has been authorized. Under this scenario, the concessionaire has used its own resources or short-term debt to finance all the works executed. The debt is paid with funds collected through this issue.

Two bonds were issued for the concession of the Arturo Merino Benítez International Airport: a private dollar issue in the U.S. market and one in Units of Account (UF) in the domestic market.

As we have noted, this contract used a total revenue guarantee with a variable concession period. However, the creditors financed the project for a fixed term and will be protected from prepayment risk.

To this end, the financial structuring of these bonds included an unconditional and irrevocable guarantee by MBIA Insurance Corporation (MBIA), a U.S. insurance company specializing in this type of operation.

This arrangement guaranteed compliance with the bond’s obligations in the agreed-upon terms and periods. The guarantee covers the event that revenue collected by the concessionaire may not cover the sums due the bondholders, with the guarantor agency providing the remaining resources unconditionally.

Creditors consider the credit rating of the company that issues the financial guarantees. Therefore, the rating granted to the issue took into account the rating of the guarantor.
The placement of these bonds was considered a success, with the lowest interest rate to date of any infrastructure bond issue (4.19 percent).

This result was possible because of the financial guarantee included and the fact that, since Arturo Merino Benítez International Airport is Chile’s main airport, it has an adequate revenue-generating capacity.

In Colombia, most financial structuring involves an initial phase of financing with bridge credits from commercial banks, later refinanced with an infrastructure bond.

**Table 10: Status of concessions financed with INFRASTRUCTURE bonds**

<table>
<thead>
<tr>
<th>Name of the concession</th>
<th>Sections</th>
<th>Issue/Series</th>
<th>Amount issued</th>
<th>Outstanding balance</th>
<th>Maturity</th>
<th>Rating</th>
<th>Prospects</th>
</tr>
</thead>
<tbody>
<tr>
<td>PISA (Operación - Construcción)</td>
<td>Buga - La Paila - La Victoria</td>
<td>Segunda Emisión</td>
<td>$ 20,000</td>
<td>$ 12,000</td>
<td>Sep-11</td>
<td>AA+(col)</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tercera Emisión</td>
<td>$ 60,000</td>
<td>$ 60,000</td>
<td>May-19</td>
<td>AA+(col)</td>
<td>Stable</td>
</tr>
<tr>
<td>Concesión Vial de Cartagena (Operación)</td>
<td>22 Km Concesión Zona Manglares</td>
<td>Serie Senior</td>
<td>$ 35,000</td>
<td>$ 17,500</td>
<td>Jun-12</td>
<td>AAA(col)</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serie MZ</td>
<td>$ 6,000</td>
<td>$ 3,000</td>
<td>Jun-12</td>
<td>BBB(col)</td>
<td>Stable</td>
</tr>
<tr>
<td>Autopistas de los Llanos (Operación)</td>
<td></td>
<td>Serie B</td>
<td>$ 15,000</td>
<td>$ 15,000</td>
<td>Sep-11</td>
<td>AA+(col)</td>
<td>Stable</td>
</tr>
<tr>
<td>Panamericana (Operación)</td>
<td>Los Ángeles - Villena - Chaguacal - Cambao</td>
<td>Serie Única</td>
<td>$ 40,000</td>
<td>$ 40,000</td>
<td>Dec-14</td>
<td>AA+(col)</td>
<td>Negative</td>
</tr>
<tr>
<td>Concesionaria de Occidente (Operación - Construcción)</td>
<td>La Victoria - Pereira</td>
<td>Serie A</td>
<td>$ 53,000</td>
<td>$ 53,000</td>
<td>Sep-13</td>
<td>AAA(col)</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serie B</td>
<td>$ 52,000</td>
<td>$ 52,000</td>
<td>Sep-17</td>
<td>AA+(col)</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serie C</td>
<td>$ 57,500</td>
<td>$ 57,500</td>
<td>Sep-20</td>
<td>AA+(col)</td>
<td>Stable</td>
</tr>
</tbody>
</table>

Source: Fitch Ratings.
Prepared by: Fitch Ratings.
5.1. Economic Structuring

We have noted that demand models are desirable if the concessionaire is able to manage the level of the demand for services. In this case the concessionaire assumes the demand risk and the structure is based on a projected cash flow, indicating the investments to be made, the rates to be charged for the service, and the Government’s share of the revenue generated.

The purpose of the structuring is to determine the economic viability of the business in a given scenario. If applicable, the economic model can help set the tariffs for the service, the level of minimum guaranteed revenue, and other basic variables of the process.

The minimum guaranteed revenue mechanism seeks to share risk between the concessionaire and concession grantor; in other words, to reduce the concessionaire’s risk to the gap that is above the minimum guaranteed revenue and below the revenue expected by the concessionaire.

The concession grantor’s obligation is to cover the deficit that may exist when revenue is below the level set as the minimum revenue.

The expected revenue from the project is higher than the minimum guaranteed revenue. Expected revenue is that which makes the project economically and financially viable as well as self-sustaining.

The minimum guaranteed revenue is that which makes the projects more attractive to creditors by mitigating demand risk and giving investors greater confidence in the capacity of inflows to cover the debt service. It makes it more viable to find lower cost financing, but does not permit recovery of the invested capital.

This characteristic is important because, if the minimum guaranteed revenue permits recovery of capital, demand risk will be assumed entirely by the concession grantor, so more than one private investor would be willing to execute the project since it had no demand risk. This would not be consistent with the characteristics of a self-sustaining project, but would make it a cofinanced project, thereby unnecessarily committing the Government’s resources.
Minimum guaranteed revenue is a contingent liability of the Government associated with the probability of occurrence, which hopefully will be slight. In Peru, the probability must be less than 10 percent.

Note that both this mechanism and the total revenue guarantee mechanism described earlier mitigate demand risk, but the latter does not constitute a contingent liability because there is no commitment of Government resources, given that the demand risk is mitigated with extensions of the concession period.

If the concession grantor’s obligation to provide funds is activated, the period for doing so will depend on its agility and budgetary capacity. Most probably the funds will be required in the next calendar or fiscal year.

The situation noted in the preceding paragraph calls for the project to have additional mechanisms to finance liquidity. The concessionaire must have sufficient capacity to meet this obligation until the Government makes the payment.

This mechanism is usually accompanied by a trust that provides security in fund management, which may have reserve accounts to cover gaps in the Government’s payment obligations.

This mechanism can also be strengthened with a financial guarantee from a monoline insurance company, or a bank loan.

**Peru**

In the Peruvian case, the concession contract for Highway Network N° 4 included for the first time this mechanism called minimum annual revenue guarantee (MARG), under which the concession grantor pledged to ensure minimum revenue to the concessionaire for the shorter of: (i) fifteen (15) years from the date of acceptance of the works, or (ii) the period corresponding to the repayment of the debt.
Box 10: Highway network 4 (sections: Pativilca–Santa–Trujillo and Salaverry–junction R01N)

In this concession, the concessionaire is in charge of construction of the second roadway of the Northern Pan-American Highway: Pativilca–Santa–Trujillo and Salaverry–Junction R01N (about 362 km.). The concessionaire receives the existing roadway from the concession grantor as soon as the works are finished.

The term of the concession is 25 years and the concessionaire’s primary obligations include:

- Construction of the second roadway between Pativilca and Trujillo, as a result of bidding. Required length: 170 km. Additional maximum length: 113.42 km.
- Additional related works: eight traffic circles, four pedestrian bridges, five overpasses and bypasses in Huarmey, Casma, and Virú-Chao.
- The concessionaire undertakes to operate and maintain the sections it builds and receives upon completion by the concession grantor.

If the MARG payment is activated, it will be made from funds provided by the concession grantor, disbursed no later than the first half of February of the year following the year in which the obligation originated. If the payment is not made by the deadline, additional interest will be charged.

In Peru, the MARG is regarded as a non-financial guarantee—i.e., as a contingent liability of the Government. Before the Government makes that commitment, it is therefore necessary to analyze the traffic flow to estimate the probability that revenue in a given year will be less than the minimum guaranteed revenue; in no case should the probability exceed 10 percent.

Chile

In the Chilean case, the minimum guaranteed revenue concept is associated with the concept of sharing benefits with the Government if the revenue exceeds certain levels. For this purpose, there is a system of bands (cap and floor) for the expected revenue curve. The Government assumes the risk if the revenue is less than the minimum guarantee, but if it exceeds the expected revenue there is a profit-sharing mechanism.

These considerations were applied in the concession contract of the North Coastal Highway [Autopista Costanera Norte], with a provision that when actual revenue exceeds the cap, the Government and the concessionaire will share the excess.
Box 11: North Coastal Highway

The North Coastal Highway concession, also known as the East-West System International Concession, includes the expressways of the North Coastal Highway, with a length of 34.9 km, and President Kennedy Avenue, with a length of 7.4 km, for a total of 42.3 km.

The term of the concession is for 30 years (360 months) starting July 1, 2003. The innovations in this concession are construction of part of the highway under the bed of the Mapocho River and implementation of an electronic toll collection system.

FIGURE 24: Financial guarantees – minimum guaranteed revenue

The risk rating company Humphreys Ltda., affiliated with Moody’s Investors Service, said the following in its risk rating report on this concession:

“One of the bond’s principal strengths is the fact that minimum revenue guaranteed by the Government to the concession (MGR) amply exceeds the obligations generated by the issue of bonds (on average by more than 40 percent). To date, given that the company’s inflows have satisfactorily matched original projections, it has not been necessary to activate the minimum guaranteed revenue system.”

Regarding Chile’s experience, we might also note the concession of the Melipilla Bypass, for which pre-operational infrastructure bonds were issued without obtaining a financial guarantee from the insurer.
Box 12: Melipilla bypass

This project involves construction of a new alternative road to the community of Rapel or in the direction of the coastal zone of the sixth region, including construction of a new bridge over the Maipo River. The term of the concession is 30 years, starting April 29, 2003.

This issue was structured on the basis of minimum guaranteed revenue, backed by a trust designed with five reserve accounts.\(^\text{51}\)

- **Operating reserve account.** Equal to one-third of the routine operation and maintenance expenses in the preceding six months.
- **Major maintenance reserve fund.** Funds six months in advance the respective amounts earmarked for major maintenance, expected to be done in 2016 and 2025.
- **Debt service reserve account.** A reserve account that since 2009 equals 150 percent of the next semi-annual coupon payment (principal and interest).
- **Insurance reserve account.** Funds received from paid insurance claims are deposited in this account, which is used for expenses for reparation of the damage from the insured peril.
- **Operating revenue account.** This account collects funds obtained from MGR, construction subsidies, and required capital contributions, in order to manage the funds and transfer them to the reserve accounts that follow it in priority. Since 2009, it also optionally funds 50 percent of the coupon payable for amortization and interest, to mitigate the cash flow effect of a possible delay in receiving the MGR from the Ministry of Public Works.

According to Fitch Rating, “the company’s growing dependence on the MGR is mitigated by adequate counterpart risk, shown by the timely payment of subsidies by the Ministry of Public Works, and by a reserve account equivalent to nine months of debt service since 2009 (six months before 2009).”

This made it possible to place bonds for UF 660,000 at an interest rate of 6.5 percent for a term of 21 years, rated AA- by Feller Rate.

