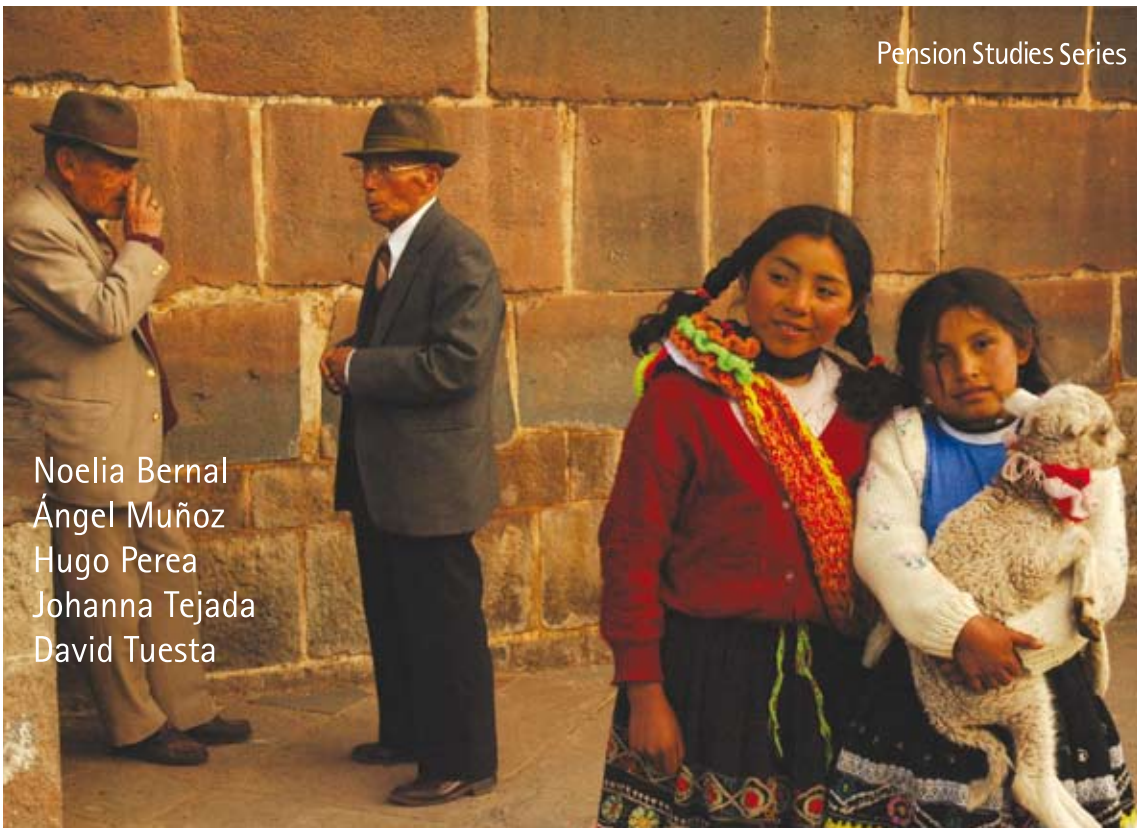
BBVA

A look at the Peruvian Pension System

Diagnosis and Proposals



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Printed at Gráfica Biblos S.A.
Calle Tizón y Bueno 639, Jesús María, Lima 11, Perú
Printed in Peru
May, 2008

Translated by: Language Workout, Gimnasio de Idiomas
Tamaulipas 150, Torre A, Piso 1
Col. Condesa, P.C. 06140
Mexico City, Mexico
May, 2008
www.lwgym.com

Photography: Luis Figueroa
Diagrams and set up: VJB diseño | Erica De Souza-Peixoto

C.C. 28000287
ISBN 978-9972-09046-2
Publishing Project: 11501310700487
Legal deposit made at the National Library of Peru: 2007-11538

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Contents

Graph Index

Chapter 3

Chapter 4

Tables

Boxes

Acknowledgments

Writing a book is not a process that relies exclusively on the authors, but also on the invaluable support of a group of people and institutions. Without this support none of what was originally planned could have been done. Even though this list can be pretty extensive we would like to use some lines to extend our gratitude to those people we consider key to the project.

Firstly, we would like to thank the support of Agustín Vidal-Aragón who has been, to a great extent, the promoter of the philosophy and the objectives of the academic projects that BBVA Group has been developing on previsional topics, as well as of the need to make proposals in which the public and private sectors can work together. This book completely sticks to that vision. Along the same line, we want to thank José Luis Escrivá from the Research Department, who has been very supportive, offering comments and giving relevant conceptual contributions for the development of the project, and facilitating and integrating the support of the different areas of BBVA group into this project. For the last stage of the book, the support of Vicente Rodero, from the Group Direction for South America, as well as Eduardo Fuentes, from the Direction of Insurance and Pensions America, has been appreciated.

We also want to acknowledge the support of Eduardo Torres-Llosa,

José María Aragone, Jaime Sáenz de Tejada and Javier Marín, who, at all times, were deeply committed to the development of the study, giving us all the support in order to make progress in Lima.

Other BBVA members also contributed in a very important manner during different stages of the project. Especially, we want to highlight the valuable collaboration of Angel Melguizo who was a very active member of the work team at the start. Additionally, the knowledge of David Taguas in previsional topics and his vision regarding the functioning of the systems were extremely helpful. Finally, the support given by Giovanni Di Placido, Javier Santiso, Enrique Summers, Patricio Urrutia and Joaquín Vial, in organizational matters, contacts and contribution with ideas has been fundamental.

During the development of this project, which started in mid-2005, we held meetings with several public institutions that, kindly, sent us their very relevant comments. Along this line, we want to thank the time given by officials of the Economy and Finance Ministry (MEF), the Superintendent's Office for Banking, Insurance and PFA (SBS) and the Previsional Normalization Office (ONP), with whom several different aspects were discussed regarding social protection systems. We would especially like to thank the PNO for the invaluable statistic information that was achieved.

Towards the end of August 2007, the final conclusions of the study were presented before the Technical Commission in charge of submitting the corresponding improvements to the National Pension System and the Private Pension System (set up by officials working for the above-mentioned public institutions). We hope that this academic project contributes to this transcendental task. Despite the support received, the authors make it clear that any mistake or omission is their entire responsibility.

Executive Summary

The current document contains a description of the main characteristics and the current situation of the Peruvian previsional system, so that afterwards, given this first estimate, we can perform projections and analysis of the main results the system will show to the year 2050, if current conditions prevail. These results are evaluated considering the fact that two fundamental objectives of a previsional system are: to assure that most of the population have a pension plan (coverage) and to try to make sure that their benefits are enough to cover the needs of that population during their old age (sufficiency).

In Peru, after the pensions' reform that took place in 1992, the previsional system is integrated by two regimes that work in parallel. On the one hand, the National Pensions System (NPS), managed by the State, operates under a Pay-as-you-Go (PAYGO) financial regime and, on the other, the Private Pension System (PPS), managed in the private sector by specialized institutions, operates under a financial regime of individual capitalization, in which each affiliate makes a direct contribution to a personal and intangible account until he or she retires.

NPS is in deficit and therefore increasing Public Treasury transfers have been necessary over the last few years to make up for the

difference. On the other hand, the current PPS situation presents aspects that could improve. Indicators show that, currently, the coverage of the PPS labor force is at slightly less than 30%, one of the lowest levels in Latin America, even when compared with younger systems. At the same time, analyzed data shows there is an important group of workers that does not have a high contribution pattern and this would be reflected on a contribution index (contributors/affiliates) with a decreasing trend, currently, which suggests that some of the affiliates are not generating enough resources to finance adequate pensions during old age.

The analysis of current pension system situation (public and private) ends up being insufficient in order to determine whether it is necessary to perform adjustments so that its performance reflects adequately the goals it pursues. In reality, it is necessary to verify where the previsional system is heading over the next few years, if current conditions prevail. For this purpose, an actuarial model for the pension system has been made. This model has been used to perform projections of its main indicators. Additionally, an economic growth model has been developed that allows us to establish long-term GDP per capita and labor productivity levels (and, therefore, real salaries).

The passive projection for the previsional system, in which the conditions under which it currently operates are maintained, shows a relative improvement of its main indicators. Nevertheless, advances are insufficient to guarantee an adequate protection during old age. Thus, we find the coverage level is kept even under what would be desirable and the purchasing power of the pensions generated by low-income workers would be small. Additionally, even when fiscal transfers to NPS will be reduced, the operational deficit of the system will not be closed during the projection horizon, despite parametric reforms that have been implemented since last decade. Eventually, NPS´s situation could become more complex as a result of demographic and political risks.

Bearing in mind these results, the document establishes the following proposals:

a. Proposals to extend coverage

- S/.1 and S/.2 Pension Plans. These are contribution and benefit predefined schemes for low-income workers who are currently outside the system. With these proposals there will be a guarantee of a percentage of the minimal pension based on the years of contribution to an individual capitalization account. In order to guarantee these levels and promote contributions, the self-financed pension would be complemented with a bond.
- Obligatory affiliation for independent formal workers.

b. Proposals to improve the level and allow access to pensions

- Extension of minimal pension on the PPS. It is proposed to extend the guarantee of the minimal pension for all PPS affiliate since nowadays this benefit is only applicable to part of the population, senior aged affiliates (in transition) and those who were affiliated before 1995, leaving relatively younger affiliates out of PPS. Therefore, the idea of extending this guarantee is set forth, especially for those younger workers with medium and lower incomes, since part of them will receive lower pensions that will need to be improved. The financing for this proposal would be done through a complementary bond.
- Access to a percentage of the minimal pension after 15 years of contributions. It is proposed to adapt access requirements to the minimal pension according to the Peruvian labor reality. With this we propose that pensions system affiliates (public and private) who have been contributing for at least 15 years have the right to the guarantee of a percentage of the minimal pension, based on the contributed time. This proposal implies being flexible with current requisite of 20 years, and it also covers lower-income affiliates and is designed based on the

years of contributions. With this, the action would be focused, it would help achieve a better income distribution among senior citizens and it would not discourage contributions significantly. Also, financing would be done through a complementary bond.

c. Proposal to focalize subsidies given by the NPS without affecting their financial sustainability

- Acceleration in the reduction of replacement rates. According to regulations, NPS pensions currently receive a replacement base rate of 50% of the average salary, but with time it will adjust gradually at a rate of five percentage points until it reaches 30% in the year 2038. Within this context, we propose to accelerate the adjustment process at a rate of three percentage points each year. With this it would reach a level of 30% by 2014. This would happen long before what we would achieve with the current scheme. In this way, this action keeps the gradual essence, adjusts pensions to a more coherent level with contributions made and would help to reduce pension expenses.

We estimate that the joint application of these steps would have the following impacts:

a. Coverage: a meaningfully reduction on the percentage of the population outside the pensions system is reached. Thus, the percentage of the population without coverage for old age goes from 77% for the five-year period 2005-2010 to only 39% for the year 2050. Additionally, labor force without coverage goes from 67% of the population between 14 and 64 years of age in 2010 to 33% in the year 2050.

b. Pensions: average pensions will improve more than in the passive scenario, and this improvement is significantly higher for

lower-income workers. Pensions for the affiliates with an income lower than S/.800 would grow, as compared to a passive scenario, on average in 98%.

c. Previsional deficit: Despite the fact that the implementation of these actions would increase previsional cost by 9.8 percentage points of the GDP at present value, the average annual impact would only be between 0,4% and 0,5% of the GDP. We point out the fact that these transfers would start at the five-year period 2020-2025 after the State finishes covering its pension-related obligations from Recognition Bond and DL N° 20530 regime.

The application of these actions will contribute to improve the coverage and the level of pensions. On the one hand, these actions are intended to promote the participation of groups of workers that today are outside the system, by presenting them plans according to theirs income level. On the other hand, proposals also intend to improve the situation of those who already participate in the system, especially lower-income workers, since—for several different reasons— they need requisites according to their labor reality as well as alternatives that could help them improve their pensions. Likewise, and considering that any social protection system must be sustainable in time in order to reach said objectives, the study also evaluates the fiscal impact of these actions in order to define them in such a way that will not generate meaningful fiscal pressures and are therefore be feasible and sustainable.

The challenges that the previsional system faces are still important. Despite the fact that the limitations that have been mentioned manifest more clearly in the medium run it is necessary to take actions now in order to achieve an adequate protection for the population about to retire, especially for those groups who during their active life generate lower income levels. Putting off the improvements that are required for the system may end up being more costly for society, and will lead to a higher transfer of the cost towards future generations.

Introduction

An approximation to pensions systems

Around the beginning of the 20th century, modern states start taking up a bigger responsibility in aspects regarding to Social Security. One of these issues, pensions, led to the design of different structures to take care of this problematic. Thus, different contribution schemes were established in order to work as pensions. This made individuals aware of the need to make a special effort throughout their working lives in order to finance their retirement. From a social standpoint, it was clear that the State could not remain neutral in front of the eventuality of a society segment lacking protection in the last stage of life and, indirectly, also affecting the well-being of younger generations, because they would end up having a higher financial responsibility.

The first schemes, called PAYGO systems, are characterized because their operation is based on the contribution of active workers that finance the pensions of those who retire. As years went by, previsional systems of this type started going through financial difficulties since they did not take into account basic technical considerations for adequate operation such as socio-demographics, the changes in labor markets and a correct balance between contributions and benefits. Some nations started

performing the necessary amendments, increasing the contribution rates and contribution periods as well as reducing the benefits. However, in the countries where governments did not find political consensus to make the required adjustments, the problems became more severe and ended up in fiscal crisis. Several Latin American countries faced this situation, and therefore, since the 80s they started making substantial reforms to the systems.

Pension reforms and the Peruvian case

By 1992, the Peruvian pension system, which used to work under PAYGO scheme administered by a state entity called the Peruvian Institute for Social Security-IPSS, was going through an unbalanced financial situation because the contributions of active workers were not enough to cover pensions. Moreover, actuarial projections showed that IPSS deficit trend was growing, which implied that public finances would bear higher pressures in the future. Thus, within the context of structural reforms implemented by the beginning of the 90s, the previsional alternative scheme was launched. This scheme is parallel and alternative to the PAYGO and it is based on contributions to individual accounts of capitalization and managed by private entities. With this scheme, the level of pensions was linked with contributions made by workers during their active life. Moreover, because it is a private system, previsional obligations that the State would have eventually to take over were reduced. This allowed some space to improve pension sustainability in the medium term.

After 16 years of operations in Peru, there is a scheme where a private system and a national pension system coexist and where we can point out important advances. For example, the creation of a private scheme has been the clearest structural improvement of the pension system, giving it a self-sustained profile and long-term stability. Additionally, the individual savings component allows for benefits in macroeconomic terms since it promoted the generation of savings, the development of capital markets

and investment growth. Additionally, the national system has succeeded in reducing its previsional deficit through important parametric reforms that, even though they have implied a long process given the political context, are a significant achievement. Along this line, a transcendental landmark is given by the closing of the pension regime of the law decree N° 20530 in 2004. This reform was necessary and took place through a constitutional modification that allowed reduction, in the short and long-term, the heavy fiscal burden of inequities that used to characterize this regime.

Despite these advances and the benefits of the current parallel system, it is evident that altogether it does not offer the adequate coverage levels required by the population and it lags behind as compared to various Latin American countries and others with similar per capita income levels. Thus, the joint data of the public and private systems point out that they only cover 26% of the labor force. Likewise, we can observe that not all population groups can have adequate pension levels. This situation could be an answer to the absence of adequate incentives or the obligation for independently-employed workers to make contributions to the system or because the labor market characteristics limit the possibility to generate a sustained flow of income, may that be for the kind of job or simply because the person is currently unemployed.

Objectives and the structure of the book

Bearing the above said into account, the purpose of this study is to perform an analysis and projection of the Peruvian pension system to appraise its benefits, identify its limitations and set up proposals that could improve its performance. The recommendations of this investigation, therefore, aim to set up guidelines to reach gradual improvements on the pensions and extend the coverage of the system without overlooking the stability of public finances. For that purpose, the work has been structured into five sections. Chapter 1 makes a deep revision of the aspects that characterize the Peruvian pension system,

both for its private component as well as its public one. For this purpose, the main institutional changes established with the reform at the beginning of the decade of the 90s and the adjustments that have been taking place to the publication of this book are highlighted.

In order to perform a correct assessment of the system, it is necessary to identify what its performance will be within the next few years if the current conditions under which it operates prevail. For this reason, we have performed a projection analysis of the main indicators of the pensions system in order to verify where they converge. Chapter 2 gives details in terms of the starting point of this analysis, demographic and labor trends to the future as well as the macroeconomic situation defined as part of a productivity model of the factors. Chapter 3 presents the results of the projections obtained from an actuarial model which takes into account the situation previously defined and which assumes that the current conditions are kept. We could point out that the projections have been performed for different affiliate groups, made up by individuals with similar characteristics such as income, age, gender and contribution frequency. This approximation has a great advantage regarding the ones that use average information for the system since it allows identification of the segments of the population over those that should be focalized considering the steps to improve the situation of pensions and their coverage.

The results that were obtained under this basic area are evaluated and therefore we proceed to performing a diagnosis which, in essence, focuses on four key questions: are the pensions that will be obtained within the next four decades adequate?; does the previsional system manage to cover a relevant percentage of the population?; what population groups achieve better pensions?; are financial systems sustainable?

Chapters 4 and 5 establish a number of proposals that allow an achievement of improvements regarding the base scenario. These improvements correspond to two areas of influence: improvements

to the pensions levels and improvements with the coverage rates. Likewise, considering that every social protection system must be sustainable throughout time, in this chapter we also evaluate the fiscal impact of those actions in order to design them in such a way that they do not generate significant fiscal pressures, especially regarding the financial sustainability of the national system, and are therefore feasible and sustainable. In general, the approaches that are developed aim at distinguishing the elements that may translate into incentives in order to bring more affiliates into the system according to their capacities, promote a higher frequency of their contributions, as well as adjustments to not alter the decreasing previsional deficit trend that the State takes on. In this study, we consider that, in order to give the system more feasibility, it is necessary to have fiscal incentives, but in a way that fiscal sustainability is not affected and with a correct focalization. Finally, in Chapter 6 we establish the main conclusions of the study.

What are the contributions of this book?

In many senses, this work constitutes an important contribution for the study of pensions in Peru. Firstly, an investigation is conducted for the Peruvian system making use of a database which has allowed us to make groups by the middle of income, gender, age and frequency of payment and project them over the next four decades. Secondly, by performing the analysis with different groups for the affiliates, we identify specific problems and this way, the scope of the proposals is better focalized. Thirdly, we submit a group of steps correctly quantified, both in terms of the benefits obtained for the population, as well as the costs that they can bring for the State and, in this way, have a correct valuation of the necessary efforts. Fourthly, the proposals to improve the system make it clear that it is critical to continue with the implementation of structural improvements in the general economy, since adequate levels of pensions and higher coverage respond directly to the economic context

where the previsional system takes place. Along that line of thought, we also present a sensitivity analysis that allows us to observe the reactions of the pension system in the presence of changes (improvements or damages/deterioration) in diverse economic indicators.

The book that we are presenting to the public today has been developed by the Study Service of Group BBVA, with the sole objective of continuing with the efforts to improve the performance of previsional systems. At BBVA, we know that the pensions industry is an area that involves fundamentally the hopes of the society in order to reach a number of benefits that will allow it to support itself during the retirement years. For that reason, we believe that it is necessary to have a permanent commitment between the state and the private sector that is reflected on permanent evaluations of the evolution of the system and that allow it to perform the necessary adjustments in a timely manner to a system whose results will be appreciated in the long-term.

We consider that the quest and implementation of improvements for the Peruvian pensions system is a joint effort between the public and private sectors, a fact that we expect to consolidate with this academic project.

BACKGROUND AND INSTITUTIONAL FRAMEWORK

1.1. Background

Since the decade of the 80s, the demographic evolution was looked at with concern by pension systems. Several organisms, amongst them the World Bank, pointed out that due to medical advances and a lower birth rate, several countries around the world would grow old rapidly and that would put the public budgets under pressure with higher pensions and health expenses. Projections indicated, for example, that by the year 2030, the number of senior citizens in the world would triple and that the highest growth would occur in developing countries. [1]

This demographic trend, together with market distortions and informality, would create a complicated situation for traditional distribution systems that characterized Latin America. Moreover, there was a bigger concern because several countries were showing serious underfinancing problems in their pensions systems as a result of the lack of balance between contributions and benefits, a lack of timely actuarial studies and unwise transactions in investments. If the situation was not improved, Latin America's economy would be affected, since it would need to invest huge amounts in order to support its pension systems. See Graph 1-1.

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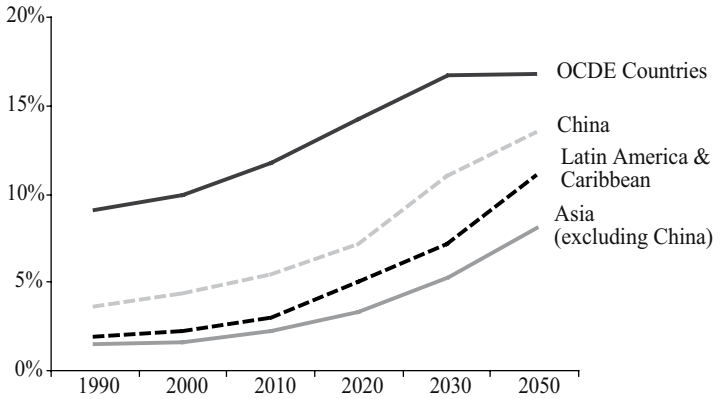
[1] World Bank (1994). "Envejecimiento sin crisis: políticas para la protección de los ancianos y la promoción del crecimiento" (Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth)

Graph 1-1. Projection of Public Spending in pensions by region 1990-2050

(Percentage of GDP)



Source: World Bank (1994)

In the face of this situation, it was necessary to perform reforms in order to avoid the conflict between generations and its fiscal implications. The biggest challenge was to create a new sustainable system and design a transition mechanism that would be acceptable for senior citizens and at the same time would not affect younger people.

In order to do this it was suggested that the states combine adequately public administration, whose role should be to satisfy the basic needs of the poor population, with private individual savings plans that would satisfy the demand for income for the groups of workers with higher resources. This implied establishing clearly the way public and private schemes would work and operate in the region using the previsional the scheme based on three pillars to protect senior citizens: i) a public obligatory pillar, managed by the State, in order to alleviate poverty when reaching old age; ii) an obligatory pillar, for private administration, self-financed with individual contributions and regulated in order to link from an actuarial

perspective the benefits with the contributions in such a way that they would substitute income in retirement; and iii) a voluntary pillar to offer additional protection to the population that eventually would want a higher level of income as of the age of retirement.[2] The combination and correct articulation of said pillars depended upon the objectives and circumstances for each country, and could change in time based on the needs that were generated.

For the Peruvian case, in a situation of financial, economic and actuarial imbalance of the delivery system then managed by the Peruvian Institute of Social Security (IPSS) and the subsequent impossibility of the state to assume the payment for current and future pensions, they ended up adopting as of 1992 a parallel pension scheme that is established and coexists with a partially reformed, state run delivery system and the introduction of a privately managed system based on individual accounts.

1.2. The current institutional framework

The Peruvian pension system is made up of two main subsystems: one of Law Decree No. 19990, otherwise referred to as National Pensions System (NPS), run by the state and operating in theory under a delivery financial regime; and the Private Pension System (PPS), managed by private entities called Private Pensions Fund Administrators (PFA), which is characterized by having a financial regime of individual accounts where each worker saves in order to obtain a pension. Additionally, there are other lower pension regimes. Among them we can mention Law decree number No. 20530 for public servants, recently

[2] The three-pillar scheme was broadly disseminated by the World Bank during the decade of the 90s. However, recently the World Bank has extended this three-pillar scheme to a five-pillar scheme adding a pillar denominated "zero pillar" based on assistance or non-contributing pensions, and a "fourth pillar" based on informal or family transfers. For further details see Holzmann and Hinz (2005).

closed at a constitutional level for new workers.[3]

Thus, since 1992, the Peruvian pension system operates under a model in which a public pillar administered by the State coexists with a private pillar where different specialized entities exclusively dedicated to this function operate. This scheme, unlike the ones in other countries, did not imply a closing of the national system, but rather created a private pension system so that it would coexist with the national system, so the workers have the possibility to choose one of them at the moment they start participating in the labor market.[4]

Another relevant characteristic is that it is a contributing system in which the workers have to make contributions to obtain a pension. In the case of the national system, since it operates under a pay-as-you-go system, in theory the contributions are destined to financing the pensions of the people who are currently retired, whereas for the private scenario, contributions are accumulated in their corresponding individual savings accounts, in order to finance the corresponding pension. Unlike other countries, there are no assistance pension regimes or non-contributing regimes.

Additionally, the Peruvian pension fund is obligatory for all those people who are freelancers in the formal sector. At the beginning of their labor life, each worker must choose which system he wants to belong to (the NPS or the PPS) and has full access to information about the characteristics, differences and other aspects of the current pension systems.[5] For independent or informal workers, affiliation into the system is voluntary.

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[3] This reform is explained in Appendix I, nevertheless it should be added that there are also other pension systems for specific worker groups such as the "Military and Police Savings System" which was established for the workers of the armed and police forces; as well as the Fishermen's Savings system, basically of a private nature.

[4] Mesa-Lago, Carmelo (2000). Estudio comparativo de los costos fiscales en la transición de ocho reformas de pensiones en América Latina. CEPAL.

[5] If a worker does not choose a system, they automatically belong to the SPP.

1.3. The National Pensions System

The NPS is a system that incorporates workers subject to the regime of private activities, workers, public servants and officials who are not incorporated into the law decree No. 20530. In theory this system is a pay-as-you-go system, and its main characteristic is getting fixed benefits and variable contributions in a sufficient value so that the collective contribution of the workers can finance the pension of the currently retired workers. This system is administered by the Oficina de Normalización Previsional (Previsional Normalization Office, PNO).

At the NPS, people who have insurance make a contribution of 13% of their salaries[6] and, when they retire (at the age of 65 with at least 20 years of contributions) they receive a fixed benefit subject to minimal and maximum levels of S./415 and S./857 respectively. The benefit is established as a percentage of the remuneration of reference calculated by an average of the last 60 remunerations and it is paid at a rate of 14 pensions a year. We must point out that in this pay-as-you-go system, due to the existence of this minimal and maximum pensions, the lower income workers obtain a higher benefit than they would obtain with personal savings while for higher income workers, the correlation is inverse as the benefit obtained is lower than what they would get for their contribution.

An advance of their retirement fund is offered after the age of 50 (for women) or 55 (for men), requiring a higher contribution effort for 25 and 30 years contribution, respectively, and establishing a deduction in the amount of pension for each year they received in advance for their retirement. Besides, the system gives benefits for physical disabilities, loss of a spouse, loss of parents, and ascendants that are equivalent to a percentage of the pension or the referred to remuneration, as it may correspond.[7] We should remember that from its creation, the NPS was

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[6] The contribution rate was shared between employee's 3% and employer's 6% until August 1995; afterwards it was 11% on the employee and beginning January 1997 it was raised to 13%.

[7] See Ministry of Economy and Finance (2004): "Los sistemas de pensiones en Perú".

conceived as a financed regime, which with inadequate management of its contributions and previsional parameters (such as the rate of contribution, age of retirement, minimal period of contribution, replacement rate [8]) and additionally employers contributions, should not go through serious problems in its operation. However, the lack of timely adaptation of the system to the demographic, labor and economic changes, as well as the lack of actuarial studies and substantial growth in the benefits without the corresponding financing ended up turning it into an unbalanced system from a financial and actuarial perspective.

In fact, these are considered to be the main problems of NPS. As a reference, the commission in charge of studying the situation of pension systems [9] points out the following: "the pay-as-you-go systems created in 1973 (law decree N° 19990) and 1974 (law decree N° 20530) were conceived and responded to the reality of those years. However, the lack of adjustments required as a consequence, among others, demographic changes, made those systems go through deficits and collapse". If we add to these factors the inadequate policy in the management of investments of public funds during the 80s, which had real negative profits of about 37% (see Graph 1-2), and the fact that those funds were constantly used by governments as a financing source, there is no doubt that the deterioration of the NPS translated into growing operational deficits, higher dependence on the incorporation of new affiliates, inexistence of a technical reserve that would allow it to face its long-term obligations and, finally, a fiscal burden for the State.

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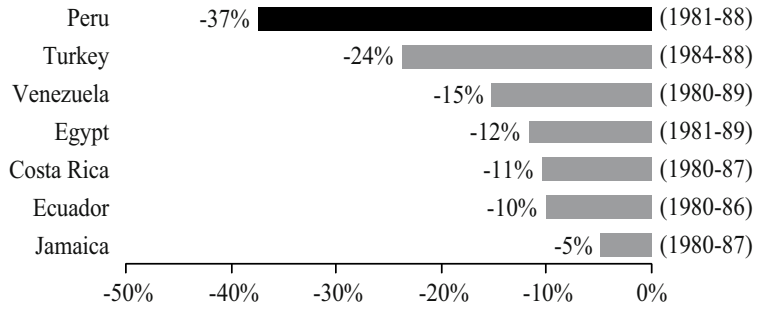
[8] Pension to be received as a percentage of average salary within a certain period.

[9] Final report from the especial commission in charge of studying the pension system situation, corresponding to Acts (Decreto Ley) No. 19990 and 20530 and other of the State, Supreme Act (Decreto Supremo) No. 003-2001).

Graph 1-2. Actual yields of some public pension plans in the 80's



Source: World Bank (1994)

Financial Situation

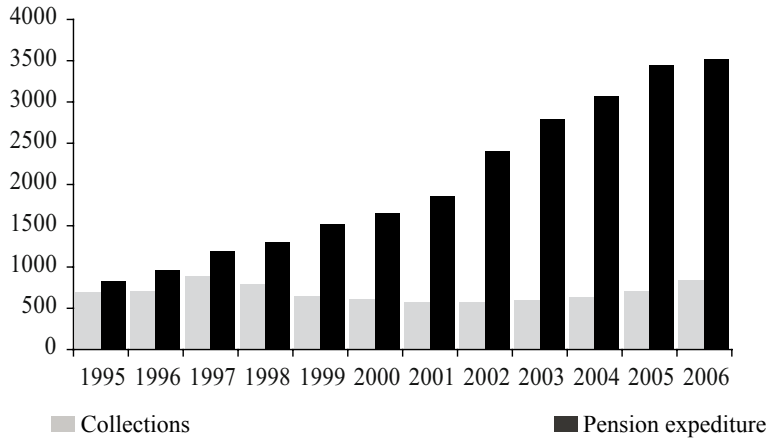
As of December 2006, the number of affiliates in the regime went up to 1.3 million, and the number of pension holders to 460 thousand. In terms of gross collections, the figure went up to 838 million, from a total base of contributors of 535 thousand. We should point out that this number is lower than the number of affiliates for a number of reasons, amongst which we can point out the fact that not all workers have a contribution frequency of 100%.

In terms of the list of obligations for pensions, it went up to 3 thousand million for 2006, which has been paid mostly with Public Treasury transfers and to a lesser extent with collection[10], making the lack of balance of the system evident. Therefore, the contributions of the current insurance holders are insufficient to finance the previsional obligations of the NPS.

[10] Additionally, the Pension Reserve Consolidated Fund of Act No. 19990 transfers its yearly earnings to help funding.

Graph 1-3. NPS Pension Collection & Expenditure

(Million S/.)

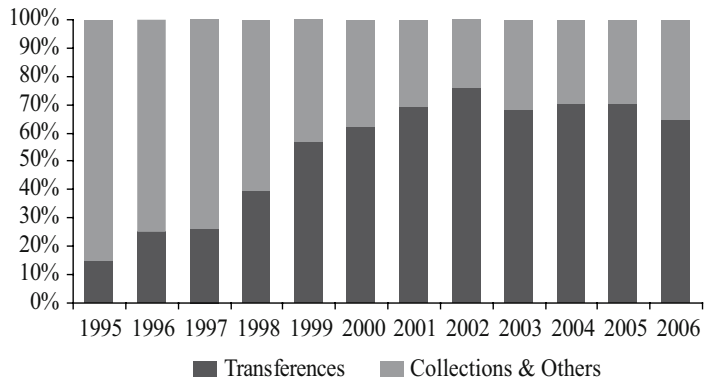


Source: PNO

As we can see in Graph 1-3, the number of participants in the system has been increasing over the last few years, at an average rate of 14% between 1995-2006, where as collection did so, on average, at a rate of only 2% over the same period. Therefore, we can appreciate that collections have been sustained at similar levels as those in 1995 considering the number of participants is four times higher than in 1995. In particular, as of the year 2002 we can observe a higher gap between obligations and collections, which has been taken over practically by the State and represents the operational deficit of the system. As we can observe in Graph 1-4, this deficit is financed as a yearly subsidy given by the State, which has been increasing throughout the last few years, reaching 65% of the total in the year 2006, which is equivalent to close to 0.8% of the GDP for the same year.

Graph 1-4 NPS Treasury Transfers

(As a percentage of the pensions expenditure)



Note: "Others" includes FCR (Fondo Consolidado de Reserva) DL N° 19990 transfers.

