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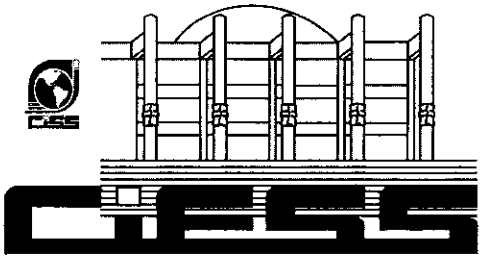

INTER-AMERICAN CENTER FOR SOCIAL SECURITY STUDIES

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PENSION FUNDS IN THE PRIVATE FINANCING OF INFRASTRUCTURE PROJECTS
DESIGN OF REGULATIONS AND INSTRUMENTS

*Antonio Vives**

Introduction

Important reforms took place in Latin American Countries in the decade of the nineties: the participation of the private sector in the administration of pension funds and in investments for infrastructure. Many countries in other parts of the world have implemented one of these reforms, but not the two of them at the same time (with the exception of the United Kingdom which is similar to the case of many countries in Latin America and was the first in the participation of the private sector in infrastructure). These reforms in both fronts have created a considerable long term source of funds, mostly internal, and at the same time have created a considerable

* Assistant Manager for Infrastructures, Financial Markets and Private Enterprises of the Sustainable Development Department, and Vice-Chairman of the Pension Fund Investments Committee of the Inter-American Development Bank. This publication has been authorized by the BID within the frame of the existing academic cooperation relationship with the CIESS.

need for national investment funds. However, in spite of the potential benefits of a happy marriage, a relationship has not yet been developed between these two factors.

The liberalization of many economies of emerging markets and the understanding of the many benefits involved in the participation of the private sector in infrastructure, have created a considerable demand for private capital. This liberalization, produced within the context of relatively underdeveloped financial markets, has depended on foreign capital to finance the growing needs, with the corresponding risk of unexpected devaluations and/or sudden setbacks of those flows. In spite of the fact that the external capital flows towards infrastructure projects have less volatility than portfolio investments, recent crises have reduced the willingness of investors to provide capital for emergent markets. For this reason, projects have been subject to exchange risks.

This situation stresses the importance of developing national long term sources of capital. The most important national sources of capital, and sometimes the only long term sources, are the pension funds resources, which in addition may contribute to the development of local financial markets. It is imperative that these resources be used by infrastructure projects. If these resources are to be used satisfactorily, those responsible for the development of projects and the international project financing industry must be abreast of the specific needs of local pension funds. Although the analysis is concentrated in Latin America, it has implications for the majority of the countries with pension funds administered by the private sector for infrastructure provided by the private sector.

The purpose of this document is to promote this symbiotic relationship, summarizing the conditions under which the long term sources and use of resources may be found and focusing the attention of both parties to the benefits of a duly structured relationship. There are benefits for both parties that can be exploited through a better understanding of the needs of the other party. We are not proposing that infrastructure projects be granted special subsidies, guaranties or fiscal benefits to make them more attractive for the administrators of private pension funds. We are not proposing either that public pension fund resources be aimed or forced towards investments in infrastructure due to their positive externalities or social benefits. The instruments for the investment of the private sector in infrastructure, must be structured to coincide with the investment strategies of private investment funds, while at the same time promoting the changes necessary within the regulatory frame of pension funds. We propose a totally voluntary relationship between private sector and private sector, although with the participation of the public sector as grantor and regulator of the activities of the private sector. The public sector has the important role of facilitator; it controls most of the rules of the game and its actions in anyone of the sectors may create or break the relationship.

If the resources for pension plans are to be used satisfactorily, those responsible for the development of projects, and the project financing international industry, must be abreast of the specific needs of these two pension funds.

Before entering into the purpose of this report – the discussion of the structure of infrastructure financial instruments needed to attract the investment of pension funds and the consequent reforms in the policies and in the regulations necessary in the majority of the countries in the process of development– we outline briefly the potential sources and needs for investment, the characteristics of the funds and of the projects, the present relationship limitations and the benefits to both parties. The report ends with a discussion of the implications that this may have

for developed countries like the United States and most of Europe, which are in arrears with respect to private participation in both areas of mandatory pensions and infrastructure.

INVESTMENT OF PRIVATE PENSION FUNDS IN LATIN AMERICA

Since the pioneer effort of Chile in 1981, many countries in Latin America have undertaken a reform of pension funds, including the introduction of the private administration of mandatory pension savings simultaneously with, or as replacement of, the public pension system.

These pension funds have accumulated a significant number of resources[1] Chart 1 shows that Chile has the largest pension funds in relation to the size of its economy. At the end of 1998, the cumulative assets were higher than 31 thousand million dollars, representing 40% of the GDP. Other regulated systems (mandatory and voluntary) are relatively recent, and every year their number is larger (the most recent of these systems has been that of El Salvador, which was established in 1998; a private pension fund system is scheduled to start in Venezuela at the end of 1999). Although most of the systems are relatively incipient, they are growing fast, as a result both of the profitability of investments and of the number of the new participants in the system. The private pension funds system in Chile has been in operation during almost 20 years and in that period resources have grown at an annualized rate of 29.4% (in local currency). Most of the recent systems have reported very high growth rates. For example, in Argentina, pensions increased at a rate of 29% per annum in a three year period; in Colombia, the growth rate was 39% in a two and a half years period; in Mexico it reached 168% in two years and in Peru 22% in a period of three years. However, these percentages are low if compared to the existing potential and to the size of the economies of the respective countries. If the countries where private pension funds have started to operate were to reach the levels reached in Chile, Latin America would have more than 560 thousand million dollars invested in them. This is an important amount that the underdeveloped and not very active capital markets would be unable to absorb, forcing investments in government securities or bank instruments (Chart 7 presents an indication of the depth of capital markets). There is a need to develop these markets and introduce new instruments that can be supported by pension funds.

Regulation of investments[2]

To defend the interests of affiliates, all the countries of Latin America where private pension funds operate, regulate the composition of their portfolios. As it is expected that these portfolios will provide or complement the pensions previously granted by the State, regulations tend to apply strict limits to the investments permitted and to the yield of the portfolio.

