

# Infrastructure and pension fund investment in Latin America

Inter-American Development Bank  
Washington, March 16<sup>th</sup>, 2010.

Economic Research Department

## Funds expertise in Latin America of BBVA Group

- Pension Funds in Latin America hold sizable Fixed income positions, mostly local currency-denominated Government Bonds
- Pension Funds are the prominent player with a share in the Fixed Income market that ranges from 24% to 50%.



**What do we see for pension funds and infrastructure development?**

- The pension fund industry is highly interested on finding new assets to diversify their portfolio if adequate conditions exist (best practices).
- Theoretically, infrastructure assets are a good match for pension funds because they have a long-term investment horizon and a good profit/risk relationship.
- It is also beneficial for the economic development of the respective countries. It has all the conditions to be a "win-win" situation.
- In a Region, where the private pension industry is constantly inquired about its socio-economic role, more investment in important infrastructure projects, with high economic impact, could be beneficial in terms to obtain a positive recognition from the society.

However, the relationship between pensions and infrastructure is not completely developed and needs a comprehensive –ad hoc- country by country analysis in order to implement the best practices for a well functioning.

**An increasing role of the pension industry in financing infrastructure is a 'win-win' situation**

Pension funds offer:

- Long-term financing, especially in the early stages of the demographic transition.
- Domestic financing, crucial when capital markets in local currency are not developed.

Infrastructure investments offer :

- Higher real returns than the average pension fund portfolio.
- Diversification, given that their returns are less than perfectly correlated with the existing portfolio.
- Higher potential growth, raising not only returns but also contributions.
- Social legitimacy ('your pensions built this road and this road finances your pensions', Chile).

We have started an ambitious project to promote the development of infrastructure in Latin America and adequate the role of pension funds

### The project phases

**Phase I: An assessment of infrastructure investment by pension funds: the Latin American experience.**

**Status:** Completed

#### Objectives:

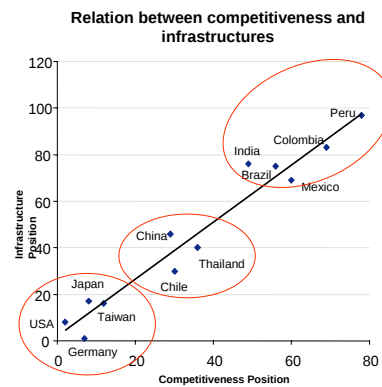
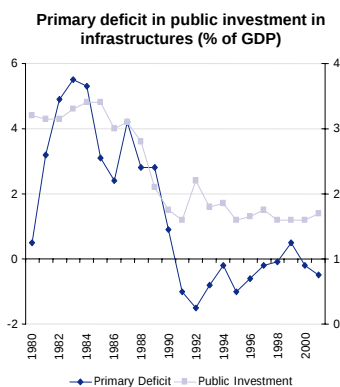
a) We collected and analyzed all of the disperse information available to provide a description of the private sector (specifically pension funds) participation in the investment of infrastructure in Latin America. In this process we identify strengths and weaknesses of the actual processes.

b) We evaluated the impact that funding infrastructure development through pension funds could have on economic growth.

**Phase II: A model of best practices for the development of infrastructure in Latin America**

**Phase III: The need for long-term infrastructure planning**

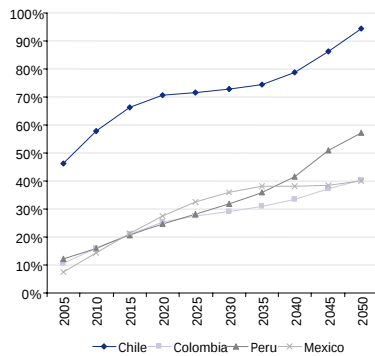
### Public savings constraints and the infrastructure gap



Fiscal problems directly affected public investment in the Region. This situation has generated an increasing infrastructure gap with regard to other countries as well as affected competitiveness.

### Potential private resources for to financing infrastructure

Accumulated Balance Projection of Private Pension Funds (% of GDP)



- The private pension funds (PPF) can be an appropriate source of savings to partially cover these needs
- PPFs will manage a large amount of resources in the next decades

### What do we see in the relationship pensions-infrastructure?

#### Strengths

- A legislative framework for the participation of the private sector in infrastructure, although more detailed and extended in the case of Chile and Peru, and more transparent and efficient in the first case.
- An increasing participation of the pension industry in infrastructure projects, mostly by indirect investments, although direct investment has been taking importance.
- Chile has successfully implemented the infrastructure bond that perfectly adapts to regulatory portfolio requirements for the pension industry and adequately distributes the risks of the project.