The following table shows the concession contracts that have included the minimum guaranteed revenue mechanism:

---

\(^{51}\) Taken from the rating report prepared by Fitch Ratings.
Table 11: Concessions structured with minimum guaranteed revenue

<table>
<thead>
<tr>
<th>Item</th>
<th>Name of Project</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transversal highways</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tunel El Matén</td>
<td>1993</td>
</tr>
<tr>
<td>3</td>
<td>Camino de La Madera</td>
<td>1994</td>
</tr>
<tr>
<td>4</td>
<td>Acceso Norte a Concepción</td>
<td>1995</td>
</tr>
<tr>
<td>5</td>
<td>Camino Nogales – Peñabruca</td>
<td>1995</td>
</tr>
<tr>
<td>6</td>
<td>Autopista Santiago – San Antonio</td>
<td>1995</td>
</tr>
<tr>
<td>7</td>
<td>Ruta 57, Camino Santiago – Colina-Los Andes</td>
<td>1998</td>
</tr>
<tr>
<td>8</td>
<td>Ruta Vial Litoral Central</td>
<td>2001</td>
</tr>
<tr>
<td>9</td>
<td>Ruta Interpuente</td>
<td>2002</td>
</tr>
<tr>
<td>10</td>
<td>Variante Melipilla</td>
<td>2003</td>
</tr>
<tr>
<td>11</td>
<td>Ruta 160, Los Finos - Coronel</td>
<td>2008</td>
</tr>
<tr>
<td>12</td>
<td>Ruta 66, Camino de la Frontera</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>Autopistas de Antofagasta</td>
<td>2010</td>
</tr>
<tr>
<td>13</td>
<td>Route 5</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Ruta 5, Talca – Chillán</td>
<td>1996</td>
</tr>
<tr>
<td>15</td>
<td>Ruta 5, Los Vilos – La Serena</td>
<td>1997</td>
</tr>
<tr>
<td>16</td>
<td>Ruta 5, Santiago – Los Vilos</td>
<td>1997</td>
</tr>
<tr>
<td>17</td>
<td>Ruta 5, Chillán – Collipulli</td>
<td>1997</td>
</tr>
<tr>
<td>18</td>
<td>Ruta 5, Collipulli – Temuco</td>
<td>1997</td>
</tr>
<tr>
<td>19</td>
<td>Ruta 5, Temuco – Río Bueno</td>
<td>1997</td>
</tr>
<tr>
<td>20</td>
<td>Ruta 5, Río Bueno – Puerto Montt</td>
<td>1997</td>
</tr>
<tr>
<td>21</td>
<td>Ruta 5, Santiago – Talca and Acceso Sur a Santiago</td>
<td>2001</td>
</tr>
<tr>
<td>22</td>
<td>Ruta 5, Tramo Vallenar – Caldera</td>
<td>2005</td>
</tr>
<tr>
<td>23</td>
<td>Ruta 5, Puerto Montt – Pergua</td>
<td>2005</td>
</tr>
<tr>
<td>24</td>
<td>Airports</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Santiago International Airport</td>
<td>1997</td>
</tr>
<tr>
<td>26</td>
<td>Campan Sur de Concepción Airport</td>
<td>1999</td>
</tr>
<tr>
<td>27</td>
<td>Chillán-Arica Airport</td>
<td>2004</td>
</tr>
<tr>
<td>28</td>
<td>Urban concessions</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>East-West System</td>
<td>2003</td>
</tr>
<tr>
<td>30</td>
<td>Northeast access to Santiago</td>
<td>2007</td>
</tr>
</tbody>
</table>

Source: Budget Office, World Bank.
5.2. Financial Instruments

5.2.1. Infrastructure bonds (Chile)

Financing of the concession of the North Coastal Highway, like most of Chile’s public infrastructure projects, involved the issue of infrastructure bonds. The placement was made on December 11, 2003, bringing in a total of 9.5 million UF (US$294 million) with periods of 13 and 21 years for each series.

After deduction of the necessary amounts for payment of the bridge loan and the expenses of the issue, the resources obtained from the bond placement will be deposited in trust accounts of the administrator and custodian, who will make payments upon approval by an independent engineer, based on the actual progress of the concession works.

This operation had a guarantee of timely, unconditional, and irrevocable payment from the IDB and the Ambac Assurance Corporation, with a participation of 15 percent and 85 percent, respectively. Both entities have an AAA rating from Moody’s Investors Service.

These financial guarantees are governed by and interpreted under the laws of the State of New York. Any conflict arising from interpretation of the financial guarantees must be submitted to a court with jurisdiction over the respective guarantor.

The financial structure for the bond issue stipulates that the issuer may only authorize the withdrawal of assets, the reduction of capital, and/or payment of the related debt if it maintains a liquidity fund to guarantee payment of the next annual coupons. The structure also requires that the periodic inflows exceed the amortization of capital and payment of interest by a pre-established percentage.

The risk-rating firm Humphreys Ltda., affiliated with Moody’s Investors Service, had this to say about the bonds in its rating report:

“Apart from the guarantee, the characteristics of the concession give the issuer the necessary financial strength so that the debt securities, standing alone, have sufficient capacity for payment with respect to the obligations assumed (at least comparable to investment-grade bonds). This is because of the characteristics of the assets and the projected net inflows.”
This issue was rated AAA by Humphreys Ltda., based on the fact that payment of the bonds was financially guaranteed. The credit backing given by the insurance companies opens the door to higher ratings for the bond because the insurance company assumes the risk for partial or total non-payment in exchange for a commission.

5.2.2. Ordinary bonds (Colombia)

The company Concesionaria de Occidente S.A., concessionaire of the Pereira–La Victoria Highway Project, ceded all economic rights of the concession to the trust Concesionaria de Occidente Fiduoccidente.

As a guarantee mechanism, the trust issued a certificate of source of payment to the legal representative of the bondholders for the total amount of the issue, plus the respective interest for the period of the issue.

Box 13: Pereira–La Victoria highway project

The concession contract for this project, signed on August 2, 2004, provides for the concessionaire to execute all the activities, works, assets, services, obligations, and necessary rights for the studies and definitive plans, the land management, construction works, improvement and rehabilitation, operation, maintenance, financing, provision of services, and use of the assets ceded to the INCO, given in concession for the proper execution of the project.\(^{52}\)

The highway in the concession is 54.49 km long, located in the departments of Valle del Cauca and Risaralda, a region of intensive economic activity consisting of important agricultural and industrial centers that supply the domestic and international market and are connected by a dense highway network. It is part of the National Highway Network and the Pan-American Highway in Colombia.

The contract belongs to the group of third generation contracts. The term of the concession contract has been estimated at 16.5 years, starting on September 27, 2004, date of signing the certificate of initiation of the contract, although the actual term will end when the expected revenue proposed by the concessionaire is attained. However, in no case may the contract’s duration exceed 21 years from the date of signing the certificate of initiation of the contract.

In order to guarantee timely payment of funds to the bondholders and obtain a good rating, the following structure of reserve accounts was established:

---

\(^{52}\) As Governmentd in the prospectus for the issue and placement of autonomous regular asset bonds by Concesionaria de Occidente S.A.
• Reserve Fund for CAPEX, to be used for payment of pending investments in works.
• Reserve fund for OPEX: to be used for payments for operation, maintenance, and project expenses.
• Reserve fund for payment of interest: First year of interest is funded with resources from the issue. Thenceforth there is a reserve for monthly interest payments (1/3).
• Reserve fund for payment of capital.
• Fund for payment of short-term creditors and providers of short-term goods or services.
• Surplus fund.

The following illustrations show the scheme designed for the bond issues in both the construction and operation phases:

**Figure 25: Bond issue scheme**
When the bonds were issued the concessionaire had executed about 90 percent of the total works. The funds received from the issue were therefore used as follows:

- 72 percent for prepayment of the local financial debt.
- 20 percent for investment in the work.
- 8 percent for the interest fund for the first year.

In addition, the concessionaire is required to maintain a debt service coverage ratio (calculated semi-annually) equal to or greater than 1.1.

For the Bosa–Granada–Girardot highway project, bonds were issued for 150 million Colombian pesos to finance 15.9 percent of the funding requirement. The bonds were floated by a trust established especially for the purpose. The trust has the direct and unconditional obligation to make the payments.

53. As reported by Corredores Asociados S.A. 
The bond issue occurred in the pre-construction stage; funds generated were used to finance studies and definitive plans, construct the works, and maintain the highway.

In this case, before the bond issue the concessionaire securitized the financial closing with the financial commitment of three banks. In order to obtain a high rating for the issue, it was stipulated that payment to creditors, including bondholders, would be made on a pro rata basis with no order of precedence.

The regulations for the bond issue imposed the following conditions:

- A long-term debt ceiling of 98 million euros (270 million Colombian pesos).
- A short-term debt ceiling of 3.6 million euros (10 million Colombian pesos).
- The debt service coverage ratio must be no less than 1.2 times.
- Leverage over the entire duration of the project must not exceed 60 percent; i.e., the total debt may not be more than 60 percent of the total debt and capital.
- Operating costs may not exceed 20 percent of the toll revenue.

As a guarantee mechanism, guaranty certificates were issued for up to 40 percent of the revenue expected by the concessionaire in current pesos of 2002, to be administered by the trustee.

In addition, there was a mechanism called “partial support for reduction of revenue,” so that investors are not exposed to demand risk, thereby reducing the uncertainty regarding inflows generated by the project for repayment of the debt.

Guzmán (2007) describes this mechanism as follows:

“It is a public guarantee, because the Government is obligated to provide resources in a contingency fund administered by another trustee. This fund will be the source of the orange part (see below) called “CIG net value” after the calculation shown in the graph is made. In this project, the contingency fund had a balance of 7.3 million euros (20 billion Colombian pesos).”

---

54. This contingency fund is administered by a public trustee and the funds are backed by the national budget. The amount is determined by the risks associated with the concession.
Figure 27: Partial support for reduction in revenue

This figure presents a band of maximum expected revenue and minimum (ISGE and IASP, respectively), whose time unit for calculation is six months. For example, if in month j+1 the collection is greater than expected (ICS>ISGE), this money is counted separately as surplus. If between month j+1 and j+4 the collection falls (ICS<IASP), the excess money in month j+1 compensates for these losses caused (grey area), and finally, if the surplus money collected in month j+1 does not compensate for the losses sustained between months j+1 and j+4, the difference is assumed by the contingency fund (CIG, orange area). If the CIG guarantee fund is used, that money will also be taken into account when calculating the expected revenue.

Through this mechanism, the concessionaire is required to provide resources needed by the trustee in the event that the resources administered by the trustee are insufficient to cover its obligations.
5.2.3. Stock exchange certificates (Mexico)

Stock exchange certificates (certificados bursátiles) are short-, medium-, and long-term debt instruments that have experienced significant rapid development in Mexico. Formerly an instrument used by the SIEFORE (pension) firms, now the document is accepted by all types of institutional investors.

Article 62 of the Stock Market Law defines stock market certificates as: “…credit instruments that represent individual participation of their holders in a collective credit in the hands of corporations or an asset in trust.”

Stock market certificates are based on a securitization mechanism that consists of a fiduciary scheme in which assets, securities, or rights are granted as assets in trust that provide the backing for the trust to issue debt instruments, duly rated, that are placed with domestic and foreign investors on the stock market.

The risk associated with these assets is thus fully or partially transferred. For example, demand risk for rights to collect tolls is transferred, although it will be necessary to cover that risk with financial guarantees\(^\text{55}\) issued by monoline insurance companies.

Box 14: Monterrey-Cadereyta highway

The Monterrey-Cadereyta Highway, also known as the Toll Highway, is in the State of Nuevo León and links the cities of Monterrey and Cadereyta. It is 29.5 km long.

With an investment of Mex$60 million (sixty million pesos) from public resources, this road was put in service in December 1988. Since then it has been operated by the public decentralized entity “State Highway Network of Nuevo León,” which has sole responsibility for planning, design, promotion, conservation, construction, exploitation, administration, and operation.”