These regulations tend to favor the stability and the uniformity of the return on investment of the portfolio which tends (even without noticing) to exclude worthwhile investments that are

[1] Although the public system of Brazil has not been reformed, the assets administered under corporate pensions are so large that they are usable to finance infrastructure and, as such, are included in the analysis.

[2] This section has the benefit of the report made by Shah (1996) who criticizes regulation due to its effect on administrative expense and on the selection of a sub-optimum portfolio, and Vittas (1998) who moderates this criticism in the case of less developed countries due to the fact that they have underdeveloped markets and financial institutions.

economically and socially attractive, such as the provision of new infrastructure. If investments in infrastructure are to become a part of the portfolios of pension funds, some regulations that hamper them must be modified.

The regulations in force cover the range of investments permitted, their liquidity, the evaluation and risk characteristics and other regulations on the portfolio itself, such as the minimum yield. These regulations determine also the administration of funds, establishing the conditions under which the administrators can change, the number of portfolios permitted per affiliate and per administrator and the number of administrators permitted. Even so, other regulations establish limits on the liquidity and evaluation of investments and limit investments to qualified instruments. Some of these regulations make almost impossible the investment in infrastructure assets or, at least, tend to discourage such investments. Appendix II presents a résumé of the most relevant regulations in the countries included in Chart 1.

Regulations that restrict

Ranking: In order to take into account the risk of assets permitted and the regulations in force, the administrators of pension funds tend to require that the securities other than government securities are rated by an independent agency and have a degree of local investment. Those schemes that permit investments in foreign assets, require a degree of investment for such assets, qualified by ranking companies of internationally renown reputation. Even investment in shares is also sometimes limited to qualified companies.

Liquidity: To minimize the problems of evaluation of securities, most of the regulations forbid, or at best limit, the tendency of securities that are not negotiable or that don't have a high degree of liquidity in the most important stock exchange markets. With the purpose of identifying the level of liquidity, some regulations use liquidity indexes.

Evaluation norms: Most of the regulations require an evaluation at market value, which tends to favor investments whose prices are frequently quoted. This would also make less probable the investment in new infrastructure, because the instruments financing these assets would tend to be negotiated less frequently.

Regulations that discourage

Permitted investments: In 1999, the most restrictive regulation on private pension funds was that of Mexico, where the only instruments permitted were debt securities issued or guaranteed by the Federal Government or by the central bank. The only exception is the investment of up to 35% of the assets of the fund in debt instruments issued or guarantied by private companies and financial institutions with a high risk ranking. In addition to the above, at least 65% of the portfolio must be invested in securities with maturities and/or revision of interest rates no longer than 183 days, some of which must be invested in securities issued by the government or by the central bank, with maturities of less than 90 days. At the end of 1998, 97% of the average portfolio of pension funds in Mexico was constituted by government or central bank securities. These conservative norms (expected to be temporary) pretend to guaranty financing for the liabilities of the government created by the displacement of the old public system of distribution to the private system. The most liberal and oldest regulations on pension funds are those of Chile, which permit investment in shares, foreign securities, real estate, infrastructure and in the majority of negotiable instruments with a certain degree of investment. These regulations have been progressively liberalized to the extent that capital markets have evolved and the confidence in the operation of the system has grown.

Chart 1
Comparative size of private pension funds

	Total of the Pension fund system (a)(millions of $)	GDP 1998 (millions of $ US dollars	Projected population 1998 (millions)	Pensión/ GDP (%)	Per capita pension assets ($ US dollars)
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
United Kingdom	991.951	1.362.300	58,3	72,8	17.027
U.S.A. (corporae)	4.400.000	8.508.900	269,8	51,7	16.310

(a) Data on pension funds as of December 1998, except Germany, the Netherlands and the United Kingdom as of December 1997.

Sources: GDP data: IMF (1999). Pensions data Latin America: FIAP bulletin #5; Pensions data in Europe: Mercer W./Inverco. Pensions data in the U.S.A.: Pensions and Investments (1999).

These regulations discourage the investment in infrastructure goods, because the majority (with the exception of Chile) apply the liquidity, evaluation and ranking norms to all investments. This actually limits the direct investment in projects and, only in certain cases permits indirect investments through the purchase of shares of corporations with a well established infrastructure or of investment funds that invest in these securities. In addition to the above, investment in totally new projects, without recourse or with recourse limited to promoters (i.e. investments depending on the flows of funds of recently built projects or projects in the process of construction) are even more restricted. These projects do not have an established history, are very risky, have no liquidity and, in most cases, do not even have a ranking (least of all a degree of investment).

Regulation of yield: To protect the value of pensions against the too aggressive behavior of administrators and to minimize the risk that the public sector will have to complement pensions, most of the countries regulate the yield of portfolios. In many cases, a minimum level of profitability is applied, measured in absolute terms (nominal or actual) or in relation to the yield of other pension funds. In the case of Chile, the yield of the funds must be higher than the 200 basic points under the average yield of the system, or half the average profitability. Those that do not satisfy these criteria must compensate the portfolio with resources from a fluctuation reserve established with previous profits that have exceeded the minimum and/or from the capital of the administrative company. In the case of Argentina, the minimum yield must be higher than 70% of the average of the system.

In order to avoid a low return at a given time, the administrators of pension funds tend to avoid the volatility (inherent to the infrastructure) and invest in similar portfolios, reducing the incentives of taking higher risks, while they diversify the portfolio within the limits permitted by local financial markets, thus disregarding higher returns. The quantitative evidence of the Chilean system presented by Shah (1997) shows that the variation in the composition of the portfolio between administrators is minimum.

This behavior as a whole is not exclusive of regulated funds. It can also be found in the

administration of corporate private pension funds, where administrators frequently share their yield with the average of the industry or with a standard reference and, in an attempt to not report a low yield with respect to the average, tend to imitate portfolios. Obviously, this tendency is not as frequent as that imposed by regulations.

Change of administrators: Most regulations permit the affiliate to change accounts among the administrators of pension funds once a year or more frequently. In addition to the obvious impact on market costs, when combined with the restrictions in the composition of the portfolio and the requirements of minimum yield, this option tends to reinforce behavior as a whole. Administrators prefer not to invest in infrastructure because this would increase the volatility of portfolios, which, in turn, could result in the loss of customers.