#### Weaknesses

- In one hand, a conservative approach of the pension fund regulator with respect of investing in infrastructure.
- In the other hand, not a clear an unified process for concessions and the participation of the different actors in the process.
- Lack of adequate legislation that spurs projects (e.g. absence of expropriation law in Colombia).
- Fragmented legal body in different economic sectors, levels of government (e.g. the case of Mexico).
- Administrative and judiciary restrictions that limit the decision of key actors in a concession process (e.g. in Mexico and Peru).
- Limits to the degree of authority of the main responsible to make long term commitments.

**Ways of investing in infrastructure**

- Primary vs. secondary market, depending on whether investment finances the star-up phase.
- Equity vs. debt finance: investors may seek some equity participation or buy infrastructure bonds.
- Listed vs. unlisted companies.
- Direct vs. indirect investment.
- General partners vs. limited partners.
- Listed vs. unlisted funds.
- Domestic vs. international, due to preferences and/or regulatory constraints.
- Single sector vs. multi-sector.

**Despite being natural counterparts and the mutual benefits, the way to strengthen pension funds-infrastructure association is not straightforward.**

**Thinks that need to study and improve**

- General
  - o Lack of confidence in long-term investment (low governance).
  - o Infra-development of basic infrastructure concession mechanisms.
  - o Lack of adequate financial instruments (structured products with recurrent income flows and solvency standards).
- Pension regulation
  - o Prohibitions (e.g. direct participation in infrastructures), quantitative restrictions (instruments and/or issuers) and rules on liquidity, valuation and ratings.
  - o Performance regulation (minimum returns).
  - o Switching of affiliates between fund administrators and public and private systems.
- Technical
  - o Risk#1: Lack of clear risk mitigation schemes
  - o Risk#2: a higher participation in domestic infrastructures may raise the sovereign risk of the portfolio (due to investments abroad limits).

## The Case of Peru

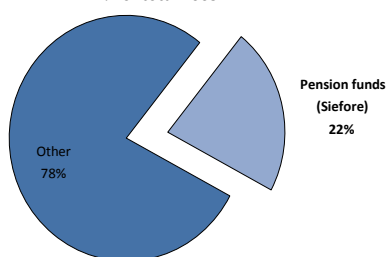
## Sample: Six concession processes

| Project       | Infrastructure  | Type             | Months |
|---------------|-----------------|------------------|--------|
| Olmos         | Water diversion | Co-Financed      | 89     |
| Red Vial 5    | Road            | Self-sustainable | 59     |
| Red Vial 6    | Road            | Self-sustainable | 90     |
| Lima Airport  | Airport         | Self-sustainable | 29     |
| North IRRSA   | Road            | Co-Financed      | 58     |
| Emfapa Tumbes | Sanitation      | Co-Financed      | 59     |

Source: Report Infrastructure projects, Payet Firm, 2009  
Elaborated by: ERD BBVA

- There are, some weaknesses in the infrastructure investment system. The most important are the bureaucratic holds in the concession process. Other obstacles include: failures in the concession contracts, social risk, an inadequate framework for setting rates and inapt supervision.
- Delays in the concession processes affect the length of the project. In a sample of six projects, the average time of decision and implementation is more than five years.

## The Case of Mexico

Outstanding debt of the Public Sector in Infrastructure by sources of financing  
% of total 2009

Source: ERD BBVA with CONSAR data

## Investment in infrastructure through structured notes

| Pension Fund | % of total portfolio Up to January 2010 | Maximum exposure allowed |
|--------------|-----------------------------------------|--------------------------|
| SB1          | 0                                       | -                        |
| SB2          | 0.7                                     | 5.0                      |
| SB3          | 1.5                                     | 10.0                     |
| SB4          | 1.6                                     | 10.0                     |
| SB5          | 1.5                                     | 10.0                     |
| System       | 1.2                                     |                          |

Source: ERD BBVA with CONSAR data

- Due to its investment regime, the Afore System has mainly supported indirect investments in infrastructure.
- In 2009, however, direct investments in infrastructure were allowed in the Afore System through structured notes.