Source: PNO

At present value, according to PNO projections, this financial situation reflects a deficit or previsional cost that goes up to US$ 21 045 million (see Graph 1-1), equivalent to around 22% of the GDP, and is explained by two components: i) the cost for the pension holders and ii) the future cost for active workers.[11]

Table 1-1 - NPF Pension Deficit Estimate

(At 2007 present actuarial value in US$ Million)

	Beneficiaries	Liabilities	Contributions	Total
Pensioners	460,539	10,606		-10,606
Assets	1 329,510	19,318	9,360	-9,958
Total		29,924	9,360	-20,564
Total including legal / administrative contingencies				**-21,045**

Source: PNO

[11] PNO Estimate (Summary of the economic study of pensions reserves of Act DL No. 1990).

In the first case, we have a deficit of US$ 10 606 million which is equivalent to the present actuarial value of the pensions which are still to be paid to the current 460 539 pension holders of the system. In the second case, we have a deficit of US$ 9 958 million for the workers who currently are considered to be active. This deficit comes from the difference between the present value of the pensions and the present value of its contributions, since we can clearly see that the contribution of active workers will not be enough to finance their pensions.[12]

This is one of the main aspects and critical points of the State from a financial sustainability standpoint since, despite the fact that several parametric reforms have been set up, the subsidy that the NPS is taking up is still very high. Thus, despite the adjustments that have been made, the current financial situation of the system is still delicate since it is still going through the effects of having postponed the reforms to its parameters and because in the future we anticipate demographic changes like an increase in life expectancy that will pressure the expense on pension.[13]

1.4. The Private Pensions System

In a situation of financial, economic and actuarial lack of balance of the NPS, in 1992 there was an effort to establish an alternative pension system supported in self-financing of the pension through the accumulation of individual profit-generating contributions. Thus, in December of that same year the Private Pensions System is created (PPS).

The PPS is characterized by an individual capitalization regime in which the contributions made by each worker are deposited into heir corresponding personal account — called Cuenta Individual de Capitalización (Individual Capitalization Account, ICA) — with the object to accumulate enough

[12] Additionally, PNO estimates a cost around US$ 500 million for possible legal and administrative demands that may turn unfavorably, increasing the system's deficit.

[13] This topic will be discussed in further detail in Chapter 3.

Box 1-1. – List of Parametric Reforms to the National Pension System in the last 15 years.

- ✓ In 1992, the number of contribution years required to obtain pension payment was increased, shifting from 13 to 15 years for females and males respectively, to 20 years for both genders.
- ✓ In the same year, the calculation formula for the maximum pension was changed, making it fixed and independent from the minimum salary. Before, the maximum pension was calculated as 80% of 10 minimum salaries, while with the modification it became a fixed amount established by norm. In order to visualize this difference, the application of the formula would be S/.4000 as maximum pension while the current norm establishes S/.857.
- ✓ Afterwards, the general retirement age was raised and made uniform, both for males and females. Before 1995, the ages required for retirement were 55 and 60 years of age for females and males respectively. With the modification (DL No. 26504), these ages are adjusted, based on the greater life expectancy and the gender distinction is eliminated, requiring 65 years for both genders as of said year.
- ✓ Likewise, the workers' contribution rate to the system was increased twice and the employers' contribution was eliminated. In effect, the first increase, in 1995, implied raising the contribution rate from 9% to 11%, the latter was totally charged to the worker. The second raise took place in 1997 and the rate was fixed at 13% which is still in force.
- ✓ After some years, in 2002, Act No. 27617 was enacted, through which, (among other measures) the replacement rates were gradually reduced, adjusting them to the contributive effort. Basically, a replacement rate base application scheme decreasing in time was established for the calculation of the pension. For instance, a worker can obtain today as pension the amount resulting from applying 50% to the average of their last salaries (considering an additional 2% for every year of contributions over 20 years). Beginning in year 2013, pensions will be calculated with a replacement rate of 45% of salaries (and the additional 2%), in year 2018 with a replacement rate of 40% and so on until reaching year 2038, when the replacement rate base will be 30% for all workers retiring from that moment on.
- ✓ Within the same norm, it was provided to adjust the calculation of the reference remuneration which is the valid average of salaries taking part in the pension calculation. This adjustment implied to "soften" its calculation based on a longer period, going from 12, 36 or 48 months (whichever is most convenient for the pensioner) to a sixty month constant.
- ✓ Additionally, along these years, the Pension Reserve Consolidated Fund – DL 19990 (FCR) has been strengthened and in 2007 it amounts to over 2,100 million dollars.

resources to finance a pension. In other words, the value of the pension depends directly on the contributions made during their working life.

The need to have an alternative retirement option was also justified based on the fact its implementation would help in the medium run to improve the level of pensions of the NPS. Along this line, one of the main objectives of the PPS was to have a solid previsional system that would allow workers to have access to reasonable pensions when they retire.[14] With this, the idea was to assure a stable income at the time of retirement that would have a level of connection with the amount collected during the active working life of the worker.[15] Secondly, the new system should contribute to the development of the capitals market and increase the efficiency in the operation of internal savings.[16] This objective would allow to boost domestic investment in attractive projects both for their yield as well as their contribution to development.

Under this scheme, the PPS would have access to enough resources and technical capabilities to direct capital flows to profitable and dynamic investments of the local economy. As a third objective, there was the intention, through the transfer of the operation to private capitals, to generate an efficient administration system and avoid possible political exposure under a state-run system. It was necessary, besides that, as a social strategy, to recover the trust of contributors to the pensions system. Likewise, it is necessary to notice that the implemented reforms for that previsional topic were part of a series of actions that the state undertook during the decade of the 90s.

Legal Framework and Operation

In terms of its operation, that PPS operates through the Administradoras de Fondos de Pensiones (Pensions Funds Administrators, PFA) which

[14] Muñoz (2000), "La reforma del sistema privado de pensiones", pp. 451-452.
[15] Morón y Carranza (2003), Diez años del Sistema de Pensiones, pp. 16
[16] Muñoz (2000). Op. Cit.

are companies set up by private capitals that have as an exclusive goal the administration of funds that, individually and periodically, their affiliates contribute to as a result of their labor activity.[17] The purpose of the administration of this fund is to offer to their affiliates a retirement pension according to the profit-generating contributions they have made during all the years of their affiliation. This fund is an independent patrimony of the PFA and is characterized for not being subject to repossession and because its purpose is only and exclusively to offer retirement, physical disability or survival benefits.[18]

Regarding free transfers, the affiliate can transfer from one PFA to another as is convenient for him/her. This characteristic must guarantee competition between the different PFAs, under the supposition that the affiliate will join the PFA that offers higher security, yield and/or service. At far as yield goes, initially the PFA was required to generate at least a positive real minimum yield. However, the volatility of the markets made it evident that it was not possible to always have positive returns of investment. For that reason, this concept was redefined pointing out that the investments the PFA makes with the resources from the fund must achieve the highest yield within the higher levels of security, in order to offer the PPS benefits.[19] In this sense, to control the security of the investments, the Superintendence of Banking (SOB) regulates and controls the limits of the investments.

Finally, regarding the contribution and the perceived pension, the PPS establishes that the more contributions an affiliate makes, the accumulated balance of the Individual Capitalization Account (ICA) will be higher and with this the pension to be received will be higher as well. This contrasts with the NPS, where the contribution goes to a pay-as-you-go system and the pension is actuarially independent from the amount that has been contributed.

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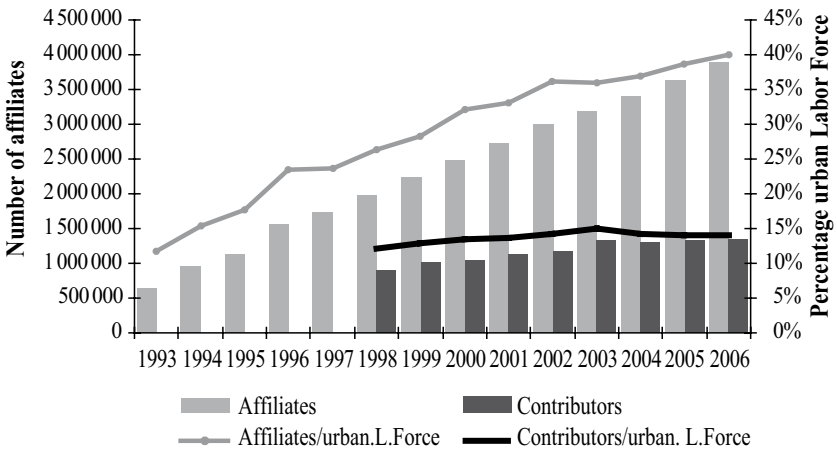
[17] The PFA must be constituted as companies with an exclusive purpose.
[18] Economic help for funerary expenses is also avalable
[19] Section 59, Supreme Act D.S. Nº 004-98-EF.

Evolution of affiliates and contributors

When analyzing the evolution of the PPS, one of the most relevant aspects is the degree of penetration (affiliates from the Población Económicamente Activa -Economically Active Population, EAP) and the contribution index. In terms of the number of affiliates, it has been evolving favorably throughout the PPS's life. On December 2006, the number of affiliates went up to 3.8 million and the number of people contributing to 1.4 million. See Graph 1-5.

Graph 1-5 Evolution in the number of affiliates and contributors



Note: Information about contributors corresponds to information available as of 1998.

Source: SOB, NIIS, MLEP / Production: BBVA

It is relevant to mention that the PPS affiliation grew rapidly during the first few years and later did so at lower rates. For this reason, in the year 1995, additional reforms were made in order to make the PPS more attractive. Firstly, in July 1995, the contribution to the fund was reduced from 10% to 8%, the solidarity contribution of 1% to the PISS was eliminated and the payment of the general sales tax (GST) for sales and

commissions was eliminated from the insurance.[20] Likewise, during that year it was established that the workers of the DL N° 19990 affiliated to the NPS increased their contribution from 9% to 11% and later to 13%, in January 1997, as well as to receive an increase of 3.3% in their earnings if they were affiliated in PPS. This made the contribution conditions become more balanced between both systems and became an incentive for the incorporation to the PPS.

These modifications made it possible to increase the rhythm of affiliations, with which the ratio of affiliates from the urban EAP, in 1996, went from 17.6% to 23.5%, and to the year 2006 this ratio went up to 40% (see Graph 1-5). Nevertheless, this ratio is reduced considerably when the coverage is analyzed taking into account only those who in fact make frequent contributions into the system. In fact, the coverage is reduced to 14% when the number of contributors is divided into the urban labor force for the same year. In comparative terms with other countries from the region, this indicator ends up being unsatisfactory since Peru is placed well under the average in the region and is only higher than the coverage (measured as the ratio of affiliates as compared to the total EAP) recorded in Bolivia. See Graph 1-6.

The situation would be reflecting mainly a high degree of informality of the Peruvian economy. However, other factors such as a lack of incentives for contributing, the lack of information and the need for higher control would also be relevant.[21]

Additional indicators refer to the difficulties of coverage. Thus, the participation of freelancers in the system represents only 37% from the total of the affiliates. The remaining 63% is made up of contracted workers. It is noteworthy that within the system there is to 19.4% that affiliated but never made contributions; and another group who probably stopped contributing, despite the fact they were employed. For those reasons, among others, it is

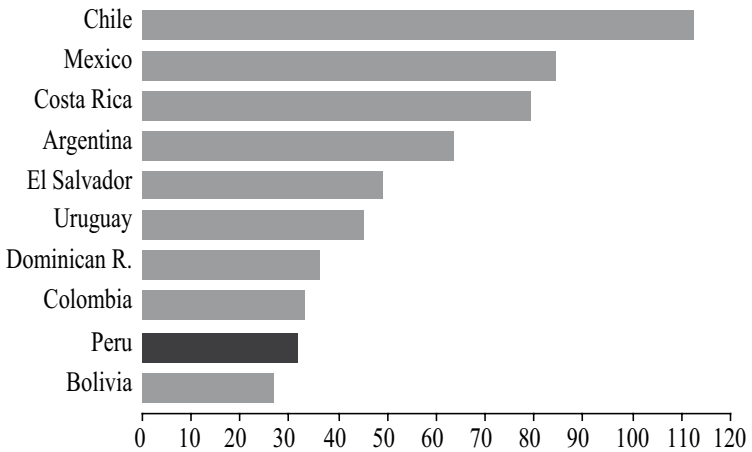
[20] The IGV is the value added tax (equivalent to VAT) and was through Act 504 that the mentioned charges were eliminated.

[21] The informality degree in Peru is of 60% according to Schneider (2004) and Loayza (1997).

important to analyze the ratio of people contributing over people affiliated considering both the total number of affiliates (which defines the simple contribution index), as well as the affiliates who have contributed to the system at least once (which defines the adjusted contribution index). From the available information, what we can find is that both indexes have been showing a decreasing trend during the last few years. See Graph 1-7.

Graph 1-6 Private system coverage in some Latin American countries and the Caribbean

(As percentage of labor force, 2006)

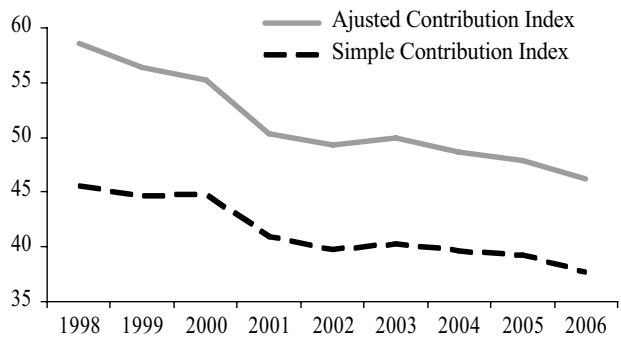


Source: SOB, AIOS

In this regard, we can point out that the adjusted contribution index has been falling until it reached, by the end of 2006, 46.3%. This could lead us to infer that at least half the affiliates may really obtain an adequate pension due to the fact they are not accumulating enough capital in their ICA. This hypothesis will be analyzed more thoroughly in Chapter 3.

Graph 1-7 Contribution Index

(in percentage)



Note: Yearly average.

Source: SOB

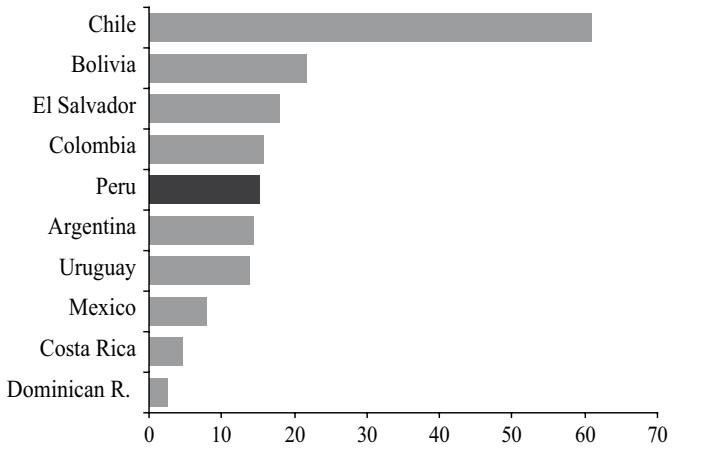
Pensions Fund and Yield

Another one of the variables that should be analyzed and that represents one of the biggest strengths of the system is the growth of the administered fund, especially over the last five years during which yield becomes a more important component. At an international level, Peru occupies the fifth place according to a classification by size of the administered fund in the PPS and the GDP in 2006. See Graph 1-8.

In the same way, in order to visualize its importance, it becomes relevant to analyze the evolution of the fund in relation to the other variables of the Peruvian economy. In the first place, according to figures of 2006, the fund represents 119% of total private investment, 92% of the Net International Reserves investments, 56% of the total internal savings and 19% of the stock market capitalization -in line with its objectives for savings promotion and development of the capitals market. Finally, the participation of the fund in the economic activity has increased over the last few years since the system was created, reaching 15% at end of 2006. See Graph 1-9

Graph 1-8 Administered fund

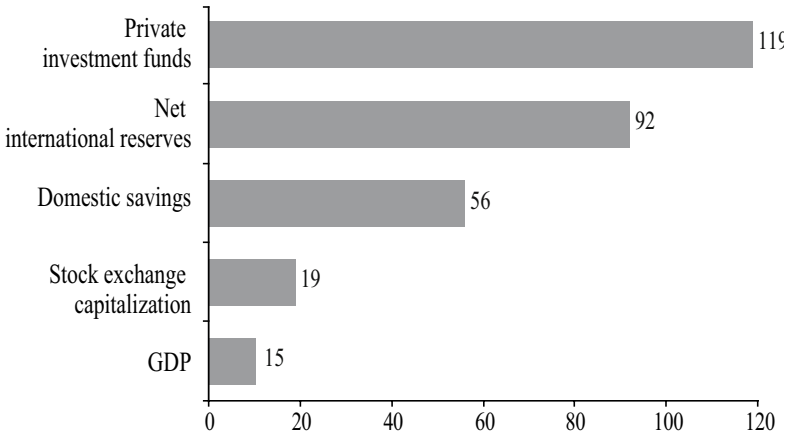
(GDP Percentage, 2006)



Source: AIOS

Graph 1-9 Administered fund as a percentage of other variables

(2006)

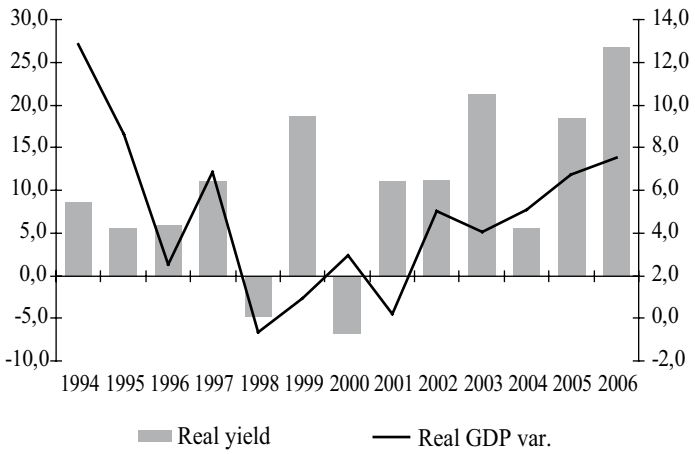


Source: SOB, CRBP, NIIS

As for yield, the performance of the administered portfolio in terms of earnings generation has been high except for two years in which the yield was negative (in 1998 as a result of the Asian and Russian crisis and in 2000 because of the political problems and the Brazilian crisis). See Graph 1-10. However, the annual actual yield of the portfolio, without including commissions, is positive from the start of the PPS. Likewise, historic yield as of 2006 reaches 9.89%.

Graph 1-10 Return on administered portfolio and GDP growth

(in percentage)



Source: SOB, CRBP, AIOS /production: PFA Association

It is relevant to mention that since 2002 a Multiple Funds Scheme has been implemented that allows the affiliate to choose between portfolios that contain financial assets that combine different risk and yield levels. The basic difference between those portfolios lies in their limit to invest in variable-profit assets and the election of the kind of funds that is subject to certain requirements such as age of the affiliate at the time of participation in the system.

Pensions

In the PPS there are basically three types of benefits: (i) by retirement, (ii) by physical disability and (iii) by death. They are mainly paid under three pension modalities: (i) Programmed Retirement, (ii) Family Life-long income and (iii) Temporary income with Deferred Life-long income. Each one is set up based on the preferences of the worker, considering if the worker or his family group value more getting lifelong pensions or to receive pensions that will not necessarily be paid on a life-time basis, but in the form of periodical withdrawals.

To this day, the number of pension holders is relatively low as compared to the number of affiliates, which is understandable given the youth of the system. Regarding their pensions, we can assert that the average pension obtained from the PPS shows a growing trend and almost reaches S/.900 for the case of retirement, S/.1050 for the case of physical disability and S/.356 for the case of survival pensions. See Graph 1-2.

Within the factors that establish the level of pensions, we can point out in the short term, the Recognition Bond plays an important role in the value of the pension.[22] In the medium and long-terms, yield, the frequency of the contributions and their level of income will be the main factors to explain pension levels that the PPS offers. In the same way, we can mention that throughout the life of the PPS it has been observed that for some groups of workers, especially during their senior years, the pensions offered do not exceed those of the pay-as-you-go system; basically due to the fact they respond to older regulations with high benefits in terms of replacement rates and that these workers have little accumulation time in the PPS. For those reasons, since the year 2000, special Recognition Bond schemes have been designed and, recently, alternatives to get out of the PPS affiliation

[22] Through this bond the State recognizes contributions made by the worker to the public system; this aspect is further analyzed in Appendix II.

which allow, in the first case, to compare the pensions between both systems, and in the second, to go back to the older system complying with certain requisites. Appendices III and IV discuss these topics more deeply.

Table 1-2 Evolution of the number of pensioners and average pension by type of benefit

A. Number of pensioners

	Retirement	Disability	Survivor
2002	10 022	1 720	20 107
2003	14 612	2 303	22 952
2004	19 927	2 944	24 758
2005	27 229	3 200	26 188
2006	32 179	3 694	29 829

B. Average pension S/.

	Retirement	Disability	Survivor
2002	860	943	286
2003	972	934	295
2004	982	942	313
2005	956	989	340
2006	900	1 050	356

Note: 12 yearly pension payments. Survival pensions take into account three types of beneficiaries: spouse, children and parents.

Source: SOB

Commission and PPS cost

The affiliate to PPS must pay two types of commissions: i) the variable commission which is a compensation to the administrator and ii) the insurance commission which is used to pay for the insurance policy for physical disability and survival. In the case of employees, the employers are the ones who keep and pay the obligatory contributions to the PFA, whereas freelancers, pay the contributions themselves based on an agreement between the freelancer and the PFA. In both cases, the workers have the possibility

to make voluntary contributions and in this case the contribution is not subject to the payment of additional commissions since it is made once with the obligatory contribution that has been made. This way, from the 12.72%, which is the average retained from the affiliate with a previsional purpose, 10% corresponds to the obligatory contribution, 1.81% to the commission that the PFA charges for administering the pensions funds and the remaining, 0.91%, corresponds to the commission of the insurance company.[23]

The cost for the commissions is one of the more controversial points of the system. According to the evolution observed, the cost of insurance has been reduced by 5.95% since the system was created, while the commission of the administrating companies remained relatively stable until the last year, as a result of higher competition, it was reduced by 12.06% on average.[24] We can point out that in the year 2003 there was a reduction in the commissions (see Graph 1-11) because it was allowed that the agreements that each PFA had with each one of the insurance companies were put up for bidding.

Graph 1-11 Evolution of PPS total commission

(Salary percentage)

Source: SOB /Production: BBVA

[23] SOB (2006).

[24] Each Pension Fund Administrator has their own commission and some offer a smaller commission through permanence agreements.

The starting point and context for 2050 projections

To perform an adequate diagnosis of the previsional system it is necessary to project where the main indicators are heading in the medium run. Considering that the projections that these variables follow will depend on the current context of the system, as well as the macroeconomic and demographic context estimated for the next few years, in this chapter we make a description of the system.

Therefore, before describing the context, details about the current situation of the integral previsional system (public and private), complementary information and additional suppositions that have been used in order to perform the estimates are given. In order to establish the context for the projection, a macroeconomic model that defines the evolution of the product and the labor productivity (and, therefore, the income) has been used.[25] Likewise, the demographic trends given by the Centro Latinoamericano y Caribeño de Demografía (Latin American and Caribbean Demography Center, CELADE) have been taken up to the year 2050 and for the labor environment it has been assumed that the EAP grows at a rate similar to the population ones.[26]

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[25] The long run macroeconomic model is described in Appendix V.

[26] Demographic tendencies (population growth and mortality, among others) are an input utilized in the actuarial model developed to obtain projections for the pension system. Appendix VI contains a detailed description of this model.

2.1. Systems Information

Disaggregated information have been a basic source for the development of the projections of the affiliates belonging to the NPS and the PPS such as salaries, pension levels, distribution of the affiliates, ages, gender, among others. In the following sections we describe this information.

2.1.1. Data used in the National Pensions System

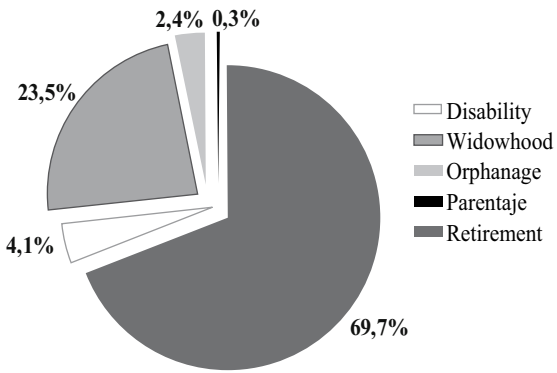
The actuarial financial simulation model applied to the study of the national pensions system starts from the data of the groups of pension holders and affiliates to a specific date (2006) and distributed by agents, and marital status. This information has been provided by the Previsional Normalization Office. The fundamental variables that come into play for the future development of the system are defined. In consideration to demographic and macroeconomic elements, value hypotheses are set forth for said variables to perform a projection into a horizon that is sufficiently broad. The evolution of the system is presented on an annual basis, considering the variations it goes through by the application of the adopted hypothesis. The groups of affiliates and pension holders, grouped according to their age, evolve annually as an effect of the application of decease probabilities. The group of assets receives new registrations by incorporation into the labor activity for the younger age groups.

The main goal that is pursued with this model is to observe the evolution of pension holders of the public system as well as the active workers as they retire during the period of the study, so that under that basis we can establish the flow of previsional obligations that both groups generate and with that their fiscal cost. By consistency and comparison with the private system we can also establish among other results the retirement pension and the replacement or average replacement rates.

Groups Information

The affiliates and pension holders from the PNO were taken to the 31st of December 2006 and they were classified according to their age groups, gender, marital status, average pension, and average remuneration. After that we performed simulations for each group. For the case of the pension holders group, we found 460 thousand people who receive a pension and subdivided this group by kind of benefit: retirement, physical disability, loss of a spouse, loss of parents and ascendants, we found that 69.7% of the benefits correspond to retirement, 23.5% to old age and the rest to physical disability, loss of parents and ascendants. See Graph 2-1.

Graph 2-1 NPS Pensioners by kind of benefit

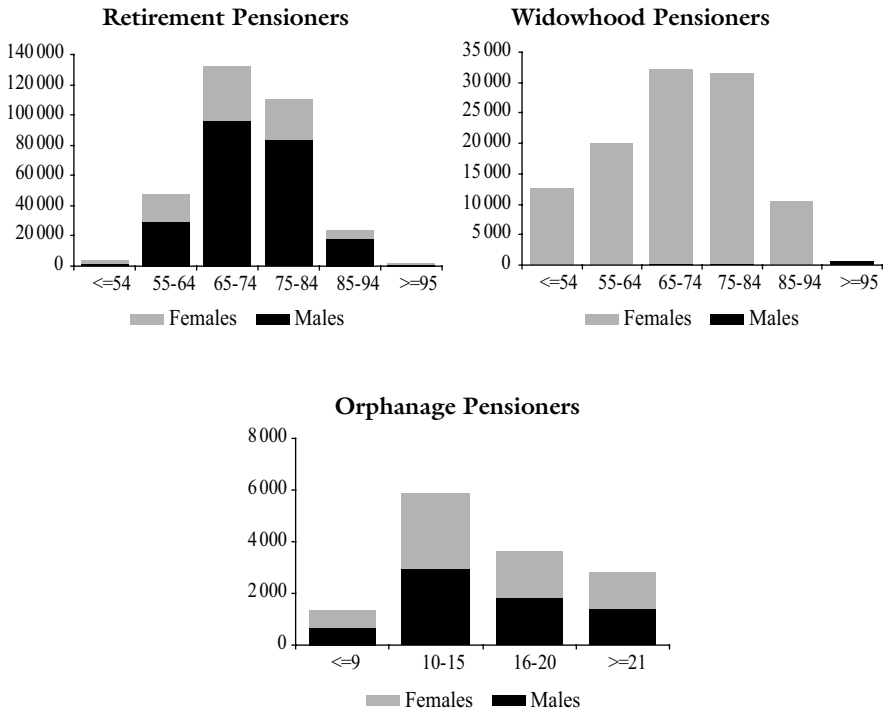


Source: PNO

Each segment was distributed by type of benefit, age group, gender, marital status, as it corresponds. As an example, we find a graph with the age distribution and gender of the people who have retired, widows and orphans and we find that the average age is 73, 70 and 20 respectively.[27] Ver el Gráfico 2-2.

[27] Likewise, somewhat minor differences by gender were observed: i) retired men are 73 years old on average, and retired women are 71 years old; ii) average widows are 70 years old, while widowers are 74; male orphans are 19 years old on the average and female orphans 20 years.

Graph 2-2 Pensioners distribution by age and gender



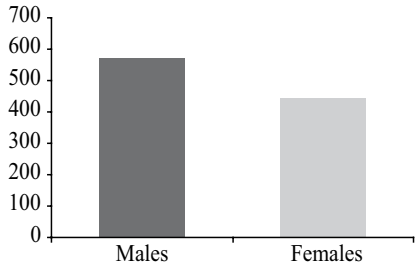
Notes: total of pension holders by loss of a spouse also includes disabled men; the trouble of pension holders by loss of parents also includes senior citizens, but disabled.

Source: PNO

In terms of average pensions, we found that for the group of retired people the average is at S/.536 with a difference by gender: for men, the average is at S/.572 while for women it is at S/.442. (See Graph 2-3). On the other hand, for widow and orphan groups, we registered average pensions of between S/.313 and S/.167 respectively, and almost did not show any differences by gender. We should point out that the amounts of the pensions are multiplied times 14 in order to establish the annual expense rate for pensions because the NPS made a total of 14 payments a year: 12 payment pensions plus two bonuses in July and December.

Graph 2-3 NPS average retirement pensions by gender

(Soles, S/.)

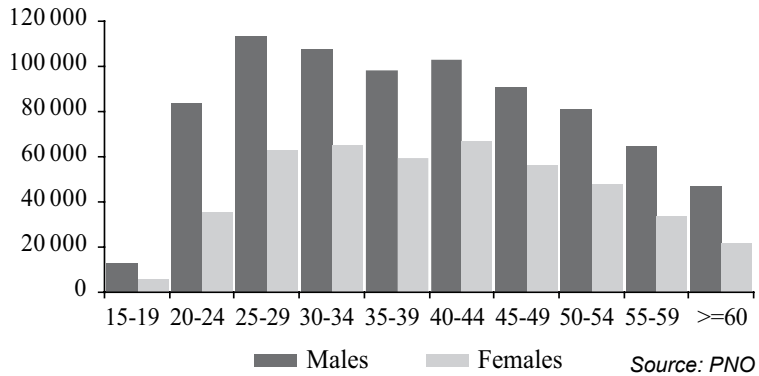


Note: pensions paid 14 times a year

Source: PNO

For the case of the assets group, we found 1.3 million people currently registered at the NPS, of which 64% are men and 36% are women. Regarding the average age, it goes up to 41 years and it shows practically no differences by gender. (See Graph 2-4). Additionally, we must point out that not all the people with insurance contribute on a frequent basis. The last group only reaches 600 thousand if we take into consideration that last year.

Graph 2-4 NPS distribution of affiliates by age

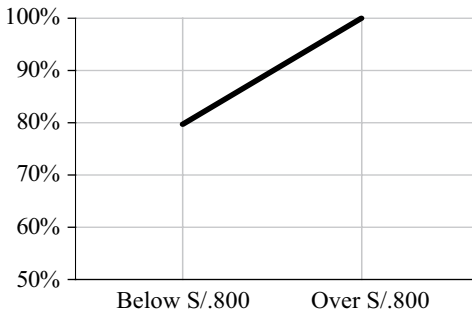


Source: PNO

In terms of income levels, it concentrates at levels of S/.800 or less (80% of the population) and it does not show much dispersion inside. It

is interesting to observe that even though it is a pay-as-you-go system where in theory there should be people with a high income in order to get the redistributive effect, only 20% of the people have a high income (above S/.800). (See Graph 2-5).

Graph 2-5 NPS distribution of affiliates by income



Source: PNO /Production: BBVA

2.1.2. Data used in the Private Pensions System

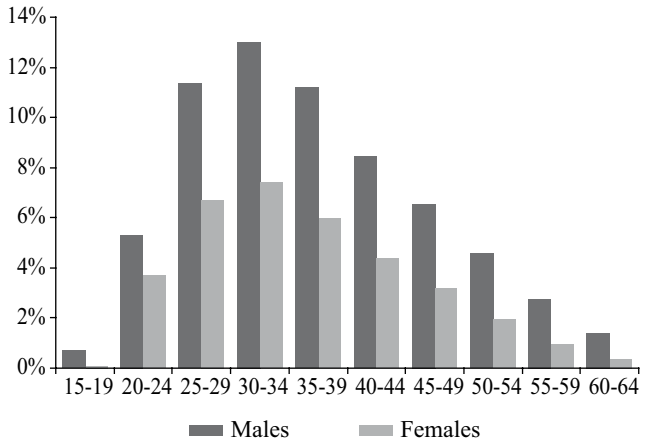
They individual capitalization model applied for the study uses PFA Horizonte's database of affiliates, under the supposition that the distribution of affiliates they have is representative of the whole system. Based on this idea, the information was applied at a system level, making groups based on different criteria such as age, sex, ownership of Recognition Bond, income level and frequency of contributions in the system (for further information see Appendix VI).

The main objective that we pursue with these models is to observe the evolution of the coverage of the capitalization system for the period we are studying, specifying among other results the old age pension for retired pensioners getting the replacement or replacement rates for the categories of affiliates defined.

Initial information

The PPS number of affiliates consists of 2.4 million men and 1.3 million women, by December 2005; its main feature is that it is a young group (currently the average age of the system is 36). (See Graph 2-6).