A portfolio per affiliate: The regulations of all Latin American countries require that all pension assets of the affiliate be invested in the same portfolio, although several countries are studying the possibility of changing this requisite. This prevents the existence of portfolios with different characteristics of risk versus yield, that may be adapted to the tolerance to risk of the affiliate and to his life cycle. Again, this restriction conspires against the incorporation of liquid goods. A good model is that of individual retirement accounts sponsored by private corporations in the United States. The affiliate may chose to divide investments among several portfolios offered by the administrator of the fund so as to create a combined portfolio that takes into consideration age, tolerance to risk or other investments that he may have. Obviously, in this case, the Government does not compensate retirees, as is the case of some countries of Latin America which guarantee a minimum pension. On the other hand, the level of development of the capital market and of the knowledge of topics of investment in securities of the affiliates in Latin America, make it more difficult to permit this freedom.

The regulations on portfolio composition and return, prevent portfolios from achieving the most efficient combination of risk and yield and conspire against investment in infrastructure goods which are more risky but potentially more productive.

A better solution would be that the affiliate invest part of his savings in a portfolio whose return may guarantee a minimum pension, allowing greater flexibility in the option chosen to invest the balance and requiring that the total amount be invested in one single administrator company.

One portfolio per administrator: Pension fund administrators may offer only one portfolio to their customers. Combined with the restrictions mentioned above, this also reinforces the convergence to the average portfolio and hinders the incorporation of more risky assets. In the case of Mexico, for example, the law provides that pension funds administrators may handle several pension fund companies with different portfolio composition and risk levels, although the present investment and minimum yield norms are very strict and restrict the viability of this option.

Monopoly in the administration of pension assets: At present almost all Latin American countries restrict the handling of pension assets to institutions operating exclusively for this purpose, frequently regulated by a special entity (in the case of Colombia, the Baking Superintendence regulates the pension funds administrators). Competition among banks, insurance companies and other financial institutions is not permitted. While this facilitates the supervision of the industry, it also prevents the supply of alternate

Chart 2

Composition of portfolio by sectors (end of 1998)

	Bonds	Shares	Real Estate	Foreign	Other	Total
	%	%	%	%	%	%
Germany	71,0	6,0	13,0	7,0	3,0	100,0
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
U.S.A (a)	28,9	51,9	3,0	10,5	5,7	100,0
Spain	62,4	13,7	0,0	16,7	7,2	100,0
Mexico	100,0	0,0	0,0	0,0	0,0	100,0
Netherlands	47,0	15,0	7,0	29,0	2,0	100,0
Perú	65,8	33,5	0,0	0,0	0,7	100,0
United Kingdom	8,0	54,0	2,0	29,0	7,0	100,0

(a) Average portfolio of the 1,000 largest funds.
Source: Latin America: FIAP (1999). USA: Pensions and Investments (1999). Europe: Mercer .

investment problems, which in general have had better yields than pension fund portfolios although with a higher risk. This possibility, which should be available as the system matures, would permit competition, the structuring of portfolios which are closer to the risk/yield frontier and that would promote interest on the infrastructure assets, particularly at the same time that financial institutions acquire more experience in the financing of infrastructure. This would not mean that supervision is eliminated. Although the specialization of pension investment and administration increases, the industry will continue needing regulations to protect the interests of affiliates. But when the system and financial markets evolve, it will be more obvious that there are important similarities between pension funds and banking and insurance industries, and that they can all operate in the same markets with common regulations.

Composition of the portfolio

By virtue of the above mentioned regulations, the composition of the pension funds portfolio tends to be quite conservative. The most mature system and hence the less conservative, is the Chilean system.

The long trajectory of the Chilean pension funds system illustrates the possible evolution of the funds that as they mature tend towards more risky portfolios, within the very conservative limits established by the regulations. At the beginning, most of the assts were invested in securities essentially free of risks, such as the present case of Mexico. As capital markets developed, the funds started to invest in mortgage bonds and corporate securities, to the extent that in 1994 they represented a proportion similar to public securities. This changed in 1998 when the securities market was affected by the uncertainty associated to the Asiatic crisis and funds were placed in bank deposits with a greater diversification in the international market.

On the other hand, in 1990 pension funds were authorized to invest in foreign securities subject to a very low limit which increased slowly (12% at present). Foreign investments started in 1993, increasing by 38% in 1998 and amounting to $1.785 million dollars. Investment in risk capital and infrastructure funds were authorized in 1993; in 1995 the limit to investments in shares increased to 37% (Vittas, 1996).

Due to its relatively large size, Chilean pension funds have also contributed to the development of the market. They have been decisive in the development of the risk ranking agencies, giving depth to markets, stabilizing prices (because they are long term investors), developing new products to attract them and the possibility of investing in infrastructure funds which is the topic of this report.

As may be seen in the Chilean case, when private pension funds mature and capital markets develop, the range of investments tend to diversify and move away from the concentration in government securities. It is expected that the present very restrictive regulations will become liberalized as systems gain the confidence of regulators and as self regulation develops. Eventually these systems will adopt the "*prudent man rule*" – i.e., without restrictions, only common sense) that governs the pension programs of private corporations or the most advanced systems in Europe, as those of the Netherlands and of the United Kingdom. This tendency needs to be stimulated to include infrastructure as a permitted investment.

Portfolio investments in infrastructure

The only countries of Latin American that at present explicitly permit investments in infrastructure (including totally new projects) are Argentina, Colombia and Chile. The administrators of pensions funds in these countries may participate in infrastructure and public services development programs only indirectly through the purchase of securities issued by funds specialized in investments in infrastructure or securities derived from title assignment operations which diversify the risks involved. Obviously, the systems that permit investments in private securities permit, indirectly, the investment in infrastructure through the purchase of mutual funds or shares and/or bonds of the corporations that own these goods. However, some of these goods probably do not have the ranking required and/or the necessary

Chart 3

Evolution of the investments of Chilean pension funds

Type of assets		Percentage	of the 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 shares	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), 1998 data from the bulletin, FIAP (1999)

liquidity to meet other regulations and therefore, if anyone wishes to make investments to finance projects, it would be necessary to make exceptions. In addition to the above, most of the administrators would have to develop the capacities to carry out the correct analysis of these investments.

