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ASSESSING PERSONAL RETIREMENT SAVINGS PLANS
– THE PORTUGUESE CASE

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Abstract

This thesis highlights the insights and shortcomings of personal retirement savings plans (*PRSP*) structure, operations and performance. These schemes were, at first, established in 1989, with the purpose of encouraging personal savings and, at the same time, complementing the traditional system of pension provision. Because of their voluntary nature, the state offered a special fiscal regime to *PRSP* in order to promote individuals' reliance on private pension savings. *PRSP* are administered by pension plan sponsors. Together with investment managers, they find that their privileged access to information and to sophisticated techniques of performance evaluation allows them to achieve superior performances (for a portfolio security) than the ones reached by a financially myopic individual. To investigate this point, an analysis was conducted on return, risk, security selection and market timing performance of a sample of 20 representative personal retirement savings funds (*PRSF*), hold in the form of pension funds. This thesis begins with a brief debate on the impact of demographic evolution in the Portuguese pension system, with a special reference to the third pillar of pension protection. Then, it portrayed *PRSP status quo* and growth trends, and pointed out some criticisms and an alternative to these schemes. The final section examines *PRSF* performance. It starts with a brief description on the data, methodology and data limitations, followed by a literature review on portfolio performance measures and market timing. Using a time series regression on *PRSF* gross returns, some illustrative results are presented and identified the potential distortionary outcome of portfolio performance measures.

Keywords: personal savings, traditional system of pension provision, special fiscal regime, demographic evolution, portfolio performance evaluation

JEL Classification: G11, G23, H31, H55, J11

UMA AVALIAÇÃO DOS PLANOS DE POUPANÇA REFORMA – O CASO DE PORTUGAL

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Resumo

Esta tese procura salientar as virtudes e debilidades inerentes à estrutura, *modus operandis* e desempenho dos planos de poupança reforma (*PPR*). Estabelecidos, pela primeira vez, em 1989, estes planos propunham-se a estimular a poupança voluntária bem como a complementar os esquemas tradicionais de provisão de pensões. Por serem planos de subscrição voluntários, o estado concedeu-lhes um regime fiscal especial a fim de promover a confiança dos indivíduos neste tipo de poupança privada para a velhice. Os *PPR* são geridos por entidades gestoras de fundos de pensões que, juntamente com os gestores de investimento, consideram que o seu acesso privilegiado à informação e às técnicas sofisticadas de avaliação do desempenho das carteiras lhes permite obter um desempenho superior àquele que seria obtido por um indivíduo com miopia financeira. Para investigar este facto, foram analisados o rendimento, risco, selecção individual e *market timing* de uma amostra composta por 20 fundos de poupança reforma (*FPR*), detido sobre a forma de fundos de pensões. A tese começa com uma breve discussão sobre o impacto da evolução demográfica no sistema de pensões nacionais, com especial referência para o terceiro pilar de protecção social. Segue-se, uma descrição sobre o *status quo* e as tendências de crescimento dos *PPR*. São também apontadas algumas críticas aos *PPR* bem como uma alternativa a estes esquemas complementares. Por fim, analisa-se a desempenho dos *PPR*, com uma breve descrição sobre os dados, metodologia adoptada e respectivas limitações. Segue-se uma revisão da literatura referente à avaliação do desempenho de carteiras e ao *market timing*. Tendo por base uma regressão temporal sobre o rendimento bruto dos *FPR*, são ilustrados os resultados alcançados e identificados os possíveis desfechos distorcionários que podem decorrer das medidas de avaliação do desempenho das carteiras.

Palavras-chave: poupança pessoal, sistema tradicional de provisão das pensões, regime fiscal especial, evolução demográfica, avaliação do desempenho das carteiras

Classificação JEL: G11, G23, H31, H55, J11

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Acronyms and Abbreviations

Eq.SP: Equity Savings Plan

ESF: Education Saving Fund

ESP: Education Savings Plan

PAIFPC: Portuguese Association of Investment Funds, Pensions and Capital

PII: Portuguese Insurance Institute

PIS: Portuguese Insurance Association

PIT: Personal Income Tax

PRSF: Personal Retirement Savings Fund

PRSP: Personal Retirement Savings Plan

R/ESF: Retirement/Education Saving Fund

R/ESP: Retirement/Education Saving Plans

RPIIF: Report on the Insurance Sector and Pension Funds

TFRS: Tax-Favoured Retirement Saving

Glossary¹

Pension plan: is an officially binding contract with an explicit retirement purpose, designed to provide individuals a pension income. Apart from having an explicit retirement objective, pension plans may offer additional benefits, such as pre-retirement income, disability, sickness, and survivors' benefits.

Savings plan: is an officially binding contract with an explicit precautionary saving objective, intended to grant individuals a supplementary income. In Portugal, this includes Personal retirement savings funds, Education savings funds and Personal retirement/ Education savings funds which may be settled under three forms: life insurance, pension fund and investment fund.

Pension plans classification

Public pension plan: is a public programme managed by a general government (that is central, state, and local governments, as well as other public sector bodies such as social security institutions).

Private pension plan: is a private programme managed by an institution other than general government (that is a private entity acting as a plan sponsor, a private pension fund or a private sector provider). These pension plans may act as complement or substitute instrument for public pension plans.

Private pension plans classification

1. Occupational pension plan: is a plan where individual's access is directly correlated to an employment or professional bond between the plan member and the entity setting up the plan (the plan sponsor). Such plan may be managed by the plan sponsor or by an independent entity (a pension fund or a financial institution operating as pension provider).

• **Mandatory occupational pension plan:** employer's participation in such plan is compulsory. That is, employers are legally compelled to participate in a pension plan setting up and making contributions to occupational pension plans while employees may voluntarily join these plans.

¹ From World Bank 1994, *Averting the Old Age Crisis*; OECD (2005), *Private Pensions – OECD Classification and Glossary*; PAIFPC *On-line Glossary*

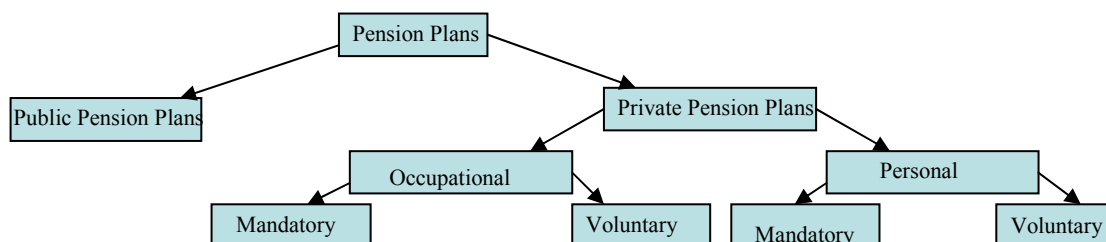
- **Voluntary occupational pension plans:** employer’s participation in such plan is voluntary (including contexts where there is automatic enrolment in the sequence of an employment contract or whenever there is a legal requirement to join plans set up on a voluntary basis by their employers). This plan is defined as voluntary, though employers are required to sponsor such plans so as to be (partially) exempted from social security contributions.

2. Personal pension plan: is a plan where individual’s access is not correlated to an employment relationship. This plan is established and managed directly by a pension fund or a financial institution operating as a pension provider without any intervention of employers. Individuals may join these plans by purchasing and selecting few aspects of the private arrangements as well as employers may make contributions to personal pension plans. In some personal plans, membership may be limited.

- **Mandatory personal pension plan:** individual’s participation or eligibility to receive pension benefits in such plans is compulsory. Individuals may be claimed to make contributions to a pension plan of their preference or to a particular pension plan.

- **Voluntary personal pension plan:** individual’s participation in this plan is voluntary. It includes those plans that individuals must join if they wish to complement part of their social security benefits with the benefits received from personal pension plans.

Figure I. Pension Plan structure:



Source: OECD (2005), *Private Pensions – OECD Classification and Glossary*

The guarantees may be offered by the pension plan itself or by the plan provider in the form of:

- **Defined-benefit plan:** a plan that stipulates a definite pre-amount of benefit upon retirement, regardless of the performance of the underlying investment pool, and wherein contributions are estimated in order to fulfil the benefits payment requirements.
- **Defined-contribution plan:** a plan specifying a definite pre-amount of contributions, whereas the final amount of benefit received by the employee depends on the investment's performance and on the cumulative amount of such contributions.
- **Mix plan:** a plan, simultaneously, ensuring a defined-benefit plan and a defined-contribution plan.

Defined-benefit plans may be classified, in the context of the social security system as:

- **Plan integrated with social security:** a pension plan offering a retirement complementary income linked to the value of social security pension value.
- **Plan non-integrated with social security:** a pension plan setting up the receiving benefits in accordance to a fraction of individual's salary by the time of retirement or any other indicator, unlinked to the value of social security pension value.

With reference to the type of financing, pension plans may be organized as:

- **Contributory plan:** a pension plan offering the possibility of the existence of participants' contributions in the accumulation of benefits.
- **Non-Contributory plan:** a pension plan financed exclusively with the sponsor(s) contributions.

Pension funds definition

Pension fund: is a pool of assets forming an independent legal entity purchased with the contributions to a pension plan with an exclusive objective of financing pension plan benefits. Additionally, fund members hold a legal or beneficial right or any other contractual claim against the assets compiled in the pension fund.

Pension funds classification:

Closed pension funds: refers to only one sponsor or a number of sponsors directly related to each other.

Open pension funds: allows for a collective or a singular affiliation without the need for any link between the sponsors.

Open pension funds classification:

Personal retirement savings funds: funds financing personal retirement savings plans.

Education savings funds: funds financing education savings plans.

Retirement/ Education savings funds: funds financing retirement/education savings plans.

Equity savings funds: funds financing equity savings plans.

Others: funds not financing any of the savings funds described earlier that allow for a collective affiliation.

Investment funds definition

Investment funds: is a pool of assets forming an independent legal entity, resulting from the aggregation and application of the savings raised by an individual or collective investor, defined as participants, in primary and/or secondary security markets.

Life insurance classification

Life insurance: is a binding contract between the policy owner and the insurer, designed to provide a financial security income until the insurer's death. Insurers agree to pay an amount of money, in certain and arbitrary moments, upon the occurrence of the insured individual's or individuals' death receiving, in exchange, a predetermined amount (premium) at regular intervals or in lump sums ("paid up" insurance) amounts.

Annuity: is a stream of payments over a specified period of time (i.e. death) used as an instrument of securing a regular income amount for the beneficiary.

Collective subscription vs. individual subscription

Collective subscription: is a binding contract between an open pension fund management company and one or more sponsors willing to join the fund in order to finance a particular pension plan.

Individual subscription: is a binding contract between an open pension fund management company and a contributor (individual or collective), in which the purchase of certificate units belongs to the participant responsible for the purchase.

Agent's classification and other definitions

Sponsors: collective persons whose pension plans are financed through a pension fund.

Beneficiaries: individuals who are entitled to the benefits obtained within the pension plan.

Benefit: the cash flow prescribed by a specified pension plan.

Participants: individuals whose eligibility to participate in a pension fund is determined in accordance to the binding contract, regardless of their role as an active (working or contributing, and hence actively accumulating assets), passive (retired, and hence receiving benefits) or deferred (holding deferred benefits) participant.

Contributors: individuals contributing to a pension fund or an entity performing contributions carried out on behalf and in favour of participants.

Contribution: deliver made to a pension fund by a sponsor, a contributor or a participant. Note that, the sponsor's contribution to the pension fund may be carried out in cash, securities, etc., while participant's contribution to the pension fund must be carried out in money.

Withdrawal: trade or reimbursement of the certificate units of a fund.

Certificate units: fractions representing the investment fund, in which the total inflow amount of certificate units constitute the total net value of the investment fund.

Classification of the costs incurred on private pension provision

Commission: monetary amount paid by the fund or by the fund participant in order to compensate the costs of fund managing.

Depositary Commission: amount charged to the fund so as to compensate the fund managing activity of the depository bank. This commission is estimated as a fraction of the total net value of the fund.

Withdrawal/ Reimbursement Commission: amount charged directly to the fund participant by the time of withdrawal and estimated as a fraction of the value corresponding to the

withdrawal of certificate units, which may vary in accordance to the permanence period of the participant in such fund.

Subscription/Emission Commission: amount charged directly to the fund participant by the time of subscribing a certificate unit and estimated as a fraction of the value corresponding to the subscription of certificate units.

Pension systems types and other definitions

Pay-as-you-go system: is a public method of financing whereby current outlays on pension benefits are paid out of current revenues from an earmarked tax, often a payroll tax. It assumes an intergenerational commitment whereby active workers secure an income to retirees, as long as the following generations entering in the labour market pay their future pension by the time they retire.

Fully funded system: is a method of financing whereby individuals' contributions, mandatory or voluntary, are accumulated in personal accounts that will provide them income security by the time of retirement.

Replacement rate: the percentage of pre-retirement income that is available to a worker by the time he reaches retirement.

Demographic definitions

Total old age ratio: the ratio between the number of individuals currently left out at the working age (and over 65 years old) and the number of individuals from the active population (aged 15 to 64).

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1. Introduction

The growing awareness of the need to continue modernising social protection systems is on State's policy agenda in order to ensure a financially and socially sound future and to cope with the effects of demographic ageing. It has become evident that the social security system on its own cannot provide an adequate level of income to the old age. In this context, second and third pillars have emerged with the aim of complementing the traditional public pension system. The improvement of these two pillars may not only avert social security crises it may even develop capital markets, encouraging the investment in new financial products and stimulating long-run savings. However, the growth of these two pillars will depend, greatly, on the structural adjustments addressed to financial markets by State's pursuing policies.

The current study concerns the third pillar of the Portuguese pension system. The third pillar denotes the individual pension provision, contracted on a voluntary basis, next to public pensions and work-related pension schemes, and is designed to cover up pension gaps from first and second pillars. Individual's contribution to the third pillar may occur through the purchase of an individual life insurance and/or a personal retirement savings plan (*PRSP*). Both schemes share a common aim of pursuing an additional income upon retirement. Yet, the objective of this thesis is to analyse the performance of personal retirement savings plans. In Portugal, few researchers have studied the performance of personal retirement savings (*PRSF*). This may be due to system's short maturity. The present thesis aims to grant a greater understanding on the financial functions of these schemes. However, the purpose of this study is not to provide a complete survey on the performance of *PRSF*, but rather to highlight the insights and shortcomings of these schemes structure, operations and performance, in ensuring (individuals) an extra retirement income and, simultaneously, alleviating state's burden on pension provision.

Plan participant's greater reliance on personal retirement savings funds has been encouraged by the potential welfare gains of investing in a tax-favoured scheme with low risk levels for a target rate of return. Pension plan sponsors and investment managers argue that their access to private and public information (not available to public) and also to sophisticated

techniques of performance evaluation allow them to achieve higher performances (for a portfolio security) than the ones reached by a financially myopic individual.

To investigate this point, a simple test was performed by running a time series regression on the gross returns of 20 representative *PRSF* over the period 2003-2007. The goal was to identify the schemes that out performed both the market and the risk free rates due to investment manager's financial literacy on asset allocation policy and security selection. Nonetheless, Sharpe, Alexander and Bailey (1995) found that a portfolio's superior performance in the past does not guaranty superior returns in the future, as it may have been the result of good luck or even manager's ability to capture market movements. Conversely, a portfolio's poor performance may be the result of bad luck, excess of shifts in the asset classes, etc. In order to disentangle the effects of luck and manager's financial proficiency, the study introduces the measures of portfolio's performance of Treynor, Sharpe, Jensen and Fama, among others. The estimation results suggests that although not requiring substantial investment amounts, *PRSF* fail to generate a significant pension savings due to portfolio's poor performance. Also, since participants are risk averse they may achieve superior investment performances through actively purchasing risk-free assets (such as cash, deposits and T-bonds) instead of a *PRSF*.

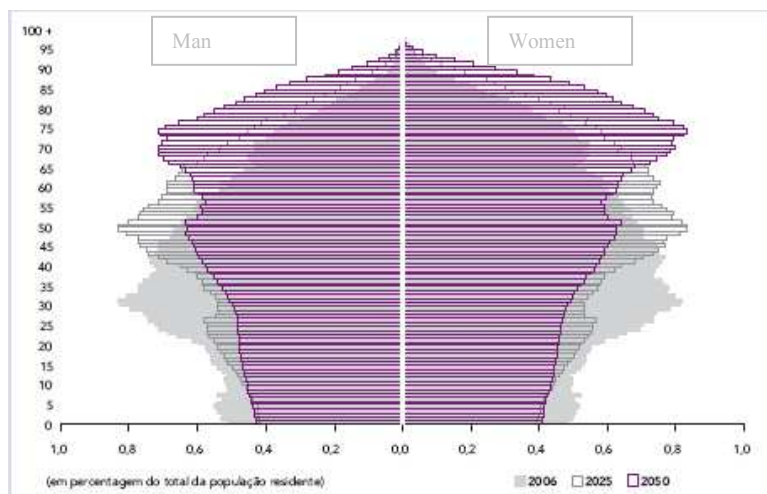
This thesis is organized as follows. Section 2 provides a brief debate on the impact of demographic issues in the Portuguese pension system and presents an overview on the institutional environment of the third pillar of pension protection across countries and within the empirical research. Section 3 describes personal retirement savings plans *status quo* and growth trends, and points out some criticisms and an alternative to *PRSP*. Section 4 begins with a brief description on the data (Section 4.1), methodology (Section 4.2) and methodology limitations regarding the assessment of *PRSF* performance (Section 4.3). The next two sections focus on the literature review on portfolio performance measures (Section 4.4) and market timing (Section 4.5). Section 4.6 presents some illustrative results and analysis on schemes performance. The study concludes by identifying potential distortionary outcome of portfolio performance measures (Section 4.7).

2. Demographic trends: shifting longevity risk towards retirement savings arrangements

2.1 Re-evaluating the scope of public pension provision

Demographic ageing is, above all, the product of considerable economic, social and medical progress, allowing individuals the opportunity to live longer and healthier. Such transformation brings up important challenges to pension systems. However, it varies widely between regions, in timing and magnitude, partly reflecting discrepancies in fertility, life expectancy and immigration trends. Figure 1 demonstrates the evolution of the Portuguese population pyramid and its progressive population ageing through the age cohorts.

Figure 1: Population by age group and gender (in percentage of the resident population)



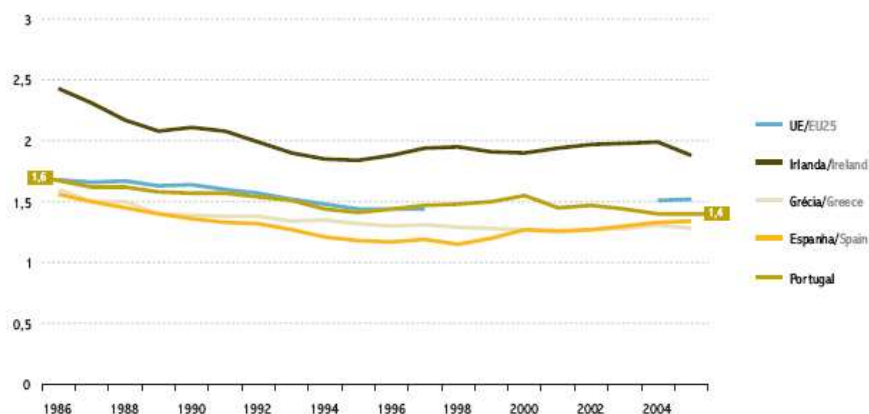
Source: Demographic Statistic 2006, INE

The base tends to narrow, reflecting a shrink in total's population size as a result of lower fertility rates, while the increase share of older and very old individuals in the total population enlarges, as a consequence of an improvement in life expectancy trends. Hence, there are two main drivers of population ageing:

- 1) Decline in fertility rates;
- 2) Increase in longevity gains.

Portugal's declining fertility trends happen to converge with the overall scenario occurring in EU countries (Figure 2).