Graph 2-6 PPS Distribution of affiliates by age

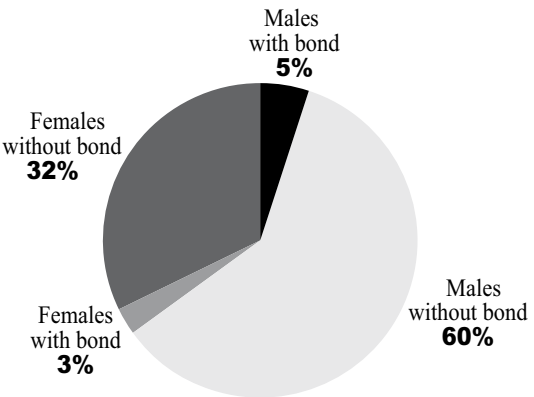


Source: BBVA

In terms of the Recognition Bond, we found that 0.2 million men are entitled to a Recognition Bond (8.4% of the total of men) whereas for women, this figure is only 0.1 million (1.2% of the total of women). Only 8% of the total of affiliates has a Recognition Bond. (See Graph 2-7).

Additionally, regarding the level of income in the frequency of contribution, we considered four classification categories based on density (A: 100%-90%; B: 90%-50%; C: 50%-10%; D: 10%-0%) and three categories based on income level (1: up to S/.500; 2: S/.500- S/.800; 3: more than S/.800). (See Graph 2-8).

Graph 2-7 Distribution of PPS affiliates by Recognition Bond



Fuente: BBVA

Graph 2-8 Distribution of PPS affiliates by income

Source: BBVA

Bearing the above in mind, we obtained more groups, and from that we modeled the accumulated balances information, Recognition Bond and contributions made.[28]

[28] In order to examine data work in more detail, consult Appendix VI of the individual capitalization model.

2.2. Economic and demographic context

2.2.1. Demographic situation

For the development of the models, we have taken into account projections of the demographic situation based on the previsions that the Instituto Nacional de Estadística e Informática (National Institute for Informatics and Statistics, NIIS) and CELADE have elaborated for the period 2005 to 2050. These projections are based on separately estimated trends for birth, mortality and migration rates. With this information, we make a projection of the trajectory of the population towards the middle of the century, based on age, sex and rural-urban population.

Growth trends to the year 2050 consider a gradual decrease in birth rate, ratifying the pattern observed in previous censuses regarding a decline in the number of children per woman over the last two decades. The median hypothesis suggests that the global birthrate will be reduced from approximately 3 children per woman for the five-year period 2000-2005 to close to two children per woman for the five-year period 2020-2025, a level at which it will tend to stabilize up to the end of the projection in the year 2050. The mortality rate for children also reflects clear confirmations of the trends of the last 20 years, where you can already observe a sharp decline.

Therefore, following those projections, the death rate is reduced to almost half for the five-year period 2000-2005, to the five-year period 2045-2050 going from close to 33 for every thousand children born to 15 for every thousand children born respectively. Also, life expectancy at birth, which for the five-year period 2000-2005 was estimated at close to 70 years of age, goes up to 78 years of age towards the year 2050.

In terms of migratory aspects, the NIIS-CELADE projections take into account an increase in the migration of Peruvians to foreign countries produced during the last decade, a period in which we register a negative migratory balance from 800,000 people as compared to the negative migratory balance of 260,000 during the 80s. This situation was reduced

once again as a result of the improvements projected in the economic field, which should discourage Peruvian citizens from exiting the country. This way, the negative balance goes from 300,000 people for the five-year period 2000-2005 to close to 30 thousand for the end of the projection. Finally, as a result of the projections of the three components for the demographic growth we have discussed, the Peruvian population, which by the end of the 20th century was approximately 27 million inhabitants, will reach 43 million by the year 2050.

These years begin to show characteristics of an aging population with close to 20% of the population between 0 and 14 years of age and more than 16% older than 65 years of age. (See Graph 2-9). With this, the dependence ratio, calculated as a percentage of the population older than 64 years in relation with the population between 14 and 64 years of age, goes from 8.3% in the year 2005 to 23.8% for the year 2050, which represents a meaningful change for the previsional schemes.

Graph 2-9 Population Pyramids

Source: CELADE

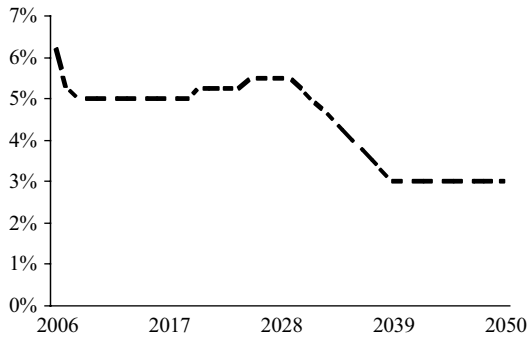
2.2.2. Macroeconomic situation

For the estimate of economy growth in the projection horizon, we have considered a long-term total productivity model of different factors, whose details can be found in Appendix V.

Considering structural changes experimented by the Peruvian economy over the last decade, the model assumes that the next government will continue with a responsible implementation of fiscal and monetary policies, by the strengthening process of the institutions, with greater economic openness as well as the generation of an adequate environment to promote private investment. With all the above, the GDP for the period from 2000-2008 will present an average growth of 5.5%; of 5.0% in the period from 2009-2019; 5.3% from 2020 to 2034; to converge further ahead as of 2034 at a rate of 3.0% towards 2050. (See Graph 2-10).

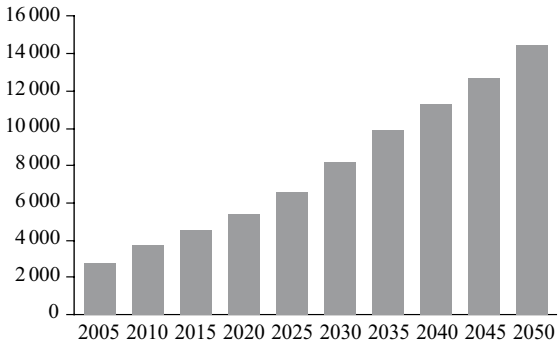
The growth generated as a result of the model used implies a labor productivity that on average grows at 3.0% and which later becomes the estimated growth for the salaries in the labor market in the long run. With this result, Peruvian economy is expected to increase its GDP five times over this period of time, surpassing 14 thousand dollars in the year 2050. In terms of the size of the informal economy, it is calculated that it is equivalent to approximately 60% of the GDP and based on the growth expectancy of the economy a reduction for the period of the study is anticipated. (See Graph 2-11).

Graph 2-10
GDP growth to 2050



Graph 2-11
Per capita GDP to 2050

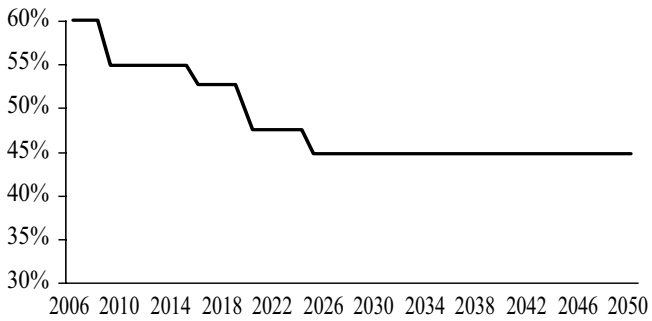
(US$)



Source: NIIS, BBVA / Production: BBVA

We assume this reduction will be 15 percentage points throughout the period of the projection, and will remain at around 45%. For this hypothetical situation we are considering a level of informality of 45%, similar to the one we can observe in countries like Argentina, with a per capita GDP that for this simulation, Peru will reach towards year 2035. See Graph 2-12.

Graph 2-12 Projection of the evolution of informal employment



Source: NIIS, BBVA / Production: BBVA

As a summary, on the next page we present a table that outline the parameters and assumptions for the projections:

Table 2-1 Projection assumptions for the macro-actuarial model

Variables	National Pension System	Private Pension System
GDP Growth	2006-2008: 5.50%. 2009-2029: 5.18%. 2030 onwards: gradual deceleration until converging at 3%.	
Population	Growth and distribution by groups according to age and gender is carried out accordingto INEI and CELADE projections (in long run, converges at 1%).	
Informallity	Decreases as economy increases, from 60% in 2006 to 45% beginning in 2035.	
Salary Growth	3.0% yearly (productivity growth average rate).	
Unemployment	Average 6.2% , but converges at 5.0% in the long run.	
Affiliates Entryos	20 -29 years old	20-29 years old
Contribution Ratee	13%	10%
Retirement age	65 males and females	65 males and females
Replacement Rate	Decreases gradually from 50% to 30% in 2038	Results from projection
	Increases 2 percent points for every additional year at 20 years.	
Contribution Density	A: 99%	A: 99%
	B: 71%	B: 71%
	C: 33%	C: 28%
	D: 1%	D: 1%
	New affiliates enter with average density.	New affiliates enter with average density.
New Affiliates	2% natural growth is maintained	Most of them enter PPS
Yield	4%	6%
Passive Interest Ratea	4%	4%
Age difference with spouse	3 years	3 years
Pension Update	3%	3%
Mortality Tables	RV 2004	RV 2004

Diagnosis

There are two major objectives in any pension system. The first is to accomplish the broadest possible coverage, i.e. for the largest share of the working population to have a pension plan upon retirement, after having had a trajectory of reasonable contribution. The second, yet equally important, objective is for these benefits to suffice in covering for a minimum consumption level during old age, which is the stage in which there is usually no income available, health care expenses grow and consequently, it is required to substitute a pension for the missing income.

This study is aimed at answering those questions in assessing whether the Peruvian pension system may meet such objectives: Will Peruvian workers be protected during their old age? Will such protection provide for minimum consumption levels?

This book tries to assess coverage, the pension's purchasing power, and the evolution of the fiscal cost for pensions. To that end, a number of indicators were established - both for the integrated system and for the NPS and PPS individually – and then the evolution of the system is projected by using the macro-actuarial model and by making reasonable assumptions. Finally, the outcomes shall be compared to the situation in other Latin American countries and to the extent possible, also to the findings in specialized literature.

3.1. Coverage

The literature on pensions states that the evolution and determining factors for coverage in pensions' systems depend on various variables. In Peru, studies by Chacaltana (2002), MEF (2004), Li and Olivera (2005), and most recently the one by Rofman and Luccheti (2006) have analyzed coverage issues and coverage measurement. Among the main findings of the studies the following can be pointed out:

- The coverage rate amongst active workers is low in most countries in the region, mainly due to high unemployment levels and low freelance worker share.
- Lack of coverage is greater in the small company sector, where it is actually inexistent.
- Coverage of public sector employees is high, but attention is drawn to the fact that in Peru it is not above the 80% mark, thus pointing to public sector compliance issues.
- Poor workers have little or no pension share, and the situation is worse in rural areas.

While this document is not attempting to analyze which are the determining factors of affiliation to pension systems and of low coverage, approaching the literature and the information available becomes useful in getting a better understanding of the coverage problem. In this sense, in the current research an effort is made to utilize the information available (which is scarce and often inconsistent) and make projections that may contribute to making progress towards a better understanding of the systems in the long run.

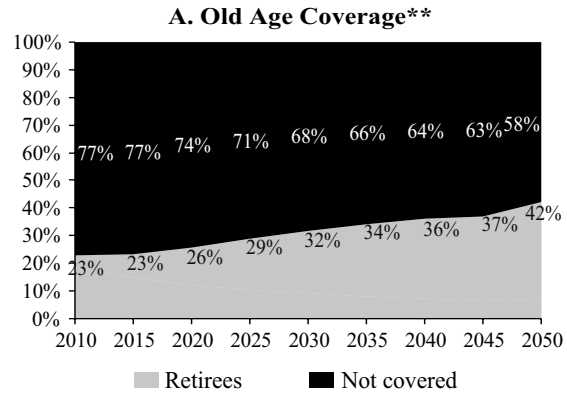
Indicators

The coverage problem is to be presented by means of two indicators and then, on that basis a further analysis will also be made on NPS and PPS findings. Thus, on the one hand, the indicator for old age coverage shows the ratio of the number of retirees compared to the population over 64. On the other hand, an indicator is used to measure labor coverage that is defined as the ratio of affiliated workers (not only those contributing) to the population group between the ages of 14 and 64. These indicators were chosen to measure coverage due to their simplicity and ease of comparison to other countries.

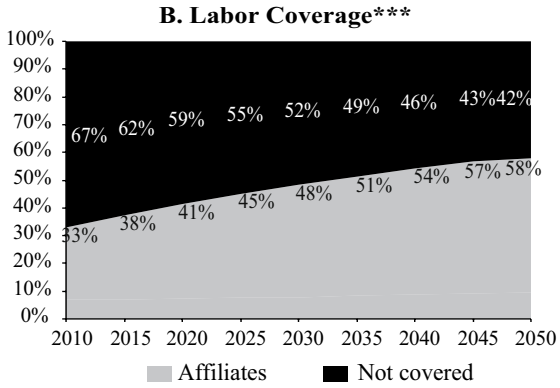
3.1.1. The system as we approach year 2050

The results point to an old age coverage rate growing from 23% in the year 2010, up to 42% in year 2050. In spite of this progress, the population over 64 years of age without pension coverage would still be a significant percentage of the total (58% by the year 2050, see Graph 3-1 A).

Graph 3-1 Projection of pension coverage



** Old age coverage = Retired staff / Population over 65 years of age



*** Labor Coverage = Affiliates / Population between 14 and 64 years old

Source: SOB, PNO, BBVA / Production: BBVA

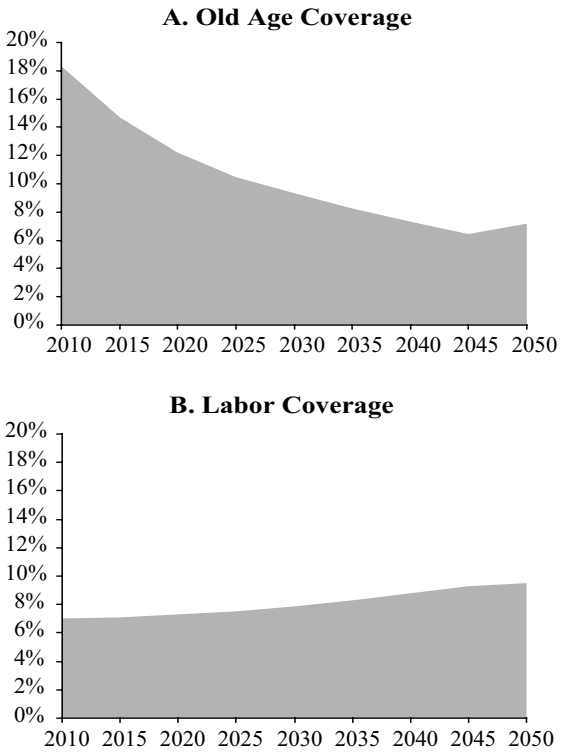
In regards to the economically active population, the labor coverage indicator shows that the ratio of workers to the population group between 14 and 64 years of age would go from 33% in the year 2010 to 58% by the year 2050. That would be a consequence of projected trends for economic growth, better labor conditions, a reduction in informal economic activities and a growing share of young people and women in the workforce. While the coverage seems to improve, almost half of the working population would still be excluded from the system (see Graph 3-1 B).

NPS

When running the estimates for each system, it was found that in the first years of the projection, the NPS is to have major significance in granting retirement benefits, but then it decreases in time. NPS's old age coverage goes from 18% in the year 2010 down to 7% in 2050. This is due to the maturation of the PPS which will be continually taking on

most of the new workers (see Graph 3-2 A). Regarding the active population, NPS maintains limited coverage throughout the projection[29]. At present, this system already has limited coverage since only one-fourth of total affiliates are enrolled in this regime and its share of the population between 14 and 64 will continue to be moderate going from 7% to 10% by 2050. (See Graph 3-2 B).

Graph 3-2 NPS Coverage Projection



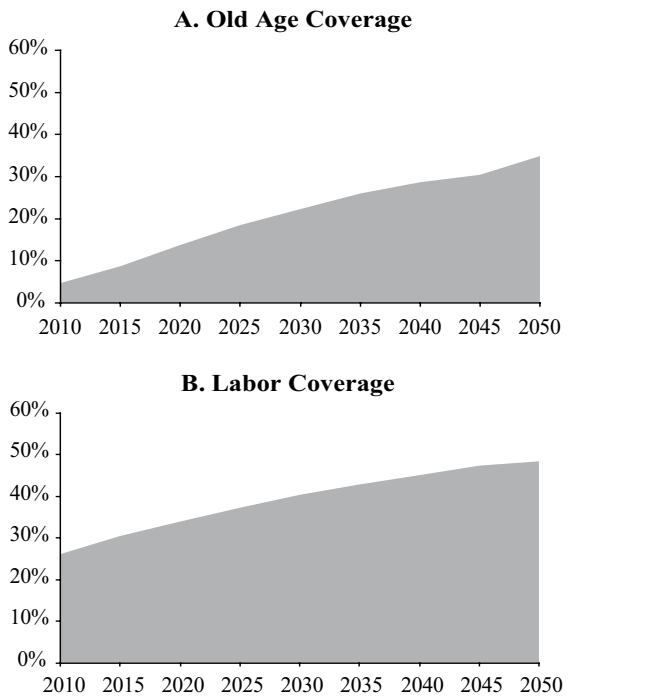
Source: PNO, BBVA /Production: BBVA

[29] The assumption is that NPS will keep the same growth rate as their affiliates

PPS

For the case of PPS, the behavior observed is the opposite of that found for NPS. On the one hand, old age coverage begins to take on a growing importance in the system's totals. In the long term, this result is due to the aging of the – now young - affiliates in the portfolio. Thus, the number of retired individuals goes from 5% of the population under 64 in the year 2010 (that is, 20% of the system's retirees) to 35% in 2050 (which is equal to 83% of retirements; see Graph 3-3 A). As for labor coverage, the PPS goes from 26% of the working age population in the year 2010 to 48% in 2050. In other words, in the year 2010 four out of five affiliates to the system would be at PPS, while by 2050 there will be five out of six. (See Graph 3-3 B).

Graph 3-3 PPS Coverage Projection



Source: SOB, BBVA / Production: BBVA

The difference in behavior of the systems' coverage can be explained basically by two factors. On the one hand, just as foreseen at the beginning of the reform, PPS is an appealing option for workers, particularly the young population. This preference was reinforced (to a greater extent during the 90's and to a lesser extent at the present time) by the grave situation the public system was facing at the time of the reform. On the other hand, during the application of PPS, worker affiliation to this system was fostered by means of mechanisms such as the default option which is applied to workers who do not make a choice (PPS or NPS) during the first 10 days after starting in a new job.

However, irrespective of the evolution observed in each subsystem, the projection points to the fact that while coverage of the system at large will continue improving over the assessed time frame, the Peruvian pension system will still leave out half the population. Moreover, coverage levels in Peru are far below the levels of other countries in the region.

3.1.2. Comparison with other countries

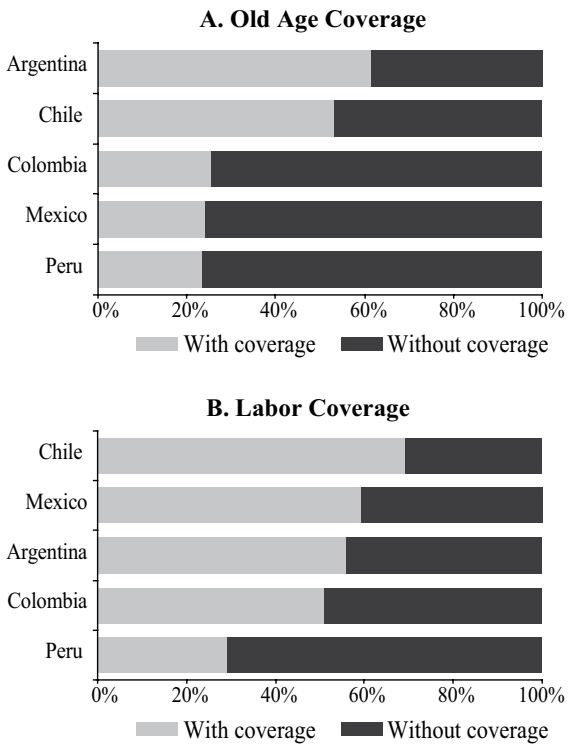
By December 2006, Peru held one of the lowest labor coverage levels in the region (29%) being outperformed by countries such as Colombia, Argentina and Mexico. Likewise, old age coverage in Peru is quite low, about 23% and is again outperformed by most countries in the region. See Graph 3-4.

It is worth clarifying that with the exception of Chile, all other countries in the region have low coverage rates; it seems, therefore, that this is a common problem. Indeed, Rofman and Lucchetti (2006) have found that one of the major problems in Latin American pension systems is still finding a way to protect workers and their families against the risks of old age and retirement. Moreover, in an analysis by economic sectors and company sizes at the regional level, the authors found that coverage is practically inexistent in the

primary sector and in small companies. Peru, Mexico and Argentina are at the top of this list.

Graph 3-4 Labor and Old Age Coverage in Latin American Countries

(2006)



Source: BBVA / Production: BBVA

By economic sectors, both manufacturing and service activities have some improvement. On the other hand, large companies (having fifty workers or more) have high pension coverage rates amongst their employees. Nonetheless, in the Peruvian case coverage in large companies is still low compared to the rest of the countries. See Table 3-1.

Table 3-1 Employee Coverage Rate by Company Size

(In percentages)

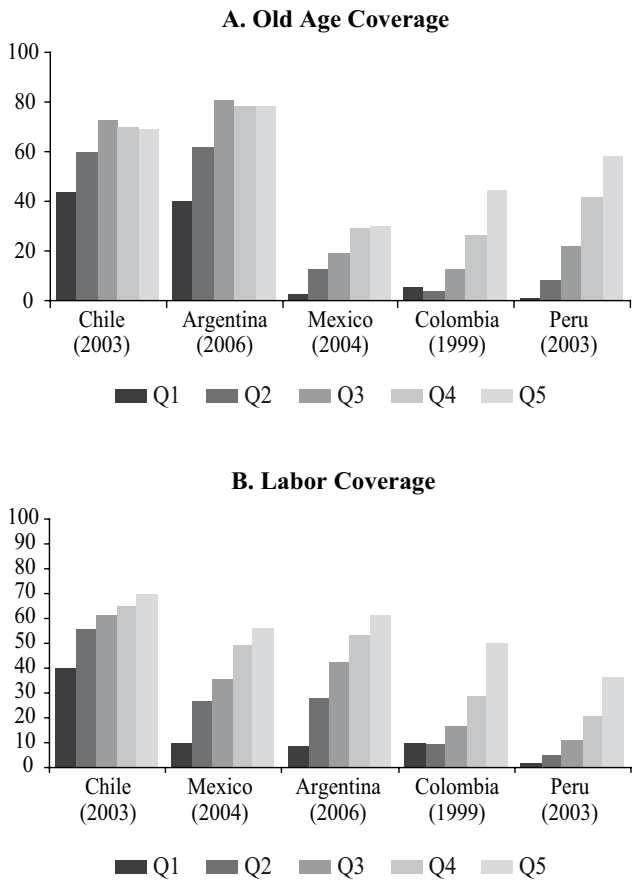
	Small	Medium	Big
Chile (2003)	32,7	78,0	90,8
Uruguay (2004)	23,6	68,8	96,4
Argentina (2004)	9,7	53,1	84,1
Mexico (2002)	6,7	55,6	88,0
Peru (2003)	4,1	17,9	63,5

Source: Rofman and Lucchetti (2006)

Likewise, the authors have identified that poor workers have low participation in contributive pensions systems. Assessments for different years for several countries across the region reveal that coverage for the economically active population in the poorest quintile (Q1) was barely 20%, whereas coverage for the richest quintile (Q5) was between 60% and 80%. Again, Peru is at the top of this unfortunate list. A similar situation is observed when analyzing old age coverage. See Graph 3-5.

Graph 3-5 Coverage Rates by quintiles of Household income

(In percentages)



Source: Rofman and Luchetti (2006)

Also, if coverage for some countries is projected for the same period of time (around year 2050), it can be observed that the Peruvian pension system will remain behind pension coverage evolution that other countries like Chile and Mexico will have. See Table 3-2.

Table 3-2 Coverage Projection for Chile, Mexico and Peru

Old Age Coverage			
	Chile	Mexico	Peru
2010	37%	32%	23%
2015	51%	33%	23%
2020	63%	35%	26%
2025	73%	38%	29%
2030	80%	42%	32%
2035	81%	47%	34%
2040	83%	55%	36%
2045	84%	63%	37%
2050	84%	69%	42%

Labor Coverage			
	Chile	Mexico	Peru
2010	67%	56%	33%
2015	71%	60%	38%
2020	74%	64%	41%
2025	75%	68%	45%
2030	76%	71%	48%
2035	76%	73%	51%
2040	77%	74%	54%
2045	77%	74%	57%
2050	76%	74%	58%

Source: BBVA Chile (2005), BBVA Bancomer (2007), BBVA Peru (2007) / Production: BBVA

These low coverage levels might be due to certain characteristics of the Peruvian economy such as high informality and wide dispersion of wealth distribution.[30] However it could also point to some sort of "short-sightedness" on the part of the workers in regards to their future.

The literature associates previsional coverage limitation mainly with labor market restrictions, poor labor relations and lack of incentives to workers, particularly freelance and low-income workers. Therefore, coverage is not a subject that should only be dealt with from the previsional perspective, but also public policies in labor matters should be comprehensively designed by including these issues. Simulation outcomes suggest that the coverage level improvement into the year 2050 would be insufficient, and it is

[30] Loayza (1997) & Schneider (2001) found that the size of the informal economy in Peru is equal to about 60% of the GDP. The simulation in this paper considers a gradual reduction of informality in such a way that this variable's level becomes consistent with per capita GDP that Peru would attain in the medium run, thus matching similar levels to the ones other - higher income - countries in the region have. Consequently, the growing trend displayed by coverage over the projected time frame is also favored by a dropping rate of informal economic activities.

necessary to implement steps to improve this situation. In this sense, coverage levels could be improved by drawing in informal workers and formal freelancers, with an emphasis on medium- and low-income groups.[31]

3.2. Pensions

The other important indicator to assess the pension system performance is the pensions' purchasing power, since it is not enough to have the benefit of protection, but it is also necessary to secure adequate protection. The above means that pensions should at least assure a minimum purchasing power.

The specialized literature makes reference to the fact that one of the main objectives in pension reforms should be that the systems are adequate, i.e. that they offer pensions whose total amount protects the population against poverty and at the same time adequately substitute for income (Holzmann and Hinz, 2005).

Indicators

In order to rate the benefits level, the growth of the pensions is assessed for the entire scope of the projected time frame by taking the values for the year 2010 as a starting point for the index. This indicator allows us to get an idea of how system benefits improve for an average retiree. Nevertheless, in order to find out whether these benefits are adequate, they should be compared with income levels or worker expenditure levels. To that end, a second indicator called replacement rate comes along; it is a variable that allows finding the ratio of the worker's pension to average income (over the past 10 years).

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[31] In the proper group, workers getting compensation between S/.500 & S/.800 are considered medium-income and those getting wages under S/.500 are considered low-income.

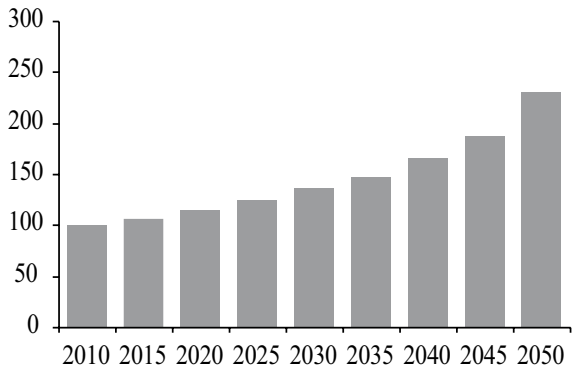
Additionally, in the cases deemed relevant, pension growth is compared to the minimum pension (as a reference for minimum income for old age) and the basic needs basket (as a measure of the purchasing power to afford such needs).

3.2.1. The system as we approach year 2050

According to the projection made, the average level of system pensions will double by the year 2050, as compared to the figures in 2010, as a result of economic growth, improvements in productivity and profitability. See Graph 3-6.

Graph 3-6 Evolution of pensions

(Average Pension in the System in the year 2010 = 100)

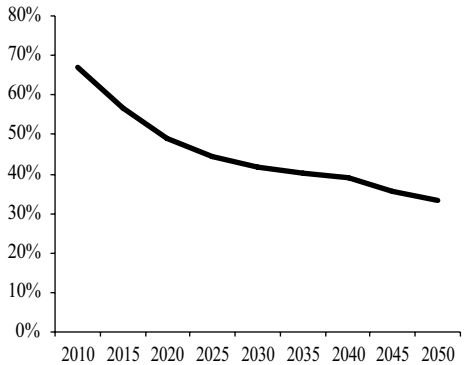


Source: BBVA / Production: BBVA

Insofar as replacement rates, the system at large will display a moderate decreasing trend for the entire projection time frame. On the one hand, this outcome is a reflection of a reduction in replacement rates at the NPS that will force it to grant more realistic rates; on the other hand, it shows the relationship between pensions and incomes at PPS under the assumption that the salary trajectory

included a 3% growth rate (according to economic growth and productivity gain assumptions, see Graph 3-7).

Graph 3-7 Evolution of Replacement rates



Source: BBVA / Production: BBVA

The evolution of average pensions and replacement rates within the system allows us to find out how the system at large will make progress and how able it will be to provide sufficient income to the retired population. However, it should be taken into account that the affiliates of NPS and PPS are different - mainly in regards to income levels and age distribution- but also their pension amounts are different depending on what system they retired on. For these reasons, it is also necessary to analyze the internal evolution of each system.

NPS

As for NPS, the average pension observed over the projection time frame will reflect the steps that, since last decade, were adopted to fit pensions to actual levels and to reduce financial non-sustainability of this system. There are two key factors that explain pension

evolution in NPS: i) what are the determining factors of the pension? and ii) which parametric changes have been implemented?

Determining Factors for Pensions in NPS

Firstly, by being a defined benefits system, NPS pensions are determined by means of parameters that are set by an express rule. The pension is equal to a percentage of the average salary and is subject to minimum (Minimum Pension) and maximum (Maximum Pension) levels. Such a percentage is called replacement rate and represents the proportion of the salary that is guaranteed to affiliates ("right-to-pension rate"). The calculation formula under the general retirement regime is as follows:

$$P\ NPS = (TRB + TRM * (APT - APB)) * RR$$

Where:

P NPS = NPS Pension. It should currently be fitted to the following range: S/.415 <= P <= S/.857

TRB = Base Replacement rate. It is currently decreasing from 50% for affiliates near retirement down to 30% for younger affiliates.

TRM = Marginal replacement rate for each additional contribution year after the 20th year. Currently it is at 2%

APT = Total contribution years over the labor career

APB = Contribution years needed to be entitled to a pension. Currently, It Is 20 years.

RR = Reference income. It is now calculated as a salary average for the past 5 years.

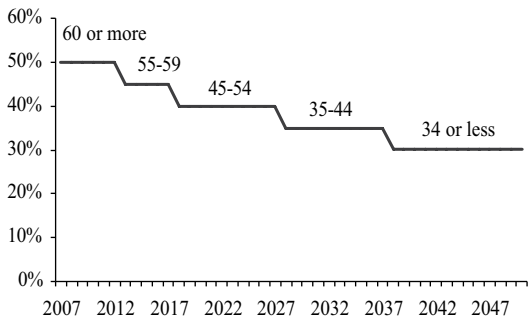
In the formula, both the importance and the positive ratio between replacement rates (base and marginal) upon determining pension amounts should be clearly noted. Thus, were this parameter to decrease (or increase) so would the pension. Secondly, NPS pension evolution is to take on the reforms passed over the past 15 years (see Table 1-1), particularly those that were made to proper parameters.

In the following paragraphs a specific analysis is made on the gradual reduction of the base replacement rate from 50% down to 30% along with the marginal replacement rate from 4% to 2%.

Gradual base and marginal replacement rates reduction

The reform of the base replacement rate consisted on keeping the 50% level for those who were 55 years or older by the year 2002 (60 years of age by now) and gradually reducing it for younger workers at a rate of 5% every five years until reaching the 30% mark for those who were 30 at that time. For instance, those affiliates who are now older than 60 years of age will continue retiring at a 50% base replacement rate, whereas in the future retiring affiliates will start getting lower rates until getting a rate of 30% starting in the year 2038. See Graph 3-8.

Graph 3-8 Base replacement rates by age and year of retirement



Source: DS N° 099-2002-EF

Likewise, the reform reduced the marginal replacement rate from 4% to 2% for each additional contribution year. Initially, in NPS the base replacement rate was improved by 4 percentage points for each additional year of contribution beyond the 20th year. The marginal rate went down to 2% as amended by the reform.

Taking into account the above statements, the following questions arise: Were these reforms necessary? What was the criterion and what pitfalls are there? In order to answer them, a simple indicator simulation will be conducted; this indicator will be called "earned pension percentage" and is aimed at measuring whether contributions made to the systems cover for the offered replacement rate. So, the system offered a 50% rate for the first 20 years, which is equal to an annual rate of 2.5%. A marginal 4% rate is added per each additional year. In light of this, accrued annual contributions would be simulated and accomplished pension percentages (year by year) would also be analyzed.

Table 3-3 shows a simulation for a male affiliate having an initial salary equal to the Remuneración Mínima Vital (Minimum Vital Compensation, MVC) (S/.550), productivity between 1.5% and 3%, occupational time frame 18-64 years of age, 70% contributing density, 13% contribution rate, 4% actual profitability rate, average salary for the past 5 years, productivity-adjusted pension, and widow benefits.