In the case of investments in established corporations that have a significant part of their assets in infrastructure, falls within the categories of investments in shares or bonds corporations sold in the stock exchange, which is quite simple and, therefore, we will not discuss here. Out interest is centered on investments in new infrastructure projects ("project finance"). Although no exact figures exist, in the case of Chile the private pension system has invested in several road and airport concessions investing in the capital of the concessionaire. In all events, it was a matter of investments in already existing assets, and not in totally new projects. In the case of Argentina, at the end of 1998 approximately 0.6% and 5.8% of the total pension assets were invested in bonds and shares respectively, of projects or companies related to infrastructure.

Recently created pension funds should emulate the corporate pension funds of the U.S.A., which operate in a well developed financial market. As from the end of 1998, in the principal 2,000 funds of the United States, defined benefit corporate pension funds have an average of 5.1% of their assets in private titles and real estate (these assets are the most similar to infrastructure projects) and 11.8% in foreign titles.[3]

[3] Although private pension funds in Latin America are of a defined contribution, the handling of portfolios is in the hands of independent administrators with one single portfolio and, as such, the resulting portfolio is more comparable with the case of defined benefits of the USA.

Investment needs of private pension funds

The regulations described above determine, in most cases in a very limiting manner, the possible investments of pension funds. If these regulations were less strict, pension funds would probably be invested in other instruments. In particular, it is probable that they would be interested in instruments that:

- Yield higher returns.
- Offer opportunities to reduce risk through diversification.
- Offer protection against inflation.
- Do not increase the volatility of reported yields.
- Do not add risks that cannot be diversified (such as exchange risk).
- Offer short and medium term flow of funds.

Unfortunately, most of the financial markets in countries in the process of development do not have the necessary instruments, even if regulations were more liberal. Therefore, it will be necessary to create instruments as financial markets develop. If duly structured, the infrastructure financial instruments may satisfy some of those needs and, as a result, should be attractive for those pension funds. However, investment in infrastructure is an activity intrinsically risky, both because of its strategic inflexibility (cannot be transferred or used for other purposes) and because of the fact that it offers basic public services subject to political interference (which may be reduced as a consequence of the participation of private pension funds). In this respect it is important to distinguish between investments in well established companies that provide infrastructure services (which must be treated as customary

investments) and investments in new projects which require special considerations in terms of the regulatory environment and the design of the financial instruments.

Private pension funds should invest between 1% and 5% in infrastructure projects financing assets.

Considering the foregoing, we propose that private pension funds invest between 1% and 5% in infrastructure project financing assets. Needless to say, this recommendation is not based on an exhaustive analysis of the characteristics of the relationship risk/yield of investments in infrastructure or the frontier of efficiency of the permitted assets of the pension funds portfolios. It does not incorporate either the risk preference of affiliates (the necessary investigation goes beyond the scope of this report). This is no more than **an empiric rule**, based on the above analysis, in particular when watching the evolution of the Chilean case and the practices of the pension funds administered under the "prudent man rule".

Possible investments of private pension funds in infrastructure

Based on the growth rates expected in the assets of pension funds[4] and **assuming that 3% of these assets are invested in infrastructure**, Chart 4 gives an indication of the availability of resources in some selected countries. The third column shows the investments in infrastructure of the funds if 3% of their total portfolio were invested in infrastructure assets. The fourth column shows the annual availability of resources for investments in infrastructure if 3% of the annual average increase in the amount of the portfolio of the funds were invested in this type of assets.

The investment of pension fund assets in infrastructure, brings about important benefits for the projects in which:

- The risk of change is reduced because the majority of the projects generate income in local currency, but have traditionally depended on foreign currency financing to satisfy long term needs.

- The refinancing risk is reduced because pension funds can offer longer terms than those available at present in local financial markets.

- There would be less interference in the taking of decisions because pension funds tend to be less involved in the daily administration than alternate sources (this must be compensated with an appropriate governability system to make sure that the rights of pension funds are respected).

- The political risk is reduced because the participation of the resources that will be the pensions of local workers may induce adherence and a more rigorous impartiality in the application of the regulations of infrastructure services. Pension funds may be more honest intermediaries because affiliates are affected both by the yield on the projects and by the rates charged for services rendered.

- The cost of capital is reduced potentially because these resources tend to be less expensive, including the adjustment for risks,

[4] Assumes the following growth rates: Argentina and Brazil, 20%; Chile, 12%; Colombia, Mexico and Peru, 30%. These rates are not critical for what we want to demonstrate, but are merely indicative.

Chart 4
Availability of resources for infrastructure in the year 2000

Country	Assets of pension funds for the end of the year (one thousand millon $)	Potential investments in infrastructure projects (portfolio) (millions of $)	Potential investments for the new year in Infrastructure projects (millions of $)
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

than the majority of the alternatives (imported capital or short term local financing).

These benefits are sufficiently important so that infrastructure projects are interested in the resources of pension funds so that they may take the necessary measures to capture them.

Participation of the private sector in infrastructure

The current decade has seen significant changes in the modalities of provision of infrastructure services, simultaneously with the reform of pensions. There has been a very important increase in the participation of the private sector in the supply of infrastructure services. This is the particular case of countries that undertook the reform of pensions and that also liberalized their economies, but it is not limited to these countries. In the case of Latin America, the principal reason for the increase in the participation of the private sector has been the need to modernize and expand the services that the State can no longer finance, and to channel the resources used before to finance the deficits of the public service enterprises to more urgent social needs. This has lead most of the countries to privatize public service enterprises and give transportation services under concession, leaving the financing for rehabilitation and expansion in the hands of the private sector. These needs for investment, as may be seen in Chart 5, are large enough and exceed the current capacities of national financial and capital markets, both as regards volume and as regards terms. This makes it necessary for the private sector to resort to international sources to finance the investments that generate profits mainly in local currencies, thus creating an exchange unbalance.

Chart 5
Investments in infrastructure projects with private participation, 1990-1997
Latin America and the Caribbean (millions de $)

Year	Electricity	Water	Gas	Telecom	Transportation	Total
1990	645,70	-	-	4.443,30	5.311,00	39.754,00
1991	-	75,00	-	9.213,80	395,50	534.2130
1992	2.130,06	-	2.930,00	11.112,00	2667.50	2731.042
1993	2.925,74	4.153,00	142,80	5.804,40	835.80	3256.882
1994	3.019,57	434,00	1.342,90	9.109,90	1.517,10	2689.987
1995	5.380,48	1.178,80	796,50	6.910,30	1.600,70	3084.068
1996	9.012,51	153,90	915.80	9.710,40	2.785.40	3386.507
1997	20.514,80	1.625,20	2.490,88	11.273,40	3.658,50	2314.56
	43.628,86	7.619,90	8.618,88	417.574	18.771,80	840.21

Source: World Bank (1999).