Figure 2: Total fertility rate² (in percentage)



Source: Instituto Nacional de Estatística (2007), *Portugal-20 Anos Integração Europeia/Portugal*, INE

The explanations for the performance of total's fertility rates balance between economist's rational choice approach and sociologist's cultural and individual changing values. The 2007 European Commission report disentangled the motives behind both approaches. Under an economist perspective³, the movement in fertility rates may be described by three views:

1. Becker's findings⁴ which pointed women's participation in the labour force has the responsible vehicle for the increase in the opportunity cost of having children;
2. Easterlin's researches⁵ which highlighted the effects of individuals expectations upon marriage and childbearing; that is, whenever individual's welfare gains exceeded their expectations, they would tend to be optimistic and, consequently, feel free to marry and have children, while if the opposite situation occurs, this would leave them pessimistic and uncertain regarding marriage and childbearing;
3. Friedman's studies which concentrated on the economic value of childbearing; that is, individuals tend to have children in order to lessen the uncertainty⁶ in their lifetime.

² The total fertility rate has to be seen as a projection since it is affected by a "tempo effect"; that is, it derives the future fertility trend of younger women from the probability of giving birth among current older cohorts of women, and thus the postponement of childbearing by older women is not taken into account, leading to a slowdown in the total fertility rate, though the probability of having children in later years is increased.

³ This is regarded as the first demographic transition scenario (FDT).

⁴ See more in Becker, G.S. (1981), *A Treatise on the Family*, Harvard University Press, Cambridge MA.

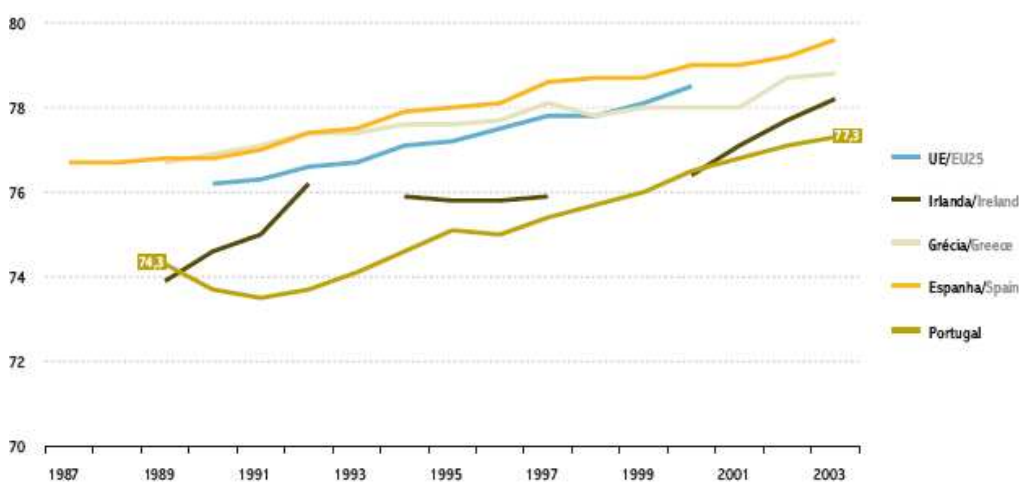
⁵ See more in Easterlin, R.A. (1980), *Birth and Fortune: The impact of numbers on personal welfare*, Basic Books, New York.

⁶ In most developed countries, this uncertainty has been overcome with the implementation of social protection systems.

Conversely, sociologists' findings claim that fertility changes are driven by other factors rather than economic aspects. To investigate this point, Van de Kaa and Lesthaeghe (1987)⁷ focused on individual's changing values and behaviour since 1960s.

A part from shifts in fertility trends, population ageing has been the result of an improvement in mortality rates in early life. This fact derives from socio-economic and health progresses. Recently, there has been also a significant decline in the mortality rates of population in their midterm life. This fact is contingent on lifestyle changes and on the appearance of medical treatment to deadly diseases (Figure 3).

Figure 3: Life-expectancy at birth



Source: Instituto Nacional de Estatística (2007), *Portugal-20 Anos Integração Europeia/Portugal*, INE

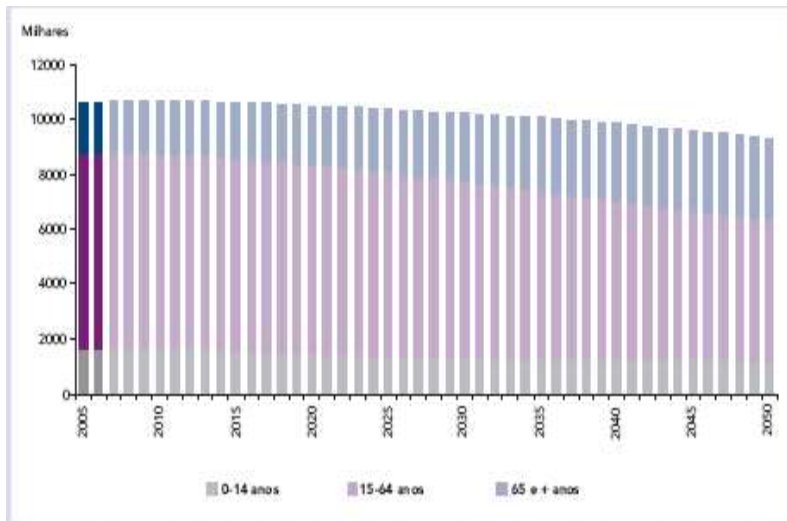
The combination of these two drivers of demographic ageing (fertility rates and life-expectancy) results in three interactive trends⁸: 1) ageing in the working age population; 2) ageing among the elderly population and 3) ageing in the overall population.

With respect to “ageing in the working age population”, it is important to observe the significant gap between the active population and the aged individuals (Figure 4).

⁷ Van de Kaa, D. J. (1987), Europe's second demographic transition, *Population Bulletin*, No 42, pp.1-57.

⁸ For further information see: Ribeiro, J.F.(2003), *Sistemas de pensões na Europa – Exemplos de “Pequenas economias abertas”*, *Departamento de Prospectiva e Planeamento*, Ministério das Finanças

Figure 4: Changes in the Portuguese population structure, 2005-2050 (in thousands)



Source: Demographic Statistic 2006, INE

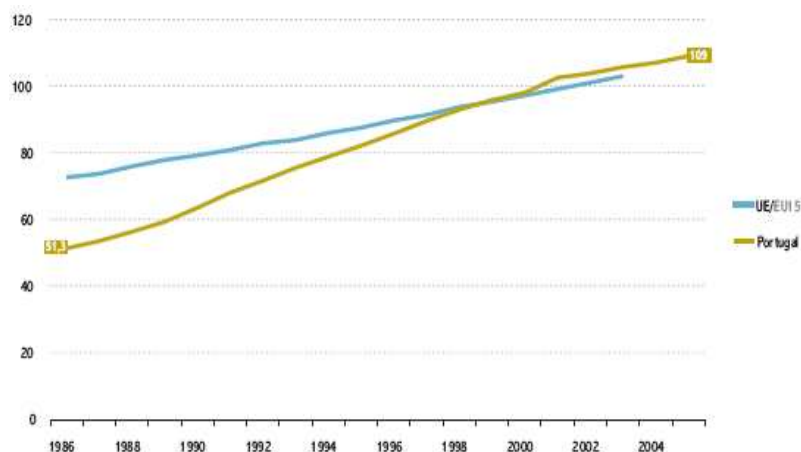
Note 1: The three colours are divided according to the demographic structure of the population. Therefore, colour grey corresponds to individuals under 14, colour purple corresponds to individuals in the working age population (15-64 years old) and colour blue corresponds to individuals over 65.

Note 2: The 2005 and 2006 values are estimates. From 2007 until 2050, the values correspond to projections.

Individuals in the working age population (15-64) will be most numerous until 2010 and will gradually decline to, approximately, 55% by 2050 (comparing to 67,3% registered in 2006).

This will induce an upward trend in the total old-age dependency ratio (Figure 5).

Figure 5: Total old-age dependency ratios



Source: Instituto Nacional de Estatística (2007), *Portugal-20 Anos Integração Europeia/Portugal*, INE

The total old age ratio matches with the evolution of Portuguese population pyramid and, at the same time, it converges and even surpasses, by the year of 2000, the EU15 estimates. According

to the *Instituto Nacional de Estatística*, this indicator seems to have benefit from a «youth potential which happen to have smoothed the “ageing effect” in the overall population».

However, this smooth in the ageing process will depend on governments’ ability to pursue policies that enhance, simultaneously, the participation of older workers in the labour force (raising the effective retirement age), the level of education of the labour force (increasing productivity) and households precautionary savings for retirement (rising the investment on private pension arrangements).

As for “ageing among the elderly population”, it is expected to continue increasing. One major question is whether this upward trend is associated to healthy life years. According to table 1, Portugal’s estimates are below EU15. Thus, there is a clear gap between the trends in longevity (figure 3) and the years in healthy ageing. Meaning that, the participation of older workers in the labour force is compromised by their capability to remain in good health.

Table 1: Healthy ageing in 2003 (in life years)

	Males	Females
EU-15	64.5 (e)	66.0 (e)
Euro area	:	:
BE	67.4 (e)	69.2 (e)
CZ	:	:
DK	63.0 (e)	60.9 (e)
DE	65.0 (e)	64.7 (e)
EL	66.7 (e)	68.4 (e)
ES	66.8 (e)	70.2 (e)
FR	60.6 (e)	63.9 (e)
IE	63.4 (e)	65.4 (e)
IT	70.9 (e)	74.4 (e)
CY	68.4	69.6
HU	53.5 (p)	57.8 (p)
MT	:	:
NL	61.7 (e)	58.8 (e)
AT	66.2 (e)	69.6 (e)
PL	:	:
PT	59.8 (e)	61.8 (e)
FI	57.3 (e)	56.5 (e)
SE	62.5 (e)	62.2 (e)
UK	61.5 (e)	60.9 (e)
HR	:	:
IS	:	:
NO	66.3 (p)	64.2 (p)

Source: European Commission (2007), *Europe's demographic future: Facts and figures on challenges and opportunities*, October, EC.

Note 1: E- estimation results; P- Provisional results.

Also, given that the elderly population is a major consumer on health and long-term care, the low levels of healthy life years registered above will pressure public healthcare spending and, consequently, increase the demand for these types of services (table 2).

Table 2: Trends on healthcare spending (in percentage of GDP)

	2004	2030	2050
	Level	Change from 2004	
BE	6.2	0.9	1.4
CZ	6.4	1.4	2.0
DK	6.9	0.8	1.0
DE	6.0	0.9	1.2
EE	5.4	0.8	1.1
EL	5.1	0.8	1.7
ES	6.1	1.2	2.2
FR	7.7	1.2	1.8
IE	5.3	1.2	2.0
IT	5.8	0.9	1.3
CY	2.9	0.7	1.1
LV	5.1	0.8	1.1
LT	3.7	0.7	0.9
LU	5.1	0.8	1.2
HU	5.5	0.8	1.0
MT	4.2	1.3	1.8
NL	6.1	1.0	1.3
AT	5.3	1.0	1.6
PL	4.1	1.0	1.4
PT	6.7	-0.1	0.5
SI	6.4	1.2	1.6
SK	4.4	1.3	1.9
FI	5.6	1.1	1.4
SE	6.7	0.7	1.0
UK	6.7	0.7	1.0
EU-25	6.4	1.0	1.6

Source: European Commission (2007), *Europe's demographic future: Facts and figures on challenges and opportunities*, October, EC.

Besides health and long-term care costs, “ageing in the overall population” is likely to increase public spending on pensions. Hence, government’s high expenditure on old age security systems may crowd out the investment in other important sectors. In the limit, this fact may hinder the sustainability of public finances. Table 4 depicts the trend on public pension expenditures across the European countries.

Table 3: Projections on public pension expenditure (in percentage of GDP)

	2004	2030	2050
	Level	Change from 2004	
BE	10.4	4.3	5.1
CZ	8.5	1.1	5.6
DK	9.5	3.3	3.3
DE	11.4	0.9	1.7
EE	6.7	-1.9	-2.5
EL	:	:	:
ES	8.6	3.3	7.1
FR	12.8	1.5	2.0
IE	4.7	3.1	6.4
IT	14.2	0.8	0.4
CY	6.9	5.3	12.9
LV	6.8	-1.2	-1.2
LT	6.7	1.2	1.8
LU	10.0	5.0	7.4
HU	10.4	3.1	6.7
MT	7.4	1.7	-0.4
NL	7.7	2.9	3.5
AT	13.4	0.6	-1.2
PL	13.9	-4.7	-5.9
PT	11.1	4.9	9.7
SI	11.0	3.4	7.3
SK	7.2	0.5	1.8
FI	10.7	3.3	3.1
SE	10.6	0.4	0.6
UK	6.6	1.3	2.0
EU-25	10.6	1.3	2.2

Source: European Commission (2007), *Europe's demographic future: Facts and figures on challenges and opportunities*, October, EC.

The results show that public spending on pensions will soar over the next decades, presenting significant differences among the European member states. This reflects an increasing shift to private pension arrangements and also a growing consciousness on the need to minimize poverty risks among the elderly population. As for Portugal, public pension expenditure is projected to increase significantly, highlighting the continuous concentration on statutory schemes for pension provision. As a result, public pension system is starting to be effectively or partially accounted as a deficit. The reasons are well known and are beyond demographic evolution. Among them, the following are described:

1. system's maturity, which replaces the stock of retirees to be renovated by new pensioners with higher income pensions;
2. decrease in the economic growth, whereas governments may fail to meet their responsibilities (including pension provision);
3. political cycles, that is pension systems may suffer from political pressure for portraying features that benefit from voters sympathy, in the short-run, but turn out to be inadequate and with lagging results, in the long-run.

To meet these challenges, governments have intervened in the old age security systems pursuing policies that alleviate the intergenerational conflict between the old age (who are receiving a statutory pension) and the young cohorts (who are financing these benefits and have no guarantee that their lifetime transfers will grant them an adequate income by the time they reach retirement).

2.2 Transition to a multi-pillar system

In 1994 the World Bank developed a report entitled "Averting the Old Age Crisis". This report provided facts and figures and called for new reforms. Furthermore, it analysed the problem of the old age income insecurity has a universal challenge that must be carried out through the perspective of those enrolled in retirement savings programmes.

The authors advocated that pension systems should be able to 1) provide income security to the elderly population and 2) help rather than hinder economic growth. To respond to their first objective, pension systems were recommended to retain the following three functions:

- a saving function – persuading individuals to allocate part of their lifetime labour income towards retirement;
- a redistribution function – guaranteeing a minimum pension income to those with lower earnings (and thus less apt to save);
- an insurance function – securing the old age against several risks such as disability, longevity, inflation (which may erode their lifetime earnings), investment risk, etc.

To reach the second objective, pension systems should try to:

- minimize the cost that may affect economic growth (i.e.: disincentives in providing new jobs and active ageing; individuals' unwilling attitude to save over their lifetime; administrative costs associated to pension provisions; inefficient allocation of capital and labour; high contribution rates which may lead to fiscal evasion);
- be sustainable in the long-run (encouraging individuals to plan for retirement and thus securing pension systems against unforeseen contingencies resulting from demographic and economic trends);
- be transparent (providing complete information to individuals and central governments by the time they perform a saving decision and, thus, protecting them against political distortions that may hinder the economic results, and, in micro terms, individuals earnings).

World's Bank report prescribed that the saving function should be separated from the redistributive function and thus should be placed “under different financing and managerial arrangements in two different mandatory pillars – one publicly managed and tax-financed, the

other privately managed and fully funded – supplemented by a voluntary pillar for those who want more.”⁹

The public pillar is an anti-poverty structure financed and managed by the State on a pay-as-you-go basis. It offers each covered employee an income pension unrelated with his earnings and contributions and mostly financed through social quotizations or payroll taxes. It has a redistributive function of reallocating individual’s income across and within generations, therefore protecting the elderly population against absolute poverty (consumption lower than the minimum subsistence level).

The second pillar is a mandatory structure managed by the private sector on a fully funded basis. It may include two types of private arrangements: occupational plans and personal savings plans. The second pillar provides employees with a pension income that is strongly linked with their earnings and contribution levels, assuring greater benefits to those who contribute most. It differs from first pillar simply because it excludes employees with lower earnings (i.e. domestic servants, employees from the informal sector¹⁰, etc.) making pension coverage constrained to individuals contributions. The second pillar carries out the saving function of smoothing individual’s income through their life-cycle.

The third pillar is a voluntary structure offering individuals a complement to their statutory pension income or even to their private pension plans (first and second pillars, respectively). It has a broad objective of, together with the second pillar, protect the old age against relative poverty (a decrease in consumption during retirement). Notwithstanding the separation of the redistribution and saving functions, the insurance function is established under the three pillars model, in an attempt to co-insure the old age against massive risks.

Strong arguments have opposed the three pillar model as the first pillar is mostly exposed to the demographic evolution and to the financial burden this evolution entails, while second and third pillars, which place their investment funds in the capital market, are frequently vulnerable

⁹ World Bank (1994), *Averting the Old age Crisis*, p.15

¹⁰ Note that in developing countries, omitting employees of the non-formal sector is a great concern since a part of their GDP is financed through this sector.

to economic cycles. Consequently, instead of a model with three pillars, the World Bank developed (in 2005) a five pillar model defined as following:

- zero pillar that offers the old age a flat or basic pension benefit that allows them to be above the absolute poverty line;
- first mandatory pillar financed on a pay-as-you-go basis;
- second pillar that is mandatory and privately managed;
- third pillar which comprises occupational and personal saving plans;
- fourth and fifth pillar addressed to the elderly population in need of a supplementary social assistance granted through informal channels that is, channels that are not derived from public pensions, house ownership, intra-familial transfers or personal savings (i.e.: access to health care services, property, etc).

The pension system in Portugal is a classical Bismarckian regime centred on the first pillar of pension provision. The first pillar covers almost the entire population, offering individuals different pension provisions: a general scheme addressed to private-sector workers and independent workers, and a special scheme for civil servants, police, and military forces. It also provides a minimum pension income to retirees.

The Portuguese government has proposed (MTSS, 2006), and later introduced, a sequence of measures¹¹ in order to offset some of the drag on long-term stability of pension provision (due to ageing and economic stagnation). For instance,

¹¹These measures have prevented the social security trust fund (whose goal is the financial stabilization of the pay as you go regime) to be inaccessible by the year of 2015. However, according to a recent report of the *Portuguese Association of Investment Funds, Pensions and Capital*, no sizeable effects of future improvements in social security accounts can be expected under these corrective measures. In fact, future improvements in the long-term stability of the social security system will depend on state's ability to implement a three pillar model over the current pension system architecture. Notably, a first pillar (entirely supported by the state) providing an earnings-related scheme, financed on a PAYG basis, and addressed to individuals earning twice the minimum salary. A second pillar, where participation is compulsory for individuals earning between two to ten times the minimum salary and where 50 % of individuals' contributions is delivered to the state and the other half is managed by a private institution. This pillar would also include a programme of state's "national accounts" set up on behalf of individuals and aimed to encourage personal savings. Last, a third pillar covering individuals with earnings higher than 10 times the minimum salary. Participation in this pillar would continue to be voluntary and encouraged through tax relief.

- 1) a new rule to the benefit formula, with the introduction of a demographic adjustment factor¹² (as in the Swedish case), allowing pension benefits to be calculated according to life expectancy trends and thus repairing the equilibrium between the contribution years (which have declined) and benefit years (which continue to increase);
- 2) a new rule to the contribution formula based on the entire career's earnings history and not on the best 10 years. Thus, the calculation on pension income is based on an average amount causing lower pension benefits;
- 3) a new rule to the contribution formula, where the earnings-related pension is indexed to prices, adjusting to economic growth¹³;
- 4) a greater participation of older workers in the labour force, encouraging the elderly population to postpone retirement¹⁴.

The second pillar of the Portuguese pension system is a private and voluntary system financed on a funding basis which offers occupational schemes to individuals (mostly pension funds managed by insurance companies and/or pension funds management entities).

The third pillar is a private and voluntary system which provides personal schemes that may take the form of: a life insurance scheme or a pension fund. It covers, among other savings products, personal retirement savings plans financed on a funding basis and exclusively designed to close pension gaps in first and second pillars.