The Mexican Stock Exchange (BMV) said\(^\text{56}\) that “the primary characteristic of the stock

---

\(^{55}\) There was a notice in the Diario Oficial de la Federación (Official Gazette) on November 30, 2006, stating: “…it is appropriate for insurance companies to be permitted to deal in financial guarantee insurance to cover the risk of default by issuers of securities, bonds, and documents offered publically or through the stock market, because this type of insurance assists with risk diversification, may contribute to strengthening the debt market, and guarantees bond issues to finance public and infrastructure projects to benefit the population.”

exchange certificates is their operational flexibility of structures based on a placement program that can be made in one or more issues. The company therefore can define the best amount and time for placement, and the characteristics of each issue, which may vary, establishing the amounts and general terms of payment and interest (real or discount, indexed, with UDIs [Investment Units], etc.), as well as the maturity of each placement.”

This instrument was used to finance the Monterrey-Cadereyta Highway by the State Highway Network of Nuevo León, a public decentralized agency of the State of Nuevo León. The payment source was toll collection for the next 30 years, done as a trust asset.

This issue of stock exchange certificates was rated AAA by Fitch Rating. The amount issued was Mex$2.418 billion for a term of 9,131 days, about 25 years.

It included “financial guarantee insurance” from MBIA Insurance Corporation, under a policy governed by the laws of New York State in the United States. The guarantee pledged unconditional and irrevocable payment in full and on time of the interest on the certificates on the dates specified. In December 2009, only two companies were authorized to operate in Mexico: Financial Security Assurance Seguros México S.A. and MBIA México S.A.

Here are some of the principal characteristics of this issue:

• The amortization scheme consisted of a zero flow scheme, in which all available net resources or remnants are used to prepay interest and capital as an obligatory prepayment mechanism.
• A reserve account for debt service was set up.
• There was a reserve account for major maintenance.

Operation of the financing through stock market certificates can be summarized as shown in the following diagram:

---

57. This transaction was recognized as the “Americas Infrastructure Deal of the Year” (including the United States and Canada) by the prestigious international publication specializing in project financing, Project Finance International.
Figure 28: Financing scheme of the stock market certificates

Article 14 Bis 7 of the Stock Market Law specifies the minimum information that the stock market certificates must contain:

- Mention that it is a stock market certificate property of the bearer.
- The name or designation of the issuer and the purpose of the company or semi-official public entity concerned, and in the case of trusts, the purpose for which it was formed. In the case of federal and municipal entities, it is only necessary to show the designation.
- The amount of the issue, number of certificates and, when applicable, the series and nominal value of each series. In addition, the purpose for which resources from the issue are to be used.
- The interest rate, if any.
- The term of payment of capital and interest, if applicable.
- The conditions and forms of amortization.
- The place of payment.
- As applicable, reasons for early call, which may include those related to default of obligations by the issuer.
- Specification of any guarantees for the emission.
- Date and place of issue.
• The signature of the issuer’s representative or agent, who must have the authority to sign credit instruments under the terms of applicable laws.
• The signature of the stockholders’ joint representative, noting the representative’s acceptance and declaration of having checked the establishment and existence of assets covered by the issue guarantees, and the obligations and powers.

5.2.4. Development capital certificates (Mexico)

Development capital certificates (CKDs)\textsuperscript{58} are financial instruments designed to finance brownfield or greenfield projects, not limited to infrastructure projects. The instruments have variable yields depending on the project’s economic results.

Under Mexican legislation, CKDs are classified according to type of investment in:
• Type A: Private capital funds that in turn invest in projects.
• Type B: Projects only, mainly for infrastructure.

CKDs are not intended to be debt instruments. They resemble capital or quasi-capital instruments invested for a specific term that work like common stock. They are represented by securities or fiduciary stock issued by trustees or special-purpose vehicles, with no nominal value, in order to collect resources to finance projects. The assets granted to the trust can be stock or securities with no obligation to pay principal and interest, so their yield varies according to the cash flows that the project generates.

To date, CKDs have been issued for three private capital funds (Wamex, Macquarie Mexico Infrastructure Management, and Discovery Mexico) for a total of 5.55 billion pesos. For infrastructure, they have been issued for the project called Red de Carreteras de Occidente [Western Highway Network] for 6.65 billion pesos.

The Red de Carreteras de Occidente (RCO) was Mexico’s first issue of CKDs. The amount was 6.55 billion pesos (US$476 million), issued for a term of 28.5 years, and the trust assets consisted mainly of a collateral contract without transfer of ownership of shares.

\textsuperscript{58} The Mexican Stock Exchange introduced this instrument in the Mexican financial system on August 10, 2009, through amendments to the stock exchange regulations.
representing 32 percent of the authorized capital\textsuperscript{59} to permit an increase in the capital of RCO, which will underwrite new Series B stock. This way, the issuer trustee became a company stockholder with the new investors as beneficiaries.

\textbf{Box 15: Red de Carreteras de Occidente (RCO) [Western highway network]}

On August 6, 2007, the Federal Government of Mexico granted to the corporation Red de Carreteras de Occidente\textsuperscript{60} S. de R.L., for a 30-year period, the concession for the following group of highways:

i. Maravatío-Zapotlanejo Highway
ii. Guadalajara–Zapotlanejo Highway
iii. Zapotlanejo–Lagos de Moreno Highway
iv. León–Aguascalientes Highway

Under the concession contract, the corporation Red de Carreteras de Occidente S.A. is required to construct, operate, exploit, conserve, and maintain said highways.

According to the Financiero.com portal, the price per share at issue was 77 pesos (US\$5.60240), and the shares began trading on the Mexican Stock Exchange. Each CKD is backed by 100 Series B shares of Red de Carreteras de Occidente, deposited with the issuer trustee.\textsuperscript{61}

This concession is part of the group of highways of the National Highways Program, and was included in the Mexican Government’s step-in program, with implementation of the trust for support of the salvaging of concession highways (FARAC). Funds collected through the CDs by the issuer trustee will be used primarily to pay part of the debt of Red de Carreteras de Occidente.

\textsuperscript{59} IXE Financial Group.

\textsuperscript{60} A corporation consisting of the consortium of GSIP, CICASA, and CONOISA.

\textsuperscript{61} http://www.financiero.com/noticias/red-carreteras-occidente-coloca-certificados-bursatiles-fiduciarios-por-us476-millones.asp
# VI. COMPARATIVE ANALYSIS OF FINANCIAL INSTRUMENTS

## Table 12: Comparative Analysis of Financial Instruments

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Minimum guaranteed revenue</th>
<th>Total guaranteed revenue</th>
<th>Partial support for reduction of revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concession period</td>
<td>Fixed</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Period for payment of associated debt</td>
<td>Fixed</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Effect on Government resources</td>
<td>Contributions</td>
<td>None</td>
<td>Partial contributions</td>
</tr>
<tr>
<td>Payment guarantee</td>
<td>Government</td>
<td>Monoline insurance companies / trust</td>
<td>Concessionaire / Government</td>
</tr>
<tr>
<td>Effect on financial creditors</td>
<td>Mitigates demand risk</td>
<td>Partially mitigates demand risk; requires additional guarantees</td>
<td>Mitigates demand risk; requires adequate design of trusts</td>
</tr>
<tr>
<td>Effect on concessionaires</td>
<td>Partially mitigates demand risk; does not guarantee financial viability</td>
<td>Partially mitigates demand risk; the variable term guarantees financial viability</td>
<td>Does not mitigate demand risk</td>
</tr>
<tr>
<td>Structuring model</td>
<td>Demand model</td>
<td>Cost model</td>
<td>Cost model</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>CR-PFW</th>
<th>CR-RFI</th>
<th>Infrastructure Bonds / Ordinary / Stock Exchange Certificates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects of construction risk on financial creditors</td>
<td>None, issued according to work progress</td>
<td>None, issued according to work progress</td>
<td>Present if issued during construction stage. None if issued during operational stage</td>
</tr>
<tr>
<td>Effects of contract termination risk on financial creditors</td>
<td>None. CR-PFWs issued will be paid</td>
<td>None. CR-RFIs issued will be paid</td>
<td>Depends on the contract’s liquidation mechanism</td>
</tr>
<tr>
<td>Verification of quality of work progress</td>
<td>Yes. Requires issuance of a WPC, which permits it</td>
<td>Yes. Requires issuance of a WPC, which permits it</td>
<td>No</td>
</tr>
<tr>
<td>Nature of obligation</td>
<td>This document represents an unconditional and irrevocable payment obligation</td>
<td>This document represents an unconditional and irrevocable payment obligation</td>
<td>Monoline insurance companies / trust guarantee unconditional, irrevocable payment. Their credit rating affects the issue</td>
</tr>
<tr>
<td>Payment guarantee</td>
<td>Sovereign guarantee</td>
<td>Indirect sovereign guarantee</td>
<td>Guarantee contracts needed</td>
</tr>
<tr>
<td>Transferability of instruments</td>
<td>Transferable</td>
<td>Transferable</td>
<td>Transferable</td>
</tr>
</tbody>
</table>
Infrastructure projects have special characteristics, such as requiring high amounts of investment, which make it necessary to have a greater variety of financing sources and financial instruments to execute them. A key aspect in the design of these infrastructure projects is proper identification of the risks to which they are exposed, in order to assign and mitigate these risks, including the associated costs. A satisfactory profitability-risk ratio is needed to encourage private sector participation.

Corporations and projects have traditionally been financed by issuing bonds or promissory notes as debt, or issuing stock as an addition to assets. These instruments are used for various investments with a view to increasing the company’s worth. Although these instruments are highly standardized and there is a regulatory framework for their issue, they cannot necessarily be used to finance an infrastructure investment project, because the backing is different. On the one hand are the company’s business flows, and on the other hand is the relation between the Government and the operator of a PPP contract. This source of resources is not necessarily used for investment in infrastructure, because it is designed to satisfy the needs of a specific type of investor.

The establishment of pension and life insurance funds in Latin America, institutional investors, created a new source of financial resources whose raison d’être is to invest in the economy through financial instruments. However, these funds are also regulated both as to the amount invested and to the conditions that the financial instruments must meet. It is therefore necessary to have instruments that make it possible to use these resources in the financing of various projects, especially infrastructure investment projects.

Institutional investors may invest directly and indirectly in the financing of infrastructure projects. The indirect investment is through the purchase of stock and bonds of companies that work in sectors in which they can invest in increasing the infrastructure stock, such as telecommunications, electricity, etc. Direct investment, which is timidly made in the countries of the region—or not at all—is the purchase of direct debt of the investment projects. Each Latin American country is analyzing its particular situation to establish an appropriate legal framework for more flexible portfolios and to create different financial instruments, based on its own scenario.
7.1. Traditional Financing

All investment projects, in both real assets and financial assets, must have a source of financing. Martín (2007) says that when agents that intervene in the economy need financing, they can do two things:

- Resort to the indirect intermediation or banking market to request lines of credit and loans.
- Resort to the direct intermediation market and offer:
  - Stock: the cheapest source of financing that companies can have, because they do not have to pay any fixed interest, only dividends, if any, because the stockholders assume the company’s business risk.
  - Fixed revenue instruments: a source of financing with a known cost for the company, because it must pay specified interest or revenue to the investors, which are only willing to assume a credit risk with the company.

7.2. Capital Market

The capital market is the place where financial instruments are issued and traded. It is an alternative to traditional bank financing, making it possible for companies to reduce the funding cost by placement of securities, and offering investors higher return for their funds. The principal issuers are the Government and private companies. The main investors are the so-called institutional investors—pension funds, mutual funds, and insurance companies. This market consists of a primary market, where new financial instruments are floated, and a secondary one where existing instruments are traded (Central Bank of Peru, 2010).