Table 3-3 Simulation of earned pension rights by age

BSR 50%, MSR 4%

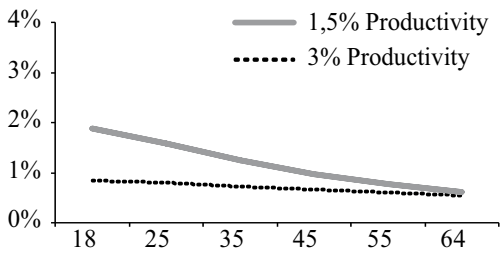
Age	% pension earned (1.5% Productivity)	% pension earned (3% Productivity)
18	1,89%	0,84%
25	1,59%	0,78%
35	1,25%	0,71%
45	0,98%	0,65%
55	0,77%	0,59%
64	0,62%	0,54%

Note: BSR stands for Base Replacement rate (Tasa de Reemplazo Base), and MSR for Marginal Replacement rate (Tasa de Reemplazo Marginal)

Source: PNO, BBVA

The percentages in the tables prove that in no case do worker contributions get to surpass the right-to-pension guaranteed by the system (2.5% and 4%). For instance, in the first column, a worker getting employment by age 18 manages to get a maximum 1.89% right-to-pension annual rate, assuming he started contributing since year one. By the age 25, contributions made by this same worker would get a lower right-to-pension percentage (1.59%) since contributions' yield time is shorter. In the second column, at a 3% productivity, the purchasing right is even lower for all ages since pensions grow alongside with salaries, and the capital required to fund such pensions is larger, that is why contributions finance less this greater capital and remain insufficient. Graph 3-9 exemplifies that the 2.5% base rate for the first 20 years would have been "earned" only by affiliates getting first employment before turning 18 years old.

Graph 3-9 Yearly Right to Pension Contributions



Source: PNO, BBVA

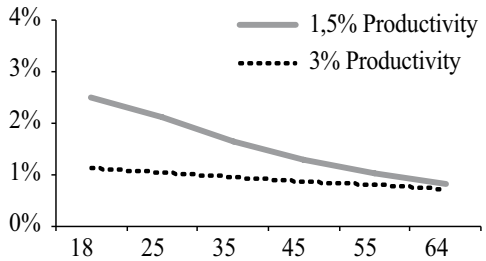
That is to say that in no case are replacement rates ever able to be funded by worker contributions, no matter how early they were enrolled in the system. Consequently, it was reasonable to have passed a reform reducing these percentages out of actuarial balance reasons between contributions, benefits and long-term sustainability for the system.

If the simulation is now conducted based on the reform for the first age group (who are now older than 60 years of age) for whom the 2.5% base rate was held, yet reducing the marginal rate down to 2%, it is found that contributions do procure percentages that are somewhat higher, but with the exception of those made at the beginning of the labor life, most other contributions do not manage to fund the right-to-pension percentages. See Graph 3-10.

Graph 3-10 Simulation of rights-to-pension earned and contributions:

BSR 50%, MSR 2%

Age	% pension earned (1.5% Productivity)	% pension earned (3% Productivity)
18	2,50%	1,11%
25	2,11%	1,04%
35	1,66%	0,95%
45	1,30%	0,86%
55	1,02%	0,78%
64	0,82%	0,71%



Note: BSR stands for Base Replacement rate (Tasa de Reemplazo Base), and MSR for Marginal Replacement rate (Tasa de Reemplazo Marginal)

Source: PNO, BBVA

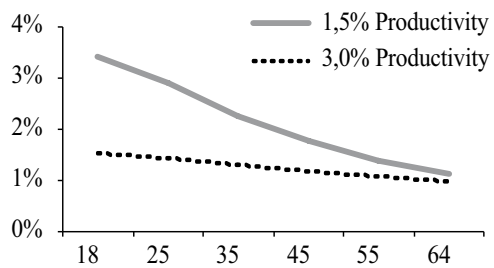
Following the same example, if the simulation is now made on the reform to the 30% base replacement rate (and 2% marginal rate) which are the applicable rates to active workers who are now 34 years old or younger, the results show that —with productivity of 1.5% — for the first 22 years of labor life (between 18 and 40) contributions allow for the procurement of

the offered right-to-pension rate (1.5% and 2% a year), because of which it could be inferred that such a percentage would have been set in following this criterion and in making sure the financial situation is not getting any worse by young and future affiliates not causing an actuarial imbalance in the system. See Graph 3-11.

Graph 3-11 Simulation of rights-to-pension earned and ontributions:

BSR 30%,MSR 2%

Age	% pension earned (1.5% Productivity)	% pension earned (3% productivity)
18	3,42%	1,52%
25	2,89%	1,43%
35	2,26%	1,29%
45	1,78%	1,17%
55	1,39%	1,07%
64	1,12%	0,98%



Note: BSR stands for Base Replacement rate (Tasa de Reemplazo Base), and MSR for Marginal Replacement Rate (Tasa de Reemplazo Marginal)

Source: PNO, BBVA

However, in higher productivity scenarios (for instance, 3%), note that both on the graph and the table above (except for those affiliates starting at age 18 and contributing from the very beginning) contributions are yet again insufficient and do not surpass the 1.5% and 2% right-to-pension rates; that is why it is inferred that these replacement rate percentages should be analyzed again, although chances are they can not be reduced any further.

Alternatively to the analysis regarding how much accrued annual contributions are able to procure the right-to-pension as offered by the system, this reform's criterion could be analyzed based on subsidy levels and their redistribution or focalization to lower income levels. To this end, we will define a "state subsidy" indicator representing the difference between the self-funded replacement rate and the one offered by the system itself.

Replacement rates offered by NPS are shown below in two separate scenarios (See Table 3-4). The first one portrays the situation before the parametric reforms were undertaken (i.e. 50% base replacement rate and 4% marginal rate), and the second one simulates the reform's effects by age groups (decreasing base replacement rates and a 2% marginal rate). Both scenarios have assumed the following affiliate traits: initial salary equal to the MVC (S/.550), 3% productivity, occupational time frame of 18-64 years of age, 70% contribution density, 13% contribution rate, 4% actual profitability rate, pension adjusted to the same productivity rate and widow benefits.

Table 3-4 NPS Subsidies

(4% Actual Profitability Rate)

	Age	Years of contribution	Current replacement rate	Self-fin replacement rate	Subsidy
Without reform	All	33	102%	31%	71%
With reform	61 or more	33	76%	33%	43%
	55-60	33	71%	33%	38%
	45-55	33	66%	33%	33%
	35-45	33	61%	33%	28%
	35 or less	33	56%	33%	23%

Source: PNO, BBVA

In the unreformed scenario it is readily noticeable that the affiliate would only fund 31% of each pension monetary unit while the State would cover 71% of his replacement rate. It was considered, therefore, that this subsidy percentage required a gradual reduction, thus

affecting to a lesser extent affiliates about to retire and to a greater extent young and future affiliates. However, even for the case of younger affiliates, there is still a 23% subsidy. That might be due to the fact that the simulation herein presumes that pensions grow above inflation at a 3% rate and consequently, the capital required to fund the pension also grows despite the reduction in the replacement rate. Yet, in a rather optimistic scenario where contributions yield amounts to 6% (see Table 3-5), NPS would pay actuarially balanced pensions whose offered replacement rate is practically funded by worker contributions and no state subsidy is called for.

Table 3-5 NPS Subsidies

(6% Actual Profitability Rate)

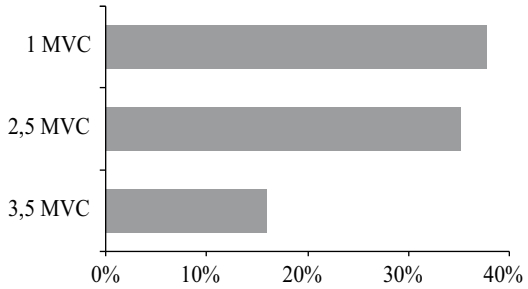
	Age	Years of Contri-bution	Current replacement rate	Self-fin replacement rate	Subsidy
With Reform	61 or more	33	76%	55%	21%
	55-60	33	71%	55%	16%
	45-55	33	66%	55%	11%
	35-45	33	61%	55%	6%
	35 or less	33	56%	55%	1%

Source: PNO, BBVA

Regarding subsidy focalization by income brackets, it is shown that in addition to the decreasing trend in subsidies by cohorts, the action is also progressive since by having minimum and maximum pensions, lower income workers end up getting higher subsidies at their replacement rates as compared to higher income workers. See Graph 3-12.

Graph 3-12 Subsidies by income brackets for the 55-60 years old cohort

(45% replacement rate, 4% profitability rate)



Source: PNO, BBVA

That is particularly true for workers getting minimum pension. Indeed, those workers who, because of their labor condition (with no higher education and low productivity), keep relatively lower compensation throughout their occupational life will most likely get the system's minimum pension. In these cases, it is justifiable to grant state subsidies in order to protect this group against poverty.

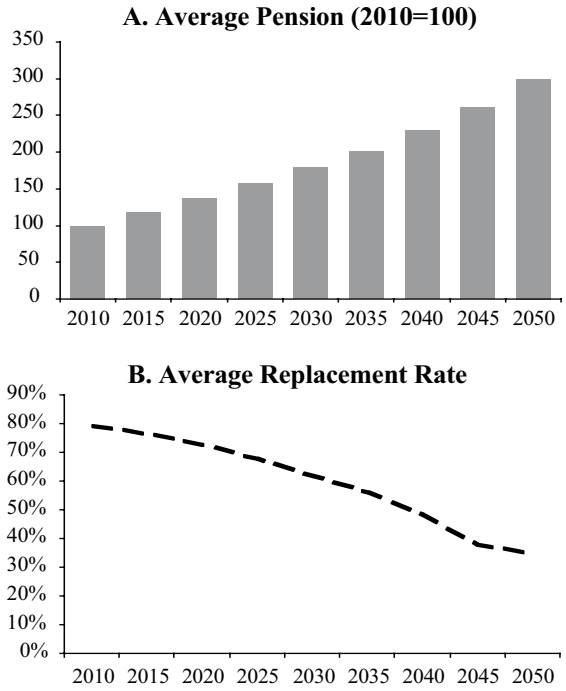
From the foregoing analysis, it can be inferred that reforms made to the NPS have sought to provide the system with a better balance by somehow linking contributions to the offered replacement rate while at the same time an attempt is being made to reduce and focalize subsidies to replacement rates for those of lower income,. These attempts would ultimately bring greater fairness to pensions in the long term and a reduction in the previsional deficit.

Approaching year 2050

In this scenario the projection is that NPS's average pension would grow almost threefold as compared to that of the year 2010, but at decreasing replacement rates since the gradual reduction imposed by the reform would make for pensions to be adjusted to more

sustainable levels without ever falling under the minimum pension level. See Graph 3-13 A.

Graph 3-13 Pension evolution and replacement rate in NPS



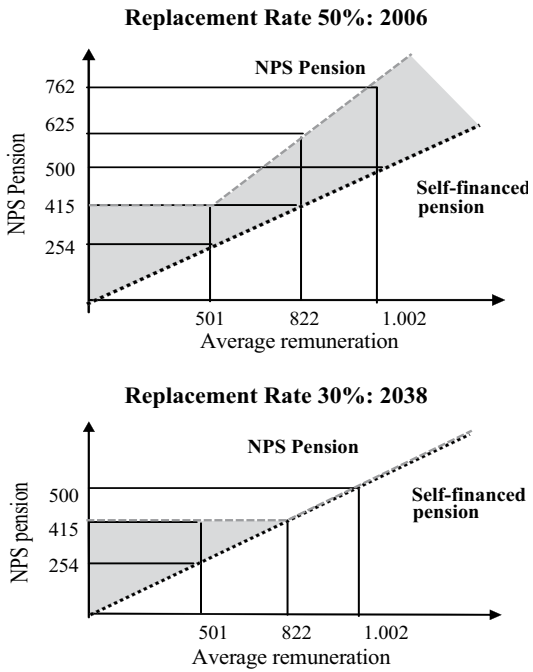
Source: DS N° 099-2002, PNO, BBVA / Production: BBVA

Note the difference between these average replacement rates and the ones in Graph 3-8. At the beginning, these rates are above the base rates since they take on the effect of the marginal replacement rate per each additional contribution year. For instance, over the first years in the projection, there are relatively high average replacement rates (around 80%) since they are a reflection of the retirement of cohorts who are entitled to the base replacement rate (50%) plus an extra 2% per each additional contribution year. In turn, towards the

end of the projection, the average replacement rate decreases because workers will get retirement at lower base rates (30%), therefore, despite the 2% increases, they will not get the same replacement rates as the ones seen today.

On the analysis by salary level, it is seen that those affiliates having higher salaries have a tendency to get lower pensions in time (in real terms) as it compares to the current situation. This is because at current replacement rates (above 50%) they end up getting higher pensions than the ones they would get on their own —through contributions made during their active employment—. Nevertheless, as decreasing replacement rates are applied these pensions would be corrected and the gap between NPS and worker self-generated pensions is reduced. See Graph 3-14.

Graph 3-14 Subsidies per Replacement Rate



Source: PNO / Production: BBVA

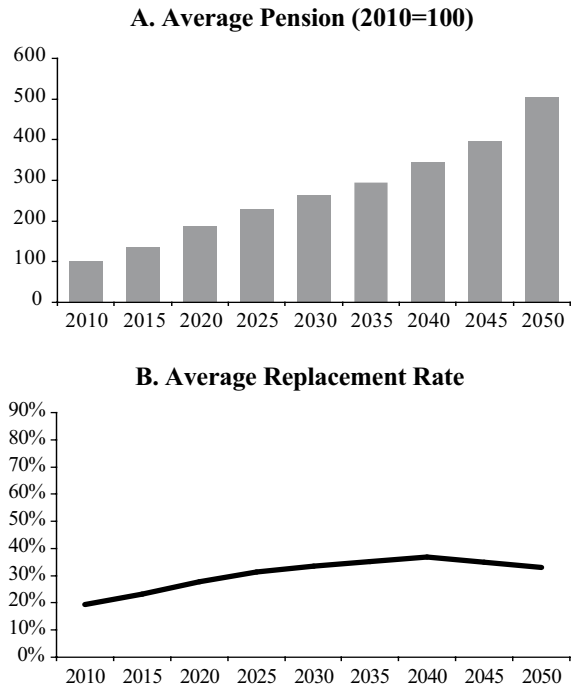
The foregoing is of special relevance, and it is worth analyzing whether most NPS affiliate workers are negatively impacted by reduced replacement rates. Data analysis establishes that they are not. Firstly, current replacement rate levels allow for there to be a differential between self-funded and granted pensions. Secondly, it should be noted that in no case do NPS pensions fall under the Minimum Pension, because of which, regardless of any future reduction to base replacement rates, the existence of this minimum level already guarantees lower income worker pensions. Plus, it should be said that reduced replacement rates allow focalizing subsidies on the least protected or lower-income workers. The shaded area in the graph above points out the subsidies granted according to income levels in 2006 and those verifiable by 2038.

PPS

In what concerns PPS, pensions display a growing trend derived from compensation evolution (positively influenced by economic growth and productivity improvements), higher contribution frequency (that would positively respond to reductions in informality and improvements in labor conditions) and overall fund profitability. Thus, the average PPS pension before year 2050 would be four times the 2010 value. See Graph 3-15 A.

With regard to the replacement rate, an initial rising trajectory is projected that will tend to stabilize towards the end of the projected time frame. Thus, before year 2010 there is a starting rate of 19% and it is expected that in year 2050 rates will reach around 33%. See Graph 3-15 B.

Graph 3-15 Pension Evolution and PPS Replacement Rate



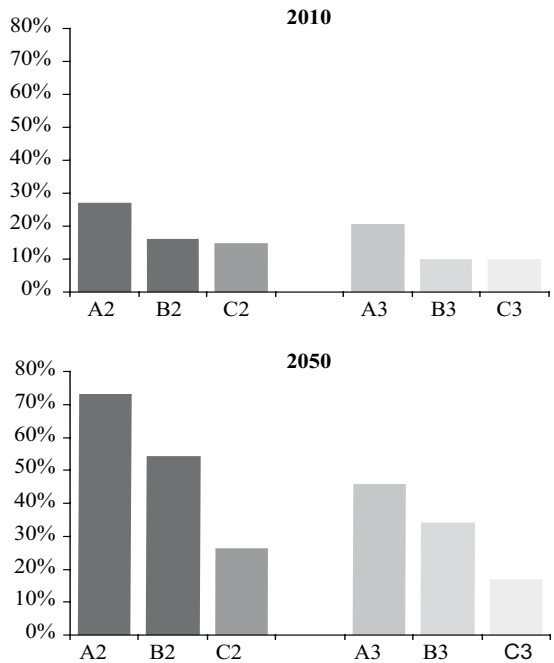
Source: BBVA / Production: BBVA

It is worth pointing out that for a same affiliate group there is a broad dispersion in income levels and contribution density. Hence, the situation upon retirement should be analyzed by accounting for these parameters; to that end, the groups have been established by income level and contribution frequency. Thus, replacement rates for workers can be studied according to income levels (2: medium-income or 3: high-income) and contribution frequency (C: low, B: medium. A: high). If the situation for each group by the year 2010 is compared to the one in they would have by 2050, it is seen that the replacement rate would grow for everyone, yet not as much for high income workers. This outcome is partly due to the assumption that high income workers have got greater occupational mobility accompanied

by improved compensation during their active career. That's why income over the last years of this group's labor life increases the average income that is used to calculate replacement rate and therefore, the ratio tends to be lower.

Nonetheless, regardless of income level, it could be said that at higher contribution densities, replacement rates tend to be greater as well (in this way, the rate for affiliates in group A will be higher than those in B, and this in turn higher than those in C). This is consistent with a higher saving profile, that is why it is so important to have a system fostering contributions for the greater part of the labor life. See Graph 3-16.

Graph 3-16 Replacement rate for workers according to density and income in PPS



Note: 2: income between S/.500 and S/.800; and 3: income above S/.800. C: contributing from 10% to 50% of times; B: from 50% to 90%; and A: from 90% to 100%.

Source and Production: BBVA

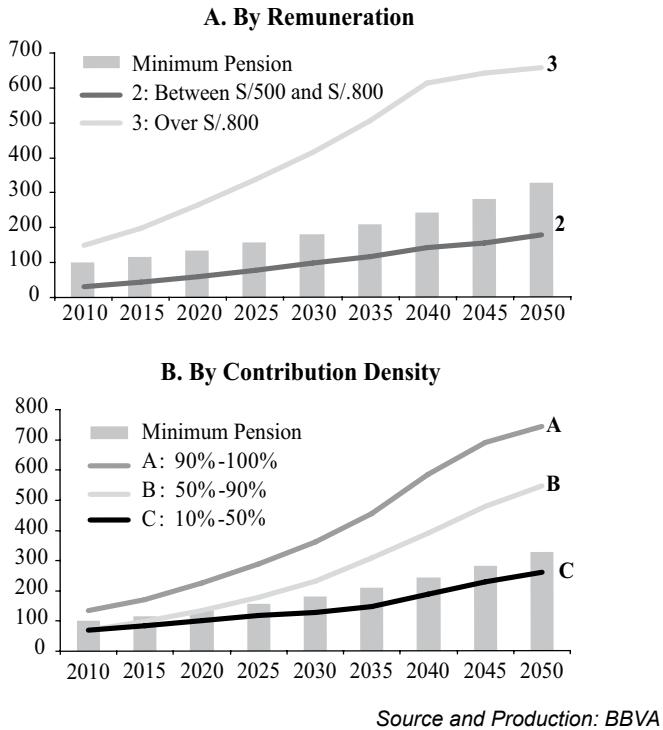
An advantage of analyzing groups sharing certain common traits is that it allows for identifying common problems, in particular, lower-income and lower-frequency contribution groups. For instance, the situation for medium-income workers is concerning if their pension amount is compared to the minimum pension in effect at NPS. Indeed, the projection to the year 2050 would point to them getting an average pension equivalent to almost two thirds the minimum pension amount. See Graph 3-17 A.

Likewise, when analyzing by contribution density, it is verified that, assuming the same income level, to the extent that workers participate more actively in the system through their contributions, the better the odds of gaining access to higher pensions. Thus, workers contributing at least 10 times a year (Group A, at a 90% to 100% density) will get higher pensions than those contributing at least 6 times a year (Group B, at a 50% to 90% density) and at least once a year (Group C, at a % to 50% density). Moreover, over the projected time frame, lowest density workers, Group C, would on average only fund pensions below the minimum pension. See Graph 3-17 B.

From that, it becomes clear that a high-income, high contribution density worker will be in a much more advantageous situation than a medium-income worker, and than a worker who also has low density. Given that high-income workers are, on average, located above the minimum pension throughout the projection time frame, it is appropriate to analyze what would happen to medium-income workers according to their different contribution frequencies. Since these are the least favored groups it should be necessary to assess what the purchasing power of their pensions would be.

Graph 3-17 PPS Pension as compared to minimum pension

(Minimum pension by 2010=100)



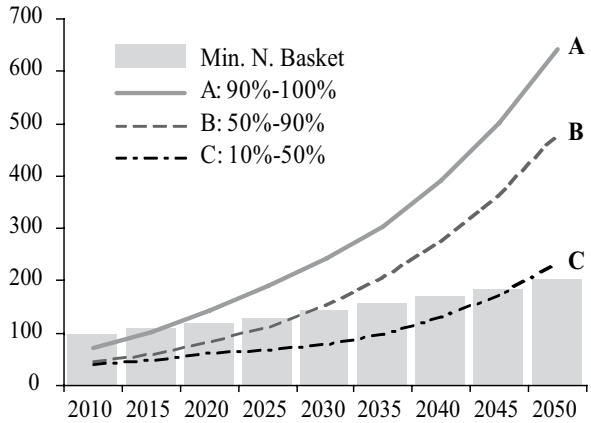
Source and Production: BBVA

Medium-income workers keeping some regularity in their contribution (contribution density starting at 50%) manage to fund pensions allowing them to procure at least one basic needs basket for the greater part of the projected timeframe.[32] On the opposite side, those workers not being consistent in the frequency of their contributions (contribution density between 10% and 50%) would only get pensions above the value of the basic needs basket in the year 2050. See Graph 3-18.

[32] The basic needs basket allows measuring household well-being by appraising all goods and services consumed. This information is drawn from NIIS (consumer price index).

Graph 3-18 Basic needs basket and pension for medium-income workers in PPS, per contribution density

(Basic Needs Basket by 2010=100, medium-income: between S/.500 & S/.800)



Source: NIIS, BBVA / Production: BBVA

These results show that in spite of a growing trend in pensions, over the next few years, many workers —medium-income and reduced contribution frequency— will not get adequate pensions that guarantee a minimum level of consumption. In order to resolve this situation it is necessary to study steps aimed at dealing with this problem, but that also incentives contribution amongst these workers, thus providing them with better pensions.

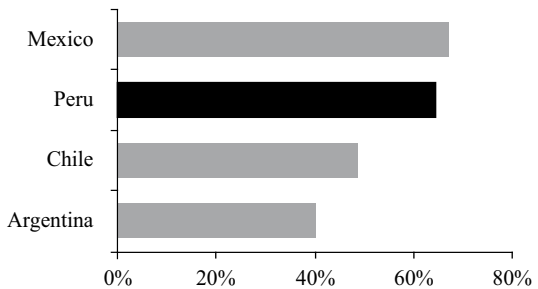
3.2.2. Comparison with other countries

Pension levels and replacement rates by country depend on numerous factors such as savings tendency, economic development, profitability and income levels. According to the World Bank (Holzmann and Hinz, 2005) the experience observed in workers with comprehensive

occupational careers shows that the net replacement rate should be at around 40%, the level that could cover for basic needs in old age. It is worth noting that Hinz recognizes at the same time that lower-income workers will require higher replacement rates while higher-income workers would do with lower rates.

As provided by this theoretical context, establishing optimum replacement rates and pension levels is rather difficult since they oftentimes depend on each country's situation. Replacement rates for some countries are shown below in order to assess how low or high are the ones in the Peruvian system. By December 2006, the average replacement rate in the Peruvian pensions system was at 67% and it was primarily due to NPS conditions, where the average rate for that year was 79%, whereas the PPS rate was 19%. As compared to Latin American countries, the foregoing results placed Peru slightly under Mexico, but above other nations such as Chile (49%) and Argentina (40%). (See Graph 3-19).

Graph 3-19 2006 Replacement rate by countries



Note: these are representative rates for the entire pension system in each country.

Source: BBVA

In addition to that and for reference purposes only, if replacement rates were analyzed on an income basis, for OECD countries (Pension at a Glance, 2005), it was found that Canada, the United States, England and New Zealand are in favor of re-distributional schemes since they grant lower replacement rates to higher income and higher rates as income levels decrease. See Table 3-6.

Table 3-6 Gross replacement rates by income level

(Male, average gross salary prior to retirement)

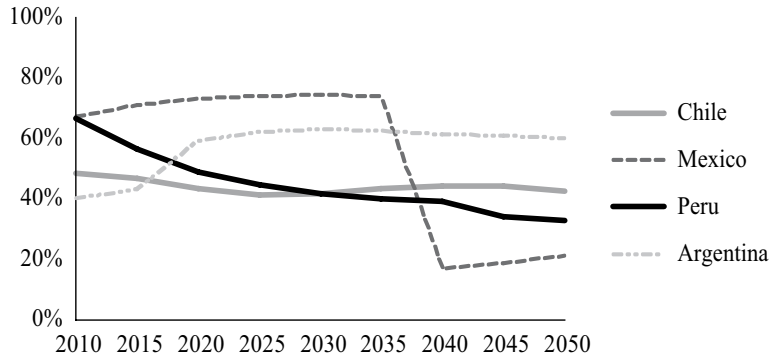
	Number of Salaries					
Country	**0,5**	**0,75**	**1**	**1,5**	**2**	**2,5**
Canadá	72%	52%	43%	28%	21%	17%
New Zealand	75%	50%	38%	25%	19%	15%
U. Kingdom	67%	46%	37%	29%	23%	18%
United States	50%	42%	39%	33%	28%	25%

Source: OECD (2005)

Back to the Peruvian case, while Graph 3-19 shows that current replacement rates are not low, as parametric reforms bring about an increased focalization over the years to come, the forecast is that replacement rates will start reflecting a rather direct relationship between accruals and grants, because of which the rates will converge at 33% by the year 2050.

The projection for other countries in the region shows that Chile will have a similar scenario (43% rate). On the other hand, the Argentinean rate would be at around 60% and Mexico would have an adjustment derived from ceasing pension retirement for the population in transition by the year 2035, thus reaching rates at around 21%. See Graph 3-20.

Graph 3-20 Evolution of replacement rates by country



Note: these are representative rates for the entire pension system in each country.

Source: BBVA, Argentina's Ministry of Labor / Production: BBVA

In summary, while the Peruvian system is currently granting significant average replacement rates, over the projected time frame granted replacement rates will become increasingly consistent with worker savings levels, and through parametric adjustments taken by NPS, a better focalization of the transfers will be attained. As analyzed on the section above, however, a significant group of workers —medium-income and low contribution frequency— will not procure appropriate replacement rates. Consequently, just as for the coverage issue, steps oriented to improving pensions have to be studied.

3.3. The previsional deficit

As provided all throughout this study, the performance of the pension systems can be analyzed via two core subjects: coverage and pension sufficiency. Yet, such assessment should also include another essential aspect: financial and actuarial sustainability of systems in time. With that in mind, this paper outlines a broad definition of

what we are hereby calling "previsional deficit" (which is to be used interchangeably with the terms "previsional cost" or "fiscal cost"); two indicators are put together for measurement purposes and a projection is made to 2050 comparing it to the unreformed status and to other countries in the region.

Indicators

Following pensions literature definitions and within a reform and transitional context, we define the total previsional deficit in Peru as the sum of the following components:

- The operational deficit in NPS, which is defined as the difference between contribution income minus pension-related expenses.
- The deficit in the reform regime of DL 20530 whose definition is similar to DL 19990, except that this regime has been closed (by constitutional order) to new affiliates.
- Recognition Bonds payments comprised of payments made by the State to workers who contributed on the former pension system.
- Minimum Pension subsidies, Supplementary Bonds and disaffiliation to PPS, defined, in the first case, as the missing resources the State transfers to PPS for those workers who cannot fund a minimum pension; in the second case as complements that the State transfers to even up pensions of older affiliates who are near PPS retirement; and in the third case, the subsidies are defined as an increase in NPS previsional deficit that would make workers de-affiliate from PPS (cases forecast by Acts N° 27617 & N° 28991).[33]

It is worth clarifying that the assessment for this deficit is twofold: i) at present actuarial value and ii) in annual terms. In the first case, present

[33] It should be clarified that the simulation has assumed that the de-affiliation cost includes minimum pension payment costs within PPS.

actuarial value is the sum of the present values all the annual deficits within a given time frame brought together at one specific time at a 4% discount rate. The term "actuarial" is expressly needed since it is not about actual flows in time, but about stochastic flows whose evolution depends on occurrence probabilities of disability or death. In the second case, annual deficit is just the difference between income and expenses for any given year.

3.3.1. The system approaching year 2050

In this context, it is seen that over the projected time frame the system's total deficit will have a decreasing trend brought about by writing off the obligations in the DL N° 20530 regime, by redeeming recognition and supplementary bonds, minimum pension guarantees, and by the De-affiliation Act.

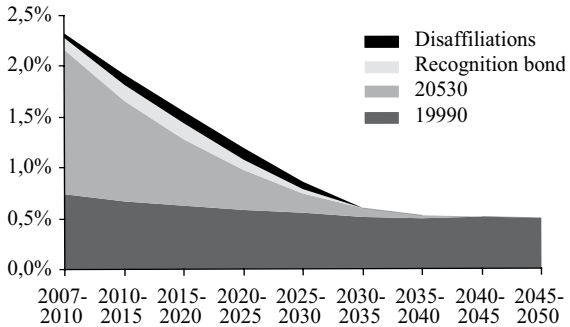
The first case is about a regime in which the majority of its population is already retired and has been closed to new workers. The second case is about stopping the payment of recognition and supplementary bonds as PPS affiliates, who are entitled to them, get retirement and consequently, there will be fewer affiliates to pay bonds to. Finally, both de-affiliation and minimum pensions do bear costs for a given period of time for as long as beneficiaries stay as a closed group because only PPS affiliates who were enrolled in NPS before 1995 are eligible for this regime and that is why no new beneficiaries are allowed in.

While these obligations will decrease by the year 2035, the deficit will not be completely covered, since DL 19990 burden remains. It has been estimated that this system's operational deficit would go from slightly more than 0.8% to 0.5% of the GDP by year 205.[34] (See Graph 3-21).

[34] This evolution is on pension cost information published by PNO and totals US$ 21.045 billion, under the assumption that NPS is getting new affiliates (having moderate coverage) and that pensions are updated on a yearly basis. Under these assumptions, the operational deficit (as a percentage of GDP) will be covered by the year 2080.

Graph 3-21 Total previsional deficit

A. Previsional Deficit (Percentage of GDP)



B. Present actuarial value 2006-2050 (2006 GDP percentage)

	% GDP
Public System	**52,1%**
NPS - 19990	31,2%
DL. 20530	20,9%
Transición	**5,8%**
Recognition Bonus	3,3%
Affilations Cancelled	**2,5%**
Pension Debt	**57,9%**

Source: PNO, MEF, SOB, BBVA / Production: BBVA

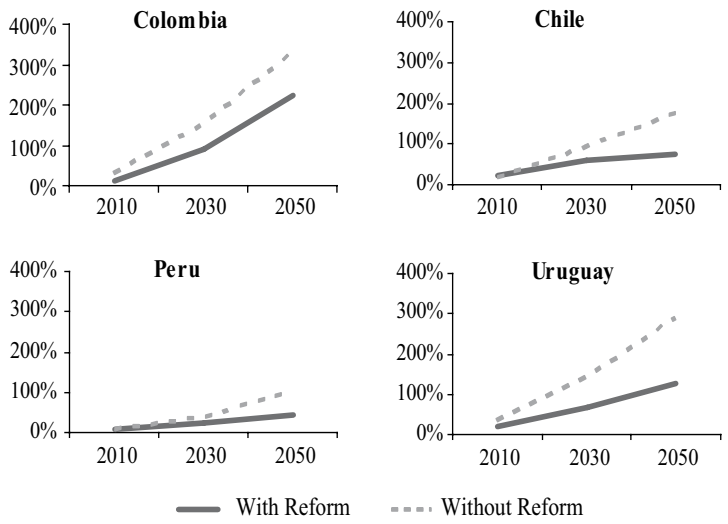
At present value, the deficit represented 57.9% of the GDP in 2006; while this percentage is indeed significant as compared to macroeconomic ratios such as debt/GDP, it is not such a high cost if compared to the situation before the reform and to obligations that countries like Colombia and Mexico are facing. Moreover, only Peru and Chile are having decreasing trends in their previsional costs.

3.3.2. Comparison with other countries

The previsional deficit prior to the 1992 reform

There are not many studies on the effect of implementing the Peruvian reform on previsional costs. However, a few authors such as Carmelo Mesa-Lago (2000) and Zviniene and Packard (2004) have concluded that in most Latin American countries fiscal costs have been reduced by previsional reforms regardless of the model (replacements, parallel or blended) and have compared that cost to what would have happened if a reform hadn't been implemented. Estimated reductions are shown on the graphs below.