Second and third pillars are not very well developed in Portugal. Together, they act as a complementary structure to the first pillar of pension provision. These two pillars provide different types of schemes:

- 1) a legal regime, planned to cover special needs or, simply, the contribution to a complementary regime in articulation with the public system;

¹² This factor may be neutralised if individuals start to contribute more to the system or if they continue to participate in the labour market (active retirement).

¹³ By doing this, government is eradicating the effect of political cycles on the present value of pensions and, at the same time, increasing the earnings of the poorest among retirees.

¹⁴ Thus, raising the effective retirement age and increasing the average earnings history for new pensioners (today estimated as 27 years).

2) a contractual regime, planned to induce supplementary contributions to the providential subsystem in the part not covered by it;

3) a voluntary regime, designed to secure an additional income to the individuals enrolled in such schemes (this is the case of personal retirement saving plans (*PRSP*)).

Personal retirement savings plans were, firstly, established in 1989, with the objective of stimulating personal savings and, at the same time, complementing the public pension provision. Because of their voluntary nature, the state offered a special fiscal regime to these schemes in order to promote individuals' greater reliance on private pension arrangements administered by pension plan sponsors. Participation in such savings schemes is voluntary and encouraged through fiscal incentives. Individuals participating in these schemes are free to choose how much to contribute, so long they respect the ceiling limits. Chapter 3 describes, in detail, the legal and regulatory framework of such plans and their tax treatment.

2.3 Overview on the third pillar of the pension provision

2.3.1 Literature Review

Much of the economic theory upon household's savings and consumption decisions follows the life-cycle models. In its simple version¹⁵, the model predicts that individuals will tend to save¹⁶ greatly during their working lives in order to consume the saved assets by the time they reach retirement. One form of financing retirement is through the investment in savings plans during their lifetime.

Gouveia (1997) advocated that the favourable tax treatment of *PRSP* creates a trade-off between the relative price over present and future consumption, so that the relative price of consuming today is greater than the price of consuming tomorrow. Hence, individuals will tend to substitute their present consumption for precautionary savings (substitution effect). This will

¹⁵ Major improvements were applied to the original model such as the introduction of: a bequest motive, capital market imperfections (i.e., liquidity constraints), a specific alteration to the individual utility function over time or the inclusion of a form of expectation as to future income.

¹⁶ Thus, the lifetime savings profile is expected to depend mostly on the rate of return to savings upon individual's preferences over inter-temporal consumption.

force them to consume too little during their working period, leading to an increase in the net return to savings. However, fiscal incentives will likely increase the present value of future earnings on *PRSP* and, consequently, individuals' natural reply to an increase in income would be a correspondent increase in consumption, therefore reducing savings (income effect). The two undertaken effects are not expected to offset each other, giving rise to an ambiguous overall effect.

For Gouveia, *PRSP* fiscal relief is not likely to treat all the assets in the same way, favouring some assets in detriment of others. As a result, such savings schemes fail to meet the desirable fiscal neutrality requirement and in addition, may influence individuals' preferences with respect to consumption and savings. One can expect that, in times of fiscal generosity, individuals tend to participate more in personal retirement savings plans. However, greater fiscal incentives do not necessarily guarantee increases in private savings.

In recent years, a wide range of empirical findings have tried to test the ability of Individual Retirement Accounts (IRAs) and 401(k) plans – American tax-favoured retirement savings plans (*TFRSP*) similar to *PRSP* – in generating significant saving decisions (Poterba, Venti and Wise, 1995, 1996a, b) or modest saving outcomes (Engen, Gale and Scholtz, 1994, 1996).

Venti and Wise (1990, 1991) studied the welfare gains of those investing in IRAs and compared with the wealth of non-IRA contributors. They concluded that most contributions to IRA will likely increase private savings and this will result in little substitution effects (provided that their initial wealth is controlled).

Gale and Scholtz (1994) followed the predecessor study and compared the savings of IRA limit contributors (those contributing the maximum limit amount to their IRA) to interior contributors (those contributing less than the maximum). Their results¹⁷ revealed that rises in the IRA limit contribution generate negligible savings amounts.

¹⁷ Gale-Scholz conclusions are based in the homogeneity assumption. This may lead to incorrect deductions that IRA form of savings displaces other savings alternatives. Thus, their results may be

Attanasio and DeLeire (2002) compared a sample of households that had just subscribed an IRA with the households who were already enrolled in these schemes. Their results suggested that individuals enrolled in IRA tend to finance this savings scheme not through a reduction in consumption but rather from existing savings or planned savings.

Poterba, Venti and Wise¹⁸ (1995, 1996a and 1996b) provided a comparison between the welfare gains of those eligible for 401(k) plans with the wealth of ineligible households and concluded that contributions to 401 (k) schemes are likely to encourage new savings and less likely to be substituted by other forms of savings plans.

Engen, Gale and Scholz (1994, 1996) considered the impact of 401(k) eligibility on broader measures of wealth (including home equity) and concluded that a 401 (k) raise in contributions may be financed using home equity, maintaining the total wealth unaffected. Antolin et al. (2005) suggested that the studies of Engen, Gale and Scholtz, and of Poterba, Venti and Wise, regarding the financial wealth of eligible and non-eligible households, may suffer from a number of caveats such as: 1) “the stock market boom of the 1980s, or 2) proportionate shifts in the allocation of wealth from real assets to financial assets, or 3) equal percentage declines in housing wealth among eligible and ineligible groups during the period could have caused changes in financial wealth and/or total wealth that ended up being confused with the impact of 401(k)”¹⁹.

sensitive to changes in the specification and in the criteria used in the sample (Poterba, Venti and Wise, 1996a,b).

¹⁸ The authors tried to solve the heterogeneity problem of savers preferences using two particular approaches. Firstly, Poterba, Venti and Wise tested whether 401(k) eligibility is exogenous to preferences for savings (after controlling for earnings). They found evidences of a significant correlation between households eligibility to 401 (k) and the median financial wealth. However, some researchers find it hard to believe in the assumption that 401 (k) eligibility is exogenous to the underlying propensity to save (Engen, Gale, and Scholz, 1994), stating that employees with savings predisposition will tend to move towards jobs that grant a better pension coverage and, at the same time, employers will provide saving programmes such as 401 (k) as a response to employees motivations. Secondly, Poterba, Venti and Wise dismissed the assumption that eligibility is exogenous and compared eligible households, over a period of time, using a series of cross-sections (1984, 1987, and 1991) obtained from the Survey of Income and Programme Participation (SIPP). The results showed a growing move in the financial assets of the households eligible to 401 (k) programmes and thus, contributions to 401 (k) reflect new savings, rather than asset reshuffling.

¹⁹ Antolin et al. (2005), Long-term budgetary implications of tax-favoured retirement saving plans, *OECD Economic Studies No.39*, 2004/2, p.40.

Recent studies have focused on the importance of favourable tax treatment in 401 (k) and other saving programmes over time and within earning groups. Engen and Gale (2000) found that a positive tax shelter is more likely to increase wealth among low earners or low savers than otherwise.

Benjamin (2003) results indicate that some earning groups that frequently save the most (homeowners, IRA participants, educated individuals) react least to 401 (k) plans. Conversely, the share of contributions that represent new savings among renters and non-IRA holders is significant. On balance, the response to whether saving incentives such as Individual Retirement Accounts (IRAs) and 401(k) stimulate new savings, rather than divert existing assets, varies widely according to the assumptions²⁰ (Table 4).

Table 4: Summary on the empirical review of retirement savings schemes

Author(s)	Measure of effectiveness	Data ¹	Results (share of contributions that represent new saving)	Period
Venti and Wise, 1990, 1991	Change in wealth of those who contribute to IRAs as compared with non-contributors.	CES and SIPP	100 per cent	1982-1986
Gale and Scholz, 1994	Changes in wealth of those who contribute to IRAs as compared with non-contributors.	SCF	Negligible	1983-1986
Attanasio and DeLeire, 2002	Changes in consumption of new contributors to IRAs as compared with people who had already contributed.	CES	10-20 per cent.	1982-1986
Poterba, Venti and Wise, 1995, 1996a,b	Changes in financial assets for those eligible for 401(k)s as compared with the group of ineligible.	SIPP	75-100 per cent	1984, 1987, 1991
Engen, Gale and Scholz, 1994, 1996	Changes in total wealth, measured as financial plus housing wealth, of those eligible for 401(k)s as compared with the group of ineligible.	SIPP	0-10 per cent.	1984, 1987, 1991
Engen and Gale, 2000	Changes in wealth of those eligible for 401(k)s as compared with the group of ineligible, but allowing the effects of 401(k)s to vary by earning class over time and using a variety of functional forms for the dependent variable that are more robust to differences in initial asset position and to economy-wide effects that raise or lower all asset values proportionally, or have different effects across earning classes.	SIPP	Low income people: 100 per cent. High income people: 0 per cent	1984, 1987, 1991
Pence, 2002	Changes in the wealth of 401(k) eligible and ineligible households over the 1989-1998 period controlling for the bias that higher taste for saving of eligible households would introduce by constructing subjective measures of saving taste from questions on the SCF and by transforming the wealth measure with the inverse hyperbolic sine.	SCF	5-10 per cent.	1989-1998
Benjamin, 2003	Changes in wealth using propensity score sub-classifications.	SIPP	Around 25 per cent. But renters, non-IRA holders: 100 per cent.	1984, 1987, 1991

1. The abbreviations stand for: Consumer Expenditure Survey (CES), Survey of Income and Program Participation (SIPP) and Survey of Consumer Finances (SCF).

Source: Antolin et al. (2005).

Behavioural economists propose a different perspective to study the welfare gains of purchasing a saving scheme. According to them, the effectiveness of tax-favoured retirement savings plans is constrained to individual's bounded rationality, bounded willpower and

²⁰ See Hubbard and Skinner (1996).

bounded self-interest²¹. Bernheim (1994) focused on the divergence between predicted and actual consumption and saving behaviours, indicating that individuals reach retirement with little financial knowledge. Moreover, he advocates that, on average, saving rates are only 1/3 of what is desirable. This places individuals with too little to consume during retirement.

Lusardi and Mitchell (2007) advocated that those who are, financially, more sophisticated are the ones more likely to plan for the future. Conversely, individuals with fairly or no rudimentary financial planning may be the ones who face more difficulties in planning for retirement and are the least likely to participate in voluntary saving schemes such as *PRSP*. Laibson (1994) and Posner (1995) suggested that retirement savings plans may encourage individuals to save, while offsetting a “time inconsistency” or a “personal failing” in planning for retirement.

2.3.2 The European and International Background

Latin American countries were the first nations to forge a transition from a statutory *PAYG* pension system (of defined benefit pension plans) towards a funding regime based, in most cases, in defined contribution personal accounts.

In 1981, Chile made a pioneer attempt to create a system of mandatory fully-funded and privately managed²² individual retirement accounts which happen to have inspired many other countries across the world. However, the past decades have been characterized by a general discontent regarding the funding of the pension system, particularly with respect to the restrictions²³ on pension coverage, fees, portfolio allocation and returns. To overcome these

²¹ According to Mullainathan and Thaler (2000), bounded rationality “reflects the limited cognitive abilities that constrain human problem solving”; bounded willpower “captures the fact that people sometimes make choices that are not in their long-run interest” and, finally, bounded self-interest “incorporates the comforting fact that humans are often willing to sacrifice their own interests to help others”.

²² The Chilean government moved from the *PAYG* regime, administered by the National Pensions Institute (IPN), to the so called Administered Pension Funds (APF), companies specialized in the management of pension funds. For further information see: Rodríguez, L. Jacobo (1999), Chile's Private Pension System at 18: Its Current State and Future Challenges, *Cato Institute Social Security Paper*, No. 17, July 30.

²³ Firstly, pension coverage is constraint to individual's ability to contribute beyond the obligatory minimum payment (10 percent of wages); thereby, there are individuals that are least likely to be enrolled in these schemes since their earnings are relatively low or derive from unstable employment or even

shortcomings, Chile's government has addressed a sequence of reforms designed to relax some of pension funds regulations as the system matures and, at the same time, it has created a nest-egg for the old age with low savings accounts (as long as they have 20 years of contributive career)²⁴.

Chilean's ongoing experience has provided other countries important lessons on the need to retain the multi-pillar system, where the pillars act with each other in a complementary basis and not in a substitute order. In effect, it is possible to recognize two major models across the European countries (Ribeiro, 2003):

- a privately funded pension system held in three or four pillars, with a special emphasis on the private capitalization pillars – as in the case of Switzerland, Denmark, Netherlands, Sweden, Ireland, Finland, and the United Kingdom.
- a state-funded pension system exclusively focused on the social security *PAYG* regime – as in the case of Germany, France, Greece, Italy, Spain and Portugal.

It follows now a description of the multi-pillar model across six representative European countries – Switzerland, Netherlands and the United Kingdom (where the pension system model combines a capitalization pillar) and Germany, France and Spain (where the traditional *PAYG* regime dominates). A special reference is addressed to the third pillar of personal and voluntary contributions²⁵.

because they work outside the formal labour market. Secondly, pension funds are remarkably costly and retain a significant share of their return (1/4 or 1/3 of employees' contributions) in the payment of operating commissions to private management entities. Thirdly, pension funds managers invest a significant share of their portfolio in government bonds. And finally, fund's return must not exceed 2 p.p. below the industry's average real return in the last 12 months, limiting the possibility of obtaining better financial performances in the market. For further information see: Rodríguez, L. Jacobo (1999), Chile's Private Pension System at 18: Its Current State and Future Challenges, *Cato Institute Social Security Paper*, No. 17, July 30.

²⁴ De Mesa, A.A. et al (2006), The Chilean Pension Reform Turns 25: Lessons from the Social Protection Survey, *Pension Research Council Working Paper*, PRC WP 2006-9

²⁵ Note that, EU is not directly responsible for the pension funds regulatory framework. However, since it is of EU's interest the promotion of social protection and cohesion, there is an implicit concern in giving member states an orientation regarding pension funds market. This fact limits pension funds portability between the European countries.

2.3.2.1 The Swiss case

The multi-pillar model

The Swiss old-age pension system is a multi-pillar system that includes three fundamental pillars:

- First pillar – a public system financed on a PAYG regime and responsible for the provision of basic pensions and supplementary benefits. It is denominated *AVS*²⁶ and has the objective of guarantying a minimum income to retirees.
- Second Pillar – a privately managed system financed on a funding basis and responsible for the provision of occupational schemes. It is designated by *PP*²⁷ and participation is compulsory for dependent-employees whose annual income is higher than the minimum level.
- Third Pillar – participation in this supplementary scheme is voluntary and encouraged through fiscal incentives.

Overview on the third pillar

The third pillar is based on personal retirement accounts that through voluntary contributions ensure a supplementary income made up to close pension gaps. These accounts comprise two versions:

- Pillar 3a covers the personal accounts that are linked to retirement savings. These schemes are encouraged by tax incentives. Participation is open to individuals already covered by the second pillar of pension system, who may deduct from their taxable income up to 8% of the upper limit imposed to “coordinated earnings” used by the second pillar.
- Pillar 3b covers the pension accounts that can be used freely. In principal, these schemes do not benefit from tax advantages. Participation is constrained to individuals not covered by second pillar, who may deduct from their earnings up to

²⁶ *AVS – Assurance vieillesse et survivants*

²⁷ *PP – Prévoyance professionnelle vieillesse, survivants et invalidité*

20% of those submitted to the first pillar system. Under this version, the savings amount that is exempt from taxation seems to be higher than the sum of the cumulative amounts obtained within the 2nd pillar and pillar 3a.

The benefit receipt becomes due under retirement circumstances and whenever individuals continue to be actively employed until five years thereafter. The assets from the third pillar retirement accounts may be received in the form of an annuity or a lump-sum payment and may be inherited by the surviving spouse and children and any other relatives or beneficiaries nominated by the participant. Under normal conditions, the benefits may only be accessed or withdrawn, at the earliest, 5 years before the normal retirement age²⁸, except in the cases of early withdrawal²⁹.

2.3.2.2 The Dutch case

The multi-pillar model

The Dutch pension system is a multi-pillar system that includes three basic pillars:

- First pillar – provides a retirement income to individuals older than 65, whose full pension entitlement is reached under two conditions: 1) total payment of the quotizations over their earnings and 2) after 50 years of living in the Netherlands.
- Second pillar – is financed on a funding basis and provides occupational benefit plans (roughly 88% of pension funds are defined benefit plans). This pillar covers work-related supplementary pensions whereas participation is almost considered compulsory (recent estimations found that 91% of employees are enrolled in the second pillar of the Dutch pension system).
- Third pillar – is represented by individual pension provisions operating under a capitalization regime and benefiting from tax shelter.

²⁸ The official retirement age is 65 for men and 64 for women.

²⁹ That is: 1) repayment of a mortgage loan; 2) purchase of own-business; 3) transition to a different sector while self-employed; 4) emigration; 5) purchase of pension funds benefits; 6) disability; 7) death.

Overview on the third pillar

The third pillar of the Dutch pension system covers personal pension plans. Participation in these plans is voluntary. Schemes returns are managed exclusively by insurance providers and may be claimed in the form of: 1) an annuity, which entitles participants to a fixed and periodic income benefit, 2) a unit-linked product³⁰ where the funds returns are based on the performance of the underlying assets, or 3) a lump-sum payment. Pension plans are financed through individuals' contributions, which are entitled to a tax relief in order to close the pension gaps of 2nd and 3rd pillars.

2.3.2.3 The British case

The multi-pillar model

The British old-age pension system is a multi-pillar system that includes three fundamental pillars:

- First pillar: provides a basic state retirement pension (approximately £3,150 per year) to individuals filled in the *National Insurance Contribution (NIC)* list. Individual's eligibility occurs by the time they reach 60 (for women) and 65 (for men).
- Second Pillar: consists of a supplementary pension system that is made mandatory to employees with earnings that exceed the lower earnings limit (LEL), except for the independent workers. Individuals may choose to receive their benefit plans in the form of: 1) a public *State Second Pension* scheme (*S2P*); 2) a *Stakeholder Pension* scheme; 3) occupational pension schemes; 4) personal pension scheme.
- Third Pillar: is a private pillar that allows individuals to purchase a fair pension fund or annuity upon retirement.

³⁰ A unit-linked is a medium/long run saving product, which takes the form of a life insurance and whose portfolio is invested in mutual funds that enjoy liquidity and fiscal advantages.

Overview on the third pillar

The third pillar of the British pension system allows individuals to self-select a personal pension plan (PPP) that exists since 1988. These schemes represent long-term savings and are addressed to individuals³¹ claiming a greater retirement income than the public pension programme. Contributions are paid to pension plans sponsors (usually ran by building societies, banks, insurance companies and unit trusts) in the form of: a regular payment (frequently every month) or a lump-sum payment. Contributions to personal pension plans benefit from a fiscal advantage³² (a 20% tax deduction) that is in accordance with the Inland Revenue Pension Schemes Office. The capital gains of investing in a personal pension plan are exempted from taxation. Moreover, by the time individuals prepare to receive the accumulated earnings they are able to withdraw a quarter of the schemes earnings value as a tax-free lump-sum amount. The reminiscent may be applied in two ways: 1) by purchasing an annuity from a life insurance company, or 2) by allowing it to continue to be invested as a non-guaranteed pension income up to age 75 or, alternatively, as a guaranteed pension income by the time individuals reach 75.

2.3.2.4 The German case

The multi-pillar model

The German pension system comprises a three-pillar model that retains:

- First pillar – is an earnings-related scheme financed mostly through employees and employers contributions, partially by taxes (as no more than 37% of pension provision is paid by country's national budget subsidies). The State does not provide a minimum pension, but it accounts for a means-tested social assistance.

³¹ Notably, personal pension plans are saving schemes that are mostly appropriate to: 1) independent workers; 2) individuals currently not working but that can bear PPP costs; 3) dependent workers whose employers do not provide a supplementary scheme, and 4) dependent workers that do not pay for the company pension scheme.