Although various financial instruments are used for financing and for getting the best return, the most common ones are stocks and bonds.

a) Characteristics of the financial instruments

Each instrument, stocks or bonds, has different characteristics, which vary depending on the investors’ needs and the companies’ requirements for financing.
**Characteristics of stocks**

Paper traded on the stock exchange that represents partial control of the corporation and the possibility of sharing its earnings.

The stockholders have limited liability with respect to the corporation.

Their profitability comes from capital gains and dividends.

**Characteristics of bonds**

They are securities that pay periodic interest called coupons.

They are issued with maturities longer than one year.

They can be issued as debt of the Government or private companies.

b) **Costs and risks of the instruments**

Here we see differences between the two instruments. In the case of stock, the investors assume the company’s business risk. Bonds, as debt securities, do not entail total business risk, only credit risk. However, in the event of liquidation of the company, creditors—bondholders—have priority in the distribution over stockholders.

With respect to costs, both instruments avoid intermediation—present in bank financing—which lowers the interest rate. Given problems such as the lack of security, liquidity, and flexibility of a bank deposit, investors are willing to buy the instruments if they offer advantages over deposits.

It is important to note that fixed costs for structuring and issue of financial instruments are not a significant percentage when a large volume of instruments is issued, but they may be high if the issue is small (Martín, 2007).

**7.3. Pension Funds**

Investment funds, managed by institutional investors, such as pension funds or life and health insurance companies, have greatly evolved in the past 30 years in Latin America.
These funds have grown in terms of the amount managed and their need to obtain the necessary return for their clients and for their own earnings.

Pension funds are resources invested in a set of assets that seek to obtain the highest yield possible with an acceptable risk in order to finance the benefits of the pension plans (OECD 2005).

In 1981, Chile became the first Latin American country to implement individual pension funds, and since then it is the country with the highest participation in pension funds as a percentage of GDP. The rest of the Latin American countries have also implemented the system: Colombia and Peru in 1993, Argentina in 1994, and Mexico in 1997. (Alonso, Bjeletic, Herrera, Hormazabal, Ordoñez, Romero, and Tuesta 2010)

Figure 29: Pension funds

The growth in the sums managed by the pension funds has made it necessary to create new low-risk financial instruments in which they can invest to get the desired return. The creation of instruments would also develop the capital market, an aspect related to the Latin American countries’ balance of payments policies.
Despite the economic liberalization the region is experiencing, some countries have rather restrictive regulations for investment funds’ portfolios, so there is a surplus that cannot be adequately tapped by the fund managers.

Moreover, given the infrastructure gap between developed and developing countries, the requirement for investment sources to increase the investment stock made it necessary to stimulate pension funds to invest in infrastructure, influenced also by the new agreement to respect fiscal discipline.

As mentioned, pension funds intervene both directly and indirectly in infrastructure project financing. They do it indirectly by purchasing stocks and bonds of companies that are working in sectors that invest to increase the infrastructure stock, such as telecommunications, mining, etc. This is called “indirect” because, although the injection of resources can help the investment, it is not necessarily the primary use of the funds. The direct manner, still not used in all countries in the region, is the purchase of the direct debt of the investment projects. This is done by purchasing recently established company bonds (special-purpose vehicles) for construction of the infrastructure project. Since the regulations require a certain number of years of history of the company, and the PPPs are new companies that cannot use conventional financial instruments, new financial instruments were established in accordance with each country’s regulatory framework.

Each Latin American country analyzed its particular situation and established an appropriate legal framework for flexible formation of portfolios and for the creation of different financial instruments, based on each country’s reality.

7.4. Public Initiative Investment Funds

Infrastructure investment in Latin America used to depend on the Government’s ability to undertake it. However, after the British experience showed that the private sector can also support this type of investment, many countries around the world have tried to apply the same formula. The main way the private sector participates is through the formation of Public-Private Partnerships (PPP), creating companies that take charge of construction and operation of specific infrastructure projects whose important features are low economic return but high social return.

The PPPs are formed by the creation of a new corporation whose sole purpose is to execute the project, so there is no financial history as a basis for rating when debt securities are
issued, making it hard to finance the project. Therefore the Government and the pension fund administrators (PFAs) are developing investment funds to finance infrastructure projects.

Since each country’s legislation and regulatory framework is different, so too is the formation and use of these funds. Here is a brief description of the various cases in each country.

7.4.1. Public initiative investment funds in Peru

Participation of pension fund administrators (PFAs) in infrastructure investment began in October 2001 when the Superintendency of Banking, Insurance, and PFAs (SBS) allowed the purchase of investment instruments for concession projects by resolution SBS N° 725-2001. The minimum amount to finance these projects was US$50 million.

Later, to increase the range of investment instruments and improve the participation of the private pension system, the PFAs were authorized to invest in different private-sector projects (highways, mining, housing, etc). The minimum investment in infrastructure projects was reduced to US$20 million, and then, in order to increase the supply of small and medium projects, it was further reduced to US$10 million.

Total capital managed by PFAs has increased since 1993, reaching about US$ 20.777 billion in 2009, part of which has been allocated to finance infrastructure projects.

**Figure 30: Funds administered by PFAs**
Participation in infrastructure projects in PFA portfolios is 14.8 percent of the total pension funds. This percentage does not represent the total of funds used in infrastructure, because the companies do not use all of them in infrastructure projects.

**Figure 31: Infrastructure investment share of PFA portfolios**

The sectors with largest share of investments are energy and petroleum (57.6 percent). The percentage in telecommunications and transportation has increased.

**Figure 32: PFA investments by sector**

Source: Superintendence of Banking, Insurance, and PFAs.
Among the principal projects in which pension funds have been invested are:

- Electric sector: Electroandes, Enersur, Edeger
- Sanitation sector: Consorcio Agua Azul, Concesión Transvase Olmos
- Transportation sector: Infrastructure for South American Regional Integration (IIRSA)

The infrastructure investment is channeled through infrastructure investment funds such as the Sociedad Administradora de Fondos de Inversión (SAFI) [Investment Fund Administrator Corporation], AC Capitales and Larraín Vial Energía Latinoamericano.

Table 13: Participation of PFAs in principal infrastructure sectors

<table>
<thead>
<tr>
<th>Empresa</th>
<th>Sector</th>
<th>Descripción de Operaciones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consorcio Agua Azul</td>
<td>Water and Sanitation</td>
<td>Capture of surface and underground water of the Chillón River basin, treatment and delivery to SEDAPAL (State-controlled water utility) for distribution to about 800,000 residents of the northern districts of Lima</td>
</tr>
<tr>
<td>Concesión Transvase Olmos</td>
<td>Water and Sanitation</td>
<td>Construction of pipeline for moving water from the Huancabamba River on the Atlantic side to the Pacific side</td>
</tr>
<tr>
<td>Pluspetrol Camarca</td>
<td>Energy and hydrocarbons</td>
<td>Exploration and exploitation of Orinoco of Camarca</td>
</tr>
<tr>
<td>Electroandes</td>
<td>Energy and hydrocarbons</td>
<td>160 MW capacity hydro generation, 4 hydroelectric dams, transmission, owner of 29 substations</td>
</tr>
<tr>
<td>Duque Energy Internacional DEDENOR</td>
<td>Energy and hydrocarbons</td>
<td>Generation and transmission of energy, Plants in the north of the country with a capacity of 160 MW thermal and 360 MW hydro</td>
</tr>
<tr>
<td>Enersur</td>
<td>Energy and hydrocarbons</td>
<td>Generation and transmission of energy, Plants in the central and south of the country, Total capacity 926 MW</td>
</tr>
<tr>
<td>Edeger</td>
<td>Energy and hydrocarbons</td>
<td>Generation and transmission of energy, Plants in the central and south of the country, Total capacity 1200 MW</td>
</tr>
<tr>
<td>Nopal Energy</td>
<td>Energy and hydrocarbons</td>
<td>Exploitation of gas and petroleum, Ethanol project</td>
</tr>
<tr>
<td>Red de Energía del Peru</td>
<td>Energy and hydrocarbons</td>
<td>Member of the ISA group, The largest electric transmission company in Peru</td>
</tr>
<tr>
<td>Southern Cone Power Perú</td>
<td>Energy and hydrocarbons</td>
<td>Owner of 21.4% of Edeger’s stock</td>
</tr>
<tr>
<td>Transportadores de Gas del Peru</td>
<td>Energy and hydrocarbons</td>
<td>Transport by ducts of natural gas (NG) and liquid natural gas (LNG) from the Camisea deposits to Paco (LNG) and Lima (NG)</td>
</tr>
<tr>
<td>Consorcio Trasmontano</td>
<td>Energy and hydrocarbons</td>
<td>Transmission of energy, Investment of US$50 million for expansion of the transmission capacity of the Mantaro-Socosaya Line</td>
</tr>
<tr>
<td>IIRSA SUR (Tramo 2, 3 y 4)</td>
<td>Road systems</td>
<td>Financing of the IIRSA SUR (Interoceánica) and Norte highway corridor</td>
</tr>
<tr>
<td>Fondo de Inversión de AC Capitales</td>
<td>Infrastructure</td>
<td>Specialized infrastructure fund, with investments in different projects: Consorcio Agua Azul, Interconexión Eléctrica ISA, Perú, Redcor, Electricidad de París, Ferrocarril Andino</td>
</tr>
<tr>
<td>Fondo Larraín Vial SAFI</td>
<td>Energy and hydrocarbons</td>
<td>Focused in energy sector investments</td>
</tr>
</tbody>
</table>

Source: BBVA.
There are two ways pension funds finance infrastructure projects in Peru:

- Direct investment, buying debt instruments or bonds issued by the concessionaire companies of the infrastructure projects.

- Indirect investment, which involves:
  - Purchase of participation bonds from firms specializing in infrastructure investment funds.
  - Purchase of bonds or debt instruments issued by companies related to companies that participate in investment projects. This revenue is not necessarily used for investment in infrastructure development.

It is estimated that 22.6 percent of the PFA infrastructure investment is in direct investment and the remaining 77.4 percent in indirect investment (Alonso et al 2010).

In 2009, in view of the great need for infrastructure investment and the impact of the global economic crisis on Peru’s economy, the Infrastructure Investment Fund was established with US$500 million to foment investment in large projects.

Peru’s development bank, Corporación Financiera de Desarrollo (COFIDE), played an important role in this context by channeling resources that it administers through institutions regulated by the SBS. This enabled it to supplement the work of the private financial sector in activities such as the financing of medium- and long-term financing, the export sector, and micro- and small enterprises through the channeling of resources.

The first step toward creation of the Fund was providing investment capital of US$100 million to COFIDE. Multinational entities such as the Andean Development Corporation (CAF) and the Inter-American Development Bank (IDB) invested US$100 million between them. The other US$300 million will be tendered by the PFAs, making them the major source of resources for the infrastructure fund.

---

62. COFIDE is a mixed capital corporation that is part of the national financial system and can perform all financial intermediation operations permitted by its legislation, as well as all types of related operations. It functions as a second tier bank.
Figure 33: Structure of the infrastructure investment fund

The infrastructure fund has the following characteristics:

- The fund’s money is distributed into various projects.
- Projects for priority funding are highways, construction of ports and airports, electric power generation, and gas.
- Project life varies from 15 to 30 years.
- Each institution that provides funds will analyze the operation according to its respective policies and procedures.
- It is not subject to the contract law or the PFA regulatory framework.