### The Case of Chile

#### Pension Funds Investment in Infrastructure Bonds

At may 2008

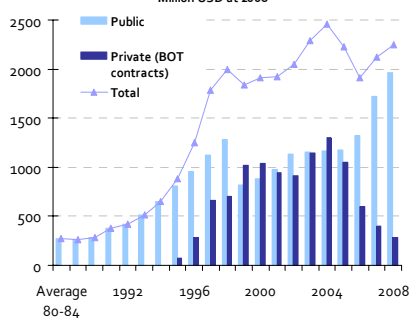
| Bond name                                      | Date of Issue | Mill. \$ USD     | % Issued Amount |
|------------------------------------------------|---------------|------------------|-----------------|
| Soc. Concesionaria rutas del pacífico          | 2002          | 155,143          | 33%             |
| Soc. Concesionaria autopista del sol           | 2002 & 2006   | 139,822          | 52%             |
| Soc. Conces. Autopista los libertadores        | 2003 & 2007   | 53,229           | 27%             |
| Soc. Conces. Autopista interportuaria          | 2006          | 8,871            | 21%             |
| Autopista del maipo soc. Concesionaria         | 2004 & 2006   | 212,851          | 43%             |
| Talca-chillán soc. Concesionaria               | 1998 & 2005   | 162,486          | 34%             |
| Ruta del bosque sociedad concesionaria         | 2001 & 2006   | 199,759          | 52%             |
| Ruta de la araucanía soc. Concesionaria        | 2000          | 125,126          | 42%             |
| Scl terminal aereo santiago s.A. Soc. Conces.  | 2004          | 104,273          | 84%             |
| Soc. Concesionaria autopista central           | 2003          | 257,180          | 47%             |
| Soc. Concesionaria vespucio norte express s.A. | 2004          | 301,906          | 45%             |
| Soc. Concesionaria costanera norte             | 2003          | 155,317          | 39%             |
| Soc. Concesionaria autopista vespucio sur s.A. | 2004          | 80,651           | 39%             |
| <b>Total</b>                                   |               | <b>1,956,612</b> | <b>42%</b>      |

Source: Superintendencia de Pensiones

- Infrastructure bond in 1998 spurs direct investment of pension funds in Chile.
- Almost all infrastructure bonds were rated AAA. The global financial crisis, however, affected some insurance companies, impacting some infrastructure bonds' ratings.
- The bonds have maintained their invested grades and ratings above those achieved by the insurance companies, because when assessing the capacity to pay the bonds, the issuer's risk rating prevails when it is higher than the guarantor's.
- A successful case of social legitimacy of the private pension system.

### Transport Infrastructure Investment

Million USD at 2008



SOURCE: Infrastructure Ministry of Chile



- Investment has increased significantly since launching the infrastructure BOT contracts. Pension Funds provide financing to this type of investment as well.
- After the earthquake: The BOT legislation forced companies awarded contracts to purchase insurance contracts against natural disasters such as earthquakes. The State of Chile is the beneficiary of the insurance policy. The insurance can't have a deductible or a stop loss agreement and must cover the complete cost of replacing the damaged infrastructure. Neither the country nor the infrastructure companies have to bear this cost.

**Strengths and Weaknesses of the current systems (0=worst, 8=best)**

|                                              | Chile | Colombia | Mexico | Peru |
|----------------------------------------------|-------|----------|--------|------|
| Macro Environment                            | 5,6   | 4,7      | 4,7    | 4,7  |
| Legal Structure                              | 4,5   | 3,8      | 3,3    | 3,3  |
| Political Risk                               | 6,8   | 4,8      | 5,5    | 4,8  |
| Information Access                           | 5,6   | 4,8      | 4,7    | 4,0  |
| Financial Markets Factors                    | 4,9   | 3,5      | 3,6    | 3,6  |
| Private Investment                           | 5,4   | 3,2      | 2,5    | 4,8  |
| Government and Society                       | 5,3   | 4,7      | 3,9    | 3,0  |
| Ability by the private government investment | 5,5   | 5,6      | 4,1    | 5,8  |

Source: Mia et al (2007) and SEE BBVA

- The functioning of an optimal institutional framework is a key step for implementing an efficient scheme for the private investment in infrastructure, and particularly the participation of the pension funds. pillar for an efficient scheme
- Chile has the better context for spurring infrastructure in the Region, however, the actual competitive framework for the Region is not optimal.