³² Up to age 75, individuals benefit from a tax relief on contributions of up to 100 per cent of the capital earnings generated each year, subject to a maximum limit of £235,000 for the 2008-2009 tax year. Savings that overcome this limit are subject to a tax constraint so that: 1) if total pensions savings exceed the maximum limit and individuals take the excess as a lump-sum amount than this excess is taxed at 55%; 2) if total pensions savings exceed the maximum limit and individuals take the excess as income amount than this excess is taxed at 25%. For further information see: <http://www.direct.gov.uk/>

- Second pillar – consists on a supplementary and voluntary funded pension scheme encouraged through a favourable tax treatment. This pillar presents two different organizational structures: 1) for employees from the public sector, the second pillar is mainly represented by supplementary pension schemes operating within the firm and financed by employers; 2) for employees from the private sector, these are occupational and voluntary savings schemes.
- Third pillar – is a voluntary pension pillar managed by insurance companies, investment funds or banks that grants participants an advantageous tax relief.

Overview on the third pillar

The second and third pillars of the German pension system were supported by the *2001 Riester Reform*³³ which introduced a scheme of non-mandatory occupational pensions or, alternatively, of individual accounts. In either case, the law sets limits on the extent of pension provision schemes that can be subsidised. There are two ways of providing a tax relief: 1) a subsidy to personal pensions on a voluntary basis; or 2) a subsidy via tax deductibility. Furthermore, eligibility to these schemes is constrained to:

- Individuals ability to perform regular voluntary contributions;
- Benefits start to be received at the age of 60 (at the earliest) or by the time they reach retirement (65);
- benefits may take the form of a lifetime annuity or a disbursement plan combined with a lifetime annuity from the age of 85;
- 30 per cent of the accumulated capital may be paid out as a lump-sum amount at the end of the deferred period;
- benefits must guarantee a minimum amount;

³³ The reasons for the reform can be summarized into three points: sustainable contribution rates, secure the long-term stability of pension amounts (the target is to reduce the current level of pensions 70% of the net salary to approximately 67 percent between 2011 and 2030; larger acceptance of supplementary pension arrangements. For further information see Borsch-Supan, A.H. and Wilke, C.B (2003) on *The German Public Pension System : How it was, How it will be*

- contracting commissions must be spread equally over a period of at least 10 years;
- significant administrative cost, legal and transparency requirements;
- the 2006 rule imposed equal premium rates for both man and women.

2.3.2.5 *The French case*

The multi-pillar model

The French pension system represents a classic example of the Bismarckian pension regime, mostly concentrated in the public pension sector, and organized as following:

- First pillar – consisting in a mandatory general scheme financed on a PAYG basis and focused in an earnings-related contributions scheme that cover almost all population.
- Second pillar – representing supplementary schemes at the company level. In 2003, this pillar suffered significant developments. Notably, the 2003 Raffarin reform introduced the collective retirement savings plan (*Plan d'épargne retraite collectif (PERCO)*), developed by companies in order to offer employees an alternative scheme to the traditional public pension provision.
- Third pillar – referring to voluntary funded schemes at the individual level.

Overview on the third pillar

The 2003 Raffarin reform established the personal retirement savings plans (*Plan d'épargne retraite personnalisé (PERP³⁴)*) which corresponds, mainly, to an insurance plan administered by insurance companies, provident institutions or mutual organisations, under the supervision of a committee designed to secure a fair execution of *PERP* contracts.

The *PERP* is a pension complement accumulated during individual's working period, whose benefits are only available by the time of retirement or at the age of 60. The scheme may take the form of:

³⁴ Until 2003, the personal retirement savings plan was known as *Plan d'épargne individuelle pour la retraite (PEIR)* (Law Nr.775/2003, of 21st of August). However, Decree-Law Nr.346/2004 renamed it to *Plan d'épargne retraite personnalisé (PERP)*.

- 1) life annuity contract but in deferred terms, allowing individuals to directly purchase their accrued rights in a deferred basis;
- 2) a private income contract, in unit terms, allowing individuals to purchase points of private income which will be thus liquidated in a lump-sum payment;
- 3) a multi-support contract, allowing individuals to constitute an amount of savings which will be, eventually, converted into a life annuity.

This type of product is capital guaranteed due to a rule of progressive security on individual's accrued rights near retirement, so that :

- 1) less than two years before the retirement of the subscriber, at least 90 % of the collected savings must be guaranteed by the *PERP* sponsor;
- 2) between two and five years, this part is at the very least 80 %;
- 3) between five and 10 years, it is at the very least 65 %;
- 4) between 10 and 20 years, it is at the very least 40 %.

Contributions made (by each household member) to a personal retirement savings plan subscribed before December 31st are tax deductible up to an annual limit amount equal to:

- 10 % of the income³⁵ derived from a professional occupation (after a 10 % depression for professional expenses) during the previous year or, alternatively, 10% of the social security ceiling³⁶ of the previous year (in case of *PERP* small return's or default).

2.3.2.6 *The Spanish case*

The multi-pillar model

The Spanish pension architecture covers a multi-pillar model, centred in a public pension provision and two other supplementary schemes³⁷, planned as following:

³⁵ This income amount is constrained to eight times the *Plafond Annuel de Sécurité Sociale* (*PASS*). In 2007, the maximum tax deduction was approximately 25747 Euros (26620 Euros for 2008).

³⁶ *Plafond Annuel de Sécurité Sociale* (*PASS*).

³⁷ In 1995, the Toledo agreement introduced several reforming measures in order to monitor and improve the deficit-process of the Spanish social security. One of this measures consisted in the boost of supplementary pension schemes.

- First Pillar – is a state and mandatory pillar financed on a PAYG basis, represented by an earnings-related contributions scheme that covers dependent and independent employees. It also provides a basic safety net to individuals in need, which consists in a means-tested benefit scheme.
- Second pillar – it includes a private supplementary scheme. Notably, occupational schemes based on collective agreements.
 - Third pillar – it comprises a private and voluntary scheme designed to complement the public pension provision.

Overview on the third pillar

The third pillar of the Spanish pension system is constituted, among other schemes, by personal and voluntary retirement savings accounts in which individuals or participants carry out contributions (periodic or extraordinary) with a long-term objective of providing a retirement income that will be able to serve as private complement to the benefits that stem from the public pension provision. These schemes cover contingencies upon:

- 1) retirement;
- 2) invalidity;
- 3) survivorship;
- 4) widowhood;
- 5) orphanhood.

Pension plans from the individual system are of the defined contribution type (thus unlinked to past salary earnings) and may be administered by pension funds management entities, investment funds institutions, credit and insurance companies, under the supervision of *Dirección General de Seguros y Fondos de Pensiones (DGSFP)*. Since these pension schemes are of defined contribution type, fund's return is uncertain and will be a function, among others things, of the contributions carried out by participants and, at the same time, of the profit value

of investments conducted by investment managers. These types of plans tend to be not capital guaranteed.

The subscription of these pension schemes is encouraged through a tax relief. Notably, contributions are tax deductible up to a maximum amount³⁸ of: 1) 10000 Euros/ year for participants under 50 years and 2) 12500 Euros/year for participants over 50 years old. As for the benefits paid, the tax shelter will vary in accordance to how the scheme's returns are perceived (if in the form of a lump-sum income, of capital³⁹ or mixed).

3. Personal Retirement Saving Plans

3.1 Legal and Regulatory framework

Since the 80's, the legal framework of the Portuguese pension system is characterized by a significant shift from the public pension provisions towards private savings arrangements, representing an historical move in government's responsibility of securing the old-age cohorts.

In 1989, Decree-Law Nr.205/89, of 5th August, set up a system of personal retirement saving plans (*PRSP*)⁴⁰ that, through voluntary contributions – generously encouraged by tax incentives – granted long-term savings strategies as well as choices of capital allocation to their subscribers. The relevance of these saving plans was justified by their ability to stimulate saving habits on households and, at the same time, support the public system in securing a complementary pension income for the old-age. Apart from providing tax shelter to pension savings, personal retirement savings funds (*PRSF*)⁴¹ may take the form of:

³⁸ The restrictions added in the 2007 pension plans regulation also inform that the annual limit (for individuals under 50) is constrained to 30% of the net yields derived from professional and economic activities (the pharmacy) perceived individually during the exercise. In the case of taxpayers over 50 years old, the previously limit augments to 50%.

³⁹ If in the form of capital, participants may deduct 40% of the contributions made to a personal retirement saving scheme until 31st December 2006.

⁴⁰ *Or planos de poupança reforma (PPR)*. PRSP are constituted by nominative certificates estimated on a daily basis corresponding to the coefficient between the net value of PRSP amount and the number of nominative certificates in circulation. Meaning that they are vulnerable to the evolution of the assets that compose the PRSP portfolio as well to fluctuations in the financial markets.

⁴¹ *Or fundos de poupança reforma (FPR)*. These funds are exempted from collective income taxation (IRC) but are subject to commissions on: 1) subscription, 2) managing, 3) transfers and 4) withdrawals. See the Fiscal Benefits Status.

1. an investment fund on *PRSP* (managed by investment management companies, under the supervision of Portuguese Securities Market Commission and the Bank of Portugal);
2. a pension fund on *PRSP* (managed by pension fund management companies and life insurance companies, under the control and supervision of the Portuguese Insurance Institute (*PII*) – which is the Portuguese Insurance and Pension Funds Supervisory Authority);
3. a life insurance on *PRSP* (managed by life insurance companies, under the control and supervision of the *PII*);

based on individual or collective agreements (in favour or on behalf of their workers), in which participants are required to provide a minimum, regular or non-regular, contribution in exchange for scheme's net returns⁴².

The attractiveness of *PRSP* can be attributed to the tax deductions received through personal income tax (*PIT*)⁴³. The *PIT* provides that contributions to a *PRSP* deposit are, within a certain limits, exempted from taxation, but withdrawals, including capital and cumulative income, are tax constrained. Nevertheless, the tax treatment associated to *PRSP* deposits benefit from a favourable fiscal regime as well as from a special rule designed to lessen the progressiveness effect in case capital is withdrawn.

Simultaneously, Ministerial Order Nr.872-A/89, of 9th October, approved the juridical regime of the *PRSP* implemented by the previous legal document.

Decree-Law Nr.145/90, of 7th May, amended the Decree-Law Nr.205/89, of 5th August, by establishing specific rules to the asset allocation policy of a *PRSP*, namely:

1. a minimum of 2% in cash, bank deposits, T-bills and other applications in the interbanking markets;
2. a minimum of 50% in public debt with a maturity longer than one year;

⁴² The participation on the *PRSP* profits will depend, among other factors, on the risk associated to each savings fund.

⁴³ *Or imposto sobre o rendimento singular (IRS)*.

3. a maximum of 20% in documents representing mortgage bonds, provided that the loan attributed to each individual does not represent more than 5%;
4. a maximum of 25% in shares, issued by a company quoted in stock market, including in this percentage the possibility to invest up to 10% in foreign securities quoted in the stock market of a representative EU-member;
5. a maximum of 5% in shares, issued by a Portuguese company which is not quoted in the stock market

and by maintaining the upper limits (Decree-Law Nr.205/89) applied to *PRSP* hold in the form of: 1) life insurance funds, 2) investment funds and 3) pension funds. Simultaneously, the present law exempted⁴⁴ from taxation the benefit received in the event of premature death of a *PRSP* participant.

Later, Decree-Law Nr.415/91, of 25th October, addressed greater elasticity⁴⁵ and additional improvements to pension funds *status quo*, particularly by pursuing a strategy that:

- 1) encourages the participation of more than one managing entity in a same closed pension fund,
- 2) allows different schemes to be financed by a common pension fund,
- 3) distinguishes two types of pension funds: closed pension funds⁴⁶ and open pension funds⁴⁷.

The idea was simply to permit pension plan sponsors to hold diversified assets managed by other companies.

Rule Nr.298/91, of 13th October, classified *PRSP* (hold in the form of pension funds) as open-end schemes, individually subscribed and administered by institutions that may (or not)

⁴⁴ Benefits received by the heirs are exempted from the succession and donation tax.

⁴⁵ Indeed, this law provided less bureaucracy to pension funds constitution as it does not require a public deed for subscription, only requiring the official publication of the contract terms concerning closed pension funds and the regulatory terms on open pension funds.

⁴⁶ Closed pension funds – refers to only one pension plan sponsor or a number of sponsors directly related to each other.

⁴⁷ Open pension funds – allows for a collective or a singular affiliation without the need for any link between the sponsors. The net value of these funds is divided into certification units.

assume the investment risk⁴⁸. In case of risk coverage, their solvency margin is constrained to 4% of the total amounts earned on the *PRSP*. In case of default, it is constrained to 1% of *PRSP* returns.

In 1995, Decree-Law Nr.204/95, of 5th August, set up the legal regime of the Equity Savings Plans (*Eq.SP*)⁴⁹. By definition, an *Eq.SP* is a personal savings plan, divided in shares, and designed to:

- 1) develop the Portuguese capital market,
- 2) encourage lifecycle investments schemes,
- 3) build up alternative financing procedures to support companies in an international context.

Decree-Law Nr.357/99, of 15th September, introduced the Educational Savings Plans (*ESP*)⁵⁰. These schemes are represented by:

1. nominative certificates of a retirement/educational savings fund with an educational and retirement component (*E/RSF*)
2. nominative certificates of an educational savings fund (*ESF*), exclusively addressed to the educational feature.

The goal of this law was to extend education to all citizens by allowing individuals to enjoy from further tax advantageous and, at the same time, finance educational expenses, by transferring the sums invested in *PRSF* to *ESF* (or to *E/RSF*) or transforming *PRSF* into *E/RSF*; hence, increasing the mobility across personal savings plans.

Decree-Law Nr.158/2002, of 2nd July, aggregated savings plan legal framework, in order to clear the juridical regime associated to *PRSP*, *ESP* and *E/RSP* schemes. It used previous experiences to review the legal requirements of *E/RSP* regarding schemes asset

⁴⁸ Investment risk – is the possibility that, by the time of retirement, the savings amount will be insufficient due to the weak performance of the assets that compose their lifetime income accumulation (Bodie, 1990).

⁴⁹ *Or planos de poupança em acções (PPA).*

⁵⁰ *Planos de Poupança-Educação (PPE).*

allocation policy. Notably, it eliminated the minimum limits that could be applied in public debt and augmented the percentage of shares allowed in a fund portfolio.

Ministerial Order Nr.1451/2002, of 11th November, determined that a scheme's net return is determined by its asset⁵¹ allocation policy which is in compliance with the following rules and limits:

- a. a maximum of 55% in shares, convertible bonds or any other assets which confer the right to subscribe shares or the chance to be exposed to stock markets environment (whereas above 40% they may include in their designation the expression *PRSP - Equity*);
- b. notwithstanding the previous statement, the investment in such assets and in bond type instruments (excluding, participation in collective investment institutions which are not priced in the security market of any EU or OECD members) must not represent more than 10% of *E/RSP* portfolio;
- c. notwithstanding the statement in a), a maximum of 5% may be represented (by participation in collective investment institutions) in securities that do not fulfil the EC requirements (Rule Nr. 85/611/EEC, of 20th December);
- d. a maximum of 20% in short-term debt instruments, bank deposits and other monetary instruments;
- e. in the case of a saving fund hold in the form of a security investment fund, a maximum of 20% in real estate funds, whereas in the form of a pension fund or of an autonomous fund from a life assurance branch, a maximum of 20% of the funds

⁵¹ According to art.3 of the Decree-Law Nr.158/2002 this assets may be:

1. securities,
2. units in collective investment institutions,
3. short-term debt instruments,
4. bank deposits or other assets of a monetary nature.

Whenever the tax deferred savings fund assumes the figure of a pension fund or of an autonomous fund from a life assurance branch, the net value of the savings fund may also be built up with land and buildings and credits inherent to mortgage loans.

portfolio may be invested in land and buildings assets and in participation units in real estate funds;

- f. in the case of a savings fund hold in the form of a pension fund or of an autonomous fund from a life insurance branch, a maximum of 20% in credits derived from mortgage loans;
- g. together, securities and commercial paper (hold within the same firm) as well as bonds (issued by this firm) must not represent more than 10% of the *E/RSP* portfolio, while in case of a group of firms or in the event of a management entity with control or group relationship this limit increases to 15%.

Decree-Law Nr.158/2002, allowed individuals to claim their *PRSP* benefits whenever he himself or any member of his household attended or enrolled in an institution of higher education or professional education, as long as this generated educational expenses in the year in reference. This holds true when carried out each year and after subject to the annual limits⁵² imposed to each student (Ministerial Order Nr.1452/2002).

Pursuant to the terms a) to d) and f) of article 4.1 of Decree-Law Nr.158/2002, a scheme's withdrawal (Ministerial Order Nr.1453/2002, of 11th November) becomes due under:

- 1. retirement due to participant's age (involving individuals receiving a retirement income provided by any social protection regime such as the social security system

⁵² 1. 2500 Euros, whenever an individual or any members of his household attends or enrolls in a course at an educational establishment located:

- a) In mainland Portugal, for students residing in that territory;
- b) In the Autonomous Regions of the Azores and Madeira, for students with regular residence in the same region where the educational establishment is located ;

2. 3750 Euros, whenever an individual or any members of his household attends or enrolls in a course at an educational establishment located:

- c) In mainland Portugal, for students with regular residence in the Autonomous Regions of the Azores and Madeira;
- d) In the Autonomous Regions of the Azores and Madeira, for students with regular residence in mainland Portugal;
- e) In the Autonomous Regions of the Azores and Madeira, for students with regular residence in another Autonomous Region which does not coincide to the one where the educational establishment is situated;

3. 5000 Euros, whenever an individual or any members of his household, with regular residence in mainland Portugal or in the Autonomous Regions of the Azores or Madeira, attends or enrolls in a course at an educational establishment located abroad.

or the CGA system (Caixa Geral de Aposentações) and also individuals receiving a pre-retirement age pension);

2. long-term unemployment (concerning dependent and independent workers that being able to work, are unemployed for more than 12 months and are registered on the employment centres);
3. permanent inability to work (referring to individuals that: a) are eligible to an incapacity pension provided by any regime of Social Protection, particularly by the Social Security or by the CGA; b) are entitled to a working accidents pension or professional sickness pension, as long as the degree of disability represents more than 60%; c) are under situations not mentioned above but who present a permanent disability to work with impact on their earnings in more than 1/3 of the wage correspondent to the normal working activity);
4. severe sickness (regarding individuals suffering from an infirmity that due to its profile and in line with his characteristics may originate a significant residual incapacity or, in the limit, a death risk);
5. professional education courses (granting a: 1) diploma equivalent to the regular secondary education diploma and a professional classification of level III, pursued at a public or private professional school (in the last case, an official certificate is required); 2) a specialization in technology, according to the Ministerial Order Nr.989/99, of 3rd November, modified by the Ministerial Order Nr.698/2001, of 11th July and Nr.392/2002, of 12th April, conceding a professional qualification of level IV;
6. higher education courses(following an academic degree (bachelor, master's or Ph. D.), officially certified in: a) public institution of higher education; b) private institution of higher education or a co-operative institute with public interest; c) Catholic University of Portugal);

7. members of a household (with a governing responsibility, as well as the their dependent, according to the n°14, article 13 of the *PIT Code*).

Notwithstanding the reimbursement cases described earlier, the Ministerial Order Nr.1453/2002, of 11th November, enumerated the means of proof required in order to satisfy the withdrawal requirements.

Law Nr.32/2002, of 20th December, introduced a multi-pillar model in which responsibilities are shared between State, firms and individuals. The rationale behind this law is simply to reduce the generosity of statutory pension provision and, simultaneously, close pension gaps through the improvement of 2nd and 3rd pillars. Later, the Portuguese Insurance Institute established the regulatory terms on savings schemes, in compliance with the rules⁵³ regarding their reimbursement, transfers and discriminative publication of their asset portfolio in order to provide (participants) more information on *PRSP status quo* (Regulation Nr.6/2003-R, of 12th February).

The 2005 State budget curtailed the fiscal benefits associated to *PRSP*. Thus, at the current conjuncture, *PRSP* contribution amounts were expected to decrease, flowing towards other life-cycle accumulation savings. However, *PRSP* deposits reached a growth rate of 15%. For many economists, the increase in *PRSP* participation was compensated by household's greater reliance on private pension provision to fund their retirement years. For pension fund managers, the rise of *PRSP* was due to:

⁵³ For each pension fund– personal retirement savings fund (*PRSF*), education savings fund (*ESF*) and retirement/education savings fund (*R/ESF*) – operating as a savings fund support, the following aspects are considered:

- discriminated composition of the asset portfolio of the savings fund;
- the number of certificate units in circulation and the unit value at the time of the publication references;

ought to be published in the bulletin of the Securities Market, on a monthly basis and referring to the last day of the month:

Furthermore, every asset ,within the pension fund portfolio, requires the publishing of elements reporting to:

- designation of the value;
- amounts in portfolio;
- pricing;
- interest amounts in Euros;
- total amount of the portfolio value, including outstanding interest, in Euros.