The SAFI formed by Brookfield of Canada and AC Capitales of Peru manages the fund. The consortium seeks to identify alternatives for infrastructure investment and channel private capital to finance the projects.
Table 14: CAF projects in Peru

<table>
<thead>
<tr>
<th>Title</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proyecto Planta Termozulia III</td>
<td>$165,000,000</td>
</tr>
<tr>
<td>Project for upgrading potable water and sewer systems in marginal areas of Lima</td>
<td>$77,000,000</td>
</tr>
<tr>
<td>COFIDE line of credit with sovereign guarantee</td>
<td>$300,000,000</td>
</tr>
<tr>
<td>Contingent line of credit</td>
<td>$400,000,000</td>
</tr>
<tr>
<td>Remaining CVIS works</td>
<td>$300,000,000</td>
</tr>
<tr>
<td>Second Social and Infrastructure Investment Program</td>
<td>$150,000,000</td>
</tr>
<tr>
<td>Second Social and Infrastructure Investment Program</td>
<td>$400,000,000</td>
</tr>
<tr>
<td>Anti-poor Social Investment and Infrastructure Program</td>
<td>$115,000,000</td>
</tr>
<tr>
<td>Anti-poor Social Investment and Infrastructure Program</td>
<td>$135,000,000</td>
</tr>
<tr>
<td>Program for Pre-Investment Studies in the Border Region</td>
<td>$2,692,000</td>
</tr>
<tr>
<td>GPC Interoceanic Highway Corridor, Section 4</td>
<td>$90,000,000</td>
</tr>
<tr>
<td>Rehabilitation of Huancayo-Huancavelica Railroad</td>
<td>$14,890,000</td>
</tr>
<tr>
<td>Program for the Environmental and Social Management of the Indirect Impacts of the South Interoceanic Highway Corridor (Sections 2, 3, and 4)</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>Guarantee for South Interoceanic Highway Corridor; Section 3</td>
<td>$49,540,000</td>
</tr>
<tr>
<td>Guarantees for the IIRSA Norte Concession</td>
<td></td>
</tr>
<tr>
<td>Trasvasse Concession Partial Guarantee</td>
<td>$26,000,000</td>
</tr>
<tr>
<td>Olmos Project Stage 1 – Trasvasse Work</td>
<td>$77,000,000</td>
</tr>
<tr>
<td>Capacity-Building Program</td>
<td>$90,000,000</td>
</tr>
<tr>
<td>Economic Infrastructure and Development Program</td>
<td>$290,000,000</td>
</tr>
<tr>
<td>Support Program for Competitiveness, Governance, and Investment</td>
<td>$113,000,000</td>
</tr>
</tbody>
</table>

Source: Andean Development Corporation.

Institutional investors began to invest in projects such as the concession for the construction, repair, conservation, and exploitation of the system for optimum use of the surface and subterranean waters of the Chillón River, executed by the Consorcio Agua Azul, and the Camisea concession project. Both are indirect investments that participate by buying debt of these companies, which participate in the consortium that manages the concession. Here is an overview of the Camisea project.
Box 16: Pluspetrol Camisea

The Camisea project involves exploitation of deposits in San Martín and Cashiriari, jointly known as Block 88 (Camisea), and construction and operation of two ducts, a natural gas pipeline and a multipurpose duct for liquid natural gas, and the natural gas network in Lima and Callao. The ducts carry natural gas and liquids for domestic use and export. The natural gas is transported to Lima, the main consumer center, where it can be used for residential and industrial purposes and to generate electricity, which will be distributed at the national level through Peru’s existing transmission infrastructure. The liquids will supply the local market for LPG and serve as an important source of foreign exchange.

In February 2000, after international public bidding, the Peruvian Government awarded the license for exploitation of the Camisea hydrocarbons to the consortium formed by Pluspetrol Perú Corporation, Hunt Oil Company of Peru LLC, Tecpetrol del Perú SAC, SK Corporation, Sonatrach Peru Corporation SAC, and Repsol Exploración Perú. The license was awarded based on the highest offer of royalties submitted by the bidders. The exploitation project consists of a 40-year license for extraction of natural gas and LPG.

In October 2000, concessions for the transport of liquids and natural gas to the coast and distribution of natural gas in Lima and Callao were awarded to the consortium organized by Tecgas N.V. (100 percent owned by the Grupo Techint), with the participation of Pluspetrol Resources Corporation, Hunt Oil Company, SK Corporation, Sonatrach Petroleum Corporation B.V.I., and Graña y Montero S.A.

In early May 2002, TGP S.A. chose Cálidda as the distributor through its company Gas Natural de Lima y Callao (GNLC), owned by Cálidda and formed to distribute natural gas in Lima and Callao. Cálidda will be a partner of TGP S.A. for the transportation project.

The project’s cost was US$850 million, which was entirely financed—directly and indirectly—by the corporations in the consortium, in proportion to their percentage of participation.

Pluspetrol Camisea has 25 percent participation in the consortium and decided to restructure its liabilities with corporate bonds, whose funds permit replacement of its debt with its affiliates and restoration of the capital structure. The total amount of the debt issued was US$150 million. Participation of the PFAs helped restructure the liabilities of Pluspetrol Camisea, obtaining participation in the project and in the sales of natural gas.

7.4.2. Public initiative investment funds in Mexico

In Mexico, the Government has created funds with capital banks or in partnership with the private sector to promote private investment for infrastructure development in various sectors. In this context, the Government established some institutions, notably the Banco Nacional de Obras y Servicios Públicos (BANOBRAS) [National Bank of Public Works and Services] in 1933, a public corporation with majority Government participation, with legal standing and its own assets. Its objective is to finance and refinance public or private infrastructure projects and public services and to assist in the capacity building of the federal, state and municipal levels.
BANOBRAS supports private sector corporations that execute projects involving public services and infrastructure based on legal instruments signed by the corporations with private agents or public institutions that permit them to obtain counterpart financing for the execution and operation of the projects. The options that BANOBRAS offers for Public-Private Partnerships are:

- Credits intended to support the development of infrastructure works that generate social benefits for the population.
- Structuring of projects offering financial products with conditions and characteristics that tailor the financing to the specific aspects of the projects to be carried out.
- Liquidity program for contractors, with resources granted through this program to private corporations to give them sufficient liquidity to execute the works programs established in the works or service contracts signed with federal, state and municipal agencies.
- Finance the National Infrastructure Fund.

Table 15: Successful projects of BANOBRAS

<table>
<thead>
<tr>
<th>Project</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arriaga-Ocozocautla Highway</td>
<td>Structuring of project</td>
</tr>
<tr>
<td>Second Beltway</td>
<td>Credit to states and municipalities</td>
</tr>
<tr>
<td>Project for Providing Irapuato—La Piedad services</td>
<td>Structuring of project</td>
</tr>
<tr>
<td>Pemex Cogeneration</td>
<td>Structuring of project</td>
</tr>
<tr>
<td>Compensation for Networks</td>
<td>Liquidity Program for Contractors</td>
</tr>
<tr>
<td>El Gallo, Chístán, and Trojos hydroelectric plants</td>
<td>Structuring of project</td>
</tr>
<tr>
<td>Ixtapaluca Hospital</td>
<td>Structuring of project</td>
</tr>
<tr>
<td>El Ahogado and Agua Prieta wastewater treatment plants</td>
<td>Structuring of project</td>
</tr>
</tbody>
</table>

Source: BANOBRAS.

There is also the Fondo Nacional de Infraestructura (FONADIN) [National Infrastructure Fund], established in February 2008 to provide coordination with the federal public administration for investment in infrastructure, especially in the areas of communications, transportation, hydroelectric projects, the environment, and tourism. Its principal objective is to finance or contribute to the financing of infrastructure projects with social
impact or payoff. Its main objectives include:

- Support the development of the National Infrastructure Program.
- Maximize and facilitate the mobilization of private capital to infrastructure projects.
- Promote the participation of the public, private, and social sector in the development of infrastructure.
- Take risks that the market is unwilling to assume.
- Make projects with social return and/or low economic return bankable.
- Seek long-term financing in competitive conditions.

The FONADIN has a total of 40 billion pesos to achieve its objectives. To do so, it promotes the following activities, among others:

- Promote the preparation of an inventory of infrastructure projects with public sector entities.
- Provide advisory services to public and private sector entities for the evaluation, structuring, financing, and execution of projects.
- Promote studies and contracting for advisory services with reimbursable and non-reimbursable support to facilitate project evaluation and structuring.
- Grant subordinated and/or convertible credits, guarantees, and capital infusions to stimulate the participation of the private and social sectors in infrastructure.
- Promote the participation of bank and non-bank financial intermediaries in infrastructure financing.

Table 16: Successful FONADIN projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Amount of Investment (Mill Pesos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mida–Tehuantepec Highway</td>
<td>10,500</td>
</tr>
<tr>
<td>Piedra Larga Wind Park</td>
<td>2,495</td>
</tr>
<tr>
<td>Maya Riviera Airport</td>
<td>2,700</td>
</tr>
<tr>
<td>Toll-paying bypass road and new railroad bridge</td>
<td>811</td>
</tr>
<tr>
<td>Matamoros–Brownsville</td>
<td></td>
</tr>
<tr>
<td>Suburban railroad system 3 Chalco–La PazNazahualcoytli</td>
<td>13,000</td>
</tr>
<tr>
<td>Pacific Coast CIP [Country Investment Han]</td>
<td>4,855</td>
</tr>
</tbody>
</table>

Source: FONADIN.
Box 17: Arriaga-Ocozocoaoutla highway

This project, which in total will cover 93.2 km, will have an investment of about 2.5 billion pesos, of which 1.2 billion pesos was already used in the first section and the remaining 1.32 billion pesos will be used in the second section, which is to be completed by the end of next year.

In the framework of the federal government’s toll highway concession scheme, a concession contract was awarded through international public bidding for three highway sections in the State of Chiapas.

The Secretariat of Communications and Transportation (SCT) gave the contract to the corporation that requested the least resources from the Infrastructure Investment Fund or offered the largest up-front counterpart, which was the case of the winning bidder.

The Arriaga-Ocozocoaoutla Highway is 93.2 km long with dual lanes and wide shoulders. It has two sections. Section 1, from Arriaga to Tierra y Libertad, is 20 km long. It starts in the State's coastal area and crosses the Sierra de la Sepultura. The SCT built this section as a public work and inaugurated it in November 2007. Section 2 starts in Tierra y Libertad and ends in Ocozocoaoutla, a length of 73 km. The concessionaire company built this section and it was opened in December 2009.

The Arriaga-Ocozocoaoutla Highway construction will improve communication along the trans-isthmian circuit from the Pacific to the Gulf of Mexico and save significant time in trips between the capital of Chiapas State and the principal cities and towns in the southern part of the State and Central America.

The road is safer for users and the travel time is shorter, especially across the Sierra de la Sepultura. The trip from Arriaga to Ocozocoaoutla is estimated to be 40 minutes faster.

BANCOBRAS gave the concessionaire a credit that forms part of the total financing of the work. To support the project, the National Infrastructure Fund provided resources for supplementary works.

7.4.3. Public initiative investment funds in Colombia

Law N° 100 in 1993 permitted the pooling of individual retirement accounts, which must be managed by the pension fund administrators (PFAs). The value of the pension funds has grown significantly since their establishment, representing about 15 percent of GDP and stimulating the development of the financial sector.

The strong link between pension funds and elements of savings, growth, and development of capital markets can only bear fruit in an investment framework that permits the structuring of efficient pension fund portfolios.

In theory, the PFAs can easily invest in infrastructure projects if the financial vehicle developed permits a satisfactory balance of risk, return, and duration, so they can optimize the structure of their portfolios.
Currently, indirect investment is permitted in infrastructure projects and companies related to this industry through three instruments: private capital funds, stock, and debt instruments.

