

Pension Funds in Infrastructure Project Finance

Regulations and Instrument Design

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Foreword

The significant increase in economic activity in Latin America and the Caribbean during the nineties has increased the need for infrastructure investment, which the Governments have had difficulty in supplying. As a result, they have resorted to fostering private financing of infrastructure by creating the proper environment for investment and in the process redirecting scarce state resources to satisfy unmet social demands. This change in strategy has been supported by the Bank Group through its Private and Public Sector lending and technical cooperation activities, as required by its infrastructure strategy and Public Utilities Policy.

Most private financing has come from foreign sources because local financial markets are relatively underdeveloped. Despite the availability of foreign financing, its timing and cost was affected by the recent financial crisis. In addition, foreign financing carries with it additional risks to the projects, in particular, foreign exchange exposure which is hard to cover given that the projects provide services mostly for local markets. This, in turn, leads to more expensive public services than would otherwise be the case.

Fortunately, there has been an almost simultaneous trend toward pension fund reform, including the creation of privately managed pension fund accounts. On the one hand, through these individual savings, Latin American economies are building a pool of financial resources in search of attractive investment opportunities that the local markets cannot supply. On the other hand, infrastructure projects are providing needed services that promote economic growth and social well-being and require long-term local financing. The time is now right to enact the necessary measures that will bring them together.

This paper describes what it takes to achieve such a union. It suggests ways to structure projects to make them more attractive to pension funds, and describes needed regulatory changes to permit pension funds to invest in them. We hope that this paper will stimulate project finance sponsors to consider pension funds as a viable financing alternative. Similarly, we hope that pension fund regulators and managers will make the necessary changes to tap into this potentially attractive instrument. If this were to happen, even on a small scale, it would further contribute to the sustainable development of the region's economies. This paper aims to further the understanding of issues that need to be addressed by both parties.

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Contents

Introduction	1
Private Pension Fund Investments in Latin America	3
Investment Regulations	3
Private Participation In Infrastructure	10
What Do Infrastructure Investments Offer	11
Compatibility Between Infrastructure Investments and Pension Fund Portfolios	13
Changes in the Regulatory Environment	13
Implications for Other Countries and Other Investments	16
Concluding Remarks	17
References	18
Appendix I	20
Appendix II	20

Introduction

In the nineties, two major reforms were undertaken with intensity by Latin American countries; namely, private participation in pension fund management and in infrastructure investment. Many countries in other parts of the world have undertaken one or another of these reforms, but not both at the same time (with the exception of the United Kingdom, which closely resembles the case of many countries in Latin America and pioneered private participation in infrastructure). These dual reforms have created a sizable, mostly domestic source of long-term funds, while at the same creating a sizable need for domestic investment funds. Nevertheless, in spite of the potential benefits of a happy marriage, a relationship has not yet been developed.

The liberalization of many emerging market economies and the attendant realization of the many benefits of private participation in infrastructure, have resulted in a considerable need for private capital. This liberalization, occurring in the context of relatively underdeveloped financial markets, has meant reliance on foreign capital to finance growing needs, with the concomitant risk for the economies of unexpected devaluations and/or sudden reversals of those flows. Even though foreign capital flows into infrastructure projects are more resilient than portfolio investment, recent crises have reduced the willingness of investors to provide capital for emerging markets. As a result, projects have been subjected to severe foreign exchange risks.

This situation underscores the importance of developing domestic sources of long-term capital. The major, and sometimes only sources of domestic long-term capital are local pension fund resources, which, in addition, can contribute to the development of local financial markets. It is imperative that these resources be tapped by infrastructure projects. If they are to tap their resources successfully, project developers and the international project finance industry must be aware of the special needs of local pension funds. Even though the discussion is concentrated on Latin America it has implications for

most countries with privately managed pension funds and private infrastructure.

If they are to tap their resources successfully, project developers and the international project finance industry must be aware of the special needs of local pension funds.

The purpose of this paper is to promote this symbiotic relationship, outlining the conditions under which sources and uses of long-term resources can meet and focusing the attention of both parties to the benefits of a properly structured relationship. There are benefits for both parties that can be exploited through a better mutual understanding of the needs of the other party. We do not propose that special subsidies, guarantees or tax benefits be granted to infrastructure works to make them attractive to private pension fund managers. Nor do we propose that public pension fund resources be directed or forced into infrastructure investments on account of their positive externalities or social benefits. Private infrastructure investment instruments must be structured so that they fit into the investment strategies of private pension funds, while appropriate changes in the pension fund regulatory framework should be encouraged. We propose a strictly voluntary private to private relationship, albeit with the participation of the public sector as grantor and regulator of private activities. The public sector has the important role of facilitator; it controls most of the rules of the game and its actions in either sector can make or break the relationship.

Before embarking on the purpose of this paper, the discussion of the structure of infrastructure financial instruments needed to capture pension fund investments and the consequent policy and regulatory reforms needed in most developing countries, we briefly review the potential sources and needs for

investment, the characteristics of the funds and of the projects, the current limitations to the relationship and the benefits for both parties. The article concludes with a discussion of the implications this

can have for developed countries, like the United States and most of Europe, that lag in private participation in both areas, mandatory pensions and infrastructure.

Private Pension Fund Investments in Latin America

Since the pioneering effort of Chile, which took place in 1981, many Latin American countries have undertaken pension fund reform, including the introduction of private management of mandatory pension savings along with or as a replacement for the public pension system.

These pension funds have accumulated a significant amount of resources.¹ Table 1 shows that Chile has the largest pension funds relative to the size of its economy. At the end of 1998, accumulated assets exceeded US\$31 billion, representing 40% of GDP.