Needs for financing

It has been estimated that for each 1% of growth in the GDP, the investment in the traditional infrastructure sectors (telecommunications, energy, transportation, water and sewerage) should grow by 1% of the GDP (World Development Report, 1995). A reasonable goal for the governments would be to make sure that the GDP can maintain a long term annual growth rate of 5%. Due to the size of the economies in Latin America, this would require investments in infrastructure of 70 thousand million dollars (in dollars of the year 2000) per year. It is estimated that the telecommunications sector would require around 25 thousand million dollars per year; energy, 28 thousand million dollars; transportation, 10 thousand million dollars; and water, 7 thousand million dollars. The telecommunications sector may be considered as a relatively safe sector, well developed, and that should be a part of the regular investment portfolio of the pension funds in shares and bonds quoted in the stock exchange. Therefore, it should be excluded from the special assignment of "project finance" that we are suggesting. A portion of the energetic sector that includes well established public service enterprises could also be regarded in this light, in countries with more developed reforms. However, since this continues to be a small segment within the global market of Latin America (although it represents a large part in Chile and Argentina) we will assume that the energetic sector needs risk capital and that it includes the estimates of our proposal. As a result, the annual total of the needs that could be potentially covered by the high risk portion of pension funds, could amount to almost 50 thousand million dollars in the year 2000. These great needs will continue to be taken care of mostly by the public sector and it is estimated that private sources cover only 15% (World Bank, 1997a).

Chart 6 shows the percentage of the private investment that could be covered by the pension funds, assuming that the private sector finances approximately 15% of the annual needs for infrastructure in those countries (15% of 5% of the growth of the GDP) and that the pension funds invest 3% of the growth of their portfolio.[5] Obviously, each country would be different and the figures presented only pretend to give orders of magnitudes to determine the total viability of the participation of pension funds. The figures are more valid in the aggregate than individually by countries.

Although the possible contribution on the part of pension funds seems to be small in comparison to the needs, it represents an important contribution to financing, particularly in terms of the scarce financing available in local currency. When these figures are considered within the context of the financing package of any project, even excluding the special case of Chile, they represent a great contribution on the part of one single source of financing and would surely be the largest source of local financing.

What do investments offer in infrastructure?

On the basis of the above analysis, it should be clear that private infrastructure can and must take advantage of the pension funds assets. However, this can only happen if these investments bring certain value to pension funds. In fact, investments in infrastructure have some valuable characteristics:

[5] If we exclude from these estimates the telecommunications sector, under the assumption that it represents traditional investments, then the figures of the last column could, as an approximate estimate, be multiplied by 1.5 because telecommunications represent almost 30% of the estimated needs for financing.

Chart 6
Potential coverage of the needs for infrastructure in the yer 2000

Country	Private financing of annual needs (15%)	New investments in infrastructure projects per year (millions of US$) Chart 4	Percentage of satisfied needs of the year
Argentina	1.900	120	6,3
Brasil	4.200	780	18,6
Chile	435	180	41,4
Colombia	525	30	5,7
Mexico	2.700	180	6,7
Perú	435	30	6,9

- They tend to give a higher yield than that obtained by pension funds portfolios.

- Although infrastructure projects involve a higher risk, they offer benefits of diversification because their gains are not perfectly correlated with the existing pension fund portfolios. For investors averse to risks, investments in infrastructure may move the global yield towards a more desirable combination of risk/yield.

- These investments could increment the volatility of the yield reported, but since their proportion in the portfolio would be very small, the impact should be insignificant.

- These investments contribute to the global economic growth, including the creation of new jobs, thus generating even more resources for pension funds and benefiting contributors.

However, these investments also have certain undesirable characteristics that must be overcome before they are covered by pension funds:

- The high yield is materialized in the long term. Although pension funds can wait for the yield because their commitments are in the long term, present regulations lead us to prefer constant and short term returns.

- These investments may not adhere to some of the regulations described above, particularly with respect to ranking, evaluation and liquidity.

- These investments carry a non diversifiable risk; this is the possibility of loss of affiliates to the fund as a consequence of the fact that they receive information regarding the failure of anyone of these investments. This situation reflects a classic agency problem, that is, a situation in which the interests of the affiliate and of the administrator are not coincident. In fact, this type of investments may benefit the affiliate in the long term by offering him a better equilibrium between profitability and risk, but may harm in the short term the administrator of the fund to the extent that the latter loses affiliates as a consequence of the failure of one of these investments.

By this time, the reader may have already thought of manners in which to overcome these obstacles, which we will discuss in the next chapter.

COMPATIBILITY BETWEEN INVESTMENTS IN INFRASTRUCTURE AND THE PENSION FUNDS PORTFOLIOS

At the end of the two previous sections we analyzed the needs for investment of private pension funds. From the above discussion it would seem that the incompatibilities are greater than synergies. However, it is important to emphasize that these incompatibilities are more the consequence of a lack of appropriate instruments and regulations than of fundamental questions. In the following paragraphs, we will analyze the ideal regulatory environment to promote investments and we will make certain policy recommendations. We will also discuss the design of the financial instruments necessary to take advantage of that source of resources.

Chnages in the regulatory environment

On the basis of the above discussion on regulations on pension funds and the characteristics of the investment in infrastructure, it is not surprising that there has been such limited participation. Regulations on ranking, liquidity, change of administrator, minimum yield, a portfolio per affiliate, a portfolio per administrator, monopoly on the part of the administrators of pension funds and the evaluation rules, make these investments practically impossible. The ideal regulatory frame would use the "prudent man rule" in which decisions on investments are taken by the administrators who exert their fiduciary responsibility, as is the case of corporate pension funds in the United States and the pension funds in the Netherlands and the United Kingdom. However, the government of each country continues to have a financial interest because, in many cases, they guarantee the minimum pension. It should be pointed out that in the case of countries in the process of development this liberalization must be accompanied by the corresponding strengthening of supervisory entities. Therefore, regulations should permit the affiliates to have several portfolios: one of them regulated appropriately for the minimum pension and several portfolios for complementary pensions that are basically not regulated and that operate under the "prudent man rule". Minimum pension portfolios would be regulated under the current norms and gradually liberalized as the system matures.