Graph 3-22 Simulation of Reform's impact: pension debt



Note: the explicit debt has been considered

Source: Zviniene and Packard (2004)

The estimations by Zviniene and Packard (2004) are conclusive in the sense of the reform having reduced fiscal pressures. For the Peruvian case, the estimate for the previsional debt at present value went from 104% to 43% as a result of the reform itself, representing a 61% reduction in the GDP. It is worth clarifying that this estimate considers the accrued explicit debt for the 2001-2050 period (based upon the PROST model from the World Bank) under a scenario in which PPS has not been implemented and no parametric changes are introduced in NPS, except for an increase in the contribution rate from 9% to 13%. Under the reformed scenario, the explicit debt estimate presumes a 100% contribution density, no need for minimum pension and no cost for Recognition Bonds or transfers (or desaffiliation) from PPS to NPS.

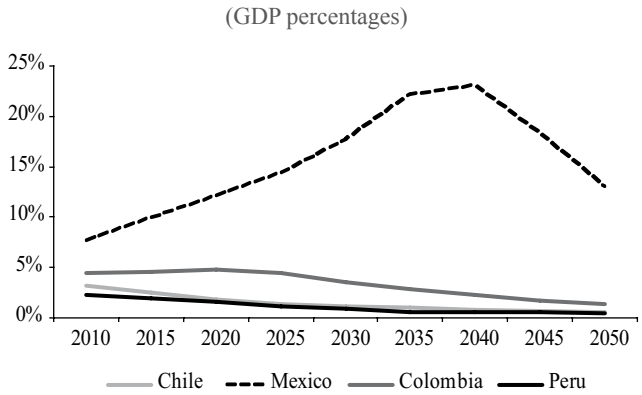
In the results assessed by Carmelo Mesa-Lago (2000) the 2050 projection showed that Argentina and Uruguay would have an annual reduction between 5% and 6%, and a 3% previsional deficit as a GDP percentage respectively.Mexico would have a 2.75% reduction by the year 2030, and Colombia, a 1% to 1.5% reduction by 2025.

It should be noted, though, that reductions seem rather moderate in parallel type models (Colombia, Peru). In that regard, the literature establishes that while this model as well as the blended one are not necessarily reducing fiscal costs in the long run, they are good for differing them considerably. In fact, it is feasible to implement profound reforms in public programs reducing fiscal costs and allowing for a smoother transition (unlike the replacements model which implies a longer transition term). That is particularly true for the Peruvian case where marked parametric adjustments have been made for the system over the past 15 years, thus contributing to reducing financial unsustainability in time.

Comparison with other countries: Chile, Mexico and Colombia before year 2050

Likewise, when comparing fiscal costs by 2050 to other countries in the region, it is found that only Chile and Peru have decreasing trends in previsional costs from the first years in the projection, which in consequence, would not cause significant pressures to public finance. On the opposite end, Mexico will face major fiscal pressures in the years to come, particularly between 2030 and 2040, and such pressures would only ease up towards the end of the projection. For the Colombian case, while the trend of previsional costs is also decreasing, that would only be clearly seen starting in the year 2025. See the Graph below:

Graph 3-23 Evolution of previsional deficit in Chile, Mexico, Colombia and Peru



Source: PNO, MEF, Ministry of Finance (Colombia), Ministry of Finance (México) and BBVA / Production: BBVA

In this context, by the numerous reforms passed, it could be observed that the Peruvian pensions deficit trajectory over the following years in GDP percentage terms would have a sustained decreasing trend and would not cause significant fiscal pressures. Its trend is surprisingly similar

to the Chilean deficit, yet any and all comparisons should be made cautiously by accounting for each system's particularities, mainly coverage differences.

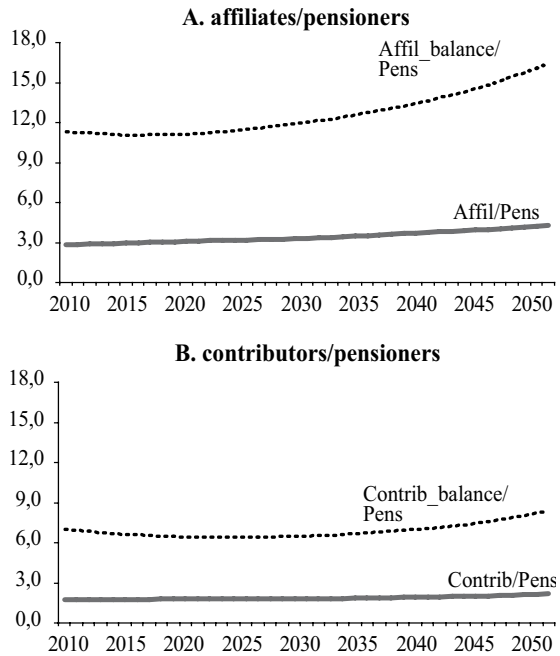
Finally, in spite of all these accomplishments and into the future, we must not neglect the fact that the system's financial situation is sensitive to its own parameters and to labor and demographic changes. Political pressures to raise pensions and demographic changes such as life expectancy growth could very quickly take the deficit up. Therefore, it is essential to make regular actuarial appraisals of these scenarios in such a way that proper planning is made on the system's design.

Sensitivity of the Previsional Deficit in the face of Demographic, Parametric and Political Changes

An important item to underline is that increasing life expectancy rates and a reduction of fertility rates will result in an aging of the Peruvian population, which will in turn lead to have more old people demanding pensions and fewer young people contributing to them.

As an example, if a simple simulation is ran for the affiliates to pensioned individuals ratio and for the contributing individuals to pensioned individuals of NPS ratio ("dependency rates"), it is found that there are currently three affiliates per each pensioned individual and fewer than two contributing individuals per each pensioned individual. That is reflected on to the system's current deficit. If these ratios were projected to the year 2050 so as to check whether any significant improvements occur, the results would show that dependency rates will not improve substantially, thus conveying the idea that the system's income flow will not increase notably through new affiliations either. See Graph 3-24.

Graph 3-24 NPS Dependency rate projection



Source: PNO / Production: BBVA

Moreover, in this very graph, it can be seen that if an exercise is made to estimate how many affiliates or contributing workers are called for to balance the system, the resulting figure is 4 times as many workers as the current number. Taking the projected demographic evolution into consideration, it would be difficult to achieve this number of workers.

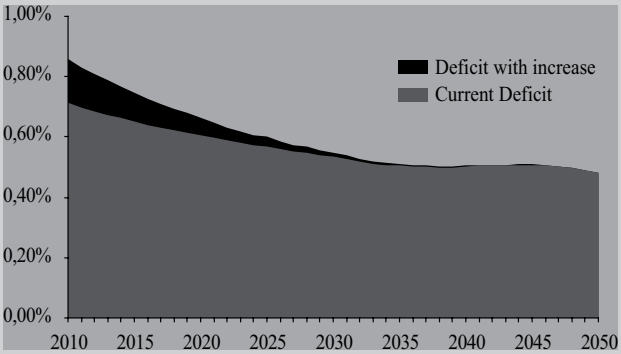
On the other hand, non-demographic factors also have an impact on the deficit. For instance, reversions to implemented parametric reforms —such as retirement age reductions, removals or increases to pensions ceilings or replacement rate increments— and pressures to increase pensions could have major impacts on the deficit. See Table 3-1.

Box 3 1 NPS deficit sensibility in the face of pension increases

The evolution projected for the operational deficit is sensitive to eventual reversions to adjustments implemented from the past decade. In this sense, the fiscal effect of pressures (such as lowering the retirement age, removing or increasing pension ceilings, among others) should be considered since they could be a step back in implemented parametric reforms. While these aspirations are aimed at providing pensioned individuals with a higher level of wellbeing, they are also contrary to efforts made to reduce the system's financial unsustainability.

As an example, the graph below presents a simulation on how the system's deficit is increased in the face of a single overall increase of S/.100 in retirement and widowhood pensions (provided that the increase happens today).

Graph 3-25 NPS deficit simulation under an S/.100 increase to pensions
(GDP percentage)



Note: No consideration has been given to disability, orphanage or benefits to ascendants

Source: PNO / Production: BBVA

An increase like this would render an additional pension cost of about USD 2 billion at present value that would consequently increase the previsional deficit rapidly by about 2 percentage points of the 2006 GDP.

It could be inferred that this cost would increase much more in the event of periodic pension increases without proper funding. In conclusion, the system's performance is rather sensitive to these kinds of factors. In particular with regard to pensions, it could be said that there is a trade off between improving public pension levels and the system's sustainability.

From all the above, it could be said that on the one hand, parametric reforms have been substantial in reducing the system's deficit in the medium term and it is therefore crucial for rules and management to keep on responding to technical criteria and regular actuarial studies allowing to warn about or correct its operability. On the other hand, further analysis is required to determine whether these reforms will be sufficient to adapt the regime, in a timely manner, to the demographic, labor and economic changes in the decades to come.

It is especially relevant to analyze the impact labor changes and contribution frequency might have on the system for current young affiliates. The assessment showed that labor outcomes for Group C in the Private System will make for a large group not to get to contribute for the years necessary to accrue capital and get an adequate pension. This population group is equally important for NPS because —by the evolution of the labor market— it will not meet the minimum requirement of having contributed for at least 20 years.

3.4. Structural factors

Coverage and pension levels seen in the projection allow us to assess the pensions system's status for the years to come. In this way, it has been possible to spot a few deficiencies in the system pointing to the need to make corrections in improving its scope. However, it should be taken into account that the design of a previsional system is just one of the pillars required to provide for appropriate coverage and pension levels, since overall system performance depends on conditions or structural factors in the economies in which it has been implemented.

In this sense, a country's macroeconomic stability as reflected by adequate sustainability of fiscal accounts and the application of consistent monetary policies becomes a requisite for maintaining contributions' purchasing power and securing conditions for the capital market development that would in turn enable an efficient management of pension funds.

In that line, the development level of an economy is a conditioning factor for pension levels as well. According to the per capita GDP rating from the World Bank, Peru is placed within the low income countries group, which restrains the possibility of getting increased contributions and benefits more prosperous nations have. In addition to low incomes, there can also be deficient income distribution problems that may in turn, determine for large population groups to not have pension protection mechanisms. Also, the inability to generate savings surplus and high poverty rates pose a major difficulty for any pension system to have any significant impact in the short term. Thus, for the Peruvian economy, poverty rates are at 69% in rural and 31% in urban areas.

Finally, informal economy conditions are another limiting factor for the better utilization of previsional systems. A highly informal economy implies numerous difficulties for any system, since problems economic agents face in getting and keeping employment restrict the possibilities for contributing in the system. In Peru, informality levels (measured as the percentage of the population without Social Security) are at around 65%. The reasons for this situation might be numerous, including current rigidity in the Peruvian labor market (according to World Bank statistics, Peru's rigidity is ranked second in Latin America).[35]

[35] See Perry et al (2007)

In order to conveniently assess, therefore, how a previsional system works one should necessarily account for the structural conditions of the context it works in. In general, it seems evident that any set of recommendations that could be presented for maximizing the efficiency of a social security regime should be subject to another set of restrictions that may be more or less important depending on a country's extent of development. Appendix VII deals with these subjects in depth.

Reform proposal

The projection carried out towards the year 2050 showed that the coverage levels present a growing trend and will keep improving towards the year 2050 as compared to the current situation. Nevertheless, over the next years 6 out of every 10 people in their senior years would lack pension coverage, whereas almost half of the people in their working years would remain outside the pension system.

Regarding pensions, despite the fact that on average they show a growing trend, we can see that there is an important group of workers — with a low level of income and contribution frequency — that in the long run would be getting reduced pensions and that, in some cases, would not be able to cover minimal levels of consumption or would not be able to receive any pension. Additionally, regarding replacement rates, they tend to be more realistic and progressive since they give higher replacement rates to lower-income workers. This allows for the allocation of public transfers to the less protected workers, guaranteeing a minimum pension. Lastly, if we can sustain that the adopted reforms will allow for the consolidation of a better financial sustainability, we also have to admit that the NPS will continue to lose resources and is sensitive to political and demographic risks and therefore it is necessary to keep promoting its actuarial balance towards the future.

Bearing in mind the above and aiming at improving the system over the next years, we might wonder who is outside the pensions system

and what characterizes these workers, as well as — for those who already are part of the system— how could the benefits that the affiliates will receive improve and how we can protect those who under the current system will not be able to perceive any pension. Additionally, we will have to evaluate the fiscal impact of the actions that will allow us to reach the above-mentioned objectives trying to make sure that the fiscal pressure that is generated is feasible. For that purpose, the current chapter makes an analysis of the target population, so that it can later develop specific proposals for that population and later on measure its fiscal impact and cost.

4.1. Target population

Target Population to Increase the Coverage

The working-age population in Peru consists of about 17.4 million people; 14.6 are considered economically active and out of those, 12.8 are between 20 and 64 years of age. This last group constitutes, in general terms, the target population of the pensions system. However, only 4.7 million are covered by the public or private systems.[36] Out of the 8.2 million workers who are outside the system, 49% receive an income under S/.500 whereas 43% receive between S/.500 and S/.800 a month. See Table 4-1.

From the above-mentioned workers, most of the middle- and lower-income ones work for micro or small companies, with less than 50 workers where informality prevails. Therefore, having labor benefits such as Social Security is unlikely. Additionally, the participation of this group can be explained because making contributions would imply a reduction in the levels of consumption and investment. In the first scenario, we must take into account that the consumption of lower-income workers is basically oriented towards the satisfaction of basic needs and, secondly that given the restrictions in terms of access to credit, the accumulation of capital

[36] Figures as of 2005 according to NIIS, MLEP, SOB, PNO and MEF.

gives them the possibility to get productive capital. These hypotheses are consistent with what the life cycle theory suggests, which points out that the tendency for consumption is higher for younger people and senior citizens because they are consuming based on future income or spending savings. Middle-aged people however have a higher tendency for saving as well as having higher salaries.

Table 4-1 Non-covered workers based on coverage and income

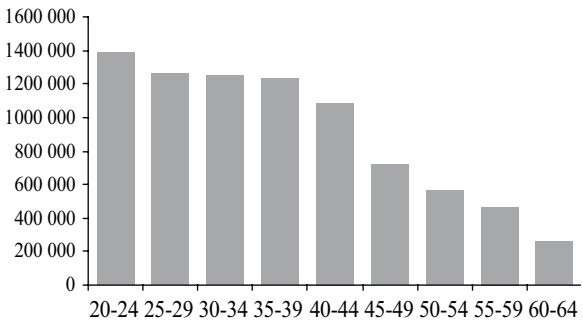
(2005)

	Number of Workers (millions)	Avg. Income (S/.)
Workers covered [1]	4,7	1 371
Workers not covered [2]	**8,2**	**605**
income below S/. 500 monthly	4,0	416
income between S/.500 and S/.800	3,6	641
income over S/.800 [3]	0,6	1 591

Note: It corresponds to workers between 20 and 64 years of age
1/ Employee or freelancer who perform professional or technical activities. 2/ Employees, Employers, home workers not included in group 1. 3/ Made up of freelancers and employers.

Source: Permanent Employment Survey 2005. NIIS, MLEP / Production: BBVA

Graph 4-1 Distribution of non-covered workers by ages



Source: Permanent Employment Survey 2005. NIIS, MLEP /Production: BBVA

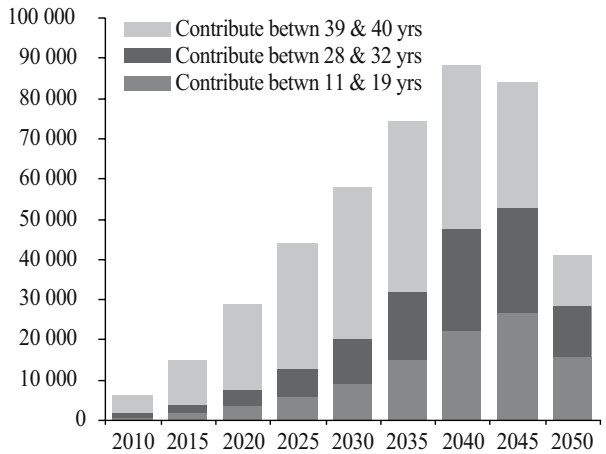
In this context, if we observe the distribution of non-covered workers by ages (Graph 4-1), we will find that an important part of them is made up of young people (under 34 years of age) and middle-aged people (between 35 and 44 years of age). For this reason, this distribution will be the foundation to develop new procedures sufficiently attractive and focused on middle-age groups to improve the coverage so that the worker can decide voluntarily to become an affiliate and has an incentive to make contributions, according to his / her possibilities.

On the other hand, the group of workers without coverage who collect an income above S/.800 is made up of, mainly, freelancers who, even though they currently may not have the obligation to make contributions to the system, have the possibility to make them, based on their income levels. In this case, the low participation of this group could be explained by the preference for cash and/or by the access to other savings alternatives, that may possibly imply a lower retention.

Target population to improve and allow access to pensions

Additionally, there are groups of affiliated workers who would also be an object of concern: a PPS group and the other from the NPS. On the one hand, those workers from the PPS with medium incomes, who despite making regular contributions (an average of at least 28% of the time), will receive pensions that in some cases would have a low purchasing power. These workers represent around 12% of the system and, in the same way as before, they should be considered within some sort of measure that, in time will offer them incentives to participate more actively in the system and that allows them to improve their pension guaranteeing a minimum level of well-being. In Graph 4-2 we can observe a growing trend of this group of workers who manage to make contributions between 11 and 19 years only. Particularly, we will design a proposal for the subgroup that can manage to make contributions for more than 15 years.

Table 4-2 PPS Affiliates in retirement age with income between S/.500 and S/.800

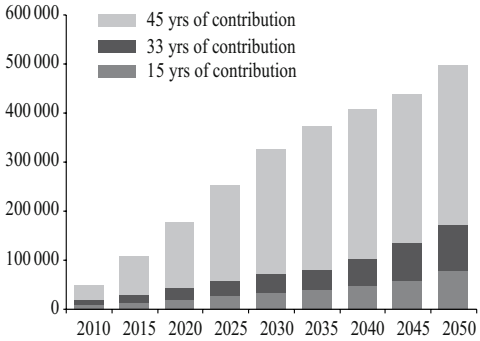


Note: Annual flow. In 2050 we can observe a reduction in the number of medium-income workers as a consequence of the impact on the composition of the socioeconomic levels that the modeled improvements in the economy would have.

Source: SOB, BBVA / Production: BBVA

On the other hand, in the analysis performed for the NPS, we find that around 10% of the medium-income affiliates from the NPS will not manage to accumulate a sufficient number of years of making contributions in order to have access to a minimum pension and would therefore not have a right to a pension. This is because in the current design, the contribution requirement to retire under the general regime is at least 20 years. Therefore, those workers who for several reasons do not manage to surpass this minimum, will obtain no pension, despite the fact they may have made contributions on a regular basis (in average around 30% of the time, which is equivalent to a little over 15 years). See Table 4-3.

Table 4-3 NPS affiliates in retirement age



Source: PNO /Production BBVA

According to that, in the same way as for PPS workers, it is necessary to study some steps that will allow them to have access to a pension that will guarantee a minimum level of well-being, without having an impact on their interest in contributions. We will design a proposal focused on this group of workers.

Bearing in mind the above and taking as a starting point the available information, from the pension systems in the surveys for homes and employment, we modeled the schemes considering the problems of medium-income affiliates as well as workers are currently outside the pensions system, given their characteristics in terms of income levels, ages and occupations. We can point out that, despite the fact we do not have access to information that can reveal in further detail the situation of the workers outside the system, in the following sections we will try, under certain suppositions, to evaluate schemes that could respond to their needs so that they can have access to a reasonable pension in their senior years.

4.2. Description of Proposals

In order to guarantee an income in the senior years of medium- to lower-income workers, we propose to extend the coverage of the system through the implementation of two defined contribution and benefit schemes, these are the programs: *Pension for S/.1 (P1) and Pension for S/.2 (P2)*. Additionally, on the line of extension of coverage, we suggest the *obligatory affiliation of formal freelancers.*

On the other hand, in order to take care of the issues of the affiliates who would obtain low or no pensions, we propose the *extension of the guarantee of the minimum pension in the PPS* and allow the *access to a percentage of the minimum pension with only 15 years of contribution*, both in the PPS as well as in the NPS. At the same time, in order to improve the focus of public transfers, as well as not aggravating the financial situation of the NPS, *we propose the acceleration in the reduction of replacement rates.*

Proposals for coverage extension

Pension plan for S/.1 and Pension plan for S/.2

The first scheme (P1) is oriented towards low-income workers outside the pensions system. The contribution would be of at least S/.30 a month which would be equivalent to saying that every month we could ensure access to the pension by means of saving S/.1 daily.

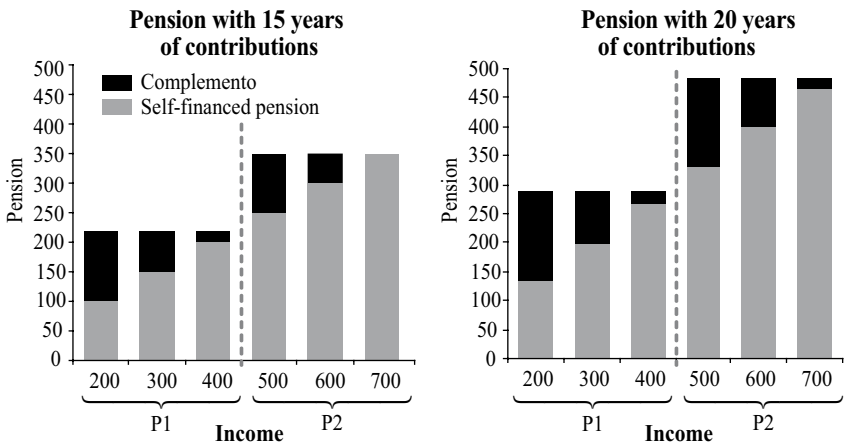
The second scheme (P2) is oriented towards workers who receive an income starting from S/.500, are not part of the pensions system and whose income cannot be traced given their labor conditions. The contribution in each case would be at least S/.50 a month.

In both cases, we attempt to narrow down the amount of the contribution to the equivalent that would correspond if we were to apply a contribution rate of 10% on the salary (referential). For that reason, this contribution

should be adjusted every year according to technical criteria in order to ensure the purchasing power of the pensions that will be obtained. For example, it could be updated according to salary growth, so that the contribution keeps a relationship with the evolution of income in the economy. Additionally, contributions above the established amounts would be considered as voluntary savings with a previsional purpose.

In each plan we guarantee a percentage of the minimum pension that would depend on the number of years giving contributions, considering 15 years as the minimal amount of time required to be entitled to that guarantee. In the case of P1 it is guarantee 45% of the minimum pension if the worker has 15 years of contributions (see Graph 4-4), but that percentage will increase with yearly contributions until it reaches the 20 years with 60%. The P2 program implies a higher level of contributions; therefore, we have 72% of the minimum pension at 15 years of contributions and 100% at 20.

Graph 4-4 Self-financed pension and guaranteed pension by income level



Note: The self-financed pension is calculated as the pension obtained with 10% of contributions from the referenced salary and with a salary increase of 3%.

Source: BBVA / Production: BBVA

For every year of additional contribution, the people who join the P1 scheme get an average of three additional percentage points of the minimum pension, whereas the P2 will receive an average of six additional percentage points. This way, every additional year of contributions offers the possibility to have access to a higher pension or a higher percentage of the minimum pension, trying to avoid an affectation to the incentives of contributions. See Graph 4-2.

Graph 4-2 Pension guarantee schemes according to years of contributions

(Pension in Nuevos Soles and as percentage of the minimum pension)

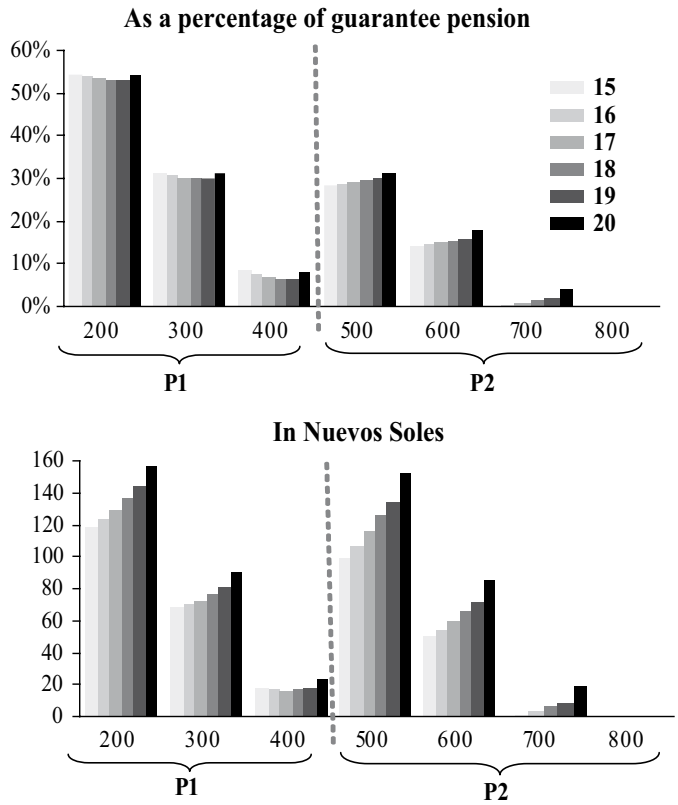
Years	P1	P2
15	218 (45%)	348 (72%)
16	230 (48%)	373 (77%)
17	242 (50%)	398 (82%)
18	256 (53%)	425 (88%)
19	270 (56%)	450 (93%)
20	289 (60%)	484 (100%)

Note: P1 Corresponds to the program "Pension for 1" and P2 to "Pension for S/.2". Yearly minimum pension: S/.484 = S/.415*14/12

Production: BBVA

Additionally, apart from establishing a difference for every additional year of contributions, we also contemplate a differentiated subsidy based on the level of income. This way, considering that for lower-income workers it can be significantly challenging to participate in a savings to scheme, the complement that would be given would be higher for lower-income workers. Therefore, for example, the complement that workers with an income of S/.200 a month would receive would be equivalent to 54% of the guaranteed pension whereas for those of S/.300, it will be 31%. See Graph 4-5.

Graph 4-5 Subsidy by income level and years of contributions



Source: BBVA /Production: BBVA

For a worker to have access to these guarantees at the moment of his/her retirement, he must: i) have made contributions for at least 15 years, ii) make a yearly contribution for at least the minimum amount that is defined in the system where he/she is affiliated (S/.30 in P1 or S/.50 in P2), iii) be at least 65 years old. Additionally, as these schemes become more solid and mature, it would be convenient to incorporate, besides, requirements on the age of the first contribution and the minimum number of contributions a year. This way, we would be looking at

minimizing opportunistic behaviors, for example making the first contribution on age 50.

Obligatory affiliation of formal freelancers

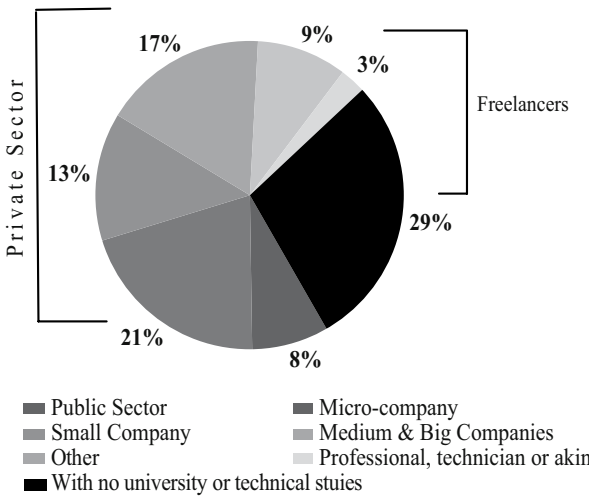
The second step for the extension of coverage of the pensions system establishes that the affiliation of freelancers who work in formal conditions is obligatory, as is established for the case of dependent workers. This way, it is intended that freelancers have the same rights and obligations that dependent workers do in previsional matters. The measure is oriented towards freelancers and formal employers who collect an average income of S/.800. The implementation would imply the discount of the corresponding percentage to the contribution rate together with the retention of the income tax for those workers whose income goes above 7 Taxation units (unidades impositivas tributarias or UIT) a year, which would be equivalent to S/.2500 a month.

While it is true that dependent workers (formal) already benefit from the system through the previously presented programs, we intend to reach lower- and middle-income workers (basically informal), we expect that by establishing obligatory affiliation we can reach the remaining remunerated workers: high-income freelancers.

Potential affiliates would essentially be workers from micro companies under the already-mentioned programs P1 and P2. The obligatory affiliation will cover independent professional and technical workers — who collect a higher income— but also independent nonprofessional workers who are formal. We may point out that according to the Ministerio de Trabajo y Promoción del Empleo (Ministry of Labor and Employment Promotion, MLEP), in the year 2006, freelancers represent 32% of the total of workers in metropolitan Lima; whereas, according to the available information for the year 2000, at a national level this figure goes up to 39%. See Graph 4-6.

Graph 4-6 EAP employed according to market structure in metropolitan Lima

(2006)



Note: 'Others' includes the family worker without an income, home workers, practitioners and others. 'Private sector' includes employers. 'Microcompany' includes from 2 to 9 workers; 'Small company', from 10 to 49 and 'Medium and big', from 50 to more workers.

Source: MLEP–DNPEFP. Survey of homes specialized in Levels of Employment, October 2006

What is needed to make it more effective? Success with this action implies having clearly developed adequate control mechanisms. Periodic inspection policies, inter-institutional agreements, as well as in the medium run a policy of incentives, we believe will promote previsional coverage. In fact, it is possible that a portion of this segment of workers is tempted to avoid contributions to the system totally or partially. Regarding this situation, we believe that a more probable hypothesis is that the group that avoids the payment to the system will become smaller with time, considering that those formal freelancers have incentives to continue being so, may that be because

the companies they usually work for may demand it that way or because they are supervised by control organisms, such as the Superintendencia Nacional de Administración Tributaria (National Superintendent of Tax Administration, NSTA), or services, as in the case of public health systems.

Therefore, for example, according to the NSTA, the number of workers registered as contributors of the Fourth category (contribution of independent professionals such as lawyers, accountants, medical doctors, etc. and nonprofessional trades such as construction workers, carpenters, etc.) is around 3 million contributors; that is to say, these workers already have contact with the formal sector by means of which we could implement a retention scheme in order to make their contributions effective for the pensions system. See Graph 4-7.

Graph 4-7 Registered contributors by type of worker

(Thousands of contributors)

Note: The figures show the number of workers with Registro Único de Contribuyentes (Contributor Registration Number, CRN) for which reason the number of independent contributors registered could be over estimated given the possibility that a dependent worker may also have an independent registration.

Source: NSTA

Nevertheless, despite the implementation of a compulsory nature and access to minimum guarantees that the system offered under these proposals,

it is necessary to study additional incentives that may be offered so that pensions systems end up being more attractive to more segments of the population. Surveys such as the Social Protection Survey (Encuesta de Protección Social) in Chile (which has become a transcendental mechanism and has been institutionalized as a biyearly process) would help to discover which would be the adequate incentives. This becomes a pending challenge.

Proposals to improve and have access to pensions

Extension on the Guarantee of a Minimum Pension at the PPS

We propose to extend the guarantee of a minimum pension for all PPS affiliates since currently this benefit is only applicable to one part of the population, the affiliates who are senior citizens (in transition) and those who were affiliated before 1995, leaving outside the PPS those affiliates who are relatively young. Therefore, we propose to extend this guarantee especially to those younger medium- and low-income workers, since an important part of them will receive low pensions that will need to be improved. Financing for this proposal will be done through a Recognition Bond. [37]

Access to a percentage of the minimum pension after 15 years of contributions.

We also propose to adapt the access requisites to the minimum pension to the Peruvian labor reality. Therefore, we establish that the affiliates of the pensions system (public and private) who fulfill with having contributed for at least 15 years have the right to a guarantee of a

[37] Nowadays, only the NPS affiliates and the PPS workers older than 30 years old are entitled to a minimum pension, if they comply with some specific criteria: i) be older than 65, ii) having made contributions for at Language Exposure Activitiesst 20 years and iii) that said contributions had been made having as a base the minimum vital income for each case.

percentage of the minimum pension, based on the time of the contributions. This action is designed to approach the issue of pensions that on the side of the PPS implies that medium-income workers, despite the fact that they contribute on a regular basis, obtain low pensions, and on the side of the NPS, it implies that the workers do not have the possibility to get this benefit. Therefore, this would be a flexing measure of the guarantee of the minimum pension for any PPS and NPS affiliate allowing access to a percentage of it in both of systems.

As we explained in the diagnosis, low-income and/or low-frequency-contribution workers would obtain low pensions in terms of the levels of consumption capacity and/or minimum purchasing power. Even more serious is the fact that in the NPS there will exist a group that will not have access to any benefit because they do not have at least 20 years of contributions. For this reason, we consider it pertinent to evaluate the schemes that not only generate incentives for contributions, but also allow for the improvement of the conditions of lower-income workers.

If on the one hand this proposal implies flexibility of the current requisite of 20 years, it is extensive mainly for those affiliates of lower income and it is designed based on the years of contributions, and the action would therefore be focalized, it would promote a redistribution improvement on income levels of senior citizens and would not deter contributions meaningfully. Financing would be made through a Recognition Bond.