Other regulated systems (mandatory and voluntary) are relatively recent, and more are added every year (the most recent one being that of El Salvador, which was established in 1998; a private pension fund system is slated to start in Venezuela in late 1999). While most systems are relatively incipient, they are growing rapidly, both as a result of the profitability of investments and the number of new entrants. Chile's private pension fund system has been in operation for almost 20 years, and in that period resources have grown at an annualized rate of 29.4% (in local currency). Most recent systems have posted very high growth rates. For example, in Argentina, pensions increased at a rate of 29% a year over three years; in Colombia the rate of increase was 39% over two and a half years; in Mexico it reached 168% over two years; and in Peru, 22% over three years. Nevertheless, they are still small when compared with their potential and relative to the size of the respective economies. If the countries that have started private pension funds were to reach the levels attained in Chile, Latin America would have over US\$560 billion. This is a significant amount that the underdeveloped and thin capital markets would not be able to absorb, forcing investments in government paper or bank instruments (Table 7 gives an indication of capital market

depth). There is a need to develop those markets and to introduce new instruments, which the pension funds are in a position to support.

INVESTMENT REGULATIONS²

In order to protect the interests of the affiliates, all the countries of Latin America in which private pension funds operate regulate the composition of portfolios. As these portfolios are expected to provide or supplement the pensions that were previously provided by the state, they tend to place strict limits on allowable investments and the performance of the portfolio.

These regulations tend to favor stability and uniformity of investment portfolio performance, which tends (however unwittingly) to exclude worthwhile, and economically and socially desirable investments like the provision of new infrastructure. A few regulations that further exacerbate this difficulty must be overcome if infrastructure investments are to be a part of pension fund portfolios.

The regulations cover the range of allowable investments, their liquidity, valuation and risk characteristics and other regulations on the portfolios themselves, such as minimum return. They also govern the management, allowing freedom to switch administrators, the number of portfolios per affiliate, portfolios per administrator and allowable managers. Still other regulations set limits on the liquidity and valuation of investments and limit investments to rated instruments. Some of these regulations make it almost impossible to invest in infrastructure assets or at least tend to dis-

¹ Even though Brazil's public system has not been reformed, the assets under administration under corporate pensions are so large that they are of considerable interest for financing infrastructure and as such are included in the discussion.

² This section benefits from the paper by Shah (1996), which criticizes the regulation for their effect on management expenses and sub-optimal portfolio choice, and Vittas (1998), which moderates the criticisms, for lesser developed countries, on account of under-developed financial markets and institutions.

Table 1
Comparative Size of Private Pension Funds

	Total Pension Fund System (a) (millions of US\$)	GDP 1998 (millions of US\$)	Population Projected 1998 (millions)	Pension/ GDP (%)	Pension assets per capita (US\$)
Argentina	11,526	337,615	36.1	3.4	319
Brazil	75,068	776,900	165.5	9.4	454
Chile	31,146	77,417	14.8	42.7	2,101
Colombia	2,110	87,474	37.7	2.4	56
Mexico	5,801	379,126	95.8	1.5	61
Peru	1,739	60,480	24.8	2.9	70
Germany	294,379	2,142,100	82.0	13.7	3,591
Netherlands	457,807	378,300	15.6	121.0	29,259
Spain	31,831	569,000	39.3	5.6	810
UK	991,951	1,362,300	58.3	72.8	17,027
USA (corporate)	4,400,000	8,508,900	269.8	51.7	16,310

(a) Pension Fund Data at Dec. 1998, Except Germany, Netherlands and U.K. at Dec. 1997

Sources:

GDP data: IMF (1999). Latin America Pension data: FIAP, Boletín #5; Europe Pension data: Mercer W./Inverco. USA Pension data: Pensions and Investments (1999)

courage such investments. Appendix II presents a summary of the most relevant regulations in the countries listed in Table 1.

Regulations that Hinder

Ratings: In order to account for the risk of the allowable assets and the rules set by regulators, pension fund administrators tend to require that non-government paper be rated by an independent agency and have a local investment grade. Those pension schemes that allow investments in foreign assets require an investment grade for such assets, rated by internationally recognized credit rating companies. Even equity investments are sometimes limited to rated firms.

Liquidity: To minimize problems with the valuation of security assets, most regulations prohibit, or in the best of cases, limit the holding of assets that are not traded or do not have a high degree of liquidity in major organized exchanges. For the purpose of identifying the level of liquidity, some regulations use liquidity indexes.

Valuation Rules: Most regulations require mark-to-market valuation, which by itself tends to favor investments whose prices are frequently quoted. This, again, would make investments in new infrastructure less likely to occur, because the instru-

ments backing those assets would tend to be traded infrequently.

Regulations that Discourage

Allowable Investments: As of 1999, the most restrictive private pension fund regulation is that of Mexico, where the only allowable instruments are debt securities issued or guaranteed by the federal government or the central bank. The only exception is the investment of up to 35% of the assets of the fund in debt securities issued or guaranteed by private companies and financial institutions with high credit rankings. Also, at least 65% of the portfolio should be invested in paper with maturities and/or review of interest rates not higher than 183 days, some of which must be invested in securities issued by the government or central bank with maturities of less than 90 days. At the end of 1998, the portfolio composition of all pension fund administrators in Mexico included 97% government or central bank paper. In addition to being conservative, these rules, which are expected to be temporary, aim to ensure financing for the government liability created by the transition from the old pay-as-you-go (PAYG) public pension system to the private system. The most liberal and oldest of the pension fund regulations are those of Chile, which allow investments in stocks, foreign securities, real estate, infrastructure and most negotiable instruments with an investment grade rating. These regu-

lations have been progressively liberalized, as capital markets became more developed and confidence in the operation of the system increased.