This ideal regulatory frame cannot be achieved in a short term, but must be the point of reference to be attained as pension funds and financial markets mature. In the meanwhile, regulations can be progressively liberalized and go from regulations permitted investments to regulations on the total risk of the portfolio. The performance of complementary pension portfolios would be determined on the basis of measures of yield adjusted to the risk. Each administrator should be authorized to handle several portfolios with different risk/yield characteristics (the number of portfolios being compatible with the development of the local capital market). Each portfolio would announce the tolerated risk level and its yield after expenses objective. Its performance under its yield norm adjusted by the risk (for example, 20% under the yield of the norm) should be covered with the reserves or with the capital of the administrator. It would still be possible to change administrators, but this would be less problematic because the comparison is relative to the yield after expenses objective and not to the other portfolios (which are not comparable, unless they involve the same risk and the same expenses). It would be ideal that all financial institutions could handle pension funds and that they would all be under a consolidated regulating organization (bank, securities, insurance, pensions).

The regulations on rankings, liquidity and evaluations should be met through an adequate design of infrastructure financial instruments. However, it would be very helpful if these regulations were more flexible, although not eliminated, for a small amount of assets, let us say 5%. For example, the evaluation and ranking norms could be substituted by independent periodical evaluations of the value of those investments.

The ideal regulatory frame:

- ***Prudent man rule for complementary pensions.***
- ***Progressive liberalization for minimum pensions.***

Design of financial instruments

Taking as a basis the above analysis, it is clear that if these instruments are to be interesting for pension funds, without becoming forced, they should be, to the extent possible:

- More liquid.
- Less risky (lesser probability of failure)
- Less volatile

These instruments may have a **direct** or **indirect** right over cash flows. In the case of **direct** right, the instruments may be securities (the need to be negotiable is a *sine qua non* condition) as for example bonds issued for projects, title assignment of specific funds flows or actions of investment vehicles. In any event, in order to meet these conditions, investments should have the right to special incentives. For example, they could have priority over income, be based on projects with a background (already in an operative phase) or have any type of incentives or guaranties through the participation of the government,. Multilateral agencies and/or political risk insurance or insurance on credit. The conditions mentioned can be improved even further if the securities are based on **indirect** rights on the funds flows through some form of aggregate investment or funds with specialized units of investment. This would permit investing in titles of several projects, in several sectors and even in several countries. The resulting securities would constitute a well diversified portfolio and, as such, would be more liquid, less risky, less volatile and could even be ranked. In all cases, subjacent projects must be well structured and supported by solid investors. Although this would be the ideal – not too probable in practice – it is the point of reference that those who search to accede to the financing of pension funds should try to achieve.

In the United States and other developed capital markets, the administrator of private pension funds has innumerable options to invest resources and to shape the desired profile of yield and risk. In the case of countries with less developed markets, the options are quite limited, sometimes restricted to securities issued by the government and by the negotiable deposit certificates or liquid deposits of financial institutions. In the case most Latin American countries it is paradoxical. The private pension funds industry generates national resources that can be long term invested, and needs to improve profitability and minimize risk. Unfortunately, there are not well developed capital markets capable of offering the necessary instruments, whether because they are underdeveloped or, as in the case of Chile, are of small size in comparison with the size of the funds. On the other hand, there are enormous unsatisfied needs for long term legitimate national investments waiting to exploit those resources. There is an actual gap between the potential of the funds, the needs of the infrastructure and the development of the capital markets that must be closed by means of the development of instruments, regulations and appropriate institutions.

Investment of pension funds in infrastructure goods

As discussed, changes in the regulations of pension funds are required, although this would not be sufficient. Also, a change is required in the design of instruments to finance infrastructure. If these regulatory changes were to occur, this would take time. In the meanwhile, for the pension funds to be capable of investing in the financing of infrastructure goods projects, the instruments would have to be adapted to existing regulations and the proposal indicated in the following square requires minimum changes in the regulations and in some countries it does not even require a change. The ideal instrument proposed is the most conservative that can be designed (only one guaranteed by AAA qualified institutions or by the governments would be more conservative). It should have ample liquidity, scarce risk (obviously with the corresponding lower yield) and would be duly valued. Even though the proposed instrument should capture funds for infrastructure, pension funds can attain a better risk/yield relationship with more direct investments. As regulations become more flexible, instruments would not have to be as complex as hinted in the recommendation and certain funds could acquire simpler instruments, including direct investments or the purchase of negotiable debt instruments of specific projects. What is most probable is that the application of the prudent man rule does not imply a dramatic change in the portfolios of pension funds, as can be noted in the composition of the portfolio of the countries that use this norm. Administrators would probably continue to insist on the liquidity, ranking and evaluation norms, but would be quite possibly, more willing to "exempt" one portion of their portfolio from these self imposed norms and to permit the investment in liquid assets, not ranked and evaluated subjectively. This would favor direct investment in infrastructure which, although relatively more risky (with a diversifiable risk) would have a better yield.

The ideal financial instrument:
Securities of an investment fund that are invested in many carefully selected projects with some risk mitigation mechanism (for example, participation of a multilateral organization, credit guaranties, political risk insurance) in several sectors (strong in energy, light in water, with a mixture of transportation sub-sectors), covering several countries, mostly in projects in an operative phase, whose shares are quoted in a stock exchange, preferably in a developed market.

Chart 7
Indicators of the depth of the capital market

	Capitalization of the market in 1996	Domestic credit (a)	Rotation in 1996 (%)	Magnitude of funds in 1998
Argentina	18	26	50	3,4
Brazil	32	37	86	9,4
Chile	93	60	10	42,7
Colombia	25	46	10	2,4
U.S.A.	105	138	93	51,7
Peru	27	12	26	1,5

Figures as percentage of the GDP, except rotation which is a percentage of capitalization.
Sources: IMF, Financial Statistics, march 1999, World Bank, World Development Indicators, 1998.
(a) Furnished by the banking sector in 1996.