1. announcement, by the end of 2005 (election year), of the reintroduction of fiscal advantages for 2006.
2. transposition of the Savings Directive NR.2003/48/EC⁵⁴, allowing immigrants to pool and transfer their investments into life products managed by national entities.

Decree-Law Nr.12/2006, of 20th January, transposed, into the Portuguese legal structure, the Directive Nr.2003/41/EC, dated 3rd June, of both the European Parliament and of the European Council, regarding the activities and the supervision of the institutions responsible for the provision of professional pension plans. In the course of this implementation, successive amendments with respect to pension plans investment policy, evolution of the arrangement rights and, ultimately, financial standing of the pension funds were applied to private pension arrangements. As for open pension funds⁵⁵, the possibility to trade funds managed by a management entity was recognized, as well as the right to perform subscription transfers (portability), in cases of: 1)substantial change of the investment policy, 2)increasing costs and 3) funds transfers.

Moreover, *R/ESP* and *Eq.SP* hold in the form of pension funds were henceforth, classified as open pension funds, only allowing individual subscription. Consequently, the present law followed the prudential rules of the EC Directive as to the assets composition and to the estimation of responsibilities by stressing the establishment of two governing structures within the pension funds, namely:

- a committee with the purpose of escorting the 2nd Pillar funds insight, and
- a tutor⁵⁶ for the participants and beneficiaries subscribing the 3rd pillar system.

⁵⁴ Decree-Law 62/2005.

⁵⁵ In the context where the company does not cover their make-up, the minimum solvency against the individual subscription to an open pension fund, a *R/ESP* or an *Eq.SP* in the form of pension funds is the equivalent to a 1% amount of the market-share of the fund corresponding to the individual subscriptions and the amount of the *R/ESP* and *Eq.SP* hold as pension funds.

⁵⁶ In 24th of May 2007 it was, officially, established the tutor position with a core objective of protecting *PRSP* and open pension funds participants, whose funds are managed by management entities within the Portuguese Association of Investment Funds, Pensions and Capital (PAIFPC). Note that, in the case of *PRSP* hold in the form of life insurance, participants interests are protected by the fact that capital is guaranteed.

These two governing structures may facilitate the development of pension funds supply or even improve households demand for pension funds, if they happen to be sufficiently skilled to provide (participants) complete information on the asset prices, capital returns and longevity risk so as to insure them against the uncertainties that are in the origin of the asymmetric information problems opposing savings fund managers (i.e.: pension plan sponsors and investment managers) and participants.

On balance, over the last two decades, a number of legal documents have been produced to facilitate the establishment of personal retirement savings plans. At the same time, policymakers have assumed an on-going position of improving and adjusting the current legislation to pension funds management needs and to economic environment. This fact was many times reflected in the amendments suffered by the rules covering the asset composition of *PRSP* portfolio (Annex 1).

3.2 Tax treatment of *PRSP*

The tax treatment of these savings plans is considered as favourable when it deviates from a fiscal regime that treats all other forms of life-cycle accumulation as equal, pointing towards an EET scheme (Antolin et al., 2004) – “exempt-exempt-taxed” cropped up:

1. at the entry level – subsidizing⁵⁷ the *PRSP* deposits in such manner that participants benefit from a tax deferment granted through personal income tax (*PIT*) for each contribution paid from and within a certain limit⁵⁸ (20% of the total gross income applied in retirement saving plans) as long as the savings amount keeps on being invested for a minimum period of five years (Table 5).

Depending on the contributor’s age and on the investment amount⁵⁹,

⁵⁷ Since 2nd of January of 2007, retirees are not entitled to tax benefits associated to *PRS* plans

⁵⁸ See Articles 14° and 21° of Fiscal Benefit Status.

⁵⁹ That is:

- 1) an individual younger than 35 years old who invests until to 2000 Euros in PPR plans, may deduct no more than 400Euros from it;

i) the limit value for tax deduction should **not** exceed in 2007:

400 Euros per each subscriber younger than 35;

350 Euros per each subscriber aged 35 to 50;

300 Euros per each subscriber older than 50.

ii) and the tax form, an investment income higher than:

1500 Euros per each subscriber younger than 35;

1750 Euros per each subscriber aged 35 to 50;

2000 Euros per each subscriber older than 50.

Table 5: Overview on *PRSP* fiscal regime

PRSP Fiscal Regime at the entry level	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
- Tax deferral to collectable income (max.)											
% of Aggregated Total Gross Income	20%	20%	20%	20%	20%						
Maximum Value/ Inactive Individuals	2.493,99	1.309,34	1.995,19	2.045,07	2.084,98						
- Maximum tax deduction											
Younger than 35 years						25%	25%	27.5%	27.5%	27.5%	27.5%
Age 35 to 50						25%	25%	26.25%	26.25%	26.25%	26.25%
Older than 50						25%	25%	25%	25%	25%	25%
- Minimum Investment to attain the maximum fiscal benefit											
% of Aggregated Total Gross Income						5%	5%	5%	5%	5%	5%
Younger than 35 years						531,71	544,69	617,27	713,28	727,55	727,55
Age 35 to 50						532,71	544,69	589,21	680,86	694,48	694,48
Older than 50						533,71	544,69	561,15	648,44	661,41	661,41

Source: APS (2005)

2. at the withdrawal level– when the withdrawal is carried out under:

- retirement due to the participant's age, only if the savings fund is subscribed within less than 5 years;
- educational expenses⁶⁰ (with professional and higher education courses), only if the savings fund is subscribed within less than 5 years and the withdrawal is constrained to an annual limit for each scholar;
- long-term unemployment of the subscriber or any other member of his household (longer than 12 months and filled at the Employment Centre);

2) an individual aged 35 to 50 who invests up to 1750Euros in PPR plans, may deduct no more than 350Euros from it;

3) an individual older than 50 who invests up to 1500Euros, may deduct no more than 300Euros.

⁶⁰ Since 1st of January 2006, every single subscription filed with the *PIT*, should not be withdrawn for educational purposes, so that it does not give rise to any fiscal loss. Additionally, subscription made since 1st of January 2007 cannot be used for educational withdrawals.

- permanent inability to work of the subscriber or any other member of his household;
- severe sickness of the subscriber or any other member of his household;
- at the age 60, only if the savings fund is subscribed within less than 5 years;
- death of the subscriber (so that the heirs are entitled to reimbursement).

If the withdrawal occurs under circumstances other than the above mentioned, it is assessed as an early withdrawal so that the contributor would have to return the corresponding tax deductions and a further 10% for each year or fraction passed since then. Consequently, when the withdrawal takes place in the first five years of the contract, the income tax rate is 20%. When the withdrawal occurs between the 5th and the 8th year after the first *PRSP* deposit, the investment income is taxed at 16%, provided that at least 35% of the contributions were subscribed in the first half of the contract. From the 8th year on, an income tax rate of 8% applies to the *PRSP* investment income as long as at least 35% of the contributions took place in the first half of the contract.

The capital gains may be withdrawn (by participants or heirs) in the form of:

- a lump-sum amount (entirely or partially), periodically or not, classified as capital income⁶¹ (category E in *PIT*) and autonomously constrained to a 8% tax rate (20% x 2/5 of income obtained), in case it results from contributions made after 31st of December 2005;
- a monthly life pension, converting the final compounded capital into an annuity that prevails until the subscriber's death. In this case, the income is filed as pension income (category H in *PIT*) and taxes are withheld at the source.
- a combination of the two later alternatives, so that a fraction of the compounded capital is received by the time of withdrawal and the other part is transformed into a perpetual income. In the case of the lump-sum amount, an 8% tax rate is applied, while the lifetime income is added to the other income forms.

⁶¹ The contributor is not obliged to file with the IRS as long as capital is withdrawn as a lump-sum receipt of the investment income.

Prior to 2006, the effective tax rate focused on (20%*1/5 of income obtained), thereby this increase has been seen among economists as an incentive measure to lock savings until *PRSP* contract maturity. At this moment, only 2/5 of the investment income, obtained as a lump-sum amount, are taxed at 20%, meaning that benefits emerging from these savings schemes are taxed at an effective rate of 8%, a lesser rate than the one applied to fixed bank deposits (20%) (Rodrigues and Silva (2005)).

3.3 The importance of *PRSP*

3.3.1 Evolution

Over the last decades, the evolution of *PRSP* in Portugal has been determined by:

- on one side, and in common with what is taking place in several countries, social security inability to provide, on her own, an adequate level of retirement income;
- on the other side, the striking fact that savings has been decreasing, significantly.

Besides these two factors, which sustain the legal framework, there are others features which have contributed greatly to *PRSP* progress, specifically pension funds market immaturity and the singular fiscal treatment associated to *PRSP*, which has attracted fund management institutions ever since (Table 6).

Table 6: Fund management institutions and pension funds

	Total Management Institutions		Insurance Companies		Specialist fund managers	
	2005	2006	2005	2006	2005	2006
Number of entities managing pension funds	26	27	13	14	13	13
Number of pension funds	223	227	65	58	158	169
Closed	171	173	57	48	114	125
PRSP,E/RSP and ESP	20	20	2	2	18	18
Eq.SP	4	4	2	2	2	2
Open, excluding PRSP,E/RSP,ESP and Eq.SP	28	30	4	6	24	24
in co-management	7	6	0	0	7	6
Pension funds amounts (in millions of Euros)	18982	212	630	549	18351	20636
Closed	180	200	594	516	17418	19499
PRSP,E/RSP and ESP	4	5	18	16	428	469
Eq.SP	0	0	3	3	13	16
Open, excluding PRSP,E/RSP,ESP and Eq.SP	5	7	15	13	493	652
in co-management	16	17	0	6	1563	1661

Source: Pension Funds Statistics (2006), PII

3.3.1.1 Participants and beneficiaries

A look at table 7 shows that the recent number of individuals participating in an *E/RSP* has significantly risen to, approximately, the double registered in 2001. Indeed, the growth rate in the number of *PRSP* and /or *E/RSP* participants has reached the average level of the past 5 years, highlighting the atypical movement of *E/RSP* growth in 2005. As for *PRSP* financing vehicle, participants prefer to concentrate their savings in the form of life insurance than in the form of pension funds and investment funds (since they may benefit from a compounded interest over their lifetime and capital is guaranteed).

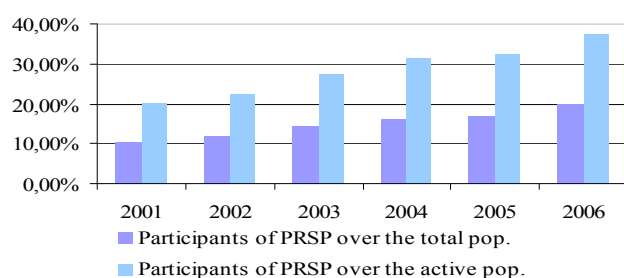
Table 7: Participation per *E/RSP* financing vehicle

Number of Participants per <i>E/RSP</i> Financing Vehicle							
In Thousand of Euros		2001	2002	2003	2004	2005	2006
Life insurance	Number	867.039	1.005.503	1.238.329	1.430.666	1.491.069	1.751.234
	Percentage	80,94%	82,58%	83,33%	83,28%	83,38%	83,68%
Investment Funds	Number	142.590	147.543	182.576	221.975	234.064	269.705
	Percentage	13,31%	12,12%	12,29%	12,92%	13,09%	12,89%
Pension Funds	Number	61.565	64.593	65.146	65.279	63.230	71.760
	Percentage	5,75%	5,30%	4,38%	3,80%	3,54%	3,43%
Total	Number	1.071.194	1.217.639	1.486.051	1.717.920	1.788.363	2.092.699
Total	Percentage	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
Market Share Correspondent to the Number of Participants per <i>E/RSP</i> Financing Vehicle							
In Percentage		2001	2002	2003	2004	2005	2006
Life insurance	Percentage	80,90%	82,60%	83,30%	83,30%	83,40%	82,90%
Investment Funds	Percentage	13,30%	12,10%	13,30%	12,90%	13,10%	12,80%
Pension Funds	Percentage	5,80%	5,30%	3,40%	3,80%	3,50%	4,30%
Growth Rate Number of Participants per <i>E/RSP</i> Financing Vehicle							
In Percentage		2001	2002	2003	2004	2005	2006
Life insurance	Percentage	-	15,97%	23,16%	15,53%	4,22%	17,45%
Investment Funds	Percentage	-	3,47%	23,74%	21,58%	5,45%	15,23%
Pension Funds	Percentage	-	4,92%	0,86%	0,20%	-3,14%	13,49%

Source: Report on the Insurance Sector and Pension Funds (2006), PII

Thus, household's greater reliance on private pension savings is supported by *PRSP* participation rates over total and active population (Figure 6).

Figure 6: *PRSP* participation rates over total and active population



Source: Report on the Insurance Sector and Pension Funds (2006), PII

However, shifting longevity risk towards pension fund sponsors will depend on State's on-going policies to foster complementary pension provision.

A look at table 8 shows that, there is a relationship between the weight of beneficiaries and benefits paid per type of pension funds. In 2006, 4,36% of beneficiaries and 4,6% of benefits paid were reported to the educational/retirement savings plans. Moreover, retirement benefits become due under retirement circumstances. Meaning that individuals (enrolled in E/RSP scheme) have accumulated wealth during their lifetime by locking their personal savings for resources in retirement.

Table 8: Beneficiaries and type of benefits paid per E/RSP hold in the form of pension funds

In year 2006		
In Millions of Euros	Number	Value
Retirement due to old age	3269	25823
Inability to work	52	420
Retirement due to age anticipation/Pre-retirement	352	1371
Widowhood	204	1484
Orphanhood	-	-
Long-term unemployment or severe sickness	229	1571
Total	4106	30669
In percentage of total pension funds	3,49%	2,99%

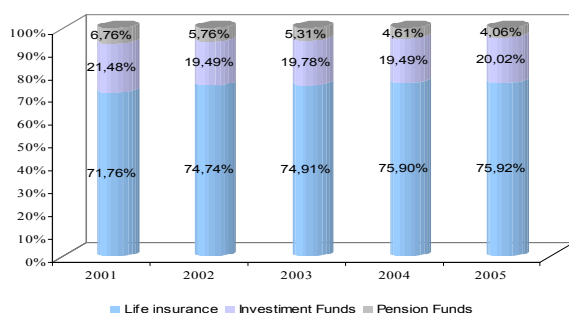
Source: Report on the Insurance Sector and Pension Funds (2006), PII

(1) Other – includes the reimbursements occurred under circumstances not mentioned above.

3.3.1.2 E/RSP financing vehicles

Figure 7 results suggest that the amounts invested in E/RSP have declined within pension funds and augmented greatly within life insurance, meaning that participants prefer to hold E/RSP in the form of life insurance and receive an actuarially fair annuity (less risky) upon retirement.

Figure 7: Amounts invested per E/RSP financing vehicle

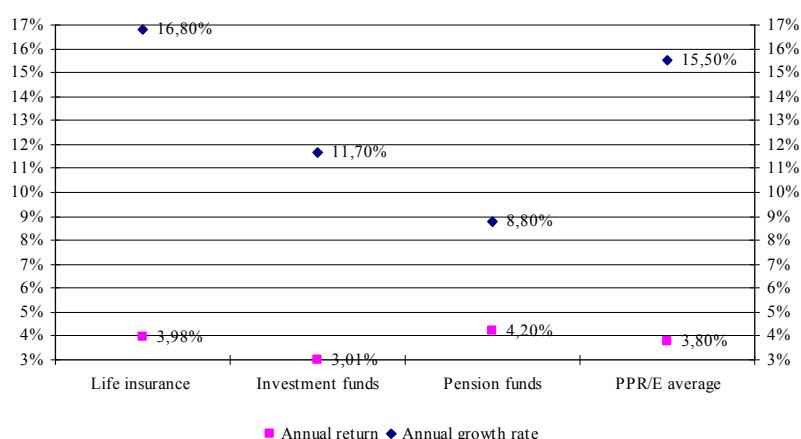


Source: Report on the Insurance Sector and Pension Funds (2006), PII

3.3.1.3 Return of *E/RSP* financing vehicles

Another important aspect to take into account refers to *E/RSP* performance per financing vehicles, using as analytical indicator their return rates. Figure 8 shows that the average return⁶² rate on *E/RSP* was, approximately, 3,8%, while the return per *E/RSP* financing vehicle balanced between the maximum percentage of 4,2% within pension funds and the lowest estimation of 3,01% within investment funds. By comparing the returns of *E/RSP* per financing vehicles with their correspondent growth rates, it is easy to see that the improvement observed within *E/RSP* invested amounts was due to an increase in the number of participants and not to a better financial performance.

Figure 8: Relationship between the *E/RSP* returns and their growth rates



Source: Report on the Insurance Sector and Pension Funds (2006), PII

Note1: PPR/E is equivalent to the English designation - *E/RSP*

3.3.1.4 Structure of *E/RSP* portfolio per financing vehicles

The investment rules applied for *E/RSP* continued to be the ones prescribed by Decree-Law Nr.158/2002 and the Ministerial Order Nr.1451/2002. Table 9 depicts the structure of *E/RSP* portfolio per financing vehicle. Such structure differs fairly among the three financing vehicles.

⁶² The data was collected using the monthly statistical time series published in “Boletim de Cotações” of Euronext Lisbon. Taking into account the monthly returns on open pension funds, ISP estimated the annual rate returns using geometric average method (that is, assuming that the returns obtained in each period would be totally reinvested in the following period) and adjusting it to inflows/outflows effects regarding the amounts invested in *E/RSP*. Moreover, the data respecting *E/RSP* hold in the form of investment funds was collected within PAIFPC.

Table 9: Structure of *E/RSP* Portfolio per financing vehicles

In Millions of Euros	2000			2001			2002			2006		
	Life Insurance	Pension Funds	Investment Funds	Life Insurance	Pension Funds	Investment Funds	Life Insurance	Pension Funds	Investment Funds	Life Insurance	Pension Funds	Investment Funds
Public Debt Securities and equivalent	1901	204	696	2163	243	715	2617	232	661			
	54,01%	47,34%	55,82%	53,22%	59,41%	54,73%	51,90%	59,79%	48,71%			
Commercial Paper and Bonds	719	67	285	794	39	365	1138	34	534			
	20,43%	15,53%	22,86%	19,54%	9,54%	27,95%	22,57%	8,76%	39,35%			
Shares and Security Certificates	292	27,9	163,9	325	13	97	287	4	67			
	8,30%	6,47%	13,14%	8,00%	3,18%	7,43%	5,69%	1,03%	4,94%			
Nominative Certificates in an Investment Fund	261	75	8	342	57	14	367	59	9			
	7,41%	17,41%	0,64%	8,42%	13,94%	1,07%	7,28%	15,21%	0,66%			
Other Assets	347	57	94	440	57	115	633	59	88			
	9,86%	13,23%	7,54%	10,83%	13,94%	8,81%	12,53%	15,21%	6,34%			
Total	3520	431	1247	4064	409	1306	5042	388	1357			
	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%			
In Millions of Euros	2003			2004			2005			2006		
	Life Insurance	Pension Funds	Investment Funds	Life Insurance	Pension Funds	Investment Funds	Life Insurance	Pension Funds	Investment Funds	Life Insurance	Pension Funds	Investment Funds
Public Debt Securities and equivalent	2472	186	472	2933	177	525	3471	189	596	3363	503	174
	41,64%	45,15%	30,77%	41,23%	41,16%	28,89%	40,09%	42,38%	27,08%	33,74%	20,46%	35,80%
Commercial Paper and Bonds	1963	93	706	2167	111	869	3255	123	1091	4439	1257	141
	33,06%	22,57%	46,02%	30,46%	25,81%	47,83%	37,60%	27,58%	49,57%	44,27%	51,14%	29,01%
Shares and Security Certificates	358	17	51	469	21	56	613	19	80	520	144	23
	6,03%	4,13%	3,32%	6,59%	4,88%	3,08%	7,08%	4,26%	3,63%	5,19%	5,86%	4,73%
Nominative Certificates in an Investment Fund	617	60	111	647	73	219	756	95	254	821	289	111
	10,39%	14,56%	7,24%	9,09%	16,98%	12,05%	8,73%	21,30%	11,54%	8,19%	11,76%	22,84%
Other Assets	527	56	194	898	48	148	563	20	180	864	265	37
	8,88%	13,59%	12,65%	12,62%	11,16%	8,15%	6,50%	4,48%	8,18%	8,62%	10,78%	7,61%
Total	5937	412	1534	7114	430	1817	8638	446	2201	10027	2458	486
	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

Source: Report on the Insurance Sector and Pension Funds (2006), PII

In 2006, life insurance funds concentrated their *E/RSP* portfolio in assets referring to commercial paper and bonds (44,3%), followed by public debt securities and equivalent (33,7%). Together, these financial assets represent 78% of the total portfolio (71,6% in the case of investment funds and 64,9% for pension funds). As for investment funds, more than half of the *E/RSP* portfolio is invested in commercial paper and bonds (51,5%, pursued by public debt securities and equivalent, though with a smaller weight (20,5%)). As for pension funds, the structure of *E/RSP* portfolio contemplates three types of assets: public debt securities and equivalent (35,9%), commercial paper and bonds (29%) and last, nominative certificates in an investment fund (22,9%). The current results are in line with the ceiling limits imposed to *E/RSP* as well as with the rules on prudent diversification⁶³.