These investment regulations discourage investment managers from investing in infrastructure assets, as most (with the exception of Chile's) make the rules of liquidity, valuation and ratings applicable to all investments. This, in effect, limits direct investment in projects and, only in some cases, allows indirect investments through the purchase of stocks of well-established infrastructure corporations or mutual funds. Furthermore, investments in non-recourse or limited recourse greenfield projects (i.e., investments that depend on the cash flows of newly constructed or under-construction projects) are even more restricted. These projects do not have an established track record, are rather risky, illiquid, and in most cases lack a rating (let alone an investment grade rating).

Performance Regulations: In order to protect the value of the affiliate's pensions against over-aggressive behavior by the administrators and to minimize the need for supplementary public pensions, most countries regulate the performance of portfolios. In many cases, they are required to earn minimum returns, measured in either absolute (nominal or real) terms or relative to the performance of other pension funds. In the case of Chile, administrators are required to earn a minimum, which is the lesser of 200 basis points below the average system return or half the average return. Those that do not meet this criteria are required to compensate the portfolio with resources from a fluctuation reserve, established with prior earnings exceeding the minimum, and/or the administrator's own capital. In the case of Argentina, minimum returns are measured as 30% below the system average.

In order to avoid under-performance at a given point in time, pension fund managers tend to avoid volatility (inherent in infrastructure) and to invest in similar portfolios, reducing incentives for taking greater risks, while diversifying the portfolio within the limits allowed by local financial markets thereby precluding larger returns. Quantitative evidence

from the Chilean system presented by Shah (1997) show that there are minimal variations in portfolio composition.

This herding behavior is not exclusive of regulated funds. It can also be found in the management of private corporate pension funds, where managers often compare their performance with the industry average or with a standard benchmark and, in an attempt not to report under-performance relative to the average, tend to imitate each other's portfolio. This tendency is obviously not as prevalent as that forced by regulation.

Switching: Most regulations allow affiliates to switch accounts, between pension fund administrators, once or more in a given year. In addition to the obvious impact on marketing expenses, when combined with restrictions on portfolio composition and minimum performance requirements, this option tends to reinforce herding behavior since administrators do not want to lose customers on account of reporting volatility, arising out of infrastructure investments.

The portfolio composition and performance regulations prevent the portfolios from achieving the most efficient combination of risk and return and conspire against investment in riskier, but potentially more profitable infrastructure assets.

One Portfolio Per Affiliate: All Latin American countries require that all pension assets of the affiliate be invested in the same portfolio, although several are considering a change. This precludes the existence of portfolios with different risk-return characteristics, that could adapt to the risk tolerance of the affiliate and his/her life-cycle. Again, this restriction conspires against the incorporation of illiquid assets. The model of the individual retirement accounts sponsored by private U.S. corporations is a good one. In this case, the affiliate can opt to divide investments among several portfolios offered by the fund manager in order to tailor the combined portfolio based on age, risk tolerance or to take account of other investments he/she may have.

Obviously in this case there is no bailout of pensioners by the government, as is the case in some Latin American countries, which guarantee a minimum pension. Moreover, the level of development of the capital markets and the investment sophistication of the affiliates in Latin America make it more difficult to allow this freedom.

A better solution would be to allow flexibility in the choice of portfolio within a given pension administrator, after the pensioner has a part of his/her savings in one that guarantees a minimum pension.

One Portfolio Per Administrator: Pension fund managers can only offer one portfolio to their clients. Combined with the restrictions described above, this one also reinforces the convergence to the mean portfolio and precludes the incorporation of riskier assets. In the case of Mexico, for example, the law establishes that pension fund administrators could manage several pension fund companies with different portfolio composition and risk levels, although the current, very strict investment and minimum return rules restrict the viability of this option.

Monopoly of Pension Asset Management: Almost all Latin American countries currently restrict the

special regulator (in the case of Colombia, the Bank Superintendency regulates pension fund administrators). Competition from banks, insurers and other financial institutions is not permitted. While this allows for easier oversight of the industry, it also precludes the offer of alternative investment vehicles, which in general have had better returns than pension fund portfolios, albeit with greater risk. This choice, which should become available as the system matures, would allow for greater competition, portfolios which are more along the risk-return frontier, and a stronger interest in infrastructure assets, particularly as financial institutions gain experience in infrastructure finance. This is not to suggest that oversight be eliminated. As investment and pension management services become specialized, the industry will continue to need regulation to protect the interests of affiliates. But, as the system and financial markets mature, it will become more obvious that there are significant similarities between the pension fund and the banking and insurance industries, and that all can operate in the same markets with common regulations.

Portfolio Composition

Given the foregoing, the portfolio composition of pension funds tends to be rather conservative. The

Table 2
Portfolio composition by sector (end of 1998)

	Bonds	Stocks	Real Estate	Foreign	Other	Total
Argentina	70.9%	25.0%	0.3%	0.3%	3.5%	100.0%
Brazil	47.0%	36.5%	14.5%	0.0%	2.0%	100.0%
Chile	76.4%	16.1%	1.7%	5.7%	0.1%	100.0%
Colombia	84.0%	3.2%	2.5%	0.0%	10.3%	100.0%
Mexico	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Peru	65.8%	33.5%	0.0%	0.0%	0.7%	100.0%
Germany	71.0%	6.0%	13.0%	7.0%	3.0%	100.0%
Netherlands	47.0%	15.0%	7.0%	29.0%	2.0%	100.0%
Spain	62.4%	13.7%	0.0%	16.7%	7.2%	100.0%
UK	8.0%	54.0%	2.0%	29.0%	7.0%	100.0%
USA (a)	28.9%	51.9%	3.0%	10.5%	5.7%	100.0%

(a) Top 1,000 Funds aggregate asset mix

Source: Latin America: FIAP (1999). USA: Pensions and Investments (1999). Europe: Mercer

management of pension assets to institutions exclusively devoted to this end, often regulated by a

least conservative system is that of Chile because that country's system is more mature.