The private capital funds are limited capital investment portfolios that use at least two-thirds of the investors’ contributions to purchase assets or economic rights that differ from the securities registered with the National Securities and Issuers Register. The maximum amount that may be invested in infrastructure projects is 5 percent of the total portfolio.

The other two ways of investing in infrastructure are through stock and debt securities, which may account for up to 40 percent of the investment. For these securities, the offering and rating play an important part in determining the PFAs’ participation.

Securities of national corporations must be rated as investment grade by an agency authorized by the Financial Superintendency of Colombia. Securities of international companies must be rated by an international agency.

Some examples of indirect participation of pension funds in infrastructure development are the company Interconexión Eléctrica (ISA), the operation and transport of energy and services in the telecommunications market, Ecopetrol – Compañía Colombiana de Petróleo, and ISAGEN, a company formed to provide the electric power market with a network of natural gas, coal, steam, and other energy sources for industrial use.

Indirect investment in infrastructure projects and corporations related to the sector has made a major contribution, more so in stocks than in debt securities. The sector with the greatest participation is electricity and energy.

Table 17: Investments of the PFAs by sector

<table>
<thead>
<tr>
<th></th>
<th>Debt</th>
<th>Equity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.7%</td>
<td>0.0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Comm.</td>
<td>0.8%</td>
<td>0.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Electric</td>
<td>3.1%</td>
<td>4.7%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Energy</td>
<td>0.6%</td>
<td>8.3%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Mortgage Securitization</td>
<td>0.2%</td>
<td>0.0%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Highway</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Total</td>
<td>6.3%</td>
<td>13.2%</td>
<td>19.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Debt</th>
<th>Equity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.4%</td>
<td>0.0%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Comm.</td>
<td>0.8%</td>
<td>0.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Electric</td>
<td>4.2%</td>
<td>3.4%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Energy</td>
<td>0.6%</td>
<td>6.5%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Mortgage Securitization</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Highway</td>
<td>0.8%</td>
<td>0.1%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Total</td>
<td>7.1%</td>
<td>10.2%</td>
<td>17.1%</td>
</tr>
</tbody>
</table>

Source: ASOFONDOS
In 2009, the Colombian Association of Severance Pay and Pension Funds Administrators (ASOFONDOS) presented an analysis giving the characteristics that infrastructure project contracts and securities must have to stimulate the participation of the pension funds in a way that the investments are secure and productive. The ideal characteristics of an infrastructure project can be classified by seven variables: quality of research studies, size of the projects, revenue sources, period, financing, incentives, and quality of regulation.

The contracts are presently designed as small, medium, and fragmented projects, but they could be large and avoid fragmentation in search of economies of scale.

Ideally, infrastructure project contracts should follow the pattern of the project finance model. This type of contract produces a high level of efficiency in the allocation of risk and responsibility, with a better design, more transparency, and better control over project execution.

Two types of securities can help mitigate the various types of risk involved in the infrastructure development process:

- The first is bonds/securities designed for the construction and design phase, seeking to cover excess costs, extension of periods, penalties for delay, and the expropriation period.
- The second is needed to identify types of securities designed for the operation and maintenance stage to mitigate risks of receiving lower traffic flows than expected, increase interest rates, and reduce the Government’s guarantees.

### 7.4.4. Public initiative investment funds in Chile

Chile was the first Latin American country to implement a structure of individual pension funds, and therefore has a very high amount as a percentage of GDP in comparison with other Latin American countries.

Chilean legislation stipulates that pension funds may invest in financial instruments for the sole purpose of obtaining the maximum possible return with reasonable limited risk.

There are two ways pension funds can invest in the infrastructure sector. The first is buying stocks and bonds issued by private infrastructure companies (indirect investment). The
second is the purchase of bonds of concessionaire companies or infrastructure projects (direct investment).

Purchase of corporate stocks and bonds should not be considered an investment in the economic sense, because the funds do not necessarily increase the infrastructure stock. Pension funds’ investment may have a positive effect in the sectors that participate indirectly in infrastructure, depending on the financial system.

Resources managed by Chile’s pension funds as of June 2009 totaled US$102.221 billion.

According to data of the Chilean Pensions Commission, pension funds’ investment in stocks and bonds of corporations in the electric, telecommunications, and water sectors was US$9.979 billion in May 2009.

Table 18: Pension fund investment in stocks and bonds of the electric, telecommunications, natural gas, and water sectors (2009)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Stocks US$ Million</th>
<th>% Pension Fund</th>
<th>Bonds US$ Million</th>
<th>% Pension Fund</th>
<th>Total US$ Million</th>
<th>% Pension Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric</td>
<td>5,485</td>
<td>5.9</td>
<td>2,133</td>
<td>2.29</td>
<td>7,618</td>
<td>0.19</td>
</tr>
<tr>
<td>Telecommunication</td>
<td>884</td>
<td>0.93</td>
<td>325</td>
<td>0.34</td>
<td>1,209</td>
<td>1.27</td>
</tr>
<tr>
<td>Gas and Water</td>
<td>329</td>
<td>0.36</td>
<td>633</td>
<td>0.65</td>
<td>1,162</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Source: Superintendencia de Administración de Fondo de Pensión [Superintendency of Pension Fund Administration]

As of 2008, Chile’s pension funds had invested in more than 48,000 different instruments in more than 500 sectors, located in about 60 countries.

Given the particular characteristics of infrastructure projects, their financing is quite complex because of: (1) the projects’ long duration (15-30 years), which requires a deep capital market; (2) the large sums involved; and (3) the fixed assets that are not easily used as a guarantee.

Regulations on pension fund investments that hamper their participation in the financing of new projects are:

- Rating
- Liquidity
7.5. Private Initiative Investment Funds

7.5.1. Private initiative investment funds in Peru

AC Capitales SAFI is an infrastructure investment fund that has invested in various projects, such as: Consorcio Agua Azul, ISA Peru, Redesur, Eléctrica de Piura, Lima Airport Partners (LAP), Maple Gas, Inmobiliaria Koricancha, and Ferrocarril Andino. As of 2008, it had invested US$100 million.

This fund has invested primarily in the energy sector, especially in electricity generation and transmission, and in petroleum. It also finances projects in the transportation sector and in the operation and maintenance of airports or railroads.

Figure 34: Infrastructure investment funds of AC Capitales by sector

- Valuation standards
- Permitted investments
- Performance evaluation

Regulations also prevent investment in companies that lack a track record in the sector (at least three years) because they cannot be rated as investment grade. And since Chile’s concessions system requires the formation of a concessionaire company for execution and exploitation of public works, as in Peru, the company will lack the record needed for rating, so it cannot be an acceptable investment for pension funds. To address this problem, the Ministry of Public Works (MOP) did several studies to develop a financial instrument that would give pension funds a part in infrastructure financing. This research led to the creation of infrastructure bonds in 1998.
With respect to the performance of AC Capitales, we could mention that it turned a profit in the period 2005-2008.

**Figure 35: AC capitales**

![ANNUAL RETURN (%)](chart)

Source: BBVA.

In June 2009, the Association of PFAs created the Infrastructure Investment Trust, which was to begin with a contribution of US$300 million from each of the PFAs of Peru’s private pension systems. It is currently estimated to have US$1.5 billion (Alonso *et al* 2009). This model can be developed quickly and be incorporated in the Government’s infrastructure fund.

The trust works like this:

- Each PFA makes a cash contribution and receives stock certificates.
- These certificates will not be negotiable through any centralized mechanism.
- The trust will invest its funds primarily in structured debt.
- The return will depend on the interest earned by the structured debt within the trust.
- The fund will be managed by a company authorized by the SBS to provide fiduciary services.
- The investment committee will be composed of representatives of the four PFAs.
- There will be advisers with experience in due diligence of financing and analysis of infrastructure projects.
The infrastructure trust model generally solves some of the problems of pension fund investments. Among the reasons for using the trust are:

- Delays and problems with the concession contracts granted.
- Lack of external financial advisers to guarantee financing of projects by contracts.
- Lack of coordination in the flow of information between the pension funds and agencies in charge of investment promotion.
- Lack of a range of structured instruments to permit investment in infrastructure.

The PFAs, in coordination with multilateral agencies and the Government, continue to search for mechanisms to provide more flexibility for their investments in these projects.

In 2009, the PFAs invested in companies that won concessions, such as the securities firm Perú Enhanced Pass-through, and two concessions related to the petroleum industry: Petroplus Camisea and Transportadora de Gas del Perú, with US$700.3 million in direct investment.

Finally, the first two projects in which the trust established by the four PFAs has participated—the Taboada and Huascacocha sanitation works, with a total investment of 448 million soles—have been finished and analysis is underway for investing in
projects such as expansion of the Metropolitano [mass transport system], the Yellow Line Expressway, the second stage of the port of Paita, and the Chira wastewater pipeline.

7.5.2. Private initiative investment funds in Mexico

The investment structure of the Sociedades de Inversión Especializadas en Fondos de Retiro (Siefore) [mutual funds specializing in retirement funds], managed by the Administradoras de Fondos de Retiro (Afore) [retirement fund administrators], permits indirect investment in infrastructure projects. In 2007 they were authorized for the first time to invest directly through trusts and financial instruments directly tied to projects.

To stimulate the economy, investment, and job creation in Mexico, the committee of Afore designed new mechanisms for resource payments, contributions, and return on investments in domestic securities and assets for the execution of infrastructure projects compatible with their investment structure, which has resulted in giving preference to investment in another type of instrument over indexed stock.

Figure 37: Siefore investment in private debt instruments

![Graph showing Siefore investment in private debt instruments](Source: BBVA Bancomer and Consar data)
Since 2008, the SIEFORE-Afores have been able to invest in trusts and instruments related to infrastructure projects. The vehicles for this purpose are the structured instruments and the real estate investment trusts (REITs).

Structured Instruments

The National Commission for the Pension System (CONSAR) defines structured instruments as:

“Senior trust bonds for investment in or financing of activities or projects in the national territory of one or more entities issued in accordance with the general provisions applicable to participants in the stock market of the National Banking and Securities Commission, except for those that invest in or finance acquisitions of Mexican corporate capital of entities listed on the Mexican Stock Exchange and subordinated non-convertible obligations issued by credit agencies” (Consar 2009).
This means that now pension funds can buy senior trust bonds instead of participating directly in the trust of projects or corporations.

The structured instruments must satisfy the following requirements in order to be part of the Sefore portfolio:

• Their purpose must be to finance investment projects in infrastructure in the national territory.
• None of the sectors or series of the structure will establish extra contributions by the owners.
• In no case will the issuer be exempt from the obligation to pay the principal.
• They cannot grant powers, directly or indirectly, with respect to derivatives or structures subject to financing.

Figure 39: Profile of cash flow in structured instruments vs. real long-term projects and instruments

![Figure 39: Profile of cash flow in structured instruments vs. real long-term projects and instruments](source: ERD BBVA BANCOMER AND CONESAR.)
In August 2009, a new senior trust bond was introduced as a vehicle to facilitate not only infrastructure, real estate, and property investment projects, but also private capital funds. This new senior bond is called the Development Capital Certificate (CKDs) [Mexican Stock Market, 2009].

The CKDs are fiduciary securities for a fixed or determinable period issued by trusts with variable and uncertain performance that is partially or totally linked to the trust’s underlying assets. Their purpose is to permit the execution of activities, carry out corporate projects, or obtain securities tied to the companies’ capital stock. They stimulate infrastructure projects as well as real estate, business, technology development, and private capital projects.