⁶³ While the preference for government debt may improve market efficiency and lead to the development of longer-term investments, concentrating it in government debt may fail to capture the benefits provided

3.4 Criticisms to *PRSP status quo*

On the issue of complementary pension provision, some studies have identified the distortions associated to *PRSP status quo* and concluded that retirement saving incentives are far from being effective and may severely affect pension plans value chain as they imply:

- a. Budgetary costs – According to 2004 OECD research, the tax benefits associated to these savings schemes are financially perverse in the sense that they value today's taxed outflows more than today's valuation of the inflows that result from taxing voluntary retirement savings plans (third Pillar). Indeed, the State subsidizes in 20% the total gross income invested in *PRSP* plans (below ceiling limits) and only taxes 8 % of the interest income by the time of withdrawal. In theory, budgetary costs would decline if tax incentives appeared to have fostered new savings. However, the effectiveness of *PRSP* in raising private savings remains unclear. Moreover, while individual's income is secure until retirement, national government loses fiscal revenues to finance their public deficit. In such circumstances, "*PRSP* effectiveness to increase national saving only occurs when the increase in private savings is higher than the negative impact in public saving of a greater deficit or a reduction in the surplus of the public sector."⁶⁴
- b. Discrimination against lower-income households – Given that, the tax relief on *PRSP* contributions takes the form of a tax deduction, the value of savings benefits decreases with income levels. For individuals with low income, saving may be neither accessible nor optimal. Furthermore, in countries with a highly redistributive public pension system where lower-income individuals face relatively high replacement rates the incentives to join tax-favoured schemes for low income individuals is reduced. Rodrigues and Silva (2005) used the 2003 personal income tax simulator and found evidence that "for households with a gross monthly income until 1.2 times the statutory minimum

by diversification. From a macroeconomic perspective, pensions invested mostly in such assets present little difference from statutory pension provision.

⁶⁴ See Gouveia (1997) p.5.

wage, the State does not reward at all the effort they make in contributing towards a *PRSP*⁶⁵. Gouveia findings also confirm these results.

- c. Low coverage – Since *PRSP* tax incentives are not uniform across income levels, it follows that *PRSP* coverage will be effectively heterogeneous so that low-income households will be less exposed to saving incentives than their high income counterparts. Rodrigues and Silva (2005) used personal income tax microdata and estimated that “only 6 per cent of all households where the main taxpayer is between 25 and 64 contributed towards a *PRSP* in 2000”⁶⁶.
- d. *PRSP* tax shelter may influence individual’s portfolio strategy – The latter authors argued that some individuals may use personal retirement savings funds as fixed deposit with a more smoothness tax payment, since in case of an early withdrawal scenario they would be less penalized than if they had invested in an ordinary fixed deposit that charges, at the end of each year, a 20% rate on the capital returns earned until the early withdrawal. This holds true for individuals that happen to declare low gross earnings, as the tax deduction would be constrained to only 2/5 of the investment income taxed at 20% and therefore, the return of the corresponding tax deductions and a further 10% for each year or fraction passed would minimize the discipline impinged on early withdrawals. Moreover, Rodrigues and Silva (2005) findings point out that taxpayer gains are smaller when early withdrawals occurs in the early stage and when the return of the corresponding tax deductions are rather high.
- e. portability costs of moving to other companies – The saving incentives associated to *PRSP* have helped banks and insurance companies to maximize their profits by simply exploiting the portability cost associated to *PRSP* and, consequently, charging high commissions to *PRSP* participants. *PRSP* life insurance and *PRSP* funds claim 2,4 and

⁶⁵ See Rodrigues and Silva (2005, p.62).

⁶⁶ See Rodrigues and Silva (2005, p.63).

1,9%, on average, for each subscription made at the entry level⁶⁷. If we take into account schemes' returns per *PRSP* financing vehicles we may find these costs relatively high. Furthermore, if an individual is discontent with his *PRSP* performance he may transfer the invested amount to other entity, provided that he pays a “penalty” for the withdrawal. In some cases, the transfer commission is roughly 5% of the withdrawal amount, which eliminates any return advantage obtained with an alternative *PRSP* application.

3.5 An alternative to *PRSP*

In recent years, policymakers have embarked on a significant reform of the old-age retirement program, regarding the creation of a system based on Social Security personal retirement accounts (Decree-Law Nr. 26/2008, of 22nd of February). The goal is to grant a supplementary income for retirement, provided that individual's subscription takes place in early times and that their investment return rate is relatively high. This goal would be achieved through contributions deposited in a personal retirement account that, once converted into retirement certificates, integrate an autonomous fund managed (under a capitalization regime) by a public entity⁶⁸. The benefit receipt becomes due under retirement conditions or under effective and permanent incapacity circumstances. Thus, participants may choose to:

1. convert the cumulative capital, deposited in their individual retirement account, into a life income; or
2. withdraw the cumulative capital; or even
3. transfer the cumulative capital for a saving plan hold by their children and spouse.

The later two options may be partially acquainted; so long the reminiscent capital is sufficiently high to allow converting it into a life income. It was considered suitable the establishment of a minimum 10% of the social assistance indexation. If participants choose to convert the cumulative capital into a life income, the amount of income will depend mostly of:

⁶⁷ These numbers are in accordance with the 2007 data collected from the Portuguese institution responsible for the protection of consumers' rights, that is DECO.

⁶⁸ The CFMISS (Capitalization Fund Management Institute of Social Security).

- average life expectancy indicator at the time of retirement;
- personal account balance sheet.

Defenders of private *PRSP status quo* are battling vigorously against the virtual advantages of the current reform. And the fact that public opinion is increasingly sympathetic⁶⁹ towards retirement certificates makes it easy the enactment of a system of personalized retirement accounts. Publicly managed personal retirements accounts may very well respond to critics pointed out in later discussion and, simultaneously, amplify additional uncertainties regarding liquidity and investment policy (Annex 2).

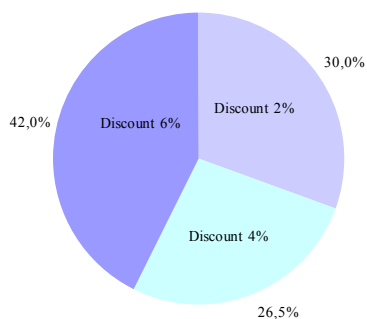
Contributions to public *PRSP* are inelastic and locked up until retirement or permanent inability. Employees of private and public sector are required to contribute an amount of 2% to 6% of their monthly average salary, together with the ordinary contributions made to Social Security system. According to data collected within the Ministry of Labour and Social Cohesion, during the first days after the announcement of the enactment of Social Security personal retirement accounts⁷⁰, it was verified that most of the subscribers had chosen to deliver 4% or 6% of their average salary, while only 28,4% of the Portuguese preferred to discount 2% on the public saving plans.

The results suggest that individuals participating in retirement certificates appear to face less stringent liquidity constraints (as they are opting to perform higher discounts) and could belong to the old age population as earnings tend to increase with the age structure and a 6% target-discount is generally reported to workers older than 50, since this is their only option to contribute to public PPR plans (Figure 9).

⁶⁹ Since 1st of March 2008 (day of announcement of Social Security Personal Retirement Accounts) and until 7th of April, roughly 3100 retirement certificates were subscribed, according to data collected within Ministry of Labour and Social Cohesion. Furthermore, half of the subscribers reported a monthly average salary of 1222€ and almost 1/3 of the subscribers had less than 40 years old.

⁷⁰ The data refers to statistics collected until 24th of March 2008 within Ministry of Labour and Social Cohesion.

Figure 9: How much to discount to public *PRSP*?



Source: Ministry of Labour and Social Cohesion (2008)

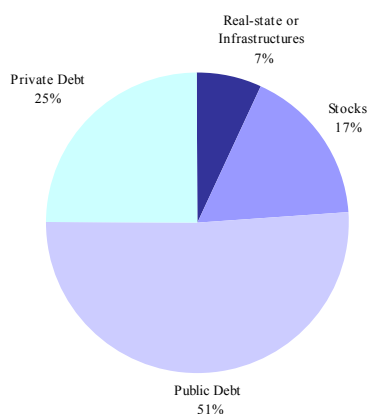
With regard to withdrawals, public *PRSP* when converted into an annuity confers individuals the opportunity to choose for conditional payments to heirs within the first three months, in the case of premature death of a subscriber. This option is rarely available in the private sector. Also, if the death occurs during the savings accumulation period, heirs are entitled with the total savings stock available in retirement certificates without incurring in bureaucracy expenses as the ones imposed by private entities. However, the welfare gains of converting the earnings into an annuity or any other form of capital accumulation are penalized by public's *PRSP* investment policy. This is due to the limits imposed to public *PRSP* portfolio assets which require:

- a minimum of 50% application on public debt⁷¹
- a maximum of 40% application on private debt
- a maximum of 25% application on stocks
- a maximum of 10% application on real state
- a maximum of 15% application on foreign currency uncoverage, as long as it comes from countries within European Union or OECD.

⁷¹ So long 25% of this investment is concentrated in Portuguese public debt. This portfolio composition may be interpreted as a public form of financing the State.

The highlights go for the ceiling limit imposed on stocks (25% of portfolio), which confer a moderate risk⁷² profile to retirement certificates. Meaning that individuals participating in these savings schemes are not likely to invest in risky assets that could leave them more vulnerable to fluctuations in asset prices (Figure 10).

Figure 10: Public *PRSP* portfolio



Source: Social Security

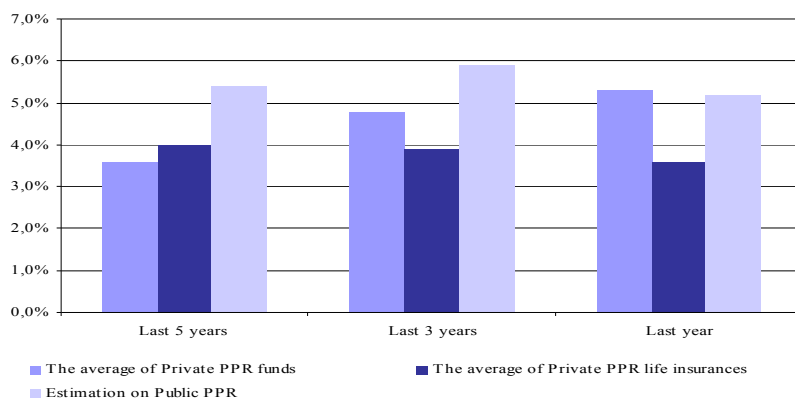
Note1: The data refers to cumulative amounts projected for the years from 2008 to 2010.

Another important fact is that retirement certificates together with private *PRSP* are not capital guarantee (excluding, most of *PRSF* hold in the form of a life insurance), consequently their performance will depend mainly on the investment that is made by the fund that is managing individuals' savings. In the case of public *PRSP*, the portfolio is modest, though the risk is always present and there is no guarantee that the returns obtained in the past will assure future outcomes. Furthermore, the returns on retirement certificates depend on the managing performance of the Capitalization Fund Management Institute of Social Security (*CFMISS*) which is expected to overcome the returns associated to private *PRSP*.

According to the last three to five years, the returns from the trust fund managed by the *CFMISS* prevailed over the average returns of private *PRSP* (whether in the form of life insurance whether in the form of pension fund (Figure 11)).

⁷² Note that, a financial product is considered as having a high risk profile, whenever it is widely held in stocks

Figure 11: Comparing returns on public and private *PRSP*



Source: DECO.

Note1: For further information see the article on public *PRSP* in *Diário Económico*, 4th March 2008, pp.4-6. According to the information gathered, the sample returns exclude *PRSP* fiscal benefits and were estimated before taxes using an annualized formula.

Nevertheless, public *PRSP* portfolios restrict individuals risk profile and also fund's return to one possibility – moderate profile – while private sector schemes tend to offer three types of risk profiles: conservative, moderate and dynamic. This portfolio constraint may penalize the return, since there may be better financial performances in the private market.

Having addressed the investment policy problem, a greater concern arises from the tax treatment of retirement certificates. Supporters of private *PRSP status quo* argue that public *PRSP* are against consumer interests since they allow the accumulation of private *PRSP* fiscal benefits with the retirement certificates tax incentives, but they forbid the accumulation of two *PRSP* from the private sector (i.e.: assuming a saver is investing up to the maximum amount allowed and he has one *PRSP* and one retirement certificate, than the saver is expected to obtain a maximum cumulative benefit of 750€ (400€ and 350€, respectively). However, if he has two private *PRSP*, it is likely that he will attain a 400€ fiscal benefit. This suggests a discrimination against the holding of more than one private *PRSP*).

Under these arguments, personal retirement accounts are expected to compete with private savings in the provision of a pension complement⁷³ by:

⁷³ Since contributions to public pension complement provision are automatic and locked up until retirement or permanent inability, state's saving programme has the virtue of encouraging effective retirement planning.

- lessening the effects of fluctuations in the capital markets (since management is addressed to a public entity which invests in a moderate portfolio that is expected to grant a 5% annual average return);
- collecting the benefits of compound interest over their life-cycle;
- receiving additional benefits than the ones received in the ordinary public system and building up a “nest egg” for retirement.

Also, a massive participation in retirement certificates may allow governments to, under the *Law of Great Numbers*, compete with private *PRSP* in terms of the commissions charged at the entry and withdrawal levels. Simultaneously, state’s credibility among consumers averts individual’s financial myopia and situations of moral hazard⁷⁴, given that retirement certificates portfolio are managed by a public entity and individuals who are not enrolled in a personal retirement account will continue to benefit from public pension provision. Conversely, participants enrolled in personal retirement accounts will not be penalized just because they set aside a percentage of their payroll taxes in retirement certificates.

4. Performance evaluation of personal retirement savings funds (*PRSF*)

4.1 Data description

Out of the 227 total pension funds recorded during 2006, 173 are closed-ended and the reminiscent are open-ended funds. With regard to the open-ended pension funds, roughly 20 are individual retirement savings funds – *PRSP* and *E/RSP*, 4 are equity savings funds and 30 are classified as other open-ended funds⁷⁵. Thus, the current sample size is composed by 12 actively traded *PRSF* and 8 other open-ended retirement savings schemes (Table 10), therefore they may be accounted as representative of the initial sample size of retirement savings plans.

⁷⁴ Unwillingness to save given than the State will guarantee and support individuals by the time they reach retirement.

⁷⁵ For further information see table 6, p.46.

Table 10: *PRSF* hold in the form of pension funds and per Management Company

Funds	Managing entity
BBVA Protecção 2015	BBVA
BBVA Protecção 2020	BBVA
BBVA Solidez PPR	BBVA
Caixa Reforma Activa	CGD Pensões
Caixa Reforma Valor	CGD Pensões
Futuro Clássico	Futuro
Horizonte Valorização	Pensõesgere
MultiReforma	ESAF - FP
Poupança Reforma CVI PPR/E	BBVA
PPR BBVA	BBVA
PPR BNU/Vanguarda	Pensõesgere
PPR Vintage	ESAF - FP
PPR/E 5Estrelas	Futuro
PPR/E Europa	Pensõesgere
PPR/E Garantia de Futuro	Futuro
PPR/E Platinium	Futuro
PraemiumS	Pensõesgere
PraemiumV	Pensõesgere
Vanguarda PPR	Pensõesgere
Viva	Futuro

Source: Author's estimates

The study period is from December 2002 to December 2007, so as to examine the performance of these schemes over the past 5 years. The selected funds were chosen according to the level of complete information gathered from the EURONEXT database and also to the time series consistency of each *PRSF*.

In order to evaluate the investment performance of *PRSP* it was created a new database containing the monthly returns of the 20 funds traded in the Portuguese capital market. This implies a total of 60 observations for each *PRSF*. Out of the 20 open-ended funds, 16 are at least previous to the 2002 study period, meaning that only 4 funds will present less than 60 observations. The new estimates were obtained from EURONEXT's database records concerning the daily prices of the participation units that compose each *PRSF* and also the total returns on the PSI-20 Index, latter used as the market's return benchmark.

4.2 Methodology

4.2.1 Return

For each *PRSF* under analyse, the monthly returns were computed as:

$$Rp = \ln\left(\frac{PRSF_t}{PRSF_{t-1}}\right) \quad (1)$$

The market returns were calculated on similar lines with the *PRSF* as:

$$Rm = \ln\left(\frac{PSI20TR_t}{PSI20TR_{t-1}}\right) \quad (2)$$

The logarithmic mean is displayed to obtain the mean monthly returns of the schemes used throughout this chapter.

4.2.2 Benchmark

To perform a comparative analysis between *PRSF* and an alternative benchmark with common characteristics, new data was collected with regard to two other classes of assets (besides the already selected PSI-20 Index). Notably, T-Bonds rates and Euribor interests rates over a three months period on long-run deposits, all gathered from Bank of Portugal online database. This benchmark⁷⁶ was built in accordance with the Portfolio Theory and with the ceiling limits imposed to *PRSF* portfolio strategy. Notably, a portfolio composed in 50% by T-Bonds, 30% long-run deposits and 20% stocks over the PSI-20 Index. Hence, the benchmark's return is computed using the return rates of each considered assets, that is:

$$R_{Benchmark,t} = 0,5 * R_{TBonds,t} + 0,3 * R_{Deposits,t} + 0,2 * R_{PSI20,t} \quad (3)$$

with,

$R_{TBonds,t}$ as the return rate on T-Bonds for a t period

$R_{Deposits,t}$ as the return rate on deposits with an Euribor over a three months period for a t period

$R_{PSI20,t}$ as the return rate on PSI-20 Index for a t period

4.2.3 Risk free asset

Another interesting concept to retain is the risk free asset, theoretically identified as having zero variability of returns. Such type of asset is mostly used to determine the excess of returns or the premiums obtained by an individual that has assumed the risk of investing in a

⁷⁶ Most fund managers' use as benchmark a combination of several other assets, including real state, and foreign mutual funds, besides the ones disclosed, but always in accordance with the prudential rules regarding the *PRSF* investment policy.

savings scheme. The current study uses Bank of Portugal database to select the risk-free rate, here represented by the Monthly Repo Refinance rates as:

$$Rf, t = \left(\frac{MRR_t}{100} \right) \quad (4)$$

4.2.4 Risk

The return analysis is an important aspect of *PRSF* performance evaluation. However, it is insufficient to measure *PRSF* risk exposition and their response to market fluctuations. Modern investment analysis points out two risk measures and a further diversification measure:

1. total (or unsystematic) risk, measured through the standard deviation;
2. market (or systematic) risk, measured through the beta of each scheme;
3. diversification measure through the coefficient of determination.