The case of Chile, with its longer history, is illustrative of the possible evolution as funds mature and tend toward riskier portfolios, even within the very conservative limits set by regulations. At the beginning, most assets were invested in essentially risk-free securities, as is the current case in Mexico (although in this case pension assets are also used to finance the deficit of the transition from the old to the new system). As time went by and capital markets developed, funds started to invest in mortgage bonds and corporate securities, to the point that in 1994 these represented a proportion similar to public securities. This changed in 1998, when the stock market was hit by uncertainties associated with the Asian crisis and funds moved into bank deposits and international diversification.

Moreover, in 1990, pension funds were authorized to invest in foreign securities subject to a very low and slowly increasing limit (currently set at 12%).

ity of investing in infrastructure funds as we are exploring in this paper.

As can be seen, when private pension funds mature and capital markets develop, the range of investments tends to widen and move away from concentration in government securities. The current, very restrictive regulations can be expected to be liberalized as the systems gain the confidence of regulators and self-regulation is developed. Eventually those systems will adopt the prudent man rule (i.e., no restrictions, just common sense), that governs the pension programs of private corporations or the most advanced systems in Europe, like the Netherlands and the United Kingdom. This trend needs to develop for the inclusion of infrastructure as an allowable investment.

Table 3
Evolution of Chile's pension fund investments

Type of asset (percentage of total assets)	1981	1985	1990	1994	1998
Government Securities	28	43	44	40	41
Bank Deposits	62	21	17	5	14
Mortgage Bonds	9	35	16	14	17
Corporate Bonds	1	1	11	6	5
Corporate Equities	0	0	11	32	15
Other	0	0	1	3	3
Foreign Securities	0	0	0	0	6
Total	100	100	100	100	100

Source: Vittas (1996), data for 1998 from Boletín #5, FIAP (1999).

Foreign investments started in 1993, increasing by 38% in 1998, reaching US\$1,785 million. Investments in venture capital and infrastructure funds were permitted in 1993; in 1995 the limit on equity holdings was raised to 37% (Vittas, 1996).

Given their relatively large size, Chile's pension funds have also contributed to the development of the market. They have been instrumental in developing credit rating agencies (*clasificadoras de riesgo*), giving depth to the markets, stabilizing prices (because they are long-term investors), developing new products to attract them and the possibil-

Infrastructure Investments

The only Latin American countries that now explicitly allow investments in infrastructure (even greenfield projects) are Argentina, Colombia and Chile. Pension fund managers in those countries are able to participate in infrastructure development programs and public services only indirectly by purchasing paper issued by specialized infrastructure investment funds or *títulos securitizados* (securitization), which spread the risks involved. Obviously, those systems that allow investments in private securities allow, indirectly, investments in

infrastructure assets, through the purchase of mutual funds or stocks and/or bonds of the corporations owning those assets. Nevertheless, some of these assets may not have the required rating and/or liquidity necessary to comply with other regulations, and, as such, may have to be exempted if project finance investments are desired. Furthermore, most managers would have to acquire the capabilities to perform due diligence on these investments.

The case of investment in established corporations that have a significant portion of their assets in infrastructure falls within the categories of investments in stocks or bonds of traded corporations and is rather straightforward. As a result, we will not address it here. We are more concerned with investments in new infrastructure projects (project finance). Although no precise figures exist, in the case of Chile the private pension system has invested in several road and airport concessions by investing in the concession partners. In all cases, it was investment in already existing assets, not greenfield projects. In the case of Argentina as of the end of 1998, approximately 0.6% and 5.8% of total pension assets were invested in bonds and shares respectively, of infrastructure related projects or companies.

The newly created pension funds should hope to emulate U.S. corporate pension funds, which operate in a very well-developed financial market. As of the end of 1998, the defined benefit corporate pension funds, in the top 1000 funds in the United States, have an average of 5.1% of their assets in private equity and real estate (these assets are the most similar to infrastructure projects) and 11.8% in international equity.³

Investment Needs of Private Pension Funds

The regulations described above determine, in most cases rather narrowly, the potential investments of

³ Even though private pension funds in Latin America are defined contribution, the management of the portfolios is in the hands of independent managers with a single portfolio and as such, the resulting portfolio is more comparable to the U.S.-defined benefit case.

pension funds. If these regulations were relaxed, pension funds would probably invest in other instruments. In particular they are likely to be interested in instruments that:

- Provide higher returns
- Provide opportunities to reduce risk through diversification
- Provide inflation protection
- Do not enhance volatility of reported returns
- Do not add undiversifiable risks (like foreign exchange exposure)
- Have liquidity
- Provide short-term and mid-term cash flows

Unfortunately, most financial markets in the developing countries do not have the instruments needed, even if the regulations were relaxed. Therefore, instruments will have to be created, as financial markets develop. If properly structured, infrastructure financial instruments can meet some of those needs and, as a result, should be attractive to those pension funds. Nevertheless, infrastructure investment is an activity which is inherently risky, both because of its strategic inflexibility (it cannot be moved or used for other purposes) and the fact that it provides basic public services subject to political interference (which could be reduced as a consequence of private pension fund participation). In this regard, it is important to distinguish between investments in well-established firms that provide infrastructure services (which should be treated as regular investments) and investments in new projects, which require special consideration in terms of the regulatory environment and financial instrument design.

In terms of the latter, we propose that private pension funds invest between 1% and 5% in infrastructure **project finance** assets. Needless to say, this recommendation is not based on a comprehensive analysis of the risk return characteristics of infrastructure investments or the efficiency frontier of the allowable assets of pension fund portfolios. Nor does it incorporate the risk preferences of affiliates (the research required goes beyond the scope of this paper). This is merely a **rule of thumb**, based on the preceding analysis, in particu-

lar by looking at the evolution of the Chilean case and the practices of pension funds administered under the “prudent man rule”.