IMPLICATIONS FOR OTHER COUNTRIES AND OTHER INVESTMENTS

Although the focus of this study has been mainly towards Latin America, the conclusions have implications for all countries, taking always into consideration the differences in the development of capital markets. This is so because the reforms of pension funds in many countries in the process of development are following the Chilean model (with the necessary variations). In addition to the above, many developed countries (especially in Europe) are under pressure to reduce their fiscal deficits and, to do so, are considering the private supply of infrastructure services. Since these countries already have corporate or private pension funds, the implications of our discussion can also be valid for them. Obviously, since the discussion refers to a relationship between private sector and private sector, the discussion is applicable if both the infrastructure and the pension funds are in the hands of the private sector. The discussion may also be applied in the case of other investments of the private sector, different from the infrastructure, that share some of the problems of lack of flexibility and of size, as would be the case of housing.

In the United States a proposal appeared at the start of the nineties to use the enormous resources of corporate private funds to finance public infrastructure (see Transportation Department of the United States, 1993). In this case, the proposal was to use the resources under private administration to finance public sector works. The proposal included the creation of a public financial institution that would issue securities insured by a separate insurance company and with the implicit guarantee of the government of the United States with fiscal deductions for buyers. These titles had to be purchased by institutional investors, including private pension funds. The funds would be used to finance the public infrastructure, levering the capital contribution by the federal government to the financial institution. Although the idea was very well structured, the private sector did not show a great enthusiasm because it seemed like a form of forced investment in public goods. The problem was that although the institution could have been administered with criteria of the private sector, the activities financed were public works without generation of income and the yield offered by the securities could well be obtained from other instruments available in the market. Pension funds, tax exempt, were more interested in liable titles (for a complete analysis of the proposal, see National Accounting Office of the United States, 1995). Since corporate pension funds in the United States have few investment restrictions, the problem of insufficient financing in infrastructure could be solved by privatizing part of the infrastructure and issuing titles as those proposed in this report.

Final comments

If the regulations on private pension funds were made flexible to permit investments in projects of the private infrastructure and, in turn, these projects would adapt their financial instruments to the needs of those pension funds, both parties could harvest very important tangible and intangible benefits. Private pension funds would benefit from the opportunity to improve the combination of risk and yield offered to the affiliates, expecting to improve the value of their savings and their pensions. Private investments in infrastructure would benefit from the possibility of using long term resources in local currency and reducing financial costs. In the process, there is the opportunity of promoting the development of the country in areas that can have a multiplying effect in terms of competitiveness and quality of life.

To achieve this relationship, the regulations on pension funds must be structured so that the purpose of safeguarding the value of pensions

will not hinder the investment in viable and productive infrastructure projects. On the other hand, the infrastructure needs to adapt the instruments to satisfy the needs of pension funds. The discussion presented in this study shows how this can be attained to the benefit of all parties. This relationship offers positive results to both parties.

References

Bustamante J. 1997. *Quince años después: Una mirada al sistema privado de pensiones,* Santiago, Chile.

Financial Times. 1998. Pension Fund Investment, Financial Times Survey. *Financial Times.* May 14.

International Federation of Pension Funds Administrators. Semiannual bulletins for the years 1996, 1997 and 1998, Santiago, Chile.

International Monetary Fund. 1999. *International Financial Statistics.* March. Washington, D.C.: International Monetary Fund.

Kilby, P., 1997. The Rising Tide of Local Capital Markets. *Latin Finance.* No. 92, October.

Latin Trade. Growing Older: Latin America's Pension Funds Come of Age. *Latin Trade,* December.

Mercer European Pension Fund Managers Guide. 1998. *Investment and Pensions Europe.* W. H. Mercer Companies, Inc., March.

Pension and Investments. 1999. The International Newspaper of Money Management. Crain communications Inc., January 25.

Public works Ministry, Finance Ministry. 1997. *Bonos de infraestructura.* Santiago, Chile

Queisser, M., 1998. *The Second-Generation Pension Reform in Latin America.* Paris: Organization for Cooperation and Economic Development, Paris, France.

Riesen H., 1997. Liberalizing Foreign Investments by Pension Funds: Positive and Normative Aspects. Technical document No. 120, January. Paris: Organization for Cooperation and Economic Development. Paris, France.

Shah, H., 1998. Toward Better Regulation of Private Pension Funds. Work paper No. 1791, March. Washington, D.C: World Bank

U.S. Department of Transportation. 1993. Financing the future, Report of the Commission to Promote Investment in Infrastructure, February. Washington, D.C.: U.S. Department of Transportation.

U.S. General Accounting Office. 1995. Private Pension Plans: Efforts to Encourage Infrastructure Investment. September. Washington, D.C.: U.S. General Accounting Office.

Vittas, D., 1996, Pension Funds and Capital Markets, Public Policy for the Private Sector, Note No. 71, February. Washington, D.C.: World Bank.

Vittas, D., 1998. Regulatory Controversies of Pension Funds, Policy Research. Work paper No. 18903, March. Washington, D.C.: World Bank.

World Bank, 1994. *Infrastructure for Development, World Development Report 1994.* Washington, D.C.: World Bank.

World Bank. 1994. Facilitating Private Involvement in Infrastructure: An Action Program. Washington, D.C.: World Bank.

World Bank. 1997. Mobilizing Domestic Capital Markets for Infrastructure Financing, World Bank. Article for discussion No. 377. Washington; D.C.: World Bank.

World Bank. 1998. *World Development Indicators.* Washington, D.C.: World Bank.

World Bank. 1999. Private Sector Development Department, Private Participation in Infrastructure. Data Base. Washington, D.C.: World Bank, April.