1. The total (or unsystematic) risk, measured through the standard deviation

This is a unique risk which is specific to a particular scheme and is unrelated to the overall market variability. It is commonly associated to investment and liquidity risks. To measure this risk, the academics and market analysts use the standard deviations calculus, here computed as:

$$\sigma_i = \sqrt{\frac{\sum_{i=1}^n (r_i - \bar{r})^2}{n-1}} \quad (5)$$

The standard deviation was computed using the logarithmic monthly means on *PRSF*.

2. The market (or systematic) risk, measured through the β of each scheme

This risk is directly linked with the overall market variability and it corresponds to the part of the total risk that is non diversifiable. It is commonly associated to interest rate risk, market and inflation risks. Since these market events occur regardless of investors' portfolio decisions, they tend to be difficult to eliminate. To measure the systematic risk it is applied the Sharpe's Market Model (1963). The Market model is valid if it satisfies two key assumptions:

1. All assets are related with each other throughout the market's portfolio;
2. There is a linear relationship between the assets and the market's portfolio.

For each scheme, the mathematical form is represented by:

$$R_{p,t} = \alpha + \beta_p * R_{m,t} + \varepsilon_p \quad (6)$$

with,

$R_{p,t}$ as the return on the *PRSF* for a t period

$R_{m,t}$ as the market return, here represented by PSI20 Index for a t period

β_p as the slope of the linear regression

ε_p as the error term

The constants α and β will be different from scheme to scheme and shall be computed using equation 6 and regressing monthly market returns with monthly *PRSF* returns. The β coefficient measures the vulnerability of the portfolio returns against the markets' returns. High values⁷⁷ of β indicate that *PRSF* returns are highly sensitive to market returns. By contrast, lower values of β indicate low sensitivity. The error term⁷⁸ (ε_p) is assumed as an approximation to the portfolio's total risk and thus, diversifiable.

3. Diversification measure through the coefficient of determination

Portfolio's diversification is important since it allows the improvement of *PRSF* performance. It can be measured using the coefficient of determination (that is, the value of R^2) provided by the Market model regression. Barnea and Logue (1973) argued that the coefficient of determination indicates fund's extent for diversification. The higher the R^2 , the closer a portfolio's return is to the market's returns. By contrast, a lower R^2 represents portfolio's large potential for diversification. However, the authors' conclusions for a single security case (where the R^2 indicates the market's diversification estimate within a managing entity) were

⁷⁷ Note that, lower values of β are desirable during a bear phase that is a short or even long period during which the price of the scheme is remarkably low. A higher value of β is desirable during a bull phase that is a short or even long period during which the price of the scheme is remarkably high. This approach is used for the stock market but it may be used for savings schemes.

⁷⁸ The Market Model assumes that the error term follows a normal distribution with mean equal to zero and variance equal to a constant.

inconclusive. Consequently, the analyses on R^2 shall be taken merely as an indicative measure of diversification.

4.3 Methodological limitations

The present study has the following limitations:

1. *PRSF* used in the study suffered from the problem of missing values, therefore it was applied a mobile average over 21 days that displayed a trend line which smoothes the recurrences of the days and grants a more appropriate overview of the period trend.
2. Pension plan sponsors tend to offer different types of *PRSF* contracts so that individuals may self-select the type of contract corresponding to their profile. The schemes under study are classified as having low risk (level 1 in a 6 scale) which limits the probability of obtaining higher performances.
3. The study only considers schemes with the same goals, risk profile (low) and similar investment constraints, which may generate misleading results⁷⁹.
4. Many academics favour T-Bonds estimates as risk free asset. However, the present study uses, as risk-free asset, the MRR which happens to be in accordance with the PII Report on the Insurance Sector and Pension Funds (2006), a reference within pension funds and insurance market.
5. The analysis is also constrained to non-identical time periods and non-equal sample of observations.
6. The examined data excludes the effects of subscription and withdrawal commissions on portfolio's returns, since *PRSF* performance evaluation is frequently observed in the perspective of pension plan sponsors. However, the current study did not neglect individual's perspective as it includes a brief survey on the commissions charged by each sponsor at the time of subscription and withdrawal.

⁷⁹ This fact may result in sample's selection bias.

7. The study only covers the schemes that are currently tradable. Thus, it ignores the funds that have been liquidated or absorbed by other funds. This may bias our sample results.

4.4 Revisiting portfolio performance measures

4.4.1 The CAP-model

In 1952, Markowitz introduced the concept of portfolio theory. He was the first to build up a measure of portfolio risk and to obtain the expected return and risk of a specific portfolio. Later on, Sharpe (1964), Lintner (1965) and Black (1972) carried out predictions for portfolio's expected returns on risky assets. Their contribution to portfolio theory was recognized with the development of the Capital Asset Pricing model (CAP-model⁸⁰) which relates a portfolio's expected return to a systematic risk measure. The CAP-model equation⁸¹ is computed as:

$$E[R_{p,t}] = R_{f,t} + \beta_p (E[R_{m,t}] - R_{f,t}) \quad (7)$$

with,

$E[R_{p,t}]$ as the portfolio's expected return for a t period

$R_{f,t}$ as the risk-free return for a t period

β_p as the systematic risk of the portfolio

$E[R_{m,t}]$ as the expected market's portfolio return

This mathematical form expresses a portfolio's expected return as a function of a risk free asset (compensating investors for favouring savings instead of consumption) and a further systematic risk times a risk premium (compensating investor for assuming the investment risk).

⁸⁰ The model holds true within a special set of hypotheses, namely: 1) investor's goal is to maximize the expected utility over each period of wealth; 2) investors base their decisions taking into account the asset returns and their variance; 3) investors are risk averse individuals; 4) Investors have homogenous expectations about asset returns and variance and they all have the same time horizon; 5) there are no market imperfections such as taxes, transaction costs or restrictions on short selling and information is costless and available to all investors; 6) all assets are perfectly divisible; 7) there is a risk free asset similar to all investors that can be used in order to borrow or lend capital amounts; 8) the capital market is at the equilibrium.

⁸¹ Also called as the Security Market Line (SML).

Since this is an *ex-ante* analysis and the market panorama may not be clear, the CAP-model is frequently postulated using an *ex-post* version that rewrites the earlier equation as the following:

$$R_{p,t} = R_{f,t} + \beta_p (R_{m,t} - R_{f,t}) + \varepsilon_t \Rightarrow R_{p,t} - R_{f,t} = \beta_p (R_{m,t} - R_{f,t}) + \varepsilon_t \quad (8)$$

with,

ε_t as the residuals on portfolio returns, which hold on an expected mean equal to zero [$E(\varepsilon_t)=0$], a constant variance [$V(\varepsilon_t)=c$] and is non-correlated with the market's return $\text{Corr}(\varepsilon_t, R_{m,t})=0$.

Also, the market may not be at the equilibrium and without the efficiency of the market portfolio the CAP-model is non-testable. Hence, it is important not to constraint the regression to pass through the origin, meaning that the regression may be computed as:

$$R_{p,t} - R_{f,t} = \alpha_p + \underbrace{\beta_p (R_{m,t} - R_{f,t})}_{\text{Systematic Risk}} + \underbrace{\varepsilon_t}_{\text{Total Risk}} \quad (9)$$

with,

α_p as security's risk adjusted performance⁸²

This regression is derived from the Jensen model (1969), which states that portfolio's excess of returns relatively to a risk-free rate depends merely on the β_p systematic risk. The Jensen measure finds out whether a scheme manager outperformed a market return. If α_p is positive than the portfolio's expected return registers a positive risk adjusted performance.

4.4.2 The Treynor ratio

The Treynor ratio (1965)⁸³ is defined as the risk premium, or the excess return (over the risk-free rate), per unit of systematic risk (where the risk is measured by a portfolio beta derived from the Security Market Line (*SML*)). This index is computed as:

⁸² Also called as the Jensen measure.

⁸³ Also identified as "reward to volatility ratio" by Sharpe, Alexander e Bailey (1995).

$$T_{p,t} = \frac{R_{p,t} - R_{f,t}}{\beta_{p,t}} \quad (10)$$

with,

$T_{p,t}$ as the Treynor ratio for a security portfolio, while the other variables have been already identified

Treynor's index for a security portfolio is analysed in opposition to a market index. Because the market's beta is equal to one ($\beta_m = 1$), than:

$$T_{m,t} = R_{m,t} - R_{f,t} \quad (11a)$$

with,

T_m as the Treynor Index for a market portfolio

If $T_{m,t} < T_{p,t}$ ($T_{m,t} > T_{p,t}$), than the scheme lies above (bellow) the *SML*, indicating a superior (or poor) performance relatively to the market index.

4.4.3 The Sharpe ratio

The Sharpe ratio (1966)⁸⁴ is defined as the risk premium, or the excess return (over the risk-free rate), per unit of total risk (where the risk is measured by the standard deviation of portfolio's returns derived from the Capital Market Line⁸⁵ (*CML*)). This is computed as:

$$S_{p,t} = \frac{R_{p,t} - R_{f,t}}{\sigma_{p,t}} \quad (12)$$

with,

$S_{p,t}$ as the Sharpe ratio for a security portfolio, while the other variables have been already identified

As in the Treynor's index, the Sharpe index for a security portfolio is analysed in opposition to a market index. The $S_{m,t}$ for a market portfolio is represented by:

⁸⁴ Also identified by the author as "reward to variability ratio".

⁸⁵ The CML equation is identified as:
$$R_{p,t} = R_{f,t} + \left(\frac{R_{m,t} - R_{f,t}}{\sigma_{m,t}} \right) \sigma_{p,t}$$

$$S_{m,t} = \frac{R_{m,t} - R_{f,t}}{\sigma_{m,t}} \quad (12a)$$

with,

$\sigma_{m,t}$ as the standard deviation of market's returns

If $\frac{R_{m,t} - R_{f,t}}{\sigma_{m,t}} < S_{p,t}$ ($\frac{R_{m,t} - R_{f,t}}{\sigma_{m,t}} > S_{p,t}$), than the scheme earns more (less) than the excess return

over the risk-free rate required by the *CML* and thus, indicating a superior (poor) performance relatively to the market index.

4.4.4 The Sharpe measure

From Sharpe's Market Model (1963) derived in equation 6, it is possible to quantify the level of systematic and unsystematic risks associated to a security as:

$$\text{Systematic risk} = \beta^2 \sigma_{R_{m,t}}^2 \quad \text{from the explained variance} \quad (13)$$

$$\text{Unsystematic risk} = \sigma_{R_{p,t}}^2 - \beta^2 \sigma_{R_{m,t}}^2 \quad \text{from the unexplained variance} \quad (14)$$

with,

$\sigma_{R_{p,t}}^2$ as the variance of portfolio's returns

$\sigma_{R_{m,t}}^2$ as the variance of market's returns

β as the Beta coefficient obtained from Sharpe's Market Model

A portfolio is assumed to be well diversified if it is expected to exhibit a low unsystematic risk level.

4.4.5 The Jensen measure

In contrast with the Treynor and Sharpe ratios, the Jensen measure is defined in terms of portfolio's excess of return (over the risk-free rate) over the CAP-model expected returns, setting up a premium for the systematic risk. In other words, Jensen's measure for a security portfolio corresponds to the relationship between a portfolio's return and its' expected return, if

the portfolio had laid on the *SML*, taking into account a similar systematic risk. This may be quantified as:

$$J_{p,t} = R_{p,t} - [R_{f,t} + \beta_p (R_{m,t} - R_{f,t})] = (R_{p,t} - R_{f,t}) - \beta_p (R_{m,t} - R_{f,t}) \quad (15)$$

with,

$J_{p,t}$ as the Jensen measure for a scheme portfolio, while the other variables have been already identified

If $J_{p,t}$ is positive (negative) than the scheme earned more (less) than the expected returns and lies above (below) the *SML*, indicating a superior (poor) performance of the portfolio security.

4.4.6 The Fama measure

The Fama measure is defined in terms of portfolio's excess of return (over the risk-free rate) over the *CML* expected returns, setting up a premium for the unsystematic risk. Notably, Fama's measure for a security portfolio corresponds to the relationship between a portfolio's return and its' expected return, if the portfolio had laid on the *CML*. Fama's performance measure is defined as:

$$F_{p,t} = (R_{p,t} - R_{f,t}) - \left(\frac{\sigma_{p,t}}{\sigma_{m,t}}\right)(R_{m,t} - R_{f,t}) \quad (16)$$

with,

$F_{p,t}$ as the Fama measure for a scheme portfolio, while the other variables have been already identified.

If $F_{p,t}$ is positive (negative) than the scheme earned more (less) than the expected returns and lies above (below) the *CML*, indicating a superior (poor) performance of the portfolio security.

4.5 Performance and market timing

On the issue of portfolio's performance measures, some studies have attempted to identify the determinants behind a security return and risk. A consensual conclusion of many of

these studies is that a large portion of the variability obtained in a portfolio's return is due to asset allocation or, in other words, to the decision to invest in asset classes. Brinson, Hood and Beebower (1986, 1991) results,⁸⁶ supported these findings and attributed little responsibility to security selection and market timing. Security selection⁸⁷ is referred to the ability of investment managers to select financial assets with superior returns through actively purchasing undervalued assets classes and under weighting overvalued asset classes. Market timing⁸⁸ is referred to the ability of investment managers to strategically alter the asset allocation within a security in anticipation to market's movements, thereby adjusting portfolio's return to its systematic risk.

4.5.1 The Mazuy-Treynor model

In order to test market's timing ability, Treynor and Mazuy (1966) added a square term to the CAP-model. The authors argued that if investment managers are able to anticipate fluctuations in price and income received, than they may increase (decrease) portfolio's risk by the time they expect a rise (decline) in the price of financial assets. Hence, portfolio's excess return is a non linear function of markets excess of returns computed as:

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_p (R_{m,t} - R_{f,t}) + \gamma_p (R_{m,t} - R_{f,t})^2 \quad (17)$$

with,

γ_p as the market timing measure for a scheme portfolio, while the other variables have been already identified.

⁸⁶ Brinson, Hood e Beebower (1986) study, found that 93,6% of the variability (in a sample made of 91 pension fund over a 1974-83 period) was attributed to investment policy and 5% to security selection. The latter study confirmed the earlier findings as 91,5% of the variations (in sample made of 82 pension plans over a 1977-87 period) were due to asset allocation.

⁸⁷ For Fama (1972), a portfolio's excess returns may be the result of the earnings derived from selectivity and market timing, keeping in mind that selectivity is divided into two categories: net selectivity and diversification. Net selectivity measures the ability of investment managers in obtaining a fair value for the portfolio's systematic risk and at the same time extending diversification to unsystematic risk, while diversification measures the degree to which a portfolio may be perfectly diversified.

⁸⁸ The timing ability (γ) and selection ability(α) are two different concepts. A scheme's portfolio is able to out perform the market just by moving to higher and lower risk portfolio when needed, without the necessary recognition of the schemes with better risk-adjusted returns.

If γ_p is positive (negative) than it indicates that investment managers were able (not able) to anticipate fluctuations in price and income received by the security.

4.6 Results and analysis

4.6.1 Absolute performance of PRSF with and without commissions

A look at 11 reveals the absolute performance of PRSF, excluding commissions applied by each management company.

Table 11: Annual average returns- without commissions on PRSF and E/RSF

	2003	2004	2005	2006	2007
BBVA Protecção 2015			2,0859%	3,7394%	2,8262%
BBVA Protecção 2020			2,0891%	4,2130%	2,3805%
BBVA Solidez PPR	1,0610%	1,4571%	1,2856%	1,8657%	1,8946%
Caixa Reforma Activa	3,2516%	3,6703%	3,6704%	3,8684%	2,8428%
Caixa Reforma Valor				5,9065%	-0,5290%
Futuro Clássico	4,3325%	3,0180%	1,9860%	1,8934%	2,6649%
Horizonte Valorização	5,5852%	4,6693%	8,7417%	4,2776%	1,1005%
MultiReforma	7,3803%	4,2427%	5,6383%	4,8460%	4,5124%
Poupança Reforma CVI PPR/E			2,4065%	4,7746%	4,3278%
PPR BBVA	3,9091%	4,3652%	3,3662%	3,3873%	2,9492%
PPR BNU/Vanguarda	3,3773%	3,7369%	6,4885%	2,3956%	0,1954%
PPR Vintage	5,6331%	3,2827%	5,7094%	6,3123%	4,2287%
PPR/E 5Estrelas	4,9105%	4,0600%	3,5214%	4,5462%	5,0272%
PPR/E Europa	4,3304%	4,0400%	8,0189%	3,5456%	0,0084%
PPR/E Garantia de Futuro	2,4449%	2,4730%	2,0356%	2,2089%	2,2390%
PPR/E Platinum	5,1652%	4,2150%	4,3704%	6,5341%	5,4466%
PraemiumS	0,9854%	1,9661%	2,0858%	1,9660%	0,5102%
PraemiumV	5,0572%	3,7524%	9,8106%	4,1509%	0,1167%
Vanguarda PPR	3,4843%	3,4166%	6,3430%	2,5803%	-0,2442%
Viva	4,9417%	4,4144%	4,4234%	5,3215%	4,3230%
PSI20TR	15,9087%	16,7562%	14,4948%	34,8128%	22,7107%

Source: Author's estimates

In general, all scheme's gross⁸⁹ returns were positive during the period 2003-2007, excluding *Vanguarda PPR* and *Caixa Reforma Valor*. These two schemes tend to add high risk asset classes (almost 30% in stocks from domestic, European and international markets) and investments (real state property, derivatives) to their portfolio. Thus, tend to vary more widely, in time and in magnitude, then their counterparts. Since 2003, the *MultiReforma*, the *PPR Vintage* and the *PPR Platinum* funds can be rated as the best performers. In 2007, most

⁸⁹ These are gross returns since they exclude the commissions on withdrawal and on subscription. The mathematical formula on a scheme return is only liquid from taxes and commissions on deposit and management.

schemes earned less than in previous years. This significant slowdown in *PRSF* performance was in line with the latest trends⁹⁰ on the economic climate indicator and the consumer's confidence indicator. All open-ended schemes under performed the market returns (PSI20TR) over the period of 2003-07, with:

- 2 schemes giving returns of less than 2% during 2003-04, 6 schemes in 2005, 3 schemes in 2006 and 8 schemes giving returns of less than 2% in 2007;
- 10 schemes giving returns of 2,1%-5% in 2003, 14 schemes in 2004, 6 schemes in 2005, 13 schemes in 2006 and 11 schemes giving returns of 2,1%-5% in 2007;
- 4 schemes giving returns of 5,1%-8,4% in 2003, 5 schemes in 2005, 4 schemes in 2006 and one scheme giving returns of 5,1%-8,4% in 2007;
- 2 schemes with returns of 8,5% and above in 2005.

A scheme's superior performance may not result in high earnings (for individuals) if it ignores the effects of commission's on its final return. The later estimates are expressed in nominal terms⁹¹, thus not capturing in detail a scheme's effective return.

The study focuses on the commissions charged at the entry and withdrawal levels. The subscription commission reimburses investment managers for the scheme issuing costs, while the withdrawal commission aims to slowdown the volatility associated to inflows and outflows in *PRSF* deposits⁹².

A look at Table 12 reveals the quantitative information on the commissions charged by each managing entity. The data suggests that *PRSF* are more penalized via withdrawal commission than via subscription commission as many pension plans sponsors prefer to cut in the commission charged at the entry level than at the withdrawal commission. This is so because *PRSF* are saving schemes that are consistent with a long-run time horizon drawn to

⁹⁰ Over the last years, the Portuguese economy has been affected by a continuous decline in private savings and a boost in household's domestic debt, phenomenon's that happen to be prior to the under study period (2003-07) but have intensified during the past two years.

⁹¹ These are the values disclosed by investment managers to capture individual's interests.

⁹² Despite the restrict circumstances that allow individuals to withdrawal. Note that withdrawal commissions will decrease in line with the increase of the scheme's stability. Furthermore, this type of commission will vary according to the period of withdrawal and to fund's nature.

close pension gaps. As a result, individuals are expected to accumulate a financial wealth that is lock until retirement or any other circumstance provided by law.