Private pension funds should invest between 1% and 5% in infrastructure project finance assets.

Potential Private Pension Fund Investment in Infrastructure

Based on the expected rates of growth in pension fund assets⁴ and assuming that 3% of those assets are invested in infrastructure, Table 7 gives an indication of the availability of resources in selected countries. The third column gives the stock of potential assets in the portfolio if the full 3% were invested. The fourth column gives the availability of resources for new investments during the year, assuming that investment of 3% of the new assets flow into the pension funds portfolio (growth).

The investment of pension funds assets in infrastructure provides important benefits to those projects in which:

- Foreign exchange risk exposure is reduced, as most projects generate local currency revenues, but have traditionally depended on foreign exchange financing to cover long-term needs.

- Financing (refinance) risk is reduced because pension funds are able to provide longer tenors than those currently available in the local financial markets.
- The cost of capital is potentially reduced because these resources tend to be less expensive on a risk-adjusted basis than most of the alternatives (imported capital or short-term local finance).
- There would be less interference in decision making because pension funds tend to be less involved in day-to-day management than the alternative sources (this must be compensated with proper governance system to ensure that pension funds are not “taken for a ride”).
- Political risk is reduced because the participation of resources representing the pensions of local workers should induce closer adherence and fairness in the application of infrastructure regulatory principles. Pension funds can be honest brokers as affiliates are affected both by the returns of the projects and the rates charged by the services provided.

These benefits are important enough for infrastructure projects to be very interested in pension fund resources and to take the necessary measures to capture them.

Table 4
Availability of resources for infrastructure in the year 2000

Country	Pension Fund Assets year end (billion US\$)	Potential investents in infrastructure projects (portfolio) (million US\$)	Potential new yearly investments in infrastructure projects (million US\$)
Argentina	20	600	120
Brazil	117	3,900	780
Chile	49	1,470	180
Colombia	3	90	30
Mexico	20	600	180
Peru	3	90	30

⁴ Assumes the following rates of growth: Argentina and Brazil, 20%; Chile, 12%; Colombia, Mexico and Peru, 30%. These rates are not critical for the point we want to show and are merely indicative.

PRIVATE PARTICIPATION IN INFRASTRUCTURE

The current decade has seen a significant transformation in the modalities of provision of infrastructure services concurrent with pension reform. There has been a major increase in private sector participation in the provision of infrastructure services. This is particularly the case in the countries that undertook pension reform, that also liberalized their economies, but it is not limited to them. In the case of Latin America, the main reasons for the increase in private participation has been the need to modernize and expand the services which the state can no longer finance and to redirect resources used to finance the deficits of public utilities to more pressing social needs. This has led most countries to privatize public utilities and to concession transportation services, leaving in the hands of the private sector the financing of the rehabilitation and expansion. These investment needs, as will be seen

GDP (World Development Report, 1995). A reasonable goal for governments would be to make sure that infrastructure can support a long-term annual growth rate of 5%. Given the size of the Latin American economy, this would require investments of US\$70 billion (in year 2000 dollars) per year. It is estimated that the telecommunications sector would require roughly \$25 billion a year; energy, \$28 billion; transportation, \$10 billion; and water, \$7 billion. Telecommunications can be considered a relatively safe and developed sector that should be part of the regular portfolio of investments of pension fund assets in publicly traded stocks and bonds. It should hence be excluded from the special "project finance" allocation we are suggesting. Also, a portion of the energy sector that includes well established utilities in countries with mature reforms could also be seen in this light. Nevertheless, as this is still a small segment of the overall Latin American market (although it represents a large part in Chile and Argentina), we will assume that the en-

Table 5
Investment in Infrastructure Projects with Private Participation, 1990-1997
Latin America and the Caribbean (million US\$)

Year	Electricity	Water	Gas	Telecom	Transport	Total
1990	645.70	-	-	4,443.30	5,311.00	10,400.00
1991	-	75.00	-	9,213.80	395.50	9,684.30
1992	2,130.06	-	2,930.00	11,112.00	2,667.50	18,839.56
1993	2,925.74	4,153.00	142.80	5,804.40	835.80	13,861.74
1994	3,019.57	434.00	1,342.90	9,109.90	1,517.10	15,423.47
1995	5,380.48	1,178.80	796.50	6,910.30	1,600.70	15,866.78
1996	9,012.51	153.90	915.80	9,710.40	2,785.40	22,578.01
1997	<u>20,514.80</u>	<u>1,625.20</u>	<u>2,490.88</u>	<u>11,273.40</u>	<u>3,658.50</u>	<u>39,562.78</u>
	43,628.86	7,619.90	8,618.88	67,577.5	18,771.80	146,216.94

Source: World Bank (1999)

below, are rather large and are well beyond the current capacities of domestic financial and capital markets, both in terms of volume and in terms of tenor. This forces the private sector to resort to international sources to finance investments that generate revenues mostly in domestic currencies.

Financing Needs

It has been estimated that for each 1% in GDP, investment in the traditional infrastructure sectors (telecommunications, energy, transportation and water and sewage) would need to increase by 1% of

energy sector is in need of risk capital and include the estimates in our proposal. As a result, total annual needs that could potentially be covered by the risky portion of pension funds assets could amount to almost \$50 billion in the year 2000. These large needs continue to be met mostly by the public sector and it is estimated that private sources only cover 15% (World Bank, 1997a).

The table below shows the percentage of private investment covered assuming that the private sector finances around 15% of the infrastructure needs of

those countries (15% of 5% of GDP).⁵ Obviously every country would be different and the numbers shown only attempt to provide orders of magnitude to assess the overall feasibility of pension fund financing. They are more valid in the aggregate than on an individual country basis.