The World Bank, in its recent study of informality "Informality: Exit and Exclusion" (Informalidad: Escape y Exclusión 2007) has also expressed the need to study potential changes to social protection schemes so that retirement does not rely so much on the labor contract. In this study they propose — apart from the need to implement multiple pillars with the main pillar focalized on poverty — the possibility to carry on benefits from one employment to another and analyze how difficult it is to reach the contribution periods in order to be entitled to a pension for some specific workers. However, we should point out that at the same time they are aware of the importance of aligning these objectives with

the urgent need to generate a higher productivity and promote work and contributions, as well as fiscal sustainability of the systems and a sustained economic growth.

In this sense, the possibility to have access to any minimum pension percentage would be necessary if you take into account that the reality of the Peruvian labor market shows that workers who are not sufficiently trained face serious difficulties In keeping their work positions making them quickly look for survival in the informal economy with the consequent cessation of their contributions to the system. It is for this reason that, throughout the labor life of the worker, going from one job to another under labor conditions that do not necessarily ensure social benefits makes the need to create actions that will help them have access to a pension clear for this group of workers.

Nevertheless, this is not a characteristic particular to the Peruvian system; similar evidence is found for the Chilean case that — despite the fact they have a system that has been operating for over 25 years, have lower levels of informality and show higher economic development — they also have the problem of low contribution levels. In Chile, according to the Social Protection Survey for the year 2002, half the workers contribute 50% of the time, that is to say, 20 years. This shows that, as in the Peruvian case, there still is a group of underqualified workers who receive a low income and go through considerable periods of unemployment which keeps them from making their contributions on a regular basis. See Graph 4-3.

Bearing in mind the above, the guarantee scheme that is proposed would be similar to the one proposed in the Pension for S/.2 (with percentages of the minimum pension from 15 years of contributions), but it would be oriented to the workers who already are in the pensions system (public and private) and which for several reasons do not manage to make contributions for 20 years. The percentages of the minimum pension that are guaranteed to these workers would be the ones shown in Graph 4-8.

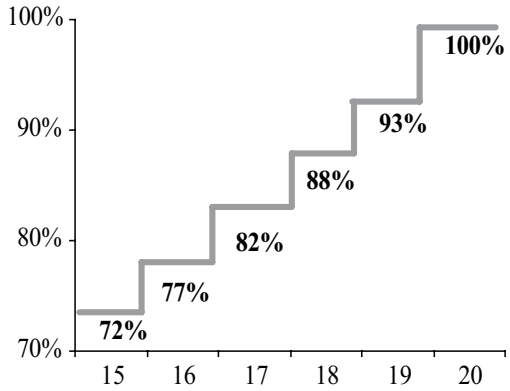
Table 4-3 Contribution Densities in Chile

(2002)

Percentiles	Density
1%	0,0%
5%	0,0%
10%	0,6%
25%	19,0%
50%	53,4%
75%	100,0%
90%	100,0%
95%	100,0%
99%	100,0%

Source: Survey of social protection 2002 /Production: BBVA Chile.

Graph 4-8 Minimum pension guaranteed based on years of contributions



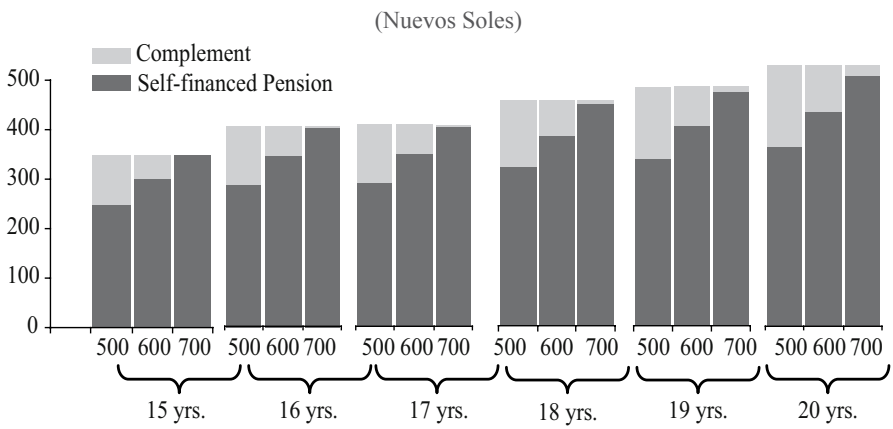
Source: BBVA /Production: BBVA

Therefore, in terms of income level the implementation of this action would be compatible with the target public of the program Pension for S/.2: workers with an income above S/.500. Nevertheless, we intend that the worker

self-selects himself/herself and goes for the scheme that best suits his/her conditions. If the worker is going through an irregular-income situation or his/her employer does not offer social benefits, the worker himself/herself can secure a pension and opt for the proposed incentive programs, based on his/her level of income. On the other hand, if we have a worker who has a better labor situation (in terms of social benefits and not being unemployed for long periods of time) but his income is not as high, it will be convenient for him to participate in the system through variable contributions (10% of his income) with the backup of the percentage of the minimum pension based on the years of contributions.

In fact, this scheme will guarantee that workers get the maximum between the pension that they self-finance, or which results from their savings, and the guaranteed pension according to the time they have been making contributions to the system. Thus, for example, the workers who get an income of S/.500 and make contributions for 20 years would managed to accumulate a fund that would allow them to finance a pension of around S/.332, however they will receive a guaranteed pension of up to S/.484; that is to say, they will benefit with an increase of up to 46% of the self-financed pension. See Graph 4-9.

Graph 4-9 Transfers for minimum pension based on income and years of contributions



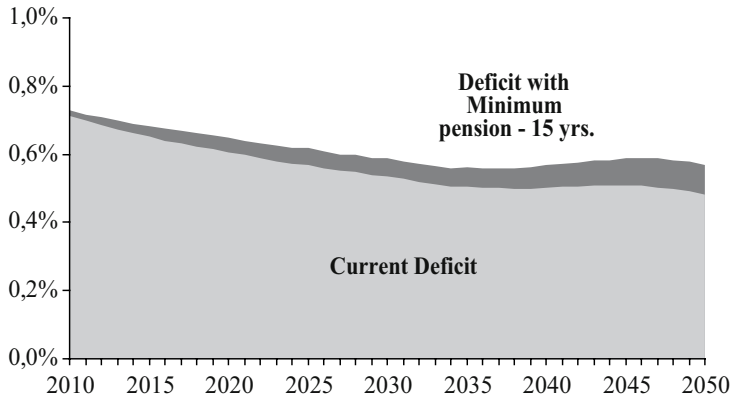
Source: BBVA /Production: BBVA

For a worker to have access to the guarantees of this scheme at the time of his retirement, he should comply simultaneously with the following requirements: i) be an affiliate, ii) have made contributions for at least 15 years, iii) be at least 65 years old, and iv) have a monthly income above S/.550 and less than S/.800.

In turn, the fiscal effect on the NPS of this action is a slight increase of the previsional deficit but without reverting the trend and benefiting approximately 130,000 pension holders who under the protection of the base scenario will not receive any pension despite having contributed with a certain amount of frequency (15 years of contribution). See Graph 4-10.

Graph 4-10 NPS Operational deficit from minimum pension for 15 years of contributions

(% GDP, annual)



Source: PNO /Production: BBVA

In line with the diagnostic of the result of the NPS explained in the previous chapter, and within a context of demographic changes and high vulnerability in terms of the pressures that respond to anti-technical criteria, we consider that in order not to affect the feasibility

in the future of this system, three clear objectives must be considered: i) not to affect its financial sustainability, ii) comply with its fair and redistributive objective, and iii) make an effort to improve their pensions in a focalized way towards those who need them. This proposal addresses this last objective.

Additionally, it is important to bear in mind that the requirement of at least 15 years of contributions, to have access to the guaranteed pension, should be reevaluated periodically in order to reflect the labor situation of the average worker. In this sense, demographic trends point out the need in the future that workers remain in the labor market longer in order to have a realistic operation of the systems. For that reason it will also be interesting that the labor legislation generates incentives for the companies so that they keep their senior collaborators as part of their staff for longer periods of time or make complementary contributions and keep the pensions improving.

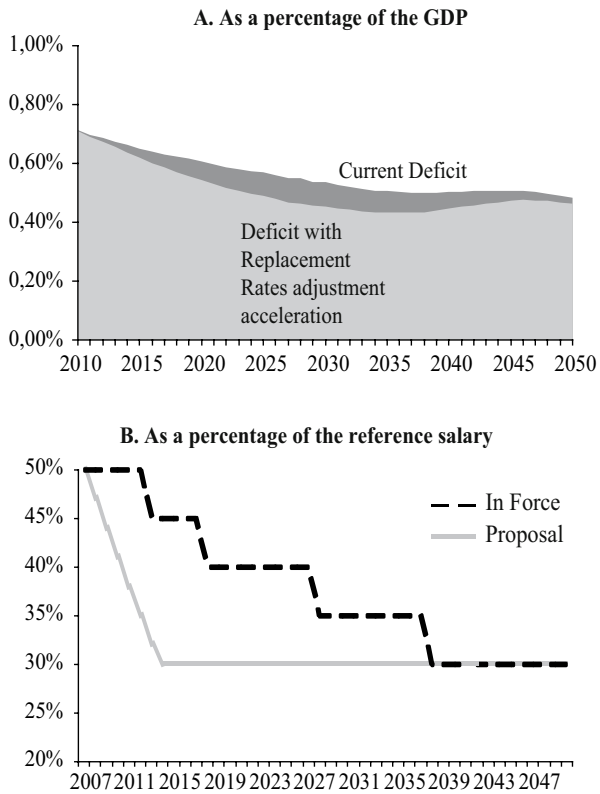
Proposal of a focalization and non-affectation of the financial situation of the NPS

Acceleration in the reduction of replacement rates

In line with the diagnostic of the result of the NPS explained in the previous chapter, the proposal previously described (percentage of minimum pension from 15 years of contributions), while implying a higher previsional cost we believe is necessary, especially for the lower-income segment, and can be compensated with the lower expense that can be achieved if at the same time the reduction of the replacement rates established in the current regulations is accelerated. For that reason, we propose to accelerate the reduction process of the application of replacement rates at a rate of 3 percentage points every year until we reach 30% by year 2014. This action preserves the gradual condition and

would produce a lower expense in the list of pensions. Look at the following Graphs:

Graph 4-11 Reduction of replacement rates



Source: PNO, DS 099-2002 /Production: BBVA

What we intend is to accelerate the application of the adopted disposition in the year 2002 and with this avoid affecting the previsional

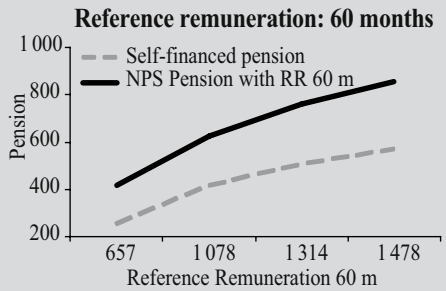
cost of the NPS at the moment of implementing the access to a percentage of the minimum pension as of 15 years of contributions. In tandem with parametric reforms that will bring pensions in line with the self-financed levels based on contributions and the focalization of subsidies only for groups of lower-income workers, the simultaneous application of both actions allows a better situation of well-being under the base scenario, since with the same fiscal costs we can give a pension to more people reducing the number of people without coverage. Moreover, the costs as well as subsidies in the replacement rates continue with a decreasing trend. Another alternative to manage to compensate these costs is to diminish the calculation of the reference remuneration in the NPS. The chart on the following page shows this alternative.

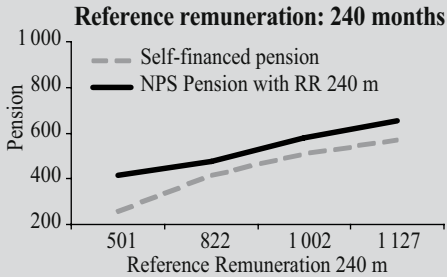
Box 4 1 Softening of the average calculation of the reference remuneration based on a 240-day period

In tandem with the acceleration in the replacement rates, we propose to soften the referred-to reference remuneration (RR) considering for the calculation of pensions, not the average of the last 60 months as established in current regulations, but the average salary of contributions in real terms of the last 240 months of contributions, in other words, practically all working life.

This measure allows us to adapt the calculation of the pension to self-financed values with contributions. If on the one hand in the NPS there are no individual accounts of management of contributions, calculating the pension based on average salary of the working life is equivalent to, in a way, "notionally" introduce the criteria that the pension reflects the contributive effort both in years and in terms of its level. This parametric reform is not unconnected from the international experience and in fact, has been emphasized by the CEPAL for the case of the reform implemented in Costa Rica [1]. The following illustrations allow to visualize the effect of a proposal in the resulting pensions.

Illustration 1 Pensions simulation





Production: BBVA

[1] CEPAL, 2006, "Social protection facing the future: access, financing and solidarity" (La protección social de cara al futuro: Acceso, financiamiento y solidaridad).

Impact Evaluation

5.1. Coverage

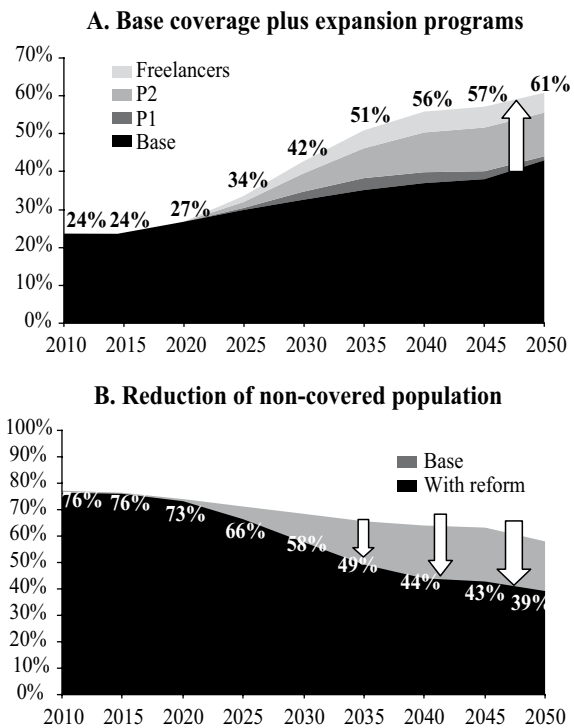
According to the projected scenario, the implementation of the actions established in the previous section would permit old age coverage of 24% and labor coverage of 37% in 2010, to increase to a coverage of old age and labor of 61% and 67% respectively in 2050. In the case of old age coverage, the actions would allow for a gain equivalent to 18 percentage points. Namely, the senior citizens who would enjoy the benefits of the pension system would increase gradually and they would go from 2.8 million pensioners (or 42% of the population older than 64 years) to 4.0 million (61%), in 2050. See Graph 5-1 A.

This situation would be explained, mainly, by the affiliations registered in the program P2. It is assumed that as improvements are observed in the economy, a socioeconomic modification will take place, so the proportion of low-income workers would decrease and the group of medium-income workers would increase (although, it is considered that part of these workers could migrate towards the high-income group). In a similar way, the participation of freelancers in the pension system would increase - because they would start realizing the benefits of the system - and this would encourage them to participate – and also because it is assumed that evasion decreases

- due to a tendency to formalization of the labor market, which should also go along with the development of better supervision mechanisms.

This way, the population outside the pension system would experience a significant reduction, from 72% of the population older than 64 years in 2010 (slightly less than the number registered in the scenario with no reforms for that year) to 39% by 2050. See graph 5-1 B.

Graph 5-1 Projection of old age coverage with reforms



Note: Old age coverage = Retired and population older than 65

Source: SOB, NPO, BBVA / Production: BBVA

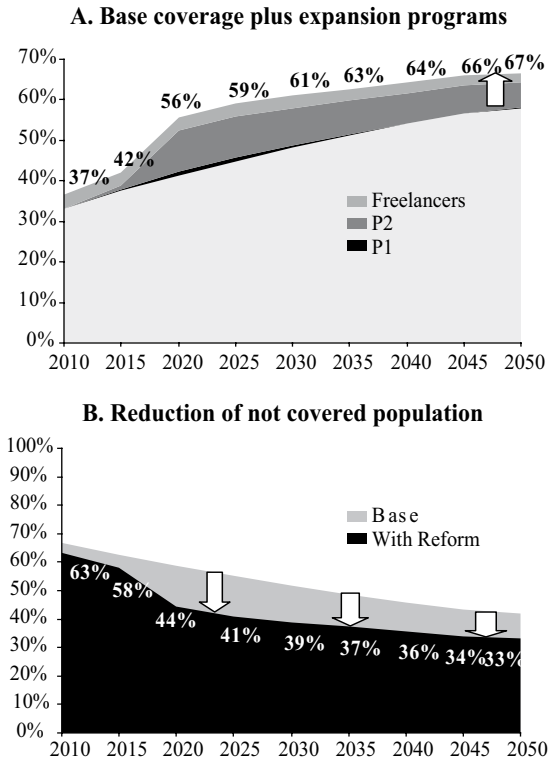
In the case of labor coverage, the programs of proposed incentives as well as mandatory affiliation (in the case of the freelancers) could make the number of workers increase and that in 2050 it will represent 9 percentage points more coverage.

This means that the number of workers who participate in the pension system would grow from 16.3 million affiliated (or 58% of the population between 14 and 64 years old) to 18.8 million (67%), in 2050. See Graph 5-2 A.

This situation would be the outcome of economic growth, the formalization of the economy, as well as the implementation of affiliation schemes in accordance with the reality of the labor market. As it is observed in old age coverage, program P2 would be the main expansion drive of the pension system among workers; although, the action oriented to freelancers would also contribute positively to this result. Indeed, it is possible to observe the impact of these actions on labor coverage in the short run, since the effects of the proposals could be registered from 2010; contrary to what is observed in the case of old age coverage, where the first impacts are presented by year 2025, when the first beneficiaries of the expanded coverage programs will begin to retire.

The more participation of workers the better the levels of old age coverage as the years pass and as long as these workers participate actively in the system, they would be able to accumulate savings for self-financing their income for old age. It is projected that the working age population outside the pension system would experience a significant reduction, from 63% of the population between 14 and 64 years in 2010 (instead of 67% for that year under a scenario without reforms) to 33% in 2050. See Graph 5-2 B.

Graph 5-2 Projection of labor coverage with reforms



Note: Labor coverage = Affiliated / Population between 14 and 64 years

Source: SOB, NPO, BBVA / Production: BBVA

5.2. Pensions

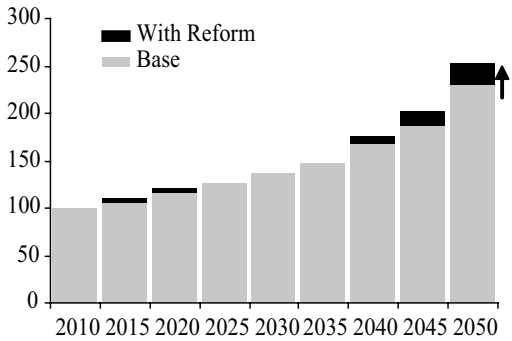
The effect on pensions that results from carrying out the proposals is subdivided in three: the effect on the new group covered (low- and medium-income workers); the effect on the affiliates of the NPS and PPS that have effected contributions for at least 15 years (workers with incomes above S/.500 and below S/.800); and the effect on

high-income workers (affiliates with high incomes plus new affiliates resulting from mandatory affiliation of freelancers).

This way, the projection exercise shows that, in the scenario without reforms, the average pension of the system would show a growing tendency that by 2050 could be 1.6 times the corresponding in the year 2010. This way, in 2050, it would reach a pension 12% higher than the one that would be obtained under the scenario without reforms. See Graph 5-3.

Graph 5-3 Evolution of system's pensions in 2050

(Average system pension in year 2010= 100)



Source: BBVA / Production: BBVA

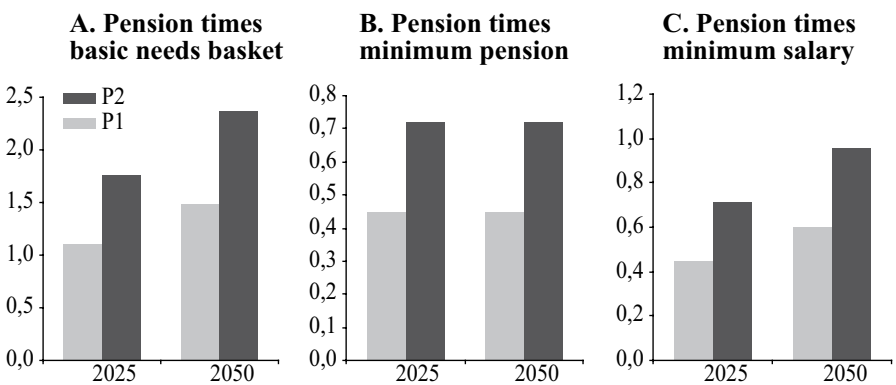
The result of the entire system seems to indicate that pensions, after carrying out reforms, are quite similar to those obtained in the basic scenario, with exception of the last years where a remarkable increase is observed. Nevertheless, the impact for the affiliates according to their salary level as well as the impact inside each system should be kept in mind.

Salary level impact

First of all, in the case of medium- and low-income workers, the immediate

impact of the reforms would be the coverage of a group that would be excluded if certain actions are not undertaken. This coverage implies the guarantee of a pension level in operation at the time of contribution (see Table 4-2). That would allow new affiliates covered by the programs Pension for S/.1 (P1) and Pension for S/.2 (P2) to have an income in their old age that assures them at least levels of minimum consumption. This way, for example, in 2050, low-income workers (beneficiaries of P1) would receive at the time of their retirement a pension that would allow them to acquire 1.5 times the basic needs basket; these pensions are equal, in average, to 50% of the minimum pension or 60% of the minimum remuneration. Something similar is observed in the case of pensions in the program Pension for S/.2. See Graph 5-4.

Graph 5-4 Pension in the Programs Pension for S/.1 and Pension for S/.2



Note: P1: Pension for S/.1; P2: Pension for S/.2

Source: BBVA / Production: BBVA

Notice that the replacement rates that are guaranteed to this group of workers are remarkably high. It is more than justifiable in order to avoid a deterioration of their life conditions and it implies that the fiscal

effort that may be implicit in the implementation of these plans is in line with the prevision policy followed in the last years, which is to focus the subsidies and fiscal resources on the ones who need them in a frame of contribution effort according to their income level.

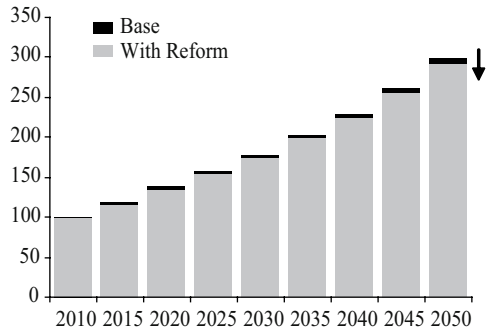
Impact by system

NPS

In relation to the NPS, the result of the acceleration of the replacement rates would be that, in 2050, the average pension of the NPS grows to a slightly lesser extent than in the basic scenario. See Graph 5-5. Nevertheless, inside the system the acceleration of the reduction of replacement rates would only affect high-income workers who under the basic scenario had been receiving some complement over the pension generated by their own contributions. As it was pointed out in the diagnosis, NPS affiliates can not buy with their contributions their rights to the pension offered with a rate of replacement of 50%, 45% or 40%. With rates of replacement of 35% and 30% workers' contributions are enough to buy a good part of their pension rights.

Graph 5-5 NPS Pension Evolution to 2050

(Average pension of NPS in year 2010=100)



Source: NPO / Production: BBVA

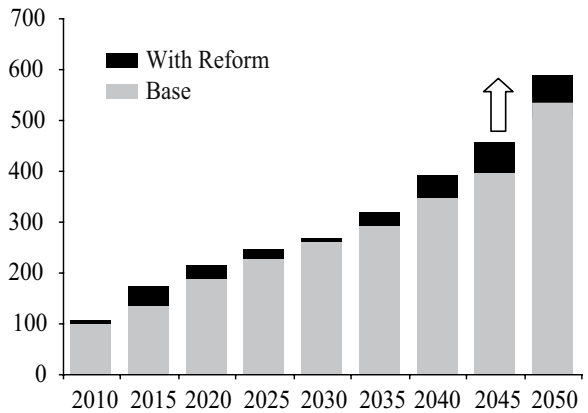
Therefore, the purpose of accelerating the reduction of the replacement rates consists of focusing on the expense that is directed to lower-income workers. It should be clear that this acceleration does not affect low-income workers because they have the minimum insured pension in spite of the fact that the pension they could actuarially obtain with their savings would be lower. In this sense, this smaller expense (or saving) should be dedicated to offer protection to those workers who, in spite of having contributed for at least 15 years, do not receive any pension today.

PPS

In relation to the PPS, the measures to guarantee minimum pension from 15 years of contribution would allow the old age income of medium- or low-income workers to increase; nevertheless, as the coverage of these sectors increases, the average pension of the system, balanced by these groups, grows moderately. Thus, in 2050 the average pension would grow 4.4 times, which represents an increment of 16% regarding the pension that would be obtained without reforms. See Graph 5-6.

Graph 5-6 PPS Pension Evolution to 2050

(Average pension of PPS in year 2010= 100)



Source and production: BBVA

By taking apart the information considering the income level and the frequency of the affiliates' contributions, it can be observed which would be the biggest beneficiaries in the extension and flexibility measure of the guarantee of the minimum pension.

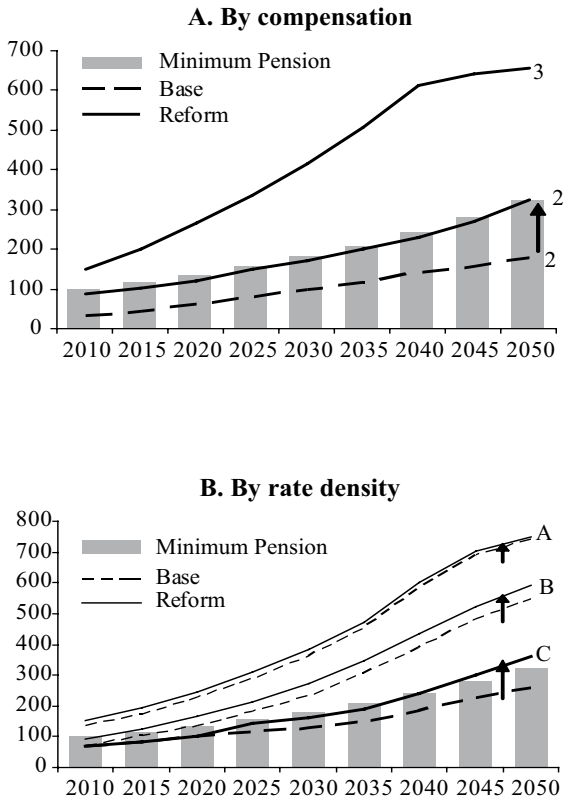
Depending on the income level, it is found that this measure would help the affiliates that collect incomes between S/.500 and S/.800 to access, during the projection horizon, pensions that in average are 98% higher than those they would obtain in a scenario without reforms. See Graph 5-7 A. In the same way, regarding contribution density, although the groups that contribute regularly meet the requirements to be considered beneficiaries, it is observed that they are in least need of transfers to match their (self-financed) pension to the guaranteed minimum pension.

Thus, the group of affiliates that contributes to the system for less than 20 years or that has a density between 10% and 50% of the times (group C) - would have a pension 20% higher than that which would correspond to it in a scenario without reforms. Groups B (with densities between 50% and 90%) and A (with densities between 90% and 100%) would also achieve higher pensions; that would be equivalent to increases of 18% and 7%, respectively. See Graph 5-7 B.

Currently, if the increase in pensions of the group of medium-income workers is analyzed, for all contribution densities, a remarkable improvement is found in the pensions in the scenario with reforms. Between 2010 and 2050 pension increases, on average, 98% respect to the one that would be obtained in the basic scenario. Thus, for example, in the basic scenario if a worker receives a pension equivalent to 100 in 2010 and 572 in 2050; in the scenario with reforms he could end up receiving 1038, in that same year. See Graph 5-8.

Graph 5-7 PPS Pension compared to minimum pension with and without reforms

(Minimum pension in 2010=100)



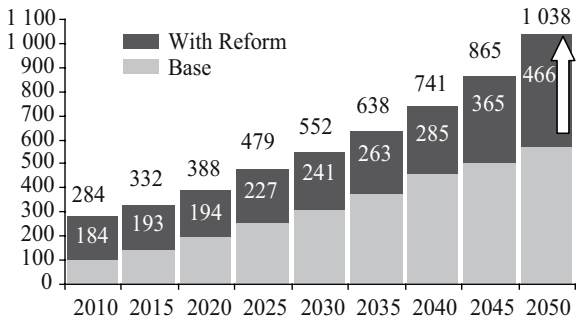
Note: 1: incomes below S/.500; 2: incomes between S/.500 and S/.800; 3: incomes above S/.800. C: rates between 10% and 50% of the times; B: between 50% and 90%; A: between 90% and 100%

.

Source: BBVA / Production: BBVA

Graph 5-8 Medium-income Affiliates Pension with and without reforms

(Average pension of basic scenario in year 2010= 100)



Source: BBVA / Production: BBVA

As we can see from the above, the pension level that results from the basic scenario would experience considerable improvements after the implementation of the measures presented, which would be focused on medium- and low-income workers.

5.3. Pension deficit

In the previous sections it was shown that the proposed reforms would allow the coverage and pensions' levels to improve and, also, these measures would be oriented to guarantee the well-being of medium- and low-income workers in their old age. To carry out these proposals would imply the assumption of new pensioner commitments with the system that would require an additional fiscal effort.

The main component of these obligations would come from the granting of guarantees that result from the adoption of measures to expand coverage (program "Pension for S/.1" and "Pension for S/.2"). In second place, the proposal to extend the minimum pension in the PPS would also represent

an additional fiscal effort. In third place, the possibility to achieve a percentage of the minimum pension starting after 15 years of contribution will also generate a fiscal cost that is necessary to quantify. It is necessary to indicate that individually the cost will be higher in the NPS since nowadays the system does not assume costs for the pensions for this kind of worker and with this proposal it would start doing it. Regarding the PPS, the cost of this measure is the complement between what they are able to finance within 15 years and the percentage offered by the guarantee of minimum pension.

Nevertheless, although these measures would result in a higher pension cost, the proposal of accelerating the adjustment of the replacement rates would allow, in addition to direct fiscal efforts towards the most vulnerable workers, to compensate for part of the deficit increase. In that sense, the projection of the impact of these measures over the basic scenario gave as a result that at the present value the pension deficit would be increased by 9.8 percentage points from 57.9% (in the basic scenario) to 67.6% of the GDP. From this new cost, the reforms linked to improve coverage represent 8.8 additional percentage points in the deficit; those linked to improve pensions, 3.3 percentage points; while the measures of reduction of the replacement rates imply a lower expense ("saving") of 2.4 percentage points. See Table 5-1.

Table 5-1 Present value of Pension Deficit

(2006-2050 as percentage of GDP 2006)

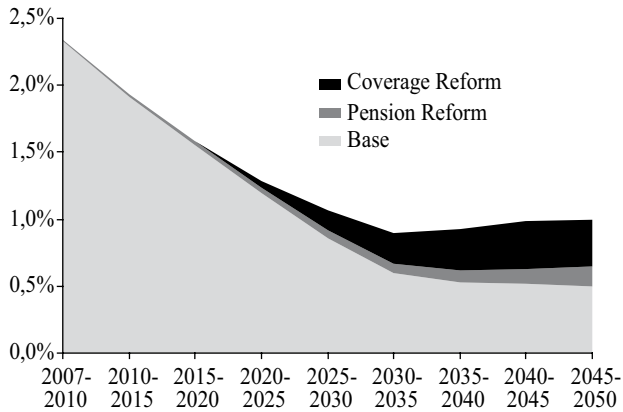
	% GDP
Public System	52,1%
NPS - 19990	31,2%
DL. 20530	20,9%
Transition	5,8%
Recognition Bond	3,3%
Affiliations cancelled	2,5%
New Reforms	9,8%
→ Replacement Rates Reduction	-2,4%
→ Pension Reforms	3,3%
→ Coverage Reforms	8,8%
Pension Debt	**67,6%**

Source: NPO, SOB, MEF, BBVA / Production: BBVA

In annual terms, this would represent a total fiscal effort from 0.4% to 0.5%. Also, it is necessary to emphasize that one of the most important characteristics of the fiscal impact of the proposals is that the transfers will be taking place as the State finishes completing the previously contracted pensioner obligations. In fact, by 2020 the first fiscal transfers would be registered which would coincide with the last years of effort of the financing obligations for the DL 20530 and the payment of the Recognition Bond. See Graph 5-9.

Graph 5-9 Total Pension Deficit with reforms

(Percentage of GDP 2006)



Source: BBVA / Production: BBVA

In synthesis, although the implementation of these measures would increase the pension cost to the present value, the average annual impact would not be high, emphasizing the fact that these transfers would be fulfilled until the period 2020-2025. In that sense, the proposals have been designed to not generate significant fiscal pressure but at the same time they represent important earnings in coverage and level of pensions for specific groups.

In particular, the proposal of accelerating the adjustment of replacement rates allows the liberating of resources to dedicate them to not covered

workers or affiliates that would receive a very low benefit or none at all. The possibility to finance the measures through complementary bonds, allows for the deferral of costs in time and to properly plan public finances in pension matters.