**The current investment situation in infrastructures**

|          | Indirect Investment |               | Direct Investment |               | Limit investment in direct infrastructure |
|----------|---------------------|---------------|-------------------|---------------|-------------------------------------------|
|          | (USD\$ millions)    | (% portfolio) | (USD\$ millions)  | (% portfolio) | (% of portfolio)                          |
| Chile    | 9969 (1)            | 9,17%         | 1956              | 1,80%         | without specific limit                    |
| Colombia | 4431 (3)            | 17,10%        | 0                 | 0             | without specific limit                    |
| Mexico   | 5535                | 6,90%         | 0                 | 0             | 10,7 (2)                                  |
| Peru     | 2416                | 11,50%        | 700,2             | 3,3%          | without specific limit                    |

Source: SEE BBVA. September 2009

(1) (electricity, water, telecommunications)

(2) weight average by each Sifore investment

(3) December 2008

In general, pension funds in the Region concentrate in indirect investment in infrastructure. In Chile, indirect investment has been important and more recently in Peru, although in the former case the institutional framework for this kind of investment is more consolidated.

**The impact of pension funds in the economy**

- Since the original Aschauer(1989a, 1989b, 1989c) papers, economic literature has found different correlations between infrastructure and economic growth.
- “Law of diminishing returns” shows an infrastructure optimal accumulation path, which is different for each country (Canning & Pedroni, 1999).
- Empirical evidence in LATAM shows that the infrastructure effect on growth is positive.

**Following Ashauer (1989a, 1989b, 1989c) Growth Accounting Model**

$$Y_t = A_t (K_t)^\alpha (L_t)^\beta (G_t)^\chi$$

**Where:**

|                                     |                                                     |         |                         |         |                               |
|-------------------------------------|-----------------------------------------------------|---------|-------------------------|---------|-------------------------------|
| $(Y_t)$                             | GDP of year t                                       | $(A_t)$ | Residual of Solow       | $(G_t)$ | Expenditure in infrastructure |
| $(L_t)$                             | Labor force                                         | $(K_t)$ | Accumulation of capital |         |                               |
| $(\alpha < 1, \chi < 1, \beta < 1)$ | Decreasing returns for each factor                  |         |                         |         |                               |
| $(\alpha + \beta + \chi = 1)$       | Constant returns to scale for all factor as a whole |         |                         |         |                               |

The projection of the capital stock of infrastructure projects, we will use the permanent inventory methodology

$$K_t = sY_{t-1} + (1 - \delta)K_{t-1}$$

The dynamics of capital stock accumulation in infrastructure also adopts the permanent inventory model.

$$G_t = sY_{t-1} + AP_t + (1 - \delta)G_{t-1}$$

The labor force ( $L_t$ ) considered in the projections is the same as the one used in the pension system projection models for Chile, Colombia, Mexico and Peru.

Based on the traditional specification in growth accounting in which TFP grows at an exogenous growth rate (tcptf), we describe the following equation:

$$PTF_t = PTF_{t-1}(1 + tcptf)$$

According to the model estimates, we will make the tcptf variable from an exogenous growth rate (tce) from the non-explained part of the model plus the explanatory component of the rise in the infrastructure stock. (tcGt):

$$tcptf = tce + (0,014\% \times tcG_t)$$

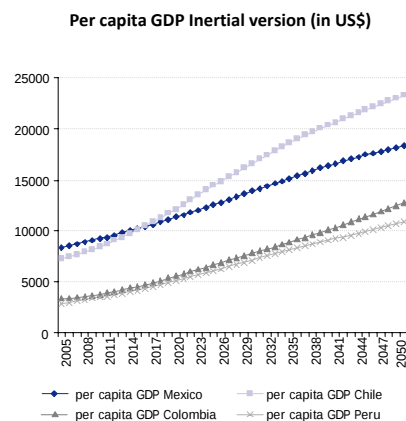
Substituting, we have the TFP accumulation rule in our model.

$$PTF_t = PTF_{t-1}(1 + tce + (0.014\% * tcG_t))$$

- We observe difficulties to choose just one study that reports a trustworthy estimate of the elasticity of the infrastructure stock in its contribution to GDP growth.
- So, we use a meta-regression (which is a form of meta-analysis) specially designed to examine empirical research in economics (Stanley and Jarrell, 1989; Jarrell and Stanley, 1990)
- We have consulted 70 works that relate infrastructure with growth. Of those works, we have selected 13 that have sufficient available information in their models. The selected works have 130 alternative models which we have used in the meta-analysis.