Even though the potential contribution by pension funds appear to be small compared with the needs, they do represent an important contribution to the financing, particularly in terms of the very scarce local currency finance. When considered in the context of the financing package of any project, these figures, even excluding the special case of Chile, represent a large contribution from a single source of financing and surely would be the largest of the local financing sources.

- Although infrastructure projects are riskier, they provide diversification benefits given that their returns are less than perfectly correlated with existing pension fund portfolios. For riskaverse investors, investments in infrastructure may move the overall return to a more desirable risk-return combination.
- These investments could increase the volatility of returns, but given that the proportion would be very small, the impact should be negligible.
- These investments contribute to overall economic growth, including the creation of new jobs, thereby generating even more resources for the pension funds and benefiting their stakeholders.

Table 6
Coverage of infrastructure needs in the year 2000

Country	Private financing of needs (15%)	New investments in infrastructure projects per year (million US\$). Exhibit 7.	Percent of yearly needs satisfied
Argentina	1,900	120	6.3
Brazil	4,200	780	18.6
Chile	435	180	41.4
Colombia	525	30	5.7
Mexico	2,700	180	6.7
Peru	435	30	6.9

WHAT DO INFRASTRUCTURE INVESTMENTS OFFER

Based on the discussion above, it should be clear that private infrastructure could and should tap into pension fund assets. Yet, this can only happen if those investments bringsomething which is of value to the pension funds. Indeed, infrastructure investments do have some valuable features:

- They tend to provide a higher return than the one obtained by pension fund portfolios.

⁵ If the telecommunications sector is excluded from these estimates, under the assumption that they represent traditional investments, then the figures could, as a rough estimate, be multiplied by 1.5, as telecommunications account for about 30% of the estimated financing needs.

Nevertheless, these investments also have some undesirable features that must be overcome before pension funds undertake them:

- Higher expected returns are achieved over the long run. Even though pension funds can afford to wait for returns because their liabilities are long term, current regulations lead them to prefer short-term, steady returns.
- These investments may not comply with some of the regulations described above, in particular with respect to ratings, valuation and liquidity.
- Given that these investments carry a higher (although mostly diversifiable) risk, they bring the nondiversifiable risk of having to

report a failure in an investment, with the potential for increased switching by affiliates to another pension fund administrator. This is an agency problem, because even though the investment may benefit the affiliate in the long run, it

poses a short-term risk to the administrator.

By now the alert reader may have already devised ways to overcome these obstacles. We will discuss them in the next chapter.

Compatibility Between Infrastructure Investments and Pension Fund Portfolios

At the end of the previous two sections we analyzed the investment needs of the private pension fund portfolios. Based on the previous discussion it is apparent that the incompatibilities outweigh the synergies. Nevertheless, it is important to emphasize that these incompatibilities are more the consequence of the lack of appropriate instruments and regulations, than of the fundamentals. Below we discuss the ideal regulatory environment to foster the investments and make some policy recommendations. We also discuss the design of financial instruments needed to take advantage of that pool of resources.

CHANGES IN THE REGULATORY ENVIRONMENT

Based on the discussion above on pension fund regulation and the characteristics of infrastructure investment, it is no wonder that there has been so little participation. The regulations on ratings, liquidity, switching, minimum return, one portfolio per affiliate, one portfolio per administrator, monopoly by pension fund administrators, and valuation rules make these investments almost impossible. The ideal regulatory framework will use the “prudent person rule,” whereby decisions on investments are left to the administrators exercising their fiduciary responsibility, as is the case of corporate pension funds in the United States and pension funds in the Netherlands and the United Kingdom. However, the government continues to have a financial interest because, in many cases, it guarantees the minimum pension. Furthermore, in the case of developing countries, this relaxation must be accompanied by the corresponding enhancement of the capabilities of the supervisory agencies. Thus, regulations should allow affiliates to have several portfolios: a properly regulated one for the minimum pension, and several for supplementary pensions that are basically deregulated and operate under the “prudent person rule.” Minimum pension

portfolios would be regulated under current rules and gradually relaxed as the system matures.

This ideal regulatory framework cannot be achieved in the short run, but should be the benchmark to be achieved as pension funds and financial markets mature. In the meantime, the regulations could be progressively relaxed and move from regulating investment to measures that regulate overall portfolio risk. The performance of supplementary pension portfolios would be assessed based on measures of risk-adjusted returns. Each administrator should be allowed to manage several portfolios with different risk-return characteristics (with the number being compatible with the development of the local capital markets). Each portfolio would advertise the risk tolerance and net-of-expenses performance benchmark and under-performance (say 20% below benchmark return) would be covered through reserves or the administrator's capital. Switching would still be allowed, but it would be less of an issue, because comparison is relative to net-of-expenses benchmark and not to other “competing” portfolios (not comparable, unless they are of the same risk and same expenses). Ideally, all financial institutions would be able to manage pension funds and all would fall under a consolidated regulatory body, with specialized units (banking, securities, insurance, pensions).

Regulations on ratings, liquidity and valuation should be handled through the proper design of infrastructure financial instruments. Nevertheless, it would help if these regulations were relaxed, not eliminated, for a small percentage of assets, say 5%.

For instance, valuation and rating rules could be substituted by periodic independent assessments of the investment value.