Other important aspects of financing projects with CKDs are:

- The CKDs are not debt instruments but capital instruments, and therefore are not subject to risk rating.
- The companies or projects that seek this type of financing must have a history of operation and demonstrate the experience of the administrator of the company or project to be financed.
- Transfer to the trust of ownership of goods and rights that constitute the project’s assets.
- Investors must sign a letter attesting that they understand the risks of the investment and the cost scheme.
- The trust must establish that the CKD is responsible for releasing the project resources in accordance with an investment scheme and must have three governing bodies: a shareholders’ assembly, a technical committee, and an investment committee.

Real Estate Investment Trusts (REITs)

REITs [FIBRAs] are securities issued by trusts for the purchase or construction of real estate in Mexico that are authorized to lease or purchase the right to receive revenue from the lease of those properties.

There are three elements in the REITs:

- An owner of the real estate with long-term lease agreements.
- Creation of a management trust by the owner of the real estate. The trust will issue ordinary participation certificates (OPCs) to the owner of the real estate instead of a
The owner of the real estate gives the OPCs to another vehicle issued, which acquires the right to revenue and capital gains from the real estate, and settles the OPCs with the owner of the real estate through the placement of stock or stock market certificates in the public investment.

7.5.3. Private initiative investment funds in Chile

Infrastructure bonds are supported by future revenue of the concessions, so the principal element of financing is the toll flow and other operating revenue.

The main purchasers of infrastructure bonds, given their long-term maturity, are institutional investors, life insurance companies, and pension funds. Life insurance companies have shown great interest in long-term instruments. Pension funds do not authorize long-term issues, favoring relatively short or medium term investments. Therefore, the regulations tried to satisfy the demand of both institutions, seeking to reconcile the fixed coupon for long-term bonds with a BBB or higher rating without prepayment, which is required by the insurance companies.

Risk is an important aspect considered by investors when evaluating bonds. Risk rating is basically an opinion regarding the likelihood that the bond issuer will faithfully carry out the commitments assumed in the bond issue contract. Rating places heavy emphasis on the payments, complete or partial, stipulated in the bond. Demand is the most important factor for rating a project’s risk.

It is very important to consider Government participation, because its subsidies or any other type of support, such as minimum guaranteed revenue, determine the projected cash flow, and therefore the investment grade given to the instrument that finances the project.

With pre-operational bonds— instruments to finance the construction stage of a project—the instrument’s risk is greater because there is the construction risk in addition to the uncertainty of future demand. Alternatives to limit pre-operational risk include buying insurance and/or guarantees from third parties, and executing lump sum or turnkey contracts. These solutions transfer the construction risk to the concessionaire or other financial institution involved in the construction company that is executing the work. Any
delay in the work, at the start or at some point in the construction, can result in a delay in meeting obligations or default, unless the concessionaire gets financing for payment of the bonds until revenue begins to come in.

It is therefore necessary to have some safeguards to protect bondholders. According to Standard and Poor (1998), some key legal safeguards for this type of bond would be:

- Guarantees for the bondholder
- Interest rate adjustment mechanism
- Preferred debt
- Establishment of an account that would permit coverage of the obligations for more than one year
- A structure in which the issuer is the owner and controls the infrastructure work
- The issuer’s sole project
- Autonomy of the issuer in the event of bankruptcy

An essential element is the quality of the institutions and the economy of the country where the concession is executed. Political stability guarantees that the legal commitments are effective and not merely nominal. In view of all the restrictions, infrastructure bonds were developed to finance concessions. The infrastructure bond is a document issued by the company that wins the concession. Because of the regulation affecting insurance companies, the bonds are not callable. In general, infrastructure bonds are 100 percent guaranteed by insurance policies issued by a monoliner international insurance company.

Chile has implemented two types of infrastructure bonds contracts:

- **Pre-operational bonds**: The bond is issued when construction of the public work begins and before it is finished. This is a *project finance* bond, because the debt will be used to execute a project and payment of this obligation is totally contingent on what happens.
- **Operational bond**: This bond is issued during the operational stage of the public work, i.e., once the permit has been granted to begin operation of the infrastructure and the concessionaire company is fully authorized to operate and exploit the project. This is a net *revenue bond*.

Most infrastructure bonds issued initially in Chile were for the expansion and improvement of existing infrastructure. This had a positive impact on the bond rating, because uncertainty
regarding the construction cost was greatly reduced and greater weight was given to estimated demand.\textsuperscript{63}

A minimum guaranteed revenue mechanism reduces the uncertainty related to projection of future demand. This enhances the possibilities for obtaining financing, which improves the infrastructure bond, because the presence of the minimum guaranteed revenue can be the deciding factor for the infrastructure bond’s investment grade rating. Projects that rely heavily on the minimum guaranteed revenue to ensure cash flows require additional liquidity mechanisms.\textsuperscript{64}

The Government provides for unprofitable yet socially beneficial infrastructure projects through its concession mechanism. In these cases, the Government pays a subsidy to the concessionaire company.

Two cases of successful application of infrastructure bonds acquired by the PFAs are the participation in the highway concessionaires Autopista del Sol S.A. and Autopista Interportuaria S.A.

\textbf{Box 18: Autopista Interportuaria S.A. concessionaire}

The Inter-Port Route was built to improve highway access to the principal port complexes of the VIII Region; facilitate access to the Carriel Sur Airport to and from the north of the metropolitan area of Concepción, and permit the urban, real estate, and industrial development of the area. It is 10.9 km long from the Concepción Bay coast, from the intersection of the Itata Highway with the Penco-Concepción route to the industrial sector and connection with Avenida Colón, in the administrative district of Talcahuano. The work also includes the extension of Avenida Alessandri by 3.9 km, which enables a direct connection of the highway to the access road for Carriel Sur Airport.

The highway is 50 percent shorter than the route used today to go from Penco to Talcahuano, and the speed limit is 100 km/hour for nearly the whole length (much higher than the speed limit of present urban routes), so travel times have been reduced by up to 70 percent.

The benefits offered by the highway include:

- Increased competitiveness at the domestic and international levels.

\textsuperscript{63} An important reason for the concession system’s success is the technical and administrative quality of the companies bidding. Chile’s experience has included large international companies that build and manage infrastructure works, which has provided an additional security guarantee related to the concessionaire’s ability to execute the infrastructure project successfully.

\textsuperscript{64} An alternative not yet implemented in Chile, but theoretically available, is the issuing of infrastructure bonds securitized by the rights gained by the concessionaire in the concession system.
• Improved access to the ports of Lirquén, Penco, Talcahuano, and San Vicente, and the Carriel Sur Airport.
• A substantial reduction of truck traffic on the streets.
• An upgraded highway structure for the metropolitan area.
• Reduction of congestion, pollution, and accidents.
• Decongestion of the urban routes in Talcahuano, by serving as a bypass for traffic heading from the north of the country to the port area of Talcahuano-San Vicente.

The participation of institutional investors would be US$8.871 billion, which is 21 percent of the financing of the project.

7.6. Financial Instruments for Investment Funds

We could make the following observations based on the review of infrastructure investment funds and the financial instruments in which they invest:

• It is necessary to design debt and capital financial instruments that investment funds can rapidly evaluate.

• The debt financial instruments must have characteristics such as the following:
  • **Subject to standardization.** There can be an identical debt instrument for the projects, with the only differences being the issuers and source of repayment.
  • **Transferable.** The institutional investors or original buyers should be able to transfer these debt securities at any time without restrictions.
  • **Independent from the PPP contract.** To be transferable to any investor the bond must be independent from what happens to the PPP contract, so that a general investor can buy it. This is only possible if there are **unconditional payments,** even though there may be penalties in the execution of the contract or even termination of the contract.
  • **Liquid source of repayment.** Payment sources must have sufficient coverage of the debt service with their anticipated inflows. The main liquidity should come from project revenue. If there is cofinancing, there must be a scheme to permit security of payment, and these promises must be guaranteed.

• The capital financing instruments must have features such as these:
Subject to standardization. The projects could use the same capital instrument, with the only differences being the issuers and the repayment source.

Transferable. Institutional investors or original buyers should have the opportunity to trade these equity securities at any time without restrictions.

Dependent upon the results of the PPP contract. In order to transfer the security to any investor, although the results are dependent upon what happens with the PPP contract, inflows and outflows must be clearly identified and separated so that due diligence procedures are not onerous. They should be structured in the PPP contract.

Perhaps a mixture of Peru’s CR-PFWS or CR-RFIs as debt instruments and CKDs as capital instruments comes closest to standardization of the financing of the special-purpose companies to execute the PPPs for development of infrastructure and public services in Latin America. We may be able to use the same instruments for financing projects of both models, cost and demand.65

---

65. Possibly in cases with a cost model we should structure with 10 to 15 percent of capital, as in the Peruvian model. For the demand model, there might be 25 to 30 percent of capital. The balance, the remaining debt, could be financed under the considerations described above: unconditional, transferable, independent of the PPP contract, and with good liquidity.
Lesson 1: Demand risk and type of PPP contract

The success of appropriate financial structuring will depend on how the PPP contracts are structured. This document has said that the contracts can be classified according to the identification of the public or private sector entity that absorbs the demand risk, which should be the one best equipped to manage the volatility of revenue derived from the use of services covered in the PPP project. If the concession grantor (the government) assumes the demand risk, the cost model should be applied, based on the principle of compensating the private operator or concessionaire for their investment costs and the costs of administering, operating, and maintaining the service. Since the private operator normally makes the investment at the beginning of the contract’s execution, it is necessary that future payments for that investment be guaranteed in some manner, because security of repayment of the investment (recovery of the investment) enhances possibilities for finding funding and providing adequate leverage.

If, on the other hand, the demand risk is administered by the private operator or concessionaire (private sector), the financial structure should be based on the demand model. In the strictest case, the inflows generated by the project should cover its costs, both operation and maintenance costs and investment costs. Here there are not certain inflows but anticipated inflows, so the requirements for financing will call for higher anticipated inflows depending on the volatility to compensate for the greater risks to be managed and financed. Although the project should be financed based on its own inflows, there is often minimum guaranteed revenue for infrastructure developed by the government, so if the contract is terminated by the concession grantor or the concessionaire, there would be compensation for the value of the asset delivered.

In either model, the PPP project is executed through a special-purpose company (SPE) to concentrate inflows, risks, and results of the PPP contract in a single entity. The private companies participating in it provide the capital and guarantees, and the government is free from the risk of paying for non-contractual commitments or execution of government guarantees in situations not covered by the contract.

Lesson 2: Simple and generalized payment for the investment

Another of the most important advantages is the formation and calculation of the repayment of the investment, in annual sums (generally regular payments) based on the total amount
of the investment, the cost of capital, and the investment repayment period. It is desirable not to base the payments on the construction of inflows with all the tax consequences or discount rates, because if the PPP contract is awarded based on the government structurers’ premises the results will be similar. Otherwise, if the purchaser and future concessionaire set a lower payment than that based on a simple scheme of periodic payments, making an additional effort that would complicate the results is not called for. This methodology may be generalized by observing a series of sectors, in which the investment can take different names, the discount rate and the repayment period may differ, but the payment scheme of periodic payments is identical, as shown in the following table.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Investment</th>
<th>COK</th>
<th>n (years)</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric power</td>
<td>Replacement Value</td>
<td>$K_{OA}=12%$</td>
<td>30</td>
<td>@NRV</td>
</tr>
<tr>
<td>Highways</td>
<td>Reference Investment</td>
<td>$K_{OA}=9.5%$</td>
<td>20</td>
<td>PFW</td>
</tr>
<tr>
<td>Hospital Infrastructure</td>
<td>Investment</td>
<td>$K_{OA}=10.5%$</td>
<td>15</td>
<td>RFI - I</td>
</tr>
<tr>
<td></td>
<td>Reference</td>
<td>$K_{OA}=9.5%$</td>
<td>7/10</td>
<td>RFI - E</td>
</tr>
</tbody>
</table>

**Lesson 3: Separation of RFI and ROM**

In the financial structure of contracts using the cost model, it is desirable to distinguish between payments for investment and payments for operation and maintenance. When the concessionaire is reimbursed for the investment it is being compensated for expenses made prior to the operation of the PPP project, so it is an earned right. This means that if payment were interrupted it would be failing to pay the concessionaire a percentage of the investment that it made and has a right to recover.