**Descriptive Statistics of the Elasticity**

| Variable         | Observations | Average | Median | Typical Dev. | Minimum | Maximum |
|------------------|--------------|---------|--------|--------------|---------|---------|
| Elasticity       | 130          | 0.1004  | 0.0515 | 0.14496      | -0.62   | 0.53    |
| Weighted Average |              | 0.1129  |        |              |         |         |

**Giving different values to the parameters of the model.**


## Opportunity cost of not investing in infrastructure by PPF

|          | Difference in % with present trend (GDP per capita) |      |      |      | Discount Present Value/GDP (2005) |
|----------|-----------------------------------------------------|------|------|------|-----------------------------------|
|          | 2020                                                | 2030 | 2040 | 2050 | 2005-2050                         |
| Mexico   | 0,8%                                                | 1,0% | 1,1% | 1,1% | 24,1%                             |
| Chile    | 1,8%                                                | 2,7% | 3,2% | 3,6% | 89,3%                             |
| Colombia | 0,9%                                                | 1,4% | 1,8% | 2,2% | 49,1%                             |
| Peru     | 1,6%                                                | 2,3% | 3,0% | 3,6% | 103,3%                            |

Fuente: SEE BBVA

## First findings

- An optimal investment in infrastructure in Latam could have a positive effect on growth and development in the continent
- Private financial sector, banks, multilateral and pension funds, have the know-how and resources to carry it out.
- However, in many cases, no met the necessary and sufficient conditions to participate appropriately
- Needed a II Phase which to make recommendations to governments for "best practices" measures and a quantification of the infrastructure needs.

**Phase II: a model of best practices for the development of infrastructure in Latin America**

- The aim of this part of the study is to provide countries with a unified theoretical framework of best practices that they can carry out in order to promote the construction of the most necessary infrastructure to private investors.

**A) Institutional survey on the shortcomings and expectations of private investment in infrastructure .**

Contrast the opinions of the various interested parties with those that are already involved in infrastructure development, and to the pension fund administrators potentially providing financing.

**Phase II: a model of best practices for the development of infrastructure in Latin America****B) Project modeling and cost-benefit analysis**

Propose a methodology of analyzing infrastructure projects that can be used by both governments and pension fund administrators. The model has to be properly delineated so that governments can evaluate whether or not a specific project should be carried out from an economic, social and financial point of view. At the same time, it should provide pension fund administrators a valid model to check the financial viability of specific infrastructure projects and require the use of tools to mitigate pertinent risks.

**C) Regulation, concession law and project controls**

Propose relevant aspects that should be included in the different regulations that ensure the concession process is as transparent, efficient and effective as possible, thus mitigating regulatory risk .

**Phase II: a model of best practices for the development of infrastructure in Latin America****D) Assets and financial markets**

Show the various funding formulas for different types of infrastructure projects, with specific proposals for existing assets (e.g. infrastructure bonds) or other new structured assets that are more adaptable to the current financial markets. Financial innovation should be accompanied by instruments that mitigate the corresponding risks.

**E) Instruments to mitigate risks**

This section proposes a general map for mitigating risks that is capable of establishing an environment favorable to receiving high credit ratings for financing infrastructure projects.

**Phase II: a model of best practices for the development of infrastructure in Latin America****F) Risk-return ratios on assets in a multi-fund environment**

Evaluate the current portfolios of securities in multi-funds, together with the instruments for risk mitigation, as an introduction to the infrastructure-based financial assets proposed in this work.

**G) Reform proposal for each country**

Assess and compare the current situation of each country in relation to the models proposed in this study and draw up appropriate recommendations.

**Phase III: the need for long-term infrastructure planning**

- The concept of the document would be to simplify the project finance for each of the infrastructure projects selected, as necessary in each country, over the next 20 years.
- This work would help governments prioritize investment projects in order to quantify the resources needed through long-term planning.
- For pension fund administrators and other private investors, this question is particularly relevant because it enables resources to be used in a planning strategy that establishes a road map for managing long-term investments.

## Infrastructure and pension fund investment in Latin America

Inter-American Development Bank  
Washington, March 16<sup>th</sup>, 2010.

Economic Research Department