The Ideal Regulatory Framework:

- *Prudent person rule for supplementary pensions*
- *Progressive liberalization for minimum pensions*

Design of Financial Instruments

Based on the discussion above, it is clear that if these instruments are to be attractive to pension funds, without been forced, they need to be, to the extent possible:

- More liquid
- Less risky (lower probability of failure)
- Less volatile

The instruments can have either **direct or indirect claims** on the cash flows. In the case of direct claims, the instruments can be securities (the need to be marketable is a *sine qua non* condition) like general project bonds, securitization of specific cash flows or shares of the special purpose vehicles. In any case, to comply with these conditions, the securities would have to have claims on special cash flows. For instance, they should have a senior claim on revenues, be based on projects with track records (operation stage) or have some form of enhancement through the participation of the government, multi-lateral agencies and/or political or credit insurance. The above-mentioned conditions can be further enhanced if the securities are based on indirect claims on the cash flows through some form of investment pools. This would allow investment in the securities of several projects, over several sectors and even over several countries. The resulting securities would already constitute a well-diversified portfolio and, as such, would be more liquid, less risky and less volatile, and may even be rated. In all cases, the underlying projects must be well structured and backed by solid sponsors. Even though this is the ideal, barely achievable in practice, it is the benchmark that those seeking pension fund financing should strive for.

In the United States and other developed capital markets, there are endless options for the private pension fund administrator to invest the portfolio assets, and to configure the desired risk-return profile. In the case of countries with lesser-developed markets the options are rather limited, sometimes limited to government paper and the negotiable certificates of deposit or liquid deposits of financial institutions. The case of most countries

of Latin America is paradoxical. The private pension fund industry generates long-term, domestic, investable resources, and it needs to enhance profitability and minimize risk. Unfortunately, it does not have a well-developed capital market capable of providing the necessary instruments, either because it is underdeveloped, or as the case of Chile, its size is rather small when compared with the size of the funds. On the other hand, there are large unsatisfied needs of legitimate long-term domestic investments waiting to tap into the pool of those resources. There is a real gap between the potential of the funds, the needs of infrastructure and the development of the capital markets that must be closed through the development of the proper instruments, regulations, and institutions.

Pension Fund Investments in Infrastructure Assets

As discussed above, changes in the pension fund regulations are needed, but these alone will not be enough. Changes in the design of infrastructure finance instruments are also needed. These regulatory changes, if at all, will occur over prolonged periods of time. In the meantime, for pension funds to invest in project finance infrastructure assets, the instruments will have to adapt to the existing regulations and the proposal indicated in the box below requires minimal changes in regulations, and in some countries none at all. The ideal instrument proposed is the most conservative that can be designed, short of one guaranteed by AAA-rated institutions or governments. It should have ample liquidity, very low risk (obviously with a correspondingly lower return) and would be properly valued. Even though it would capture funds for infrastructure, pension funds could do better in the risk-return tradeoff with more direct investments. As regulations are relaxed, the instruments will not have to be as complex as implied by the recommendation and some funds may be able to acquire simpler instruments, including direct investments or the purchase of negotiable debt instruments of specific projects.

The application of the prudent man rule most likely would not imply a dramatic change in the portfolios

of pension funds, evidenced by the portfolio composition of countries that use this rule. Administrators would probably still insist on liquidity, ratings and valuation rules, but most likely, they would be willing to “exempt” a portion of the portfolio from these self-imposed rules and allow investment in illiquid, non-rated and subjectively valued assets. This would favor direct investment in the relatively riskier (diversifiable), but return-enhancing infrastructure assets.

The ideal financial instrument: Securities of a fund, invested in many carefully selected projects, with some form of credit enhancement (e.g. multilateral participation, credit guarantees, political risk insurance), over several sectors (heavy on energy, light on water, with a mix of transportation subsectors), covering several countries, mostly in operational stage, with shares quoted in some exchange, preferably in a developed market.

Table 7
Indicators of Capital Depth

	1996 Market Capitalization	Domestic Credit (a)	1996 Turnover	1998 Fund Size
Argentina	18	26	50	3.4
Brazil	32	37	86	9.4
Chile	93	60	10	42.7
Colombia	25	46	10	2.4
Peru	27	12	26	1.5
USA	105	138	93	51.7

Percent of GDP, except turnover

Sources:

IMF, Financial Statistics, March 1999; World Bank, World Development Indicators, 1998;

(a) Provided by banking sector in 1996

Implications for Other Countries and Other Investments

Even though we have been mainly discussing Latin America, the conclusions have implications for all countries, taking into account the differences in financial markets development. This is particularly the case because pension fund reforms in many developing countries are following the Chilean model (with the needed variations). Also, many developed countries (particularly in Europe) are under pressure to reduce their fiscal deficits and, to do so, are considering the private provision of infrastructure services. Given that these countries already have corporate or private pension funds in place, the implications of our discussion are also valid for them. Obviously, as the discussion refers to a private-private relation, it is valid if both infrastructure and pension funds are in private hands. The discussion can also be applied in the case of other private investments, different from infrastructure, that share some of the problems of inflexibility and size, as would be the case of housing.

In the United States, there was a proposal in the early nineties to utilize the vast resources of private corporate funds to finance public infrastructure (see U.S. Department of Transportation, 1993). In this case, the proposal was to use resources under pri-

private management to finance public sector works. The proposal involved the creation of a public financial institution that would issue securities, insured by a separate insurance company and with the implicit guarantee of the U.S. government and tax benefits for purchasers. These securities were to be purchased by institutional investors, including private pension funds, and the proceeds would be used to finance public infrastructure, leveraging the capital paid in the corporation by the federal government. Even though the idea was very well structured, the private sector was not enthusiastic about it, as it appeared to be a form of forced investment. The problem was that even though the corporation may have been managed along private criteria, the activities financed were public works without an underlying cash flow and the tax exempt pension funds were more interested in taxable securities (for a comprehensive analysis of the proposal, see U.S. General Accounting Office, 1995). Given that corporate pension funds in the United States have very few investment restrictions, the problem of insufficient infrastructure finance could be solved by privatizing some of the infrastructure and issuing securities along the lines proposed in this paper.