Appendix I

Characteristics of private pension funds in Latin America

	Chile	Peru	Colombia	Argentina	Mexico	Bolivia	Brazil
Start of operations	1981	1993	1994	1994	1997	1997	1977
Public distribution system	closed	continues	continues	continues	closed	closed	continues
Private system							
Affiliation of new workers	mandatory	voluntary	voluntary	voluntary	mandatory	mandatory	corporate
Fund administration companies (a)	AFP	AFP	AFP	AFJP	AFORES	AFP	EFPP
Rate of contribution for savings (% of salary)	10	8 (d)	10	7.5	6,5 + subsidy	10	variable
Commissions + insurance (% del salario)	2,94	3,72	3,49	3,45	4.42	3,00	variable
Collection of contributions	descentralized	descentralized	descentralized	centralized	descentralized	descentralized	corporate
Past contributions (b)	BR	BR	BR	PC	life-time switch	PC	N/A
Disability/survivors insurance	Private	Private	Private	private	public	private	N/A
Supervision	specialized	specialized	integrated	specialized	specialized	integrated	integrated
Tansfer of accounts(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	not regulated	relative	relative	no	no (e)	N/A
Minimum pension	Yes	No	Yes	Yes	Yes	No	N/A

Notes:
FP = Pension funds Administrators; AFJP = Retirement and pension funds administrator; AFORE = retirement savings funds administrators; EFPP = Private providence dated entities.
BR = Recognition bonus; PC = Compensatory pension;
Due to administrative delays the transfer can be more limited.
The contribution rate will increase gradually to 10%.
Funds administration companies must have guaranties.
Source: Queisser (1998) and own data.

Appendix II

Comparison of investment regulations

(Percentages are on the total of assets of pension funds)

	Securities issued or guaranteed by the government and/or Central Bank	Debt obligations (non governmental)	Shares	Mutual funds	Foreign investment	Other
Germany			Maximum 30%		Maximum 20%	Real Estate Maximum 25%;
	• Shares: European Union, including Germany: maximum 30%; Non European Union shares: maximum 6%					
Argentina	Maximum 65%	Maximum 100%	Maximum 35%	Maximum 14%	Maximum 17%	Maximum 2%
	• In any event no higher than 7% of the securities issued or guaranteed by the same entity. • Maximum 1% of the fund in a mutual fund and/or 10% of the capital of the mutual fund. If the mutual fund invests in the real estate sector, Maximum 5% of the capital of the fund for each real estate mutual fund or 20% of the issue.					
Brazil	Maximum 100%	Maximum 80%	Maximum 50%	Maximum 15%	-	Maximum 35%
	• Maximum 5% of the funds in the capital of a company or Maximum 20% of its capital. • Maximum 10% of the funds in a company and/or group and Maximum 20% of the fund in a financial institution and/or group					
Chile	Maximum 50%	Maximum 100%	Maximum 37%	Maximum 15%	Maximum 16%	Maximum 10%
	• Maximum 7% of the funds of an entity or Maximum 15% of the funds in a group. • Maximum 5% per diversification factor in mutual funds investing in real estate, development of enterprises and assignment of titles; and/or 20% of its capital.. • Maximum 3% in debt of new companies (may include public infrastructure by private companies); and/or 20% of the issue. • Maximum 5% in real estate companies (may include investments in public concession projects); and/or 20% of the capital of the company. • Maximum 1% of the fund by foreign investment fund.					
Colombia	Maximum 50%	Maximum 100%	Maximum 30%	-	Maximum 10%	-
	• Maximum 5% of the fund per issuer, including the group. If the issuer is supervised by the banking superintendence, the limit is 10%. • Maximum 10% of the capital of a company and Maximum 20% of an issue, including assignment of titles, except government or central bank securities.					
Spain	• Minimum 90% investment in registered securities, real estate or bank deposits; bank deposits: Maximum 15%. • Maximum 5% (maximum 10%) in securities issued or guaranteed by an entity (group). This limit does not apply to foreign properties/international organizations.					
U.S.A.	• Prudent man rule..					
Mexico	Maximum 100%	Maximum 35%	-	-	-	-
	(a) Maximum 10% issued or guaranteed by an entity, and Maximum 15% by a group. (b) Maximum 15% per series or same issue.					
Nether-lands	• Prudent man rule • Self investment: Maximum 5%					
Peru	Maximum 40%	Maximum 100%	Maximum 35%	Maximum 15%	Maximum 10%	Maximum 10%
	• In all instances not higher than 15% in a company or 25% in an economic group. • Shares: European Union, including Germany: Maximum 30%; Non European Union shares: Maximum 6%					
United Kingdom	• Prudent man rule.					

Source: Web pages of pension funds administrators associations, laws and regulations.

repercussion of local and global aspects. It may even be pointed out that projects developed as final products of several academic activities, whether at-a-distance or semi attendance, have been incorporated with the pertinent adaptations, as a reference of application of knowledge in the didactic material of the following version of the course. Without being limited to a technical outline of the final project, the courses insist in *learning how to be and learning how to live together*, which are demonstrated in the efficient and responsible exercise which is the obligation of the participant as social security official.

It should be mentioned, finally, that if in the consolidation of a net for learning with the demands mentioned, the advantageous use of technological resources is very useful, the true overcoming of frontiers which is required with the internationalization of knowledge, is fulfilled in the measure that reconstructions and applications are incorporated which, from the local ambits, contribute to the circulation of information, the sense of which is found only in the possibility of joining together a know-how that will permit facing the reality in all its dimensions. In this scenery, the perspective of at-a-distance education is promising because it is focused, not to the gathering of persons to transmit knowledge, but to propitiate that by giving sense to the transmission of knowledge, the gathering of persons and institutions is motivated.

Bibliographic references

Castells Manuel, (1999), *La era de la información. Economía, sociedad y cultura.* Volume 1*: The net society,* Mexico, Siglo XXI Editors.

Delors Jacques, (1997), *La educación encierra un tesoro,* México, UNESCO.

Duch Lluis (1997) *La Educación y la crisis de la modernidad,* Barcelona, Paidós.

Evans Terry and King Bruce, *Beyond the Text: Contemporary Writing on Distance Education.,* Deakin University Press, 1991.

Fainholc Beatriz (1999) *La interactividad en la educación a distancia.* Buenos Aires, Paidós.

MartínezVillalba Luis José (1999), *Perspectiva y tarea del CIESS en la formación de recursos humanos para la seguridad social,* document presented at the V Technical Meeting of the American Comisión for Organization and Administrative Systems, Arlington Texas.

Raggat Peter (ed.), *The Learning society. Challenges and Trends,* London, Routledge, 1996.

Sfez Lucien (1999) "*Internet y los embajadores de la comunicación*" in Le Monde Diplomatique, México, March, pages 18-19.

Tiffin John and Rajasingham Lalita (1997) *En busca de la clase virtual. La educación en la sociedad de la información* Barcelona, Paidós.