Even if the concession were terminated, the concessionaire would be entitled to continue to receive the remaining payments for the duration initially agreed upon for recovery of the investment. If the concessionaire causes the termination, it is subject to the corresponding penalties and guarantees, but this does not affect the payment scheme, because usually in this type of contract the right to the payments has been assigned to other investors.
A separate issue is the operation of the payment for operation and maintenance of the PPP contract. This payment depends on the service executed or denied. In the operational phase the concessionaire makes the payment for the period and after its conclusion the concession grantor pays the concessionaire through the payment mechanisms contained in the contract. The concession grantor’s risk for this concept is therefore only for the period.

Since the payment of the investment and the payment for operation and maintenance have different characteristics, it is necessary to separate these payments clearly in a cost model. In a contract under the demand model, the bank does this task.

Lesson 4: Differences between conditional and non-conditional payments

One benefit of the structuring of the contracts in Peru is the separation of the investment repayments. They provide a periodic payment at a discount rate, but since there is a payment guarantee, we analyzed whether the guarantee should be for 100 percent of the payment. After various analyses we concluded that it is necessary to distinguish between two concepts: payment not contingent on any occurrence or event in the PPP contract, including contract termination; and payment contingent on the contract’s service indicators.

Non-conditional payments are periodic payments at market interest rates, at the level of the investment budget and within the periods established for repayment of the investment. This means that payments generated at the interest rate would be sufficient to repay the investment, but the concessionaire assumes risks of construction, termination, prices, and others, which could increase the investment. It would therefore not be attractive for the concessionaire if the investment were compensated at the level of its financing costs. This is why the investment repayment has a capital cost higher than the debt cost.

There are thus a total periodic payment (total RFI) calculated on the capital cost (debt interest rate + spread) and a periodic payment not tied to the debt cost. The difference would be the conditional portion of the total payment (conditional RFI). The non-conditional RFI is the payment that guarantees the return to the investors, and the conditional RFI would be the payment made to compensate the concessionaires for the project risks subject to verification of the service indicators.
Lesson 5: Guarantees and non-conditional payments of the investment

After differentiating the non-conditional RFI and the conditional RFI, it is necessary to find adequate incentives for the SPE to fulfill its contractual obligations. The contracts contain penalties for failure to fulfill the goals in projects or to meet the service indicators.

The application of penalties is backed by performance bonds to guarantee that the SPE has incentives to fulfill the contracts. Moreover, noncompliance results in loss of the conditional RFI, which includes earnings for proper operation of a concession.

Lesson 6: Payment for the investment and payment start date

When the contract is signed there is a timeline of payments that usually begins with the work’s start, which provides the date certain for beginning periodic payments on the investment (RFI). To provide that the payment start date is after the start of operations, it is advisable to agree upon the payment start date with a reasonable safety margin, such as one year after the date set in the initial timeline. If there are delays, this additional period can cushion the concession grantor’s risk of starting payments before the PPP project begins operations. The delay may be longer than foreseen, however, so some contracts provide that payments should start after the works are finished, with the start of operations.

This proviso would seem logical but it weakens and renders meaningless the non-conditional periodic payment (non-conditional RFI). A creditor requires a start payment date that is certain; for example, if it is decided to issue a bond for the periodic payment it would not be possible to determine when the bond will be paid.

Similarly, the non-conditional periodic payment should be pre-set for its entire duration, without conditions and irrevocable.

Lesson 7: Traditional financing and financing by WPCs

Issuance of bonds is the traditional mechanism for financing debt. However, since the SPEs do not satisfy the requirements for their issuance, alternatives are needed. One alternative, used in Peru, is issuance to investors of work progress certificates (WPCs) in payment for finishing specific phases of the work’s construction.
Lesson 8: Work progress certificates (WPCs) financing mechanism

One innovation in Peru for financing the PPPs has been the work progress certificates (WPCs). The basic idea is to divide a project into several construction milestones—perhaps 10 or more—and certify the reaching of each one through the WPCs.

Issuance of these documents makes it possible to generate real rights to the proportional part of the non-conditional periodic payments. In other words, if 10 percent of the work is done, there is a right to 10 percent of the payment (RFI) or payments for works (PFWs). If the contract were terminated at that time, the concessionaire or its lender would have the possibility of collecting this share of the repayment of the investment.

With certification (issuance of the WPCs) and the right generated to a proportion of the payments, the concessionaire can transfer them to the creditors or investors, which in turn release capital for execution of the next construction milestone. Under this procedure the problem of structuring 100 percent of the investment is reduced to one of 10 percent, or the percentage on which WPCs are issued. For the concessionaire this becomes a problem of working capital that must be maintained in the construction period to achieve leverage of 100 percent when the works are finished.

Lesson 9: The financial instrument: CR-RPI CR-PFW

The WPC per se is not a negotiable financial instrument; it must be standardized for trading on the market regardless of whether the investor or creditor is aware of the PPP contracts that gave rise to the payment they should get.

They are called certificates of recognition of rights (CR) related to the nature of the project. For self-financed projects there are CR-RFI (certificate of recognition of rights to remuneration for investment) and for cofinanced projects, the CR-PFW (certificate of recognition of rights to payment for works).

These instruments are standardized, irrevocable, unconditional, transferable, and guaranteed by the concession grantor. In the case of the CR-PFW the guarantor is the Republic of Peru and in the case of the CR-RFI the guarantor is the trust inflows related to the project.
These certificates are a sort of zero-coupon bond that earns semi-annual interest in 15 years, 30 if documented by each WPC.

**Lesson 10: Demand risk and financing structure**

In the demand model, in which the concessionaire manages the demand risk, variable cash inflows throughout the life of the concession are considered. However, a part could be converted to non-conditional flow, using the mechanism of the WPCs and CR-RFI with a given rate of indebtedness.

The rest of the financing will be from the resources of the companies that participate in the SPE and seek to recover them through the variable flow, which will depend on the management of the demand factors (price and volume). For this part of the financing, it is possible to use the Mexican CKDs, which are variable revenue instruments that appeal to investors seeking a higher return.
References

Agencia de Promoción a la Inversión Privada – PROINVERSION. Lima, Peru. www.proinversion.gob.pe


Asociación Mexicana de Administradoras de Fondos de Retiros AC. 2009. Acciones de las Afores para apoyar la reacti\v{v}ación económic\v{a}, la inversión y la creación de empleos en México. [Actions of pension funds for economic recovery, investment, and job creation in Mexico] www.amafore.org.mx


Banco Nacional de Obras y Servicios Públicos – BANOBRAS. México. www.banobras.gob.mx

BONET, C. 2003. Emisión de Bonos de Infraestructura en Chile: una experiencia exitosa [Floating of Infrastructure Bonds in Chile]. Article of Feller Rate.


Comisión Nacional de Ahorro para el Retiro – CONSAR. México. www.consar.gob.mx


FIAP. 2001. Participación de los fondos de pensiones latinoamericanos en el desarrollo de infraestructura [Participation of Latin American pension funds in infrastructure development.] Study Series N°3, FIAP.

Fondo Nacional de Infraestructura – FONADIN. Mexico. www.fonadin.gob.mx


Annexes

Annex 1

It was established that the discount rate $K$ used to construct the described revenue inflows of $13.1$ million, subject to a tax rate $(T)$, indicates the capital cost used to calculate capital yield. A simplified calculation figures the financial cost of capital $(K_{OA})$ discounting the tax impact on the discount rate $K$.

$$K_{OA} = K (1-T) \rightarrow K_{OA} = 10\% (1-30\%) \rightarrow K_{OA} = 7\%$$

The $K_{OA}$ is based on the profit and loss statement and funds flow, which determined that the $K_{OA}$ equivalent is 7.3 percent.

In cases such as Peru, workers normally participate, so the discount rate $K$ used to construct revenue inflows is subject to the tax rate $(T)$ and the workers’ participation rate $(p)$, so the financial cost of capital is the result after these deductions. A simplified calculation is to figure the financial cost of capital $(KOA)$ discounting the effect of taxes and workers’ participation from the discount rate $K$.

$$KOA = K (1-T) (1-p) \rightarrow KOA = 10\% (1-30\%) (1-5\%) \rightarrow KOA = 6.7\%$$

Annex A11 calculates the $KOA$ from the profit and loss statement and funds inflows, indicating that the $KOA$ equivalent is 6.9 percent.

The investment amount in this stage of structuring is in reference terms, and the reference cost of capital can be estimated based on average financing interest rates. To this rate it is possible to add a spread reflecting the investors’ anticipated capital contribution.

With respect to the repayment period, it should be aligned with the asset’s useful life; it could be shorter, but never longer. For example, in the case of infrastructure with a 30-year useful economic life, the repayment period for the investment could be set at 17 years. If we consider a reference investment amount of US$100 million and a reference cost of 10 percent according to the following Excel formula:

$$PAO = Pago(k,n,Inv) \quad PFW = Payment(k,n,Inv)$$

Where:

- $k =$ Capital cost rate of 10 percent
- $n =$ Repayment period of 15 years
- $Inv =$ Reference investment amount of US$100 million

We get a PFW of US$13.15 million.
Given that the investment components—infrastructure, equipment, furniture, etc.—have different useful lives, the PFW must be calculated by separating the infrastructure components from the equipment and furniture. Equipment and furniture can be grouped with similar useful lives.
Annex 2

Here is a model of the WPC for the IIRSA Norte concession contract:

MODEL WORK PROGRESS CERTIFICATE FOR THE IIRSA NORTE CONCESSION CONTRACT

WORK PROGRESS CERTIFICATE (WPC)

WPC N°________


This Work Progress Certificate (WPC) is issued pursuant to Annex XI of the CONTRACT FOR CONCESSION OF WORKS AND MAINTENANCE OF THE HIGHWAY SECTIONS OF THE MULTIMODAL AXIS OF THE NORTHERN AMAZON OF THE “ACTION PLAN FOR REGIONAL INFRASTRUCTURE INTEGRATION OF SOUTH AMERICA – IIRSA” (hereinafter, the concession contract), signed between the Peruvian Government, through the MINISTRY OF TRANSPORTATION AND COMMUNICATIONS (hereinafter the concession grantor) and the company CONCESIONARIA IIRSA NORTE S.A. (hereinafter the concessionaire)

Work Progress Certificate

As provided in Annex XI and the procedure established in Annex IX of the concession contract, the regulator certifies that the concessionaire has satisfactorily completed progress in works equivalent to (XXX)% of the works in stage (XXX).

Recognition of the progress in works executed establishes the concession grantor’s unconditional and irrevocable obligation to pay the concessionaire the respective PFW/ WPCs for the progress of the abovementioned work.

The regulator certifies that the works covered by this WPC have been executed in accordance with the standards and the specific technical, socio-environmental, and engineering parameters approved by the concession grantor.

DATE: ___________
www.pppnetwork.info

The network of professionals working for successful Public-Private Partnerships