Concluding Remarks

If regulations of private pension funds were to be relaxed to allow investments in private infrastructure projects and, in turn, these projects adapted their financial instruments to the needs of those pension funds, both parties would be able to reap significant tangible and intangible benefits. Private pension funds benefit from the opportunity to enhance the risk-return combination offered to the affiliates, hopefully enhancing the value of their savings and pensions. Private investments in infrastructure benefit from the possibility of tapping long-term resources in local currency and reducing financing costs. In the process, there is the opportu-

nity to promote the development of the country in areas that can have a multiplier effect in terms of competitiveness and quality of living.

To achieve this relationship, pension fund regulations must be restructured so that the goal of safeguarding the value of pensions does not hinder investments in viable and profitable infrastructure projects. On the other hand, infrastructure needs to tailor the instruments to satisfy the needs of pension funds. The discussion presented shows how this can be achieved for the benefit of all parties. This relationship is a positive sum game.

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Appendix I
Characteristics of Latin American Private Pension Funds

	Chile	Peru	Colombia	Argentina	Mexico	Bolivia	Brazil
Start of operations	1981	1993	1994	1994	1997	1997	1977
Public PAYGO system	closed	remains	remains	remains	closed	closed	remains
Privately-funded system							
Affiliation of new workers	mandatory	voluntary	voluntary	voluntary	mandatory	mandatory	corporate
Fund management companies (a)	AFP	AFP	AFP	AFJP	AFORES	AFP	EFPP
Contribution rate for savings (% of wage)	10	8 (d)	10	7.5	6.5 + subsidy	10	variable
Commissions + insurance (% of wage)	2.94	3.72	3.49	3.45	4.42	3.00	variable
Contribution collection	decentralized	decentralized	decentralized	centralized	decentralized	decentralized	corporate
Past contributions (b)	RB	RB	RB	CP	life-time switch	CP	N/A
Disability/survivors insurance	private	private	private	Private	public	private	N/A
Supervision	specialized	specialized	integrated	specialized	specialized	integrated	integrated
Account transfers (c)	2 x p.a.	2 x p.a.	2 x p.a.	2 x p.a.	1 x p.a.	1 x p.a.	N/A
Minimum rate of return	relative	unregulated	relative	relative	no	no (e)	N/A
Minimum pension	yes	no	yes	yes	yes	no	N/A

Notes: (a) AFP = Administradoras de Fondos de Pensiones; AFJP = Administradoras de Fondos de Jubilaciones y Pensiones; AFORE = Administradoras de Fondos de Ahorro para el Retiro; EFPP = Entidades Fechadas de Previsión Privada.

(b) RB = Recognition Bond; CP = Compensatory Pension;

(c) Due to administrative delays, transfer may be more limited.

(d) Contribution rate will be increased gradually to 10%.

(e) Guarantees are required from the fund management companies.

Source: Queisser (1998) and own data.

Appendix II
Comparison of Investment Regulations

(Percentages are of the total assets of the pension fund)

	Securities issued of guaranteed by Government and/or Central Banks	Debt Securities (non Government)	Stocks	Mutual Funds	Foreign Investments	Others
Argentina	Max. 65%	Max. 100%	Max. 35%	Max. 14%	Max. 17%	Max. 2%
	<ul style="list-style-type: none"> In any case no more than 7% in securities issued or guaranteed by the same entity Max. 1% of the fund in a mutual fund and/or 10% of the capital of the mutual fund. If mutual fund invests in the real estate sector, max. 5% of capital of the fund per real estate mutual fund or 20% of the issue 					
Brazil	Max. 100%	Max. 80%	Max. 50%	Max. 15%	-	Max. 35%
	<ul style="list-style-type: none"> Max. 5% of the fund in the capital of a company or max. 20% of its capital Max. 10% of the fund in a company and/or group and max. 20% of the fund in a financial institution and/or group Max. 20% of the capital of a real state mutual fund 					
Chile	Max. 50%	Max. 100%	Max. 37%	Max. 15%	Max. 16%	Max. 10%
	<ul style="list-style-type: none"> Max 7% of the fund in one entity or max. 15% of the fund in a group Max. 5% per diversification factor on mutual funds that invest in real state, development of enterprises and securitization; and/or 20% of its capital Max. 3% in debt of new companies (could include public infrastructure by private companies); and/or 20% of the issue Max. 5% in real estate companies (could include investments in public concession projects); and/or 20% of the capital of the company Max. 1% of the fund per foreign investment fund 					
Colombia	Max. 50%	Max. 100%	Max. 30%	-	Max. 10%	-
	<ul style="list-style-type: none"> Max. 5% of the fund per issuer, including group. If the issuer is supervised by the bank superintendency, the limit is 10% Max. 10% of the capital of a company and max. 20% of an issue, including securitization, except government or central bank paper. 					
Mexico	Max. 100%	Max. 35%	-	-	-	-
	<ul style="list-style-type: none"> Max. 10% issued or guaranteed by an entity, and max. 15% for a group Max. 15% for a serie or same issue 					
Peru	Max. 40%	Max. 100%	Max. 35%	Max. 15%	Max. 10%	Max. 10%
	<ul style="list-style-type: none"> In any case no more than 15% in one company or 25% in an economic group 					
Germany			Max. 30%		Max. 20%	Max. 25%; Real Estate
	<ul style="list-style-type: none"> Equities: E.U. equities, including Germany max 30%; Non E.U. equities: max. 6% 					
Netherlands	<ul style="list-style-type: none"> Prudent person rule Self Investment: max. 5% 					
Spain	<ul style="list-style-type: none"> Min. 90% invested in listed assets, real estate and bank deposits; Bank Deposits: max. 15%. Max. 5% (max. 10%) in securities issued or guaranteed by one entity (group). This limit doesn't apply to foreign estates/international organization 					
United Kingdom	<ul style="list-style-type: none"> Prudent person rule 					
USA	<ul style="list-style-type: none"> Prudent person rule 					

Source: Web sites of Associations of Pension Fund Administrators, law and regulations