5.4. Impact evaluation of improvements in the parameters and the macroeconomic context

Although the analysis of the reform proposals for the system shows that significant improvements are reached, it is also important to analyze how it influences the change in exogenous parameters to the pension system (such as salary growth level or contribution frequency for example).[38] In that sense the comparative of the system performance is presented - evaluated through three indicators: old age coverage, pensions level and debt – facing scenarios that, in addition to incorporating the reforms proposed in this study, also contemplate the combined effect of improvements in the economy (whose main consequence results in a higher economic growth and higher reduction of informality).[39]

The scenarios considered are:

i) Passive scenario, which has the suppositions of the base model and does not incorporate reforms;

ii) Active scenario, which maintains the suppositions of the base model but incorporates the proposed reforms;

iii) Active scenario with macroeconomic improvements, in which it is assumed that the economy grows to a quicker rhythm, with significant reductions in the informality levels and the measures proposed are implemented.

In general, what can be appreciated in the table is that, regarding the basic scenario (passive scenario), the proposed reforms mean a gain in

[38] Some of the factors that come into play in order to establish the frequency of contribution are the level of informality, the economy growth, employment growth and the improvement in labor caonditions among others.

[39] We recommend to review Appendix VIII about the sensitivity analysis.

coverage terms and in the pensions level, but they also imply assuming a higher cost (See Table 5-2). Thus, the reforms evaluated in Chapter 4 allow to achieve 19 additional percentage points in coverage and 13 in the average level of pensions, but they also imply assuming 10 additional points in terms of fiscal effort. See Table 5-2.

Table 5-2 Impact of pension and extra pension reforms

	Results (2050)	Coverage (old age)	Pensions 1/ (2050=100)	Fiscal Cost (% PBI 2006)
(i)	Base (passive scenario)	42%	100	58%
(ii)	Base + Pension System Reforms	61%	110	68%
(iii)	Base + Pension System Reforms + Macro Framework Reforms 2/	71%	150	63%

1 / In 2050 of the basic scenario pensions represented 5 times those obtained in 2010. 2 / Macro reforms consider to move from: an average growth of the GDP from 4.5% to 6% between 2005-2050, to move from a reduction of informality (from 60%) from 45% to 30% and the growth of the public pensions is adjusted to a lower rate than the productivity.

Production: BBVA

But, if in addition to the reforms in the pension system they were also carried out in the rest of the economy to generate a better economic environment, the performance of the pension system could be extremely positive. On one hand, coverage would grow 10 more percentage points (being available to 71% of the population over 64 years old) as a result of measures guided to workers who are outside the system as well as for the best labor conditions. On the other hand, pension's level would be increased in 36 additional percentage points to the scenario with reforms or 50 percentage points on the basic scenario. It is due as much to the focusing of transfers to the neediest layers as to the best economic situation of workers. And, in spite of the fact that in the scenario (iii) better coverage and higher pensions are observed, the associated cost would grow less than the one registered in the scenario (ii), regarding the basic scenario it would be 5 additional percentage points versus 10, thus representing 63% of the GDP.

This situation would be the result of the improvements of the economic environment that would allow better conditions for the worker so that he would be able to self-finance benefits that he could not attain in the other scenarios. Therefore, we can say that the efforts to improve the economy would make it possible that reform initiatives of the pension system reach levels that overcome in great measure everything that could be achieved with particular efforts to adjust the pensions system.

To achieve a better system: conclusion

According to current operating conditions, it is considered that the Peruvian pension system will show improvements in its main indicators in the medium term. Nevertheless, these advances are insufficient to achieve an appropriate protection during the old age.

First of all, even though the coverage rises in the working age population as well as the senior citizen group the period that goes until 2050, the results show that significant percentages in both groups would still be outside the system. The exclusion would reach to 42% in the working age population and 58% in the retirement age population by 2050. The informal economy partly explains why approximately half of the population remains without coverage; nevertheless, a lack of incentives to capture the different groups of workers that do not participate in the pension system is also detected, as well as measures that specify mandatory contribution of those upon whom some control can be exerted. For this reason, on one hand, the implementation of the plans Pension for S/.1 and Pension for S/.2, oriented to formal and informal workers of low and middle incomes, respectively, is proposed. In these plans, an outline of pension guarantees is sketched as a function of the time the worker has participated in the system. Thus, with at least 15 years of contribution a percentage of the minimum pension is assured, according to each case. This guarantee is increased to the extent in which the affiliate contributes more years, so after having contributed 20 years an affiliate would be

entitled to 60% or 100% of the minimum pension, according to the plan. In this way, it is sought to reward contribution efforts, ensuring a higher pension as workers contribute an additional year. On the other hand, it also intends the obligatory affiliation of formal freelancers. This proposal seeks to reach high-income freelancers who are subject to the income tax and to extend them the same rights and obligations that a formal dependent worker has inside the pension system.

A second point is that the conditions that at the moment govern the previsional system would also allow an increase of the average level of the pensions. Nevertheless, when carrying out the analysis according to the income levels and contribution frequency, it was found that a group of workers exists in the NPS that, not fulfilling 20 years of contribution, would not be able to consent to the guarantee of the minimum pension. While in the PPS low-income and low contribution frequency workers will obtain pensions of reduced acquisitive capacity, eventually they would not be able to cover the cost of the basic needs basket. In addition, youth in this system do not have access to the Minimum Pension. In that sense, to approach the problem of these workers, an extension of the guarantee of the Minimum Pension in the PPS is proposed that would consist of extending this guarantee toward the young population of the PPS that today does not have that right. At the same time it intends to be more flexible in the access requirements allowing that the affiliated workers of the pension system (NPS and PPS) agree to a percentage of the minimum pension starting from 15 years of contributions. This way, the requirements adapt to the labor reality and it follows a guarantee scheme that looks for the formal medium-income workers to have the access to a level of minimum income and have a direct incentive to participate actively on the system.

In third place, the evolution of the fiscal effort in the matter of pensions for the coming years was projected, in order to analyze the pressures that it will generate. Nowadays, the estimated cost of pension in 2050, represents 57.9% of the GDP. It is important to mention that a significant part of the components of this cost will disappear toward the year 2035 as a result of reforms adopted previously (the closing of

DL 20530, the end of the redemption of the Recognition Bond, the setting in motion of parametric reforms on the DL 19990, among others). Nevertheless, in spite of the reforms, all over the projection horizon, the DL 19990 continues showing an operational deficit. For this reason, the acceleration in the reduction of replacement rates is intended, used for pension's calculation in the NPS, like a measure to focus the subsidies granted by the NPS and not to affect their financial sustainability. This measure will allow for the elimination of subsidies to workers with higher incomes and while reducing the gap with the self financed levels. Additionally, it will be possible to reduce the deficit of the system.

These results suggest the necessity to implement adjustments, from now on, to improve the results of the previsional system. Starting from projection exercises based on the macro-actuarial pattern, it was found that if reforms take place in the mentioned areas the following impacts would be achieve:

a. In the coverage levels: it is possible to reduce significantly the population's percentage outside of the pension system.. The lack of old age coverage changes from 77% of the population older than 64 years in 2010 to only 39% in 2050. The lack of labor force coverage changes from 67% of the population between 14 and 64 years old in 2010 to only 33% in 2050.
b. In the pension level: The average pensions improve in relation to the passive scenario, and this improvement is significantly greater for lower-income workers. The pensions of the affiliates with lower incomes at S/800 would grow, regarding the passive scenario, on the average by 98%.
c. In the pension deficit: although the implementation of these measures would increase the cost of pensions by 9.8% percentage points from the GDP at present value, the annual average impact would be only between 0.4% and 0.5% of the GDP, pointing out the fact that these transfers would be carried out starting from

the five year period 2020-2025 as the State finishes fulfilling the pension obligations of the Recognition Bonds and of the Regime of the DL N° 20530.

These estimates suggest that the effort required to obtain substantial improvements for the previsional system is not excessive. It is important to emphasize that to improve the results of the previsional system an integral focus is required, which implies to adopt measures that are outside of their environment. For example, the implementation of polices that allow the reduction of informality levels and to increase the productivity of workers will have a positive impact on the coverage and the pension levels. In this line of work, to foster an appropriate operation of the labor market and to improve the education levels and human capital will help to improve the performance of the previsional system substantially.

The challenges that the previsional system still faces are important. Although the negative effects that have been mentioned will be shown in a clearer way in the medium run, it is necessary to take measures from now on to achieve an appropriate protection for the population in retirement, in particular for the groups that generate low levels of incomes during their active life. To postpone the improvements that are required for the system can be more onerous for society, and it will induce a transfer of a bigger part of the cost toward future generations.

Appendix

The constitutional reform of the regime of the law decree N°20530 and its economic impact

The regime of the Law Ordinance N° 20530 has its origin in very old laws that granted lifetime pensions in charge of the Public Treasury for a reduced group of officials of the State, like recompense for their borrowed services. Contrary to the National Pensions System, this regime is not one of allotment but one of ceasing activity, since it does not take into account retirement age and minimum period of contribution, it only demands years of service (15 years for men and 12.5 years for women) and it does not have a minimum retirement age. It was created for a limited number of beneficiaries of the public sector, but due to the generosity in its benefits and lax rules for their granting, this regime began enlarging, including more beneficiaries with more benefits, becoming a fiscal concern, not only because in this system the contributions do not finance the pension benefit, but because this breach had been increasing in an exponential way, making it financially untenable.[40]

At the moment it constitutes a closed system for new inscriptions through a constitutional reform carried out in 2004, and in accordance with the available information in that moment assists near 23 thousand insured and 295 thousand pensioners of public entities. Here its previous financial situation before the reform is described, to explain the more

[40] For details about benefits look into: Los Sistemas de Pensiones en Perú, MEF 2004.

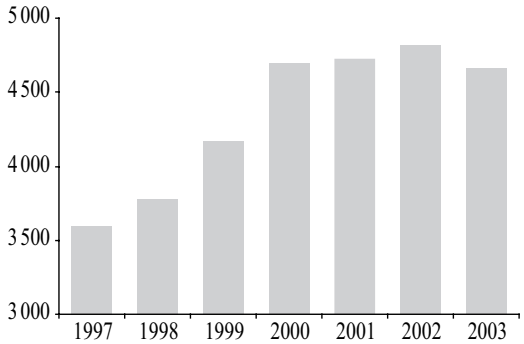
important reasons that justified the undertaken reform and its estimated economic effect in present value.

Financial Situation pre-reform

Regarding its financial situation, and due to the national system of pensions, the Regime of the Law Ordinance N° 20530 was not financed, requiring considerable transfers from the Public Treasury to finance the payment of the schedules of pensions, which grew to around S/.5 200 millions in 2003.

Graph I-1 Transfers to DL 20530

(Millions of Nuevos Soles)



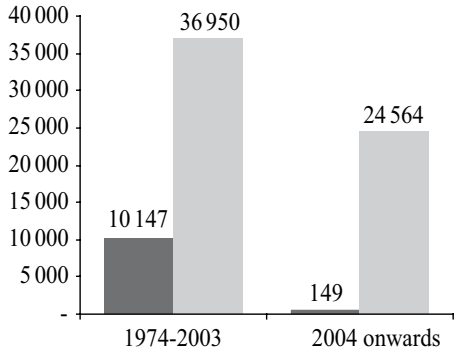
Source: MEF

Again, the lack of adjustments to their previsional variables added to their arbitrary handling in the incorporation of beneficiaries and the granting of benefits had generated a more severe imbalance among contributions and pensions that became worse because of the existence of additional harmful factors such as the leveling of pensions, named "mirror effect" or "live identification" (which consisted of allowing the pension to increase in the same magnitude as the active personnel's remunerations) and generous pension rights for widows and single daughters (100% of the holder's pension).

According to the information published for the reform, the State had subsidized this regime annually transferring it budget resources equivalent to 2% of the GDP for the period 1997-2003, meaning that for the period 1974-2003 these transfers triplicate the contributions collections evidencing their inadequacy and the generosity of the benefits. See the following graph.

Graph I-2 Financial unbalance of Regime DL N° 20530

(Millions of dollars)



Source: MEF

A future view considers that the situation would not improve, evidencing a previsional deficit or cost of US $24 415 million at present value.

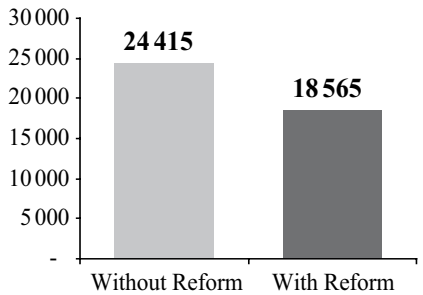
Financial situation post-reform

Besides this fiscal concern, the distortion of this regime was also contrasted with other pension regimes in the State's charge, from the point of view of fairness, concluding that it was a regime of privileges that besides being costly it limited (due to the leveling) other reform aspects such as public employment that would have allowed for the reordering of the State employees and the beginning of the so expected reform of the State.

These arguments, mainly, justified the necessity of a constitutional reform that signified an important landmark that allows reducing in the short and long runs the onerous fiscal load and inequities that characterized this regime of privileges. It was in 2004 by means of Law N° 28389 issued by the Congress of the Republic that it was closed, definitively and at the constitutional level, to the future entrance of new members to this regime, as well as the harmful aspect that characterized it, the leveling effect or "live identification".

Thanks to this reform among others[41], and in spite of also considering measures to increase the pensions (granting minimum pensions and future annual readjustments in the pensions in function to the variation of the IPC and the budgetary capacities); it was considered that the previsional cost for the DL N° 20530 would lower by 24%, from US $24 415 million to US $18 565 million. The following graph was taken from public documents of the constitutional reform:

Graph I-3 Economic impact of DL 20530 constitutional reform in pension costs



Source: MEF

[41] Such as adjustments to future pension rights for widows and the elimination of the right to a pension for single daughters, as well as the implementation of ceilings for the higher pensions

Annually, the reduction of this previsional cost would be captured in a smaller expense on the order of S/.1 400 million, taking the period 2005-2009 as average.

Simulation of the economic impact in 2050

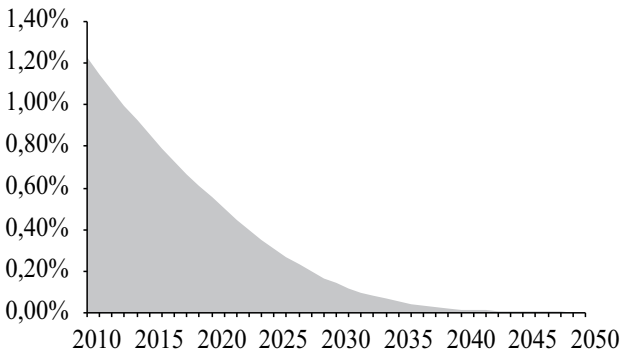
In this section, what is looked for is to model in annual terms this important reduction of the deficit of DL 20530, as a product of the constitutional reform, by 2050. Contrary to the simulation of the PAYGO system, in the present case, the model was made without taking into account age, range of pension, civil status or the insured's remunerations.

A closed community has been simulated for pensioners and insured (that is to say new insured do not join), and for the first case, the entire list of pensioners has been used in pensions, the total number of pensioners per gender (295 thousand) and their average age, the evolution is simulated using the life charts RV 85 assuming that they will continue receiving pensions that will generate, in real terms, derived rights or will adjust according to the constitutional reform and the new implemented rules. Regarding the assets, some ages and remuneration average together with retirement ages at 55 years have been assumed. Nevertheless there are only 23 thousand people; its impact on the result is not significant. The following graphs show the evolution as a GDP percentage.

The results show that indeed the reform has produced important reductions in the previsional cost and as long as it remains closed, the cost is diluted starting from 2040.

Graph I-4 Simulation of DL 20530 deficit with constitutional reform

(As percentage of GDP)



Note: The evolution of the schedule and new pensions were simulated using the Life Chart RV 85, in accordance with the life expectancy by gender and keeping in mind the following parameters of the reform: i) 50% pension for widows, ii) no pension for single daughters, iii) Limit to the highest pensions, iv) increases of pensions in 2005 and v) annual readjustments smaller or similar to inflation.

Source: MEF / Production: BBVA

Recognition Bond

The Recognition Bond (RB) constitutes an obligation for the PNO, on behalf of the Peruvian State, for the contributions the worker has carried out to NPS. The emission of this title allows the members of the NPS that decided to incorporate to the PPS to not lose their contributions and to continue accumulating resources for their retirement. The estimate of the nominal value is defined as follows and is S/ 60 000 maximum:

$$B = 0.1831 * R * M$$

Where: B is the nominal value; R is the average of the last 12 remunerations and M is the amount of contributed months.

Depending on what periods the member prefers his contributions to be recognized and on his transfer date, there are three kinds of bonds: RB 1992, RB 1996 and RB 2001, each one recognizes the contributions and it is expressed in soles with the specified date. The requirements for obtaining these bonds are: 1) to be affiliated to any of the pension systems administered by the PISS or PNO and; 2) to have contributed a minimum of 48 months within 10 years prior to December 1992, 1996 or 2001, respectively, depending on the RB.

The payments for these RB take effect when: a) The member fulfills the legal retirement age or consents to a premature retirement; b) The member is permanently disabled or; c) The member dies. The PNO is in charge of these payments and they carry out on the total actual value, which is, the nominal value previously described and the adjustment for inflation.

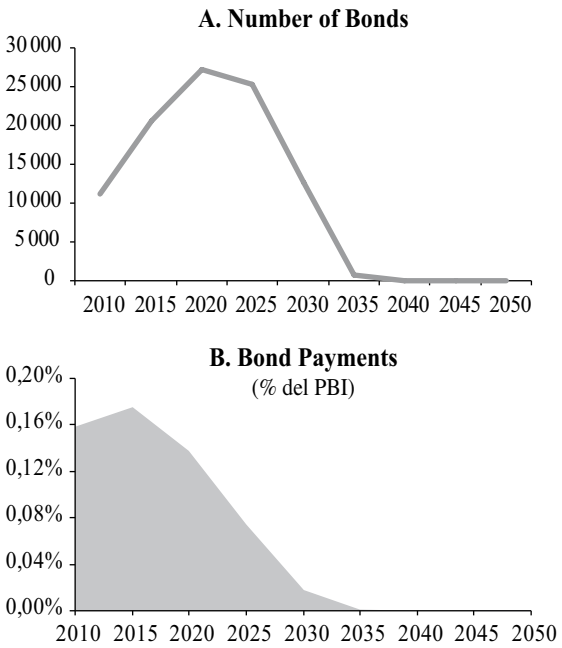
Projections for the Recognition Bonds

Projections of fiscal expense related to the previsional transition are necessary not only for evaluating this transition but also to obtain a better knowledge of the future fiscal obligations of the State in previsional matters. The present section projects the fiscal effects of the Recognition Bonds payment by 2045.

This estimate has two objectives: (1) to know the future State commitments to the private pension system in the framework of the 1992 reform; (2) to contribute to the efficient budgetary administration anticipating future fiscal pressures. In accordance to the actual normative, it considers three basic approaches: 1) based on the bond expiration by fulfillment of the retirement age (65 years), 2) The possibility to pay the bond in advance for disability or death, and 3) new emissions for those members who have still not requested their Recognition Bond. This last variable, although it is not foreseen in the legislation, is important to quantify as much from a conservative point of view as based on international experience.[42]

[42] See Arenas de Mesa y Gana (2005), Proyections for the Fiscal Expense in Chile, Recognition Bonds 2005-2038 Proyecciones del gasto fiscal previsional en Chile, Bonos de Reconocimiento: 2005-2038

Graph II-1 Simulation of Recognition Bonds Number and Payments



Source: MEF, BBVA / Production: BBVA

The limitations we found and recommend to approach in future studies are to separate the payments for yielded interests corresponding to the obligations of Recognition Bonds and their accounting inside the projections of the economic result in a transparent administration of public finances. Also, this simulation does not consider the possibility to pay the Recognition Bond in advance for Ordinary Early Retirement (based on the experience of the Régimen de Jubilación Anticipada por Desempleo -Regime of Advanced Retirement for Unemployment,

RARU) and neither simulates possible new bond estimates with zero value or new applications refused before 2002 for not fulfilling some requirement (for example, that of 6 months of contribution before joining the PPS, effective up to 2002).

Finally the graphs do not show the financial effect that disaffiliation would produce, because the Recognition Bond would not transfer to the members who return to the NPS, but they would receive monthly payments for pension. At this point, an uncertain effect might occur because a financial saving would not necessarily take place since the bond would not be paid in a single share, because the NPS pensions will have some subsidy component that motivates the disaffiliation.

Complementary Bonds

With the purpose of making the benefits of both PPS and NPS equal and to avoid disaffiliation of the first one and the consequent return to the second one, in 2000, new benefits were implemented in the PPS such as the Minimum Pension and the regimes of early retirement for mining workers, civil construction workers, workers with rights already acquired in the NPS, and the unemployed.

Each of these new regimes has a very important commitment on the part of the Peruvian State, through the PNO, for financing the not covered part of pensions with the balance of the ICA and the liberation of the RB, in order to make pensions in both systems equal.

This commitment has created the denominated Complementary Bonds. These bonds, contrary to RB that are redeemed when the member consents to retirement and paid in one single payment to the members, who have consented to the Minimum Pension regime, Early Retirement Law Decree 19990 or Premature Retirement for High Risk Workers, run out of balance in their ICA and the balance coming from the redemption of their RB and therefore, do not have resources to continue financing their pensions. For such reason, these bonds are paid as pensions, once the member's resources are exhausted, in such a way that the State commitment is not immediately executed.

Disaffiliation

In spite of the good performance the PPS has shown in many spheres of the economy, time has shown that for some people, especially of advanced age (called "transition group") the decision of moving to this new system was not the most convenient, because they have not reached a higher pension than in the NPS basically because of the short time to accumulate and to capitalize resources in their individual account.[43]

For such a reason, in addition to the Recognition Bonds for the contributions to the old system, since 2000 measures were taken to coordinate the benefits of the PPS with those of the NPS through the grant of complementary bonds that allow the workers to obtain similar pensions in both systems.

Continuing with these protection measures, in 2007, through the Law N° 28991 a legal mark of disaffiliation of the PPS has been consolidated, that regulates the conditions and requirements in case it is convenient for a workers group to disaffiliate and to return to the NPS, following a legal process which grants their pensioner rights.

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[43] Besides, in the NPS, pensions are paid above the self-financed because these pensions have been calculated based on pensioner variables not previously adjusted.

These rules approve the following conditions for the workers to leave the PPS:

- When they had belonged to the NPS up to 1995 and at the moment of such disaffiliation were entitled to a retirement pension in the NPS, no matter the age. When retiring from the PPS they fulfilled the requirements to obtain a retirement pension in the NPS.
- When retiring from the PPS they fulfilled the requirements to obtain a retirement pension in the NPS.
- When their job implies a life or health risk and at the time they fulfill the requirements to obtain a retirement pension in the NPS.

Also, by this regulation, the minimum pension benefit has been extended to affiliated workers of the PPS who belonged to the old system before the creation of the PPS and also fulfill the same requirements of the NPS, including the payment of the differential of contributions between both systems foreseen in the law.

Macroeconomic Model

To evaluate where the previsional system is heading in the coming years requires defining the trajectories that a group of macroeconomic variables will follow. In particular, the simulations for the system take into account the evolution of the GDP, the labor force (EAP) and the productivity. This way, the product level allows us to build ratios as a GDP percentage, the EAP tendency defines the active population that eventually will require coverage, and the productivity indicates the tendency the salary will observe in the long run and, therefore, the contributions and pensions levels that workers will obtain in retirement. For that reason, a model was developed to estimate the labor force productivity. The production function assumed for this case is the Cobb-Douglas type, with productivity improvements obtained directly in the work factor (production function with technology that improves work efficiency):

$$Y_t = F(L,K) = (A_t L_t)^{\alpha} (K_t)^{1-\alpha} \quad (1)$$

Where:

Y_t is the long run product

A_t is productivity

L_t is labor force (represented by the EAP)

K_t is capital stock

Assuming a sketch similar to Solow (1957), the proposed specification (1) for the production function implies that in the long run (in a stationary state) the GDP per capita and the capital stock per capita grows in the same way as productivity (balanced growth model).[44] The value assumed for α is 0.54 and it has been calculated as the average of the estimates of Carranza, Fernández Baca and Moron studies (2001).

By the fragmentation of the elements of (1) it is sought to calculate the economy productivity A_t. For that, the trajectories for Y_t , L_t, and K_t are previously defined, thus, A_t is a residual variable. For the GDP (Y_t) the scenario of medium run projection (2007-2010) was taken from the Service of Studies of the BBVA Continental Bank.

Later on, up to 2019, the product grows to the rate that at the moment shows potential according to estimates of their own (around 5.0%). Also, between 2020 and 2035 an acceleration of the GDP was incorporated, because a reduction in the informality of economy was modeled.

This is consistent with the results of Loayza (1996) who realizes a reduction of the informality would accelerate the GDP growth rate in the long run. Finally, between 2034 and 2050 the growth diminishes as the economy matures, in such way that the GDP growth rate converges at 3.0%.

Regarding the EAP, it grows at the same speed that the population's growth rate, according to the information provided by CELADE 2004 up to 2050. Finally, in the construction of the stock series of physical capital the reference is the study of Nehru and Dareshwar (1993) and the perpetual inventory method, which is based on the following dynamic accumulation equation[45]:

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[44] The Cobb-Douglas function for production complies with the following properties: (i) Both factors are needed in order to obtain a positive amount of product, (ii) marginal productivity of the factors shows decreasing yields, (iii) it has scale yields and compiles with Inada conditions; and (iv) work and capital participations are constant and equal to and α y $1-\alpha$, respectively.

[45] The description of this method has been taken from the work of Ramírez y Aquino (2005).

$$K_t = (1-\partial)^t K(0) + \sum_{i=0}^{t-i} I_{t-i}(1-\partial)^i \qquad (2)$$

where K_t is the capital stock in the period *t constant prices),* $K(0)$ is the initial capital stock (in the period 0), I_{t-i} is the domestic fixed gross investment in the period *t-i*, and ∂ is the depreciation rate. For the $K(0)$ estimate, in the stationary state, the product growth rate product (g) is equal to the capital stock growth rate. Also, for two consecutive periods, the equation (2) would be:

$$(K_t - K_{t-1}) / K_{t-1} = -d + I_t / K_{t-1} \qquad (3)$$

As the capital stock grows to rate g, equation (3) is equivalent to:

$$K_{t-1} = I_t /(g+d) \qquad (4)$$

Therefore, in period 0, the capital stock might be calculated as:

$$K(0) = I_t /(g+\partial) \qquad (5)$$

The depreciation rate is 4 percent. The investment is taken from the projection scenario at medium term of the BBVA Continental Bank for the period 2007-2010 and then is referenced that the investment ratio over the GDP converges around 20% of the GDP. The rest of the series is calculated from the equation (2). With this sketch, a series for the labor force productivity was obtained.

Methodology Of The Individual Capitalization Model

The individual capitalization model applied to the study of the Peruvian previsional system is based on the data of the affiliate community to a certain date, distributed in categories previously established in an analysis of the available data of the members of the PFA Horizon, on the assumption that the affiliate distribution of this PFA is representative of the whole system. The fundamental variables that intervene in the future development of the capitalization system are defined. In consideration of demography and macroeconomic elements, hypotheses of value of these variables to carry out a projection of a sufficiently extensive horizon are programmed.

The system evolution is programmed for five year periods, obtaining the variations that it experiences due to the application of the adopted hypotheses. The affiliate groups, contained in five-year age subgroups, evolve in each five-year period because of the application of death and disability probabilities. The group receives admissions for incorporation in the labor activity by the youngest age subgroups.

The main objective pursued by this model is to observe the coverage

of the capitalization system evolution in the study period, determining among other results the old age pension for the retired pensioners and obtaining replacement rates from the different defined categories of members.

Starting point scenario

Members from the PFA Horizon as of December 31, 2005 were classified according to their income levels, contribution density, age group, sex and right to pension bond. Then, the percent weights of each group were calculated classified over the total of affiliates of their same age range. Later on, the members, separated by gender, from the whole Private Pension System were distributed in proportional categories to the allotment of the Labor force Horizon groups. Also, the individual account balance averages and pension bond for PFA Horizon category as of December 31, 2005 were used as averages for the Private Pension System group.

First, they took the pension bond series and the members' account balance with a higher salary level and the tendencies were softened. The softening was achieved by these logarithmic or exponential regressions $y = a \cdot \ln(x) + b$ o $y = a \cdot e^{-b \cdot x}$, according to the data profile, where the independent variable is age.

These same softened tendencies were used later to evolve balances and accounts of members with lower salary levels. In this process it was sought to maintain a high correlation between the individual account balances, the pension bonds amounts, the contribution density levels and the salary.

The resulting members' data are joined in a matrix separated by sex and age groups, containing people in five percentage point series of contribution density and salary range. The same distribution for the individual account balance averages and amount of pension bond.

The contribution density is an index of the number of months

quoted in the capitalization system in relation to the three previous years to the cut-off date (December 2005). The affiliate group is formed by 2.4 million men and 1.3 million women 0.2 million male members (8.4%), and 0.1 million women (1.2%) are entitled to pension bonds.

Members are classified based on the contribution density. Four groups result. Category A has a contribution density of 98.7%, which means that the previsional contribution is paid practically every month; Category B has a density of 71.2%, C of 28.3% and D barely 0.5%. Category D groups together 53% of the male members and 51% of the female members. On the other hand, members are classified by contribution salary. Three categories come out: Group 1: up to 500 soles; Group 2: from 501 to 800 soles; Group 3: more than 800 soles.

The conjunction of distributions for contribution density and salary allows us to make twelve affiliate categories. Distinguishing between those who are entitled to a pension bond and those who are not, there are twenty-four resulting categories. Once members are classified, the individual account balance average is identified for each of the categories in function of sex, age, contribution density, salary and right to pension bond. Regarding salaries, groups 1 and 2 do not show any variation by age. Only group 3 has a salary determined by the average group salary identified by this group, distinguishing between men and women. In the system projection, salaries are affected by the hypothesis of salary growth by productivity.

Model Hypothesis

Demographic aspects

Mortality applied in the projection development is based on the projections by CELADE to 2050. Disability rates used for the model are from the experience of the Mexican Institute of the Public Health in 2004, without projection. The hypothetical affiliation for men between 20 and 24 years is 30%, and it rises to 45% in the group from 25 to 29 years. For women it is 25% in the first group and 30% in the second one.

Workers who affiliate between the ages of 20 to 24 are distributed, according to the initial allotment, in categories A1 to D3. Workers who affiliate between the ages of 25 to 29 are classified into a new category E, with salary distinction, but with the system average for contribution density.

The demographic charts applied for determining retirees' benefits (retirement, survival and disability) are at the moment effective in the Peruvian legislation, based on the experience of retirees in Chile: i) charts RV 2004 without annual improvements for old age pensions; ii) charts B 85 for survival pension beneficiaries, and iii) charts MI 85 for disabled retirees.

System aspects

Starting from the contribution density for the categories of the defined affiliates, it proceeds to a density ratio increment of 1% and 2% every five years for the B and C groups respectively, with the purpose of obtaining a convergence between the active population projected in the defined macroeconomic scenario and the contributing affiliates. Group A remains with a 98.7%, density under the supposition that it is close enough to the contribution for every week the member remains in the system, and its increase is not relevant.

The projection for the monetary parameters of the system is made in real terms, without considering inflation effect. The macroeconomic analysis for the possible evolution of the national economy allows us to adopt the hypothesis of salary growth because of productivity of 3% annually. As a result of this macroeconomic analysis, and in coherence with the system experience in the years it has been effective, the annual productivity hypothesis of the individual capitalization account is 6%. The type of technical interest that applies to determine the benefits to retirement, survival and disability beneficiaries is 4%, effective according to the current legislation for this purpose, and that agrees with the hypothesis of profitability for the individual capitalization account.

The contribution to consider for the individual capitalization account is 10%, a percentage that actually is represented in the Peruvian previsional legislation. The following administration expenses have been considered: 1) Commission for contribution base 1.5%; 2) Annual commission on balance 0%.

For determining family composition, it is assumed that all members are married without children, and the woman is three years younger than her spouse. This assumption simplifies the projection estimates and it allows us to follow a reasonable hypothesis trying to compensate, at least in a theoretical way, the existence of children beneficiaries and of ascendancies with the spouse's absence for a part of the affiliate population.

Base parameters:

t = time, measured in five year periods (2010, 2015, 2020, 2025, 2030, 2035, 2040, 2045, 2050)

Gi = Affiliate generation per five year period.

dj = Density and salary cohorts:

A_h, B_h, C_h, D_h, E_h (con h= 1,2 y 3)

x = sex

$AF\left(Gi\ ,d_j\right)_t$= affiliates by age and cohort

Model Dynamic

Affiliates

Starting from the affiliate group as of 31 of December, 2005, an evolution forecast to the future is made considering: admission of new affiliates and discharges for death, disability and retirement. Admissions of new affiliates are carried out using the hypothesis considered as total population percentage for sex and corresponding age bracket. This way, the population's projection is assumed to 2050 by CELADE for the Peruvian population.

In this model, admissions from 20 to 24 years old and from 25 to 29 years old have been foreseen. In the first age bracket the most important portion of workers would be entering the system, and they would be assigned categories equivalent to those existing for the initial date for age bracket 30 to 34 years old, assuming that after the time elapsed since the previsional reform this age bracket is sufficiently representative. The admission of affiliates in the age bracket 25 to 29 years old is carried out through category E, with a differentiation for salaries from 1 to 3, and with an average contribution density.

Retired workers

Retired workers from the period are the affiliates who were in the age bracket from 60 to 64 years old in the previous five-year period, discounting the deceased and invalids, considering half of the period.

$$J\left(Gi, d_j\right)_t^x = AF\left(Gi_{-5}, d_j\right)_{t-5}^{\ x} - F\left(Gi, d_j\right)_t^x - Inv\left(Gi, d_j\right)_t^x$$

- *Total retired*: It corresponds to the sum of retired workers in the model plus the ones existing in the system in the previous period,

corrected by mortality. At the beginning of the study the retired workers are calculated from the pensioners' data to December 2005.

$$JTot_t^x = \sum_{Gi,d_j} J(Gi,d_j)_t^x + Jsist_t^x$$

$$Jsist_t = \sum_{Gi,x} Jsist(Gi)_t^x$$

$$Jsist(Gi)_t^x = Jsist(Gi_{-5})_{t-5}^x \times \varphi_t^x$$

Where $J(Gi,d_j)_t^x$ are the retirees of the model and $Jsist_t^x$ is the stock of retirees of the system

φ_t^x is the probability of death, according to sex and age.

To be entitled to Survival and Disability benefits, Peruvian pension legislation indicates that certain conditions should be fulfilled regarding the contribution number and regularity.

- Deceased covered by this model: The deceased are calculated by applying the corresponding mortality rate to the previous period's affiliates. This rate Ψ is the mortality rateaccording to the annual projection carried out by CELADE for the age i in year t and sex x,

$$F(Gi,d_j)_t^x = AF(Gi_{-5},d_j)_{t-5}^x \times \Psi_{i,t}^x \times \alpha(d_j)$$

Being $\alpha(d_j)$ the coverage factor

- Disabled Pensioned covered by this model: The disabled are calculated by applying to the members who survive from the previous period the rate of corresponding disability. This rate σ is the disability rate according to the information given by the Mexican Social Security Institute for their actuarial valuation in

2004, for the age i.

$$Inv\left(Gi, d_j\right)_t^x = AF\left(Gi_{-5}, d_j\right)_{t-5}^x \times \left(1 - \Psi_{i,t}{}^x / 2\right) \times \sigma_i \times \alpha\left(d_j\right)$$

- Disabled Pensioned (Total): It corresponds to disabled pensioners in the model plus the ones belonging to the system in the previous period, corrected by mortality.

$$InvT_t^x = \sum_{Gi,d_j} Inv(Gi, d_j)_t^x + \sum_{Gi,x} INVsist\left(Gi_{-5}\right)_{t-5}^x \times \left(1 - \Psi_{i,t}{}^x\right)$$

Where $\text{Inv}^{(Gi, d_j)_t{}^x}$ are disabled affiliates in the model and

INVsist is the disabled individuals in the system

- Total beneficiaries: It corresponds to the beneficiaries of the model plus the beneficiaries belonging to the system in the previous period, corrected by mortality.

$$BfT_t^x = \sum_{Gi,d_j} Bf(Gi, d_j)_t^x + \sum_{Gi,x} Bfsist\left(Gi_{-5}\right)_{t-5}^x \times \left(1 - \Psi_{i,t}{}^x\right)$$

Where $Bf(Gi, d_j)_t{}^x$ are the beneficiaries of the model by death of the affiliates, and

$Bsist_t^x$ is the stock system´s beneficiaries stock

- Total Pensioners: Total pensioners includes those who are a result of the model in the period "t" plus the pensioner stock to year "t"

$$Pens_t^x = \sum_x \left(JTot_t^x + BfT_t^x + InvT_t^x \right)$$

Incomes, Contributions, Balances and commissions

- Taxable Incomes: All the monetary projections are carried out in new constant soles of 2005. The taxable incomes in the economy evolve in line with the apparent work productivity, projected in the macroeconomic model (productivity rate w). Also, $w(Gi,dj)^x$ increases along people's labor life according to the data profile to 2005 for the members in the salary category 3, this means, those who have a taxable base over eight hundred soles. Combining both effects –the aggregate productivity of the economy and individual productivity for age brackets in category 3 - the real salary of the different categories of affiliates is simulated in the different cohorts for the period 2010-2050. For the categories 1 and 2, less than five hundred soles and up to eight hundred soles respectively, it only applies the hypothesis of growth by productivity.

  $$w\left(Gi,d_j\right)_t^x = w\left(Gi,d_j\right)_{t-5}^x \times (1+w)^5$$

  Where: $w\left(Gi,d_j\right)_t^x$ = Age Salary i, density j in year t

- Individual accumulated balance in the account: To estimate the individual accumulated balances in the period, contributions are made by the half of each year:

$$SC(Gi,d_j)_t^{\ x} = SC(Gi,d_j)_{t-5}^{\ x} \times (1+i)^5 \times (1-comsaldo)^5 +$$

$$\left[\begin{array}{l} \\ (w(Gi_{-5},d_j)_{t-5}^{\ x} \times (\phi - \chi)) \\ \\ \times \varepsilon (d_j)_t^x \times \mathrm{M} \times \left(\begin{array}{l} (1+i)^{4,5} \times (1-\varphi)^{4,5} + (1+i)^{3,5} \times (1-\varphi)^{3,5} \times (1+\dot{w}) + \\ (1+i)^{2,5} \times (1-\varphi)^{2,5} \times (1+\dot{w})^2 + (1+i)^{1,5} \times (1-\varphi)^{1,5} \times (1+\dot{w})^3 + \\ (1+i)^{0,5} \times (1-\varphi)^{0,5} \times (1+\dot{w})^4 \end{array} \right) \end{array} \right]$$

Where: ϕ is the contribution rate

$\varepsilon (d_j)_t^x$ is the contribution density rate for cohort j, sex x and year t

M is the amount of contributions a year (in model M=12)

i s the fund yield

$\dot{w}$ is the salary growth rate

φ is the percent commission over balance

χ is the commission expressed as % of the taxable income

For new members, affiliation is produced halfway through the five-year period.

- Contributions from the five-year period to individual accounts: Contributions made in the five-year period by the group of each type of member in each age bracket is estimated by :

$$AP\left(Gi,d_j\right)_t^x = \left[\ w\left(Gi_{-5},d_j\right)_{t-5}^{\ x} \times (\phi - \chi)\ \right] \times \mathrm{M} \times \varepsilon\left(dj\right)_t^{\ x} \times \left(\frac{1-(1+\dot{w})^5}{-\dot{w}}\right)$$

$$\times \left(AF\left(Gi,d_j\right)_t^x + \left(\frac{F\left(Gi,d_j\right)_t^x + I\left(Gi,d_j\right)_t^x}{2}\right)\right)$$

The last element of the second parenthesis represents the supposition that the contingencies for death and disability take place halfway through the five-year period, so that these members contributed until then.

- Total accumulated balance: It corresponds to the individual accumulated balance by number of affilates.

$$ST\left(Gi,d_j\right)_t^x = SC\left(Gi,d_j\right)_t^x \times AF\left(Gi,d_j\right)_t^x$$

As much for admissions as discharges in the system, whether for death, disability or retirement, the hypothesis that they take place halfway through the five-year period is adopted.

Survival, disability and old age benefits

- Monthly Survival Pension for Beneficiary: The widowhood pension results from the application of a factor η^x over the member's liquidation base. Base liquidation is defined as the monthly income average for the last four years. For the study η^x is 42%, which corresponds to the spouse without children.

$$PSob\left(Gi,d_j\right)_t^x = \eta^x \times BL\left(Gi,d_j\right)_t^x$$

- Monthly Disability Pension per Beneficiary: Disability pension is obtained by application of a factor λ^x over the affiliate's liquidation base. In the study λ^x corresponds to 70%.

$$PInv\left(Gi, d_j\right)_t^x = \lambda^x \times BL\left(Gi, d_j\right)_t^x$$

- Necessary Technical Capital (NTC) of survival for beneficiary: The Necessary Technical Capital of survival is the actuarial present value of death pension benefit, applying survival probabilities derived from currently effective mortality charts according to the previsional legislation, and applying the financial renewal to the type of technical interest.

$$CTNSob(Gi, d_j)_t^x = PSob\left(Gi, d_j\right)_t^x \times \mathrm{M} \times \frac{Nx_{(i+3-\rho)}}{Dx_{(i+2-\rho)}} + \left(\frac{\mathrm{M}-1}{2\mathrm{M}}\right)$$

ρ is the age difference with the spouse.
Nx and Dx are commutative values from the corresponding mortality chart.

- Necessary Technical Capital (NTC) of disability for beneficiary: The Necessary Technical Capital of disability is the actuarial present value of the disability pension benefit applying the probabilities of survival derived from the currently effective mortality of disabled persons charts according to previsional legislation, and applying financial renewal to the type of technical interest.

$$CTNInv(Gi, d_j)_t^x = PInv\left(Gi, d_j\right)_t^x \times \mathrm{M} \times \left[\frac{Nxi_{(i+3-\rho)}}{Dxi_{(i+2-\rho)}} + \left(\frac{\mathrm{M}-1}{2\mathrm{M}}\right) + \eta^x \times \left(\frac{Nx_{(i+3-\rho)}{}^m}{Dx_{(i+2-\rho)}{}^m} - \frac{Nx_{axy(i+3)}{}^m}{Dx_{axy(i+2)}{}^m}\right)\right]$$

Nxi and Dxi are commutative values from the disability chart:
Nx_{axy} and Dx_{axy} are commutative values from the disabled and non-disabled charts.

- Monthly old age pensions for beneficiary: Old age pension is obtained by dividing the balance accumulated in the member's individual account

and the lifetime income rate at retirement age meaning the current actuarial value for a unitary income, considering the mortality chart effective for old age income and the type of technical interest.

$$PV\left(Gi, d_j\right)_t^x = \frac{\left(SC(Gi, d_j)_t^x\right)}{\left(RV_t^x / \mathrm{M}\right)}$$

Where RV_t^x is the calculation rate for old age pensions with lifetime income

- Monthly old age minimum pension supplement for beneficiary: It corresponds to the complement that the State shall contribute to the beneficiaries' monthly pension for those who are entitled to minimum pension state insurance.
  If

  $$PV(Gi, d_j)_t^x > PM_t$$

  $$CPM(Gi, d_j)_t^x = 0$$

  Where PMt is minimum pension

  If

  $$PV(Gi, d_j)_t^x \leq PM_t$$

  $$CPM(Gi, d_j)_t^x = PM_t - PV(Gi, d_j)_t^x$$

- Individual additional capital for affiliate - survival: Survival Additional Capital is determined by the difference between the Survival Necessary Technical Capital and the accumulated balance of the Retirement Cessation and Old Age (RCOA) individual account.
  If

  $$CTNSob(Gi, d_j)_t^x - SCRCV(Gi, d_j)_t^x > 0$$

$$KASob(Gi,d_j)_t^x = CTNSob(Gi,d_j)_t^x - SCRCV(Gi,d_j)_t^x$$

Or

$$KASob(Gi,d_j)_t^x = 0$$

- Individual additional capital for affiliate - Disability: Disability Additional Capital is estimated by the difference between the Disability Necessary Technical Capital and the accumulated balance of the individual account of RCOA.
  If

$$CTNInv(Gi,d_j)_t^x - SCRCV(Gi,d_j)_t^x > 0$$

$$KAInv(Gi,d_j)_t^x = CTNInv(Gi,d_j)_t^x - SCRCV(Gi,d_j)_t^x$$

Or

$$KAInv(Gi,d_j)_t^x = 0$$

- *Total additional Capital for affiliate - Survival:*

$$CATSob(Gi,d_j)_t^x = KASob(Gi,d_j)_t^x \times FC(Gi,d_j)_t^x$$

- *Total additional Capital for affiliate - Disability:*

$$CATInv(Gi,d_j)_t^x = KAInv(Gi,d_j)_t^x \times IC(Gi,d_j)_t^x$$

Determinants for pensions and coverage levels

Authenticity in any pension system is based on the possibility of reaching appropriate coverage and pension levels. The valuation society gives to these systems is very relative and it depends in general on the economic, social and political conditions of the country. Variables such as income level per capita, income distribution, poverty levels, degree of informality, weight of the tax load that the citizens support, characteristics of the labor market, among others, are elements that condition the success of a previsional scheme.[46]

In general, the search for appropriate coverage levels and pensions (some authors refer to the "replacement rate", that is to say, the pension workers receive as a percentage of the incomes they received in the active period), tries to support the population in the making of economic decisions referring to their income distribution throughout their life, what is usually known as intertemporal maximization, a fact that was chosen some decades ago through the cycle of life theory.[47]

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[46] See Vidal-Aragón, Agustín y David Taguas (2005) Route Sheet for *Previsional Systems*.

[47] Modigliani, Franco can be reviewed (1966), "The Life Cycle Hypothesis of Savings, the Demand for Wealth and the Supply of Capital", in: Social Research, 33, pág. 160 a 217.

An ideal system should search for an appropriate replacement and coverage rate, with the economic objective of softening consumption -and investment - through people's lifetime. A good design, evidently, will allow the individuals a better allotment to face the financial disorders implied by living during a period in which they cannot generate the same incomes as during the period of labor activity, thus alleviating the reduction in the standard of living to which they were accustomed. For that reason, it is important to specify those factors that determine the ideal coverage and pension levels.

Box VII 1 Desirable Characteristics of a previsional system

Previsional systems have evolved through time and improvement, some authors have pointed out some desirable properties to establish schemes with the purpose that the State accomplish its mission (at least partially) of providing population with proper and realistic pension levels and coverage rates.

Blahous (2000) emphasizes three desirable characteristics in a previsional system: (i) To provide social security and to make contributions proportionate to the received benefits; (ii) To increase incentives in the labor market and (iii) To reduce inequalities among different demography groups. Ball and Bethel (1997) have considered nine key principles for development of a good security scheme: (i) universality; (ii) fair benefits; (iii) coherence in regards to salary; (iv) contributive and self-financed; (v) redistributive; (vi) readjusted; (vii) correlation with salary tendencies; (viii) protection against purchasing power loss; and (ix) compulsory. Modigliani and Muralidhar (2005), in a more focused classification, refer to "macro properties" and "micro properties". For the first they emphasize (i) national saving contribution; (ii) financial stability; (iii) "armor" against political risks; (iv) universal availability; (vi) benefits certitude; and (vii) high fund profitability.

Regarding micro properties, these authors mention: (i) consumption and investment softening; (ii) the possibility that beneficiaries choose a replacement rate, a contribution rate and a portfolio which are coherent to each one; and (iii) low administration costs.

Coverage

Any nation has as a central objective, to have a social security scheme that provides the population with support in the event of not having a job in old age to generate appropriate incomes to at least to cover their basic needs. This forecast attitude can be taken individually, and starting from it, dedicate a proportion of the incomes as savings for that circumstance.

Nevertheless, knowing that people are usually "short-sighted regarding the future", and they do not usually dedicate savings for the period of inactivity, countries have established obligatory systems. In general, it might seem that, being compulsory, a country could have a system for covering a relatively wide percentage of population.

Sadly it does not happen in many countries, such as Peru, because the compulsory contributions suppose an income flow that acts as a base for it, which constitutes an axis for the main decisive factors of the coverage levels. To contribute to a certain social security system, the population, first of all, should have resources.

For this, what normally happens is that resources:

i) Might not be available, basically because they do not exist (people are unemployed with more or less frequency),

ii) Are too low, and the worker chooses not to contribute because of the necessity of facing other basic needs; or,

iii) Incomes might be reasonable as well, but population may consider that the system, even when it is compulsory, does not provide enough incentives for paying the contributions, and for that, if they can avoid the payment they will.

The mentioned factors show an impact on the coverage levels that any previsional system could reach. The implications of these factors are relative, and they will depend on the characteristics of each society and on the adopted pension system. Knowing that these are presented in high or low degree, governments historically have searched to adopt strategies for diminishing their effects. This way, facing the problem that population is unprotected in old age by not having resources to pay -cases (i) and (ii) - states have searched to establish a non-contributive pension scheme, in order to reach a higher degree of coverage for the adopted system.

However, non-contributive subsidiary schemes should be applied carefully, because some important aspects for the good performance of the whole system should be considered. In the first place, subsidiary schemes require that the Public Treasury has enough resources which are sustainable through time, in order to not generate instability in the macroeconomic foundations that can damage the pension system itself in the long run.

Secondly, accepting that state support is important, it is necessary to assure that the applied subsidy is correctly directed to those that indeed cannot contribute to the system for lack of resources in order to get an efficient use of the same. A third aspect is that if the subsidy is not properly assigned, you can generate disincentives for those who make efforts for contributing to the previsional system, so it has to be applied carefully. A fourth aspect has to do with the fact that those who can afford to contribute with the system, do not do it because they see the system does not grant them enough benefits.

In that case, solutions may exist in the system design because it does not generate appropriate incentives. So, the most advisable thing to do is to establish the necessary reforms to the previsional system which guide the economic-financial incentives of the agents, before establishing subsidies which deteriorate the Public Treasury accounts. Also considering that these schemes are usually obligatory,

it's important to establish better controls so that contributions become effective, through a reinforcement of the administration

Pension Levels

As important as assuring a wide covering of the previsional system, is the consideration of the factors that allow the maximization of the pension levels of those who contribute to the system. Starting from the experience and following different studies[48], pensions for those who participate in the system, will depend on:

i) The proportion of the incomes destined for accumulation in the defined system, that which constitutes the affiliate's contributions;
ii) contributions frequency;
iii) period that the affiliates contribute to the system;
iv) yield.

All these determinants are mainly related to those that impact coverage rates, that have the possibility of generating enough incomes and in the previsional system generate enough economic incentives so that members pay the contributions, considering that making it compulsory is not necessarily enough for the agents to participate. A real profitability rate, sustained in time, will contribute substantially to a higher accumulation of contributions to the system and facilitate higher resources for the pension.

The contribution rate the law defines becomes a key element in the pension that the population could receive in the future, because it should be established at a level such that it does not become a disincentive, especially if a tax system already imposes a heavy load.

In that context, contributions to the previsional system could be perceived as an additional tax. Considering the previous restriction, the

[48] It is recommended to review Modigliani and Muralidhar (2005)..

rate should be realistically planned, in accordance to the pension offered in the future. Low contribution rates reflect reduced pensions, unless the State finances the system imbalance, which could constitute uncertainty in the previsional system.

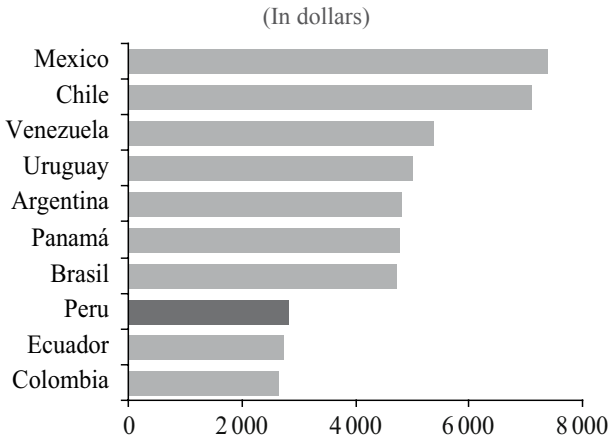
The rate also should be flexible enough for adapting to changes presented in the economic, social and demographic context. Contribution frequency and quantity of years members participate in the system, especially in the first years of the labor career, constitute an important factor so that members can obtain pension improvements. However, the labor reality in each country conditions the possibility of having a better continuity of contributions. This way, a structurally elevated rate of unemployment usually lowers contributions continuity and therefore, reduces average retirement pensions

Structural factors that subjugate system kindness

Previsional system design is only one of the necessary columns to provide a proper coverage and pensions level. However, it finally depends on the conditions or structural factors of the economy where it is implemented. Macroeconomic stability in a country, reflected in a policy to sustain fiscal accounts and monetary politics in a rational way, is constituted in a previous requirement to maintain purchasing power of the contributions and to assure conditions for the development of financial markets that lead to an appropriate handling of the pension funds in order to reach appropriate profits where long term vision is fundamental.

An economy's relative level of development conditions pension levels to receive. This way, for example, in Peru, with a GDP per capita near US $2800, which locates it in the group of low-incomes countries, according to World Bank classification, the possibility to generate benefits is limited comparable to more prosperous countries.

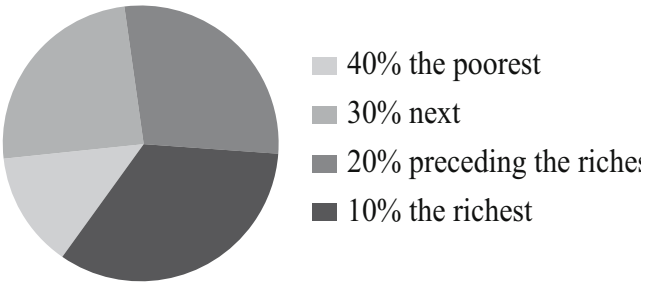
Graph VII-1 GDP per capita in selected Latin American countries



Source: BBVA

In several countries not only the income levels per capita constitute a limit to improve pension conditions, but also low incomes do not harmonize with the potentials pensions and coverage rates that should be obtained. This way, in addition to low incomes, problems of bad distribution may also exist; this fact can determine that a high proportion of the population does not count on a previsional protection mechanism.

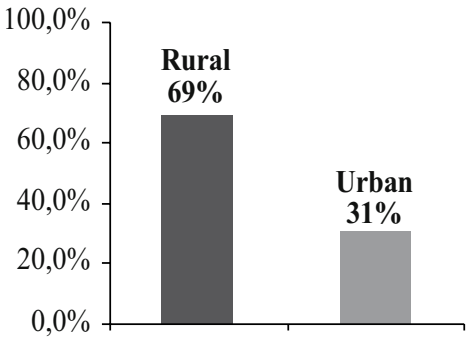
Graph VII-2 Income Distribution in Peru



Source: NIIS

Besides the poor distribution of income, high poverty rates represent a great difficulty for any previsional system to have a great impact in the short run. Thus, in the Peruvian economy, these poverty rates are 69.3% in rural populations and 31.2% in urban areas. The poverty situation is even more complicated when it does not adjust to the growth that the economy experiences. In Peru, poverty flexibility is low in the presence of changes in the GDP growth, which implies that reducing the current poverty situation could take more time, and could limit the potential of the previsional system.

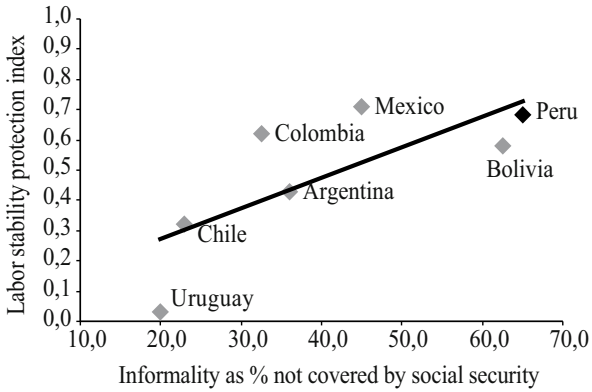
Graph VII-3 2005 Poverty rates in Peru



Source: MEF

Finally, another restrictive factor for a better previsional system achievement is the conditions of informality that an economy may experience. A highly informal economy implies several difficulties for the system, first, the problems that economic agents face to obtain employment and to maintain it, which restricts the possibilities to contribute to the system. In Peru, the informality levels reach 65%, measured as the percentage of the population not covered by social security. There are different reasons for this situation; one of the most mentioned is the inflexibility in the labor market, for which Peru is located in second place in Latin America according to World Bank statistics.[49]

Graph VII-4 Informality vs. labor protection



Source: World Bank

[49] See Perry et al (2007)

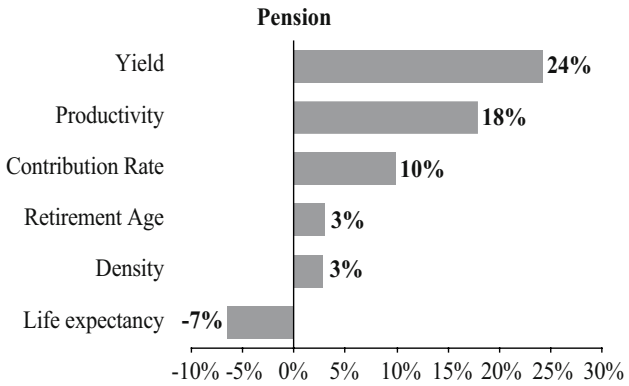
Therefore, in order to evaluate the operation of a previsional system convenient, it should necessarily acknowledge the structural conditions of the context where it performs. In general, it seems evident that any recommendation presented to maximize the efficiency of a social security regime should observe a group of restrictions that, depending on a country's degree of development, could have higher or lower relevance.

How Does The System Improve When Facing Parameter Changes And Macroeconomic Context?: Sensitivity Analysis

The pension a worker obtains is the result of the combination of several factors. In that sense, it is important to understand how each variable impacts the amount he finally receives. There are variables that may be of consequence, such as the selection of a portfolio that gives him a higher profitability or increases his voluntary contribution, which would make the implicit contribution rate higher to improve his pension. Nevertheless, there is a group of variables that does not depend directly on his decision, but on the particular characteristics of the economy.

With the purpose of measuring the effect of the Peruvian economic context on the previsional system, an analysis of sensitivity is produced to individually determine each variable that intervenes in the pension amount, leaving the others in accordance with the assumption adopted in the base scenario, and a variation equivalent to a representative unit is introduced. In the following graph the variables with more consequences for the pension's amount are presented.

Graph VIII-1 Main Pension Determinants



Note: these exercises were produced based on the actuarial model, leaving all variables considered on the base model constant and only evaluating the impact of modifying one variable at a time.

Production: BBVA

In the first place, the increment in 1 percentage point in the percentage of profitability - from 6% to 7% - gives as result that pension grows by 24% or that every contributed sol is 24% more productive in terms of the pension to be received. The second variable that considerably affects the pensions is the level of the remunerations or, alternately, the rate at which it grows annually.[50] This indicates that the increment of 1 percentage point in the salary growth rate would allow an individual to obtain an 18% higher pension. That means, labor improvements or, in general, improvements in the economy that allow for an increase in remunerations level, will allow access to higher future benefits for workers.

In a manner similar to the previous case, if the contribution rate changes from 10% to 11%, the corresponding pension would be 10% greater.

In the same way, if the effective period of contribution increases, either due to delay of retirement age, more continuity in contributions, or starting to contribute in the system from an early age, the accumulated

[50] It is necessary to determine that in the model the mentioned variable is obtained through productivity rate of economy and is, indirectly, a reflection of economical growth.

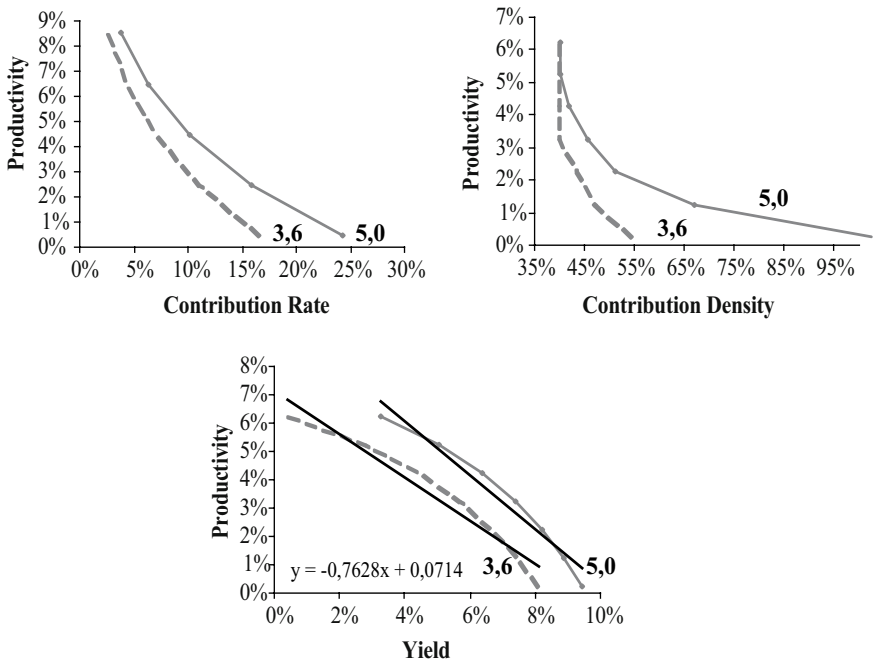
fund would be higher and so the associated pension. On the contrary, if adjustments were not made during the contribution period but the period to have the benefit of pensions is prolonged, as a result of a higher life expectancy or the advance of the retirement age for example, the accumulated fund would have to be distributed among higher payments and the total impact on the pensions would be negative.

Iso-Pension curves

Another way to evaluate the impact of the variation of variables on the pensions' level can be carried out by analyzing the effect of change in more than one variable. With this purpose, the iso-pension curves were used to show, for the same pension level, the different values that two variables could adopt, maintaining the rest as in the base scenario. This way, the curves allow us to know how the parameters change so that pension levels remain the same; but they also show how much these variables would have to increase to obtain an objective determined pension level.

Regarding these approaches, variables were analyzed in pairs and the most important combinations are presented in the following graph. In the first place, for a certain pension level, a higher salary growth allows for compensation of a smaller contribution rate to the system; therefore, assuming the rest is constant, higher pensions could be reached by increasing both variables or at least one and maintaining the other one at the current level. Something similar is presented in the existent relation between contribution frequency or density and salary growth rate. Nevertheless, in order to reach higher pension levels it's necessary to have higher earnings in density to substitute reductions in the salary growth.

Graph VIII-2 Iso-Pension



Note: The first curve, 3.6 corresponds to PPS average pension growth in 2050 in respect to 2010. The second curve, 5.0 is the objective level for evaluating the variation in the parameters.

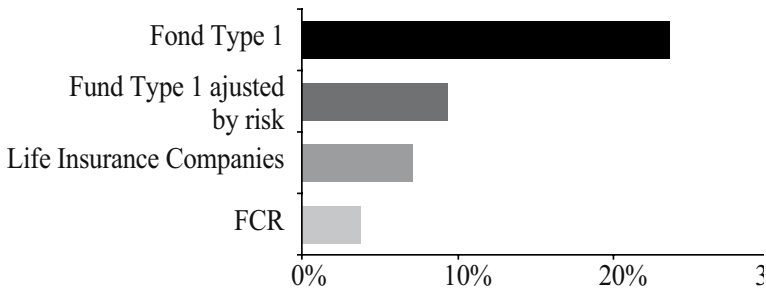
Production: BBVA

Finally, it is necessary to mention that although an inverse relation is observed between the system profitability and the rate of salary growth, the substitution reason among these variables would be closer than the one found in the cases previously described. In other words, in order to reach a certain pension level proportional variations in profitability and salary growth are required.

Return On Previsional Funds Administered By The State

Another alternative to consider is to improve the sustainability of the PAYGO system through measures guided to achieve improvements in the profitability of the pensions funds managed by the State. In particular, it is intended to study and implement mechanisms that allow the profitability of the FCR-DL N° 19990 to be improved. The following could be evaluated: i) a new policy of investments that generates bigger yields, ii) to bid the funds to the private administration with fiduciary responsibility. The following graph shows that a lot of margin exists if it is compared with the funds in private pensions or insurance companies.

Graph IX-1 Comparisons of Yields (2007)



Note: In FCR the equivalent rate has been calculated. Information from April 2007

Source: PNO, SOB / Production: BBVA

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ZVINIENE, Asta y PACKARD, Truman
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Peru is going through a total demographic transition: fall in the birth rate, a more long-lived population, a bigger young labor force. These changes should generate a higher economic growth within the next 25 years. Further ahead there will be costs, mostly for the population who will then be ready to retire. This book is absolutely essential reading material for those who believe that the essence of a good government lies in its vision towards the future and prevention with practical measures given on time.

Pedro Pablo Kuczynski G.
Former Minister of Economy

Achieving a higher access of the Peruvian people into the pension system is one of the most important challenges that we have as a society. With this publication, BBVA Group brings specific proposals into the debate in terms of how to achieve a better access into the previsional system and how we must change so that the system manages to cover adequately the needs of the Peruvian people during their old age. This study that analyzes the pension system to the year 2050, shows that the pension topic is no longer just a topic for a study for the State or the multilateral agencies. The contribution of BBVA for the design of public policies shows the potential of a public-private effort to approach the more relevant topics for the development of Peru.

Fernando Zavala Lombardi
Former Minister of Economy

The virtue in approaching pension topics lies not only on knowing how to put together contractual savings and investment mechanisms that belong to the model, but also, in a fundamental way, their impact on the population, and for the latter, in terms of the well-being levels that the society and the industry itself can achieve. This study fulfills that purpose, considering that the look, the diagnosis and the matrix lines of the proposals aim at achieving the most important goal and ultimate purpose of any Social Security system: promote higher levels of access as well as substitute incomes by the time a worker reaches the end of his working life.

Felipe Tam Fox
Superintendent for Banking, Insurance and AFP

How important it is for the National Pensions System to promote academic efforts whose results are now handed over to us by BBVA. Designing public social security policies is an obligatory commitment for the society, setting forth our feasibility for social and economic development as a system and as a country. Increasing the previsional coverage and the level of benefits is part of my vision to build a universal and long-term sustainable pensions system. If we share that vision without putting aside the mechanisms that will help us achieve this purpose, we will have taken a big step forward in the construction of the institutions and the responsibility in the handling of the pension system in Pe ru. I celebrate with pleasure this type of contributions. I am a believer of their need.

José Luis Chirinos
Chief of the Previsional Normalization Office

C.C. 28000287
ISBN 978-9972-09046-2