Table 12: Main commissions applied on *PRSF* and *E/RSF*

	Commission on subscription	Commission on withdrawal	Managing Company
BBVA Protecção 2015	0%	0%	BBVA
BBVA Protecção 2020	0%	0%	BBVA
BBVA Solidez PPR	Max. 2%	Max. 2%	BBVA
Caixa Reforma Activa	0%	Max. 1,5%*, 1%** or 0%***	CGD Pensões
Caixa Reforma Valor	0%	Max. 1,5%*, 1%** or 0%***	CGD Pensões
Futuro Clássico	0%	2%	Futuro
Horizonte Valorização	Max. 2%	Max. 1%	Pensõesgere
MultiReforma	Max. 2,5%	0%	ESAF - FP
Poupança Reforma CVI PPR/E	Max. 2%	Max. 2%	BBVA
PPR BBVA	Max. 2%	Max. 2%	BBVA
PPR BNU/Vanguarda	Max. 2%	Max. 0,7%	Pensõesgere
PPR Vintage	Max. 3,5%	Max. 1,5%	ESAF - FP
PPR/E 5Estrelas	0%	2%	Futuro
PPR/E Europa	Max. 2%	0%	Pensõesgere
PPR/E Garantia de Futuro	0%	2%	Futuro
PPR/E Platinum	0%	2%	Futuro
PraemiumS	Max. 2%	Max. 1%	Pensõesgere
PraemiumV	Max. 2%	Max. 1%	Pensõesgere
Vanguarda PPR	Max. 0,5%	Max. 0,7%	Pensõesgere
Viva	0%	2%	Futuro
*	If subscribed in less than one year, starting from the first contribution		
**	If subscribed in less than two years, starting from the first contribution		
***	If subscribed from the second year on, starting from the first contribution		

Source: On-line prospects

As observed, excluding this type of information from individuals may envisage their preferences towards schemes that performed well but imply aggressive commissions. Hence, the net effect on wealth may not remain unaffected. Comparing these values with the gross returns computed for each scheme, it is clear that there may be other schemes performing better for an acceptable price. This is the case of *Viva*, *PPR/E 5 Estrelas*, *PPR/E Europa* and *Caixa Reforma Valor*⁹³. However, for *MultiReforma* and *PPR/Platinum* the welfare gains remain significant.

4.6.2 Relative performance of *PRSF*

In order to delineate a superior investment strategy, pension plans sponsors should compare it with an alternative portfolio (a benchmark) with common characteristics (Table 13).

Table 13: Return on a benchmark

	2003	2004	2005	2006	2007	Since 2003
Rbenchmark	5,1514%	5,2364%	4,7466%	9,5691%	7,8955%	33,6489%

Source: Author's estimates

⁹³ Note that *Caixa Reforma Valor* returns varies significantly.

By simulating an alternative portfolio, this study attempts to assess the impact of passive (benchmark) and active asset allocations on 20 personal retirement savings funds during the period of 2003-07. Table 14 uses as a return measure the excess returns (over a benchmark return).

Table 14: Excess return of *PRSF* and *E/RSF* without commissions

	2003	2004	2005	2006	2007
BBVA Protecção 2015			0,9628%	-3,2567%	-3,6667%
BBVA Protecção 2020			1,7419%	-7,1735%	-7,7001%
BBVA Solidez PPR	-0,8210%	-1,1963%	3,2723%	-6,0234%	-7,8870%
Caixa Reforma Activa	-2,7065%	-2,7634%	-2,7110%	-7,3602%	-5,6564%
Caixa Reforma Valor				-3,0350%	-2,4489%
Futuro Clássico	-1,6671%	-1,8198%	1,5964%	-6,9888%	-8,1396%
Horizonte Valorização	-0,2409%	-1,1764%	-1,2252%	-5,0229%	-2,8682%
MultiReforma	-1,2423%	-0,8712%	-1,3804%	-6,1818%	-4,9463%
Poupança Reforma CVI PPR/E			-2,6609%	-7,6030%	-7,3852%
PPR BBVA	-0,0942%	-1,4840%	5,0640%	-5,4181%	-7,7788%
PPR BNU/Vanguarda	0,4338%	-0,5670%	3,9951%	-5,2915%	-6,7949%
PPR Vintage	-0,2097%	-0,8219%	-0,3232%	-4,2476%	-3,5724%
PPR/E 5Estrelas	-0,8189%	-2,2183%	-2,7607%	-7,6757%	-5,2305%
PPR/E Europa	2,2289%	-0,9937%	0,8917%	-4,7231%	-3,3830%
PPR/E Garantia de Futuro	-1,8998%	-1,5661%	-1,0762%	-5,7007%	-5,0526%
PPR/E Platinum	-4,0904%	-3,7793%	-3,4610%	-7,7034%	-6,0009%
PraemiumS	-5,1514%	-5,2364%	-2,3401%	-4,7945%	-3,5676%
PraemiumV	-5,1514%	-5,2364%	-2,6608%	-5,8296%	-5,0692%
Vanguarda PPR	-5,1514%	-5,2364%	-2,6575%	-5,3561%	-5,5150%
Viva	-5,1514%	-5,2364%	-4,7466%	-3,6626%	-8,4245%

Source: Author's estimates

The results show that, since 2003, the welfare gains of purchasing an alternative portfolio can be extensive just by changing the asset allocation of a fund. However, it is less likely that the benchmark will out perform the market index. In fact, the PSI-20TR index is not only capable of out performing the 20 schemes but it may even achieve higher returns than the ones earned by the benchmark.

Under a year-to-year basis, the analysis may present some revealing facts. In 2003, out of 20 open-ended schemes, 4 funds out performed the benchmark. And in 2005, 7 schemes recorded returns higher than benchmark return's. In all other years, none out performed the benchmark. Meaning that investment managers are required to review their asset allocation policy over time since a static asset allocation is not consistent with on-going market fluctuations.

4.6.3 Absolute and relative performance per managing entity

As for pension plans sponsors, the data on gross returns varies widely from scheme to scheme, allowing individuals to self-select the type of contract that suits their interests (given the return performance and the level of commissions charged). *ESAF-FP* and *Futuro* are the managing entities offering higher returns. However, *Futuro* charges fewer commissions than *ESAF-FP*. When considering the average estimates on the excess returns (over a benchmark return), computed each year and per pension plans sponsors, the results are more homogeneous since they all present negative excess returns, excluding *ESAF-FP* that in 2003 out performed in 1,3553% the benchmark and in 2005, out performed in 0,9273%.

4.6.4 Risk-return analysis

A study based only in a return performance measure is inconclusive since a portfolio's return is associated to a particular level of risk. Since the key objective of the asset allocation policy is for a scheme to achieve higher earnings for a tolerable risk level or, in alternative, a lower risk for a required rate of return, it is convenient to study the binomial risk-return relation for each *PRSF*. For each scheme, it is studied the risk-return analysis over the period 2003-07.

Table 15: Statistical properties on *PRSF* and *E/RSF*

	Mean	Median	Maximum	Minimum	Std.Dev.	Skewness	Kurtosis	JB Test	p-value	ADF Test	Observations
BBVA Protecção 2015	0,2529%	0,2098%	3,7015%	-4,3794%	1,2295%	-1,0684	9,9174	63,3365	0,0000	-9,0822	29
BBVA Protecção 2020	0,2552%	0,1709%	1,6386%	-1,1193%	0,7369%	-0,0938	2,3766	0,5121	0,774105*	-3,8424	29
BBVA Solidez PPR	0,1252%	0,1203%	1,0869%	-0,5985%	0,1754%	1,6082	19,5269	820,1355	0,0000	-6,6822	60
Caixa Reforma Activa	0,2839%	0,3415%	0,8215%	-0,4930%	0,3100%	-0,5045	-0,1773	2,5892	0,274006*	-6,0786	60
Caixa Reforma Valor	0,4007%	0,5281%	2,0880%	-1,7504%	0,9569%	-0,4850	2,7329	0,8856	0,642243*	-3,6782	21
Futuro Clássico	0,2284%	0,1873%	1,6112%	-0,5218%	0,3375%	1,1047	4,0007	43,5770	0,0000	-8,4034	60
Horizonte Valorização	0,3953%	0,5338%	2,2094%	-2,5360%	0,8427%	-0,9078	1,7968	13,8544	0,0010	-6,1626	60
MultiReforma	0,4328%	0,5025%	1,2943%	-1,1406%	0,4933%	-0,9642	1,7431	14,4806	0,0007	-5,5472	60
Poupança Reforma CVI PPR/E	0,3133%	0,4348%	1,4812%	-1,0865%	0,6048%	-0,6535	3,0016	3,2034	0,201557*	-6,3259	45
PPR BBVA	0,2947%	0,3969%	1,6713%	-1,3593%	0,5739%	-0,6148	0,8964	4,9066	0,08601*	-6,7810	60
PPR BNU/Vanguarda	0,2645%	0,3271%	1,8688%	-1,2838%	0,6677%	-0,2130	0,1128	0,4312	0,806072*	-5,6640	60
PPR Vintage	0,4096%	0,3938%	1,5751%	-0,2548%	0,2708%	1,3502	5,4713	78,0254	0,0000	-8,2339	60
PPR/E 5Estrelas	0,3604%	0,3860%	1,4755%	-0,9207%	0,4907%	-0,3842	0,3864	1,5671	0,456788*	-6,9833	60
PPR/E Europa	0,3242%	0,3380%	1,9716%	-1,4939%	0,7796%	-0,4925	0,1037	2,3053	0,315802*	-5,4966	60
PPR/E Garantia de Futuro	0,1881%	0,2088%	0,5356%	-0,1950%	0,1639%	-0,2011	-0,3798	0,8845	0,6426*	-5,9281	60
PPR/E Platinium	0,4188%	0,4941%	3,1283%	-1,7395%	0,8125%	-0,1593	2,0460	8,1721	0,0168	-9,4712	60
PraemiumS	0,1242%	0,1361%	1,6914%	-1,1077%	0,3358%	0,6173	9,8920	205,5941	0,0000	-9,8765	60
PraemiumV	0,3703%	0,5322%	2,7140%	-1,9771%	0,9914%	-0,4723	0,4855	2,4218	0,297923*	-6,5284	60
Vanguarda PPR	0,2544%	0,3137%	4,9848%	-5,2046%	1,1391%	-0,7195	12,6447	336,5196	0,0000	-9,1525	60
Viva	0,3822%	0,4184%	1,4020%	-1,3836%	0,5984%	-0,8136	0,7401	7,1351	0,0282	-7,1231	60
PSI20TR	1,3825%	2,5055%	6,7583%	-6,6438%	3,0024%	-0,6909	2,8968	4,8004	0,0907*	-6,5403	60

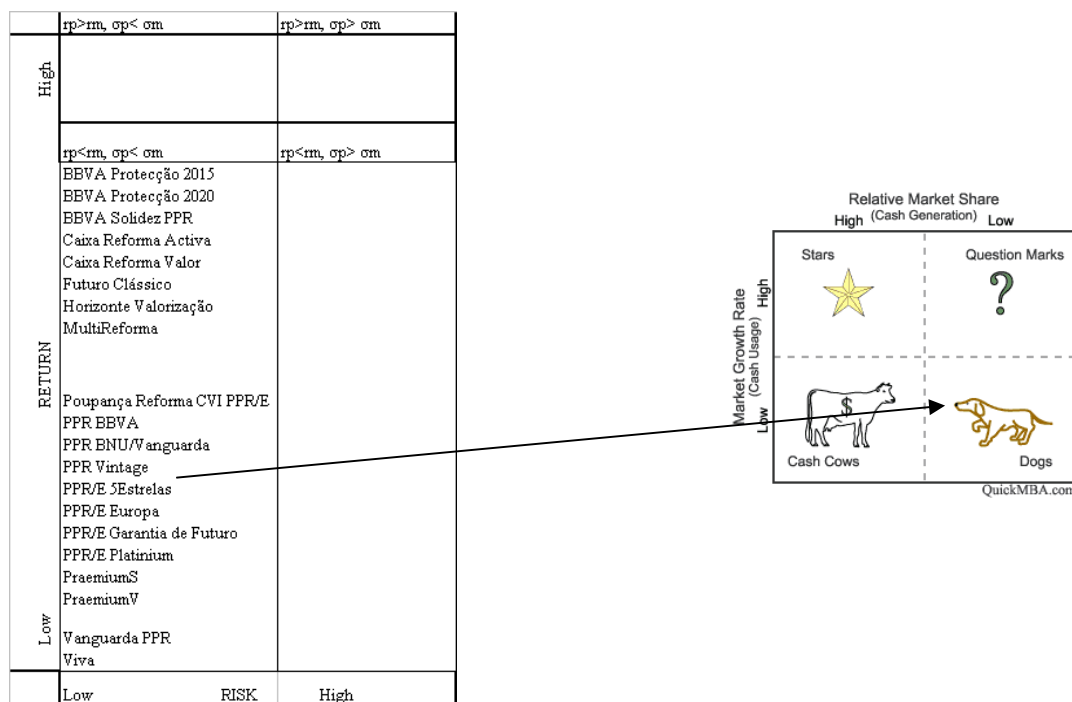
Source: Author's estimates

Table 15 summarizes the statistical properties on the 20 schemes under study and on the market index measured through PSI20TR. The first four columns record the scheme's average and median returns, the maximum and minimum returns achieved by each scheme and the variations in returns.

As expected, all open-ended schemes under performed the market returns (Annex 3). Furthermore, all funds registered a lower total risk level comparing with market's volatility. This fact is not surprising. A large proportion of *PRSF* asset allocation is concentrated in low risky asset classes (i.e. Bonds, cash ...) in order to cover potential liquidity constraints on the certificate units, while the market's portfolio's is composed merely of stocks, which add more risk since it fluctuates in value more.

Table 16 displays a 2x2 matrix based in a BCG matrix. The goal is to link investment strategies to a risk-return analysis, allowing individuals to compare schemes at a glance

Table 16: Risk-return diagram



Source: Author's approach and figure collected from NetMBA.com/

. As observed, all schemes are positioned at the dog region since their returns underperformed the market returns and, at the same time, presented lower total risk levels.

Meaning that personal retirement savings funds do not require substantial investment amounts, nor generate a significant quantity of financial wealth for retirement. As a result, the investment in *PRSF* may be locking savings that could be better applied elsewhere (i.e. banking deposits, retirement certificates (expected to earn 5% rate each year)). Unless pension plans sponsors offer better contracts that happen to be capital guaranteed, such type of schemes should be liquidated if individuals' welfare gains have little prospects to increase.

Modern portfolio theory assumes that a schemes return follows a normal distribution totally defined by its first two moments: the mean and the variance. However, table 15 shows that half of the schemes distribution would be better described by introducing the 3rd and 4th order moments to the conventionally-employed first two. The 3rd moment (skewness)⁹⁴ is computed in column 6th as a measure on the asymmetry distribution of the returns. The 4th moment (kurtosis)⁹⁵ is estimated in column 7th as a measure on the extent to which outliers (that is, very high and very low returns) occur more frequently (high kurtosis) or less frequently (low kurtosis) relative to a normal distribution. The location (skewness) and extent of variability (kurtosis) on a scheme return distribution will depend on investment manager's objectives, constraints and time horizon (and this will tend to vary from scheme to scheme).

A JB test (Jarque-Bera Test)⁹⁶ is computed (in column 8th) using the absolute value of both skewness and kurtosis. For half of *PRSF*, the *p*-value is below the 5% default significance

⁹⁴ A scheme's returns exhibits positive skewness if it is skewed to the right of the mean and it exhibits negative skewness if it is skewed to the left of the mean. Note that, investors will be often willing to accept low or even negative returns if the schemes exhibit positive skewness, since this implies that a scheme return is skewed to the right of the mean, therefore granting higher expected returns. Only *PPR Vintage*, *Praemium S*, *Futuro Clássico* and *BBVA Solidez PPR* registered positive skewness.

⁹⁵ High kurtoses (also called fat tails) indicate a large fraction of very high and very low returns than it would be expected under a normal distribution. Low kurtoses (also called thin tails) indicate a small fraction of very high and very low returns than it would be expected under a normal distribution. Note that, investors will prefer low to negative excess of kurtosis (that is, a value under 3), since this would imply better expected returns. Out of 20 schemes, 15 registered low excess of kurtosis.

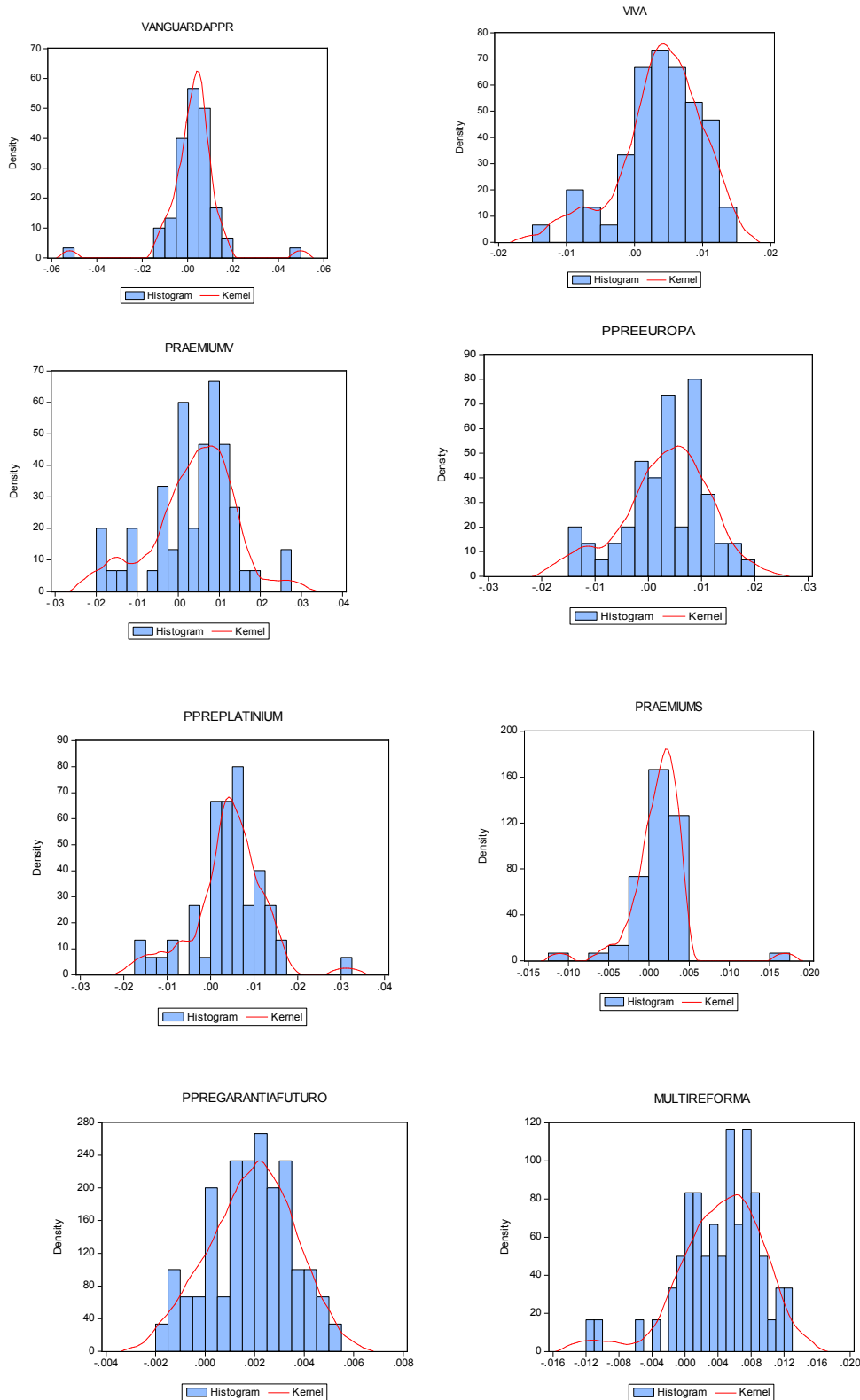
⁹⁶ See Jarque, C.M. and Bera (1987), A.K., on "A Test for Normality of Observations and Regression Residuals", International Statistical Review, vol.55, pp.163-172. The JB Test is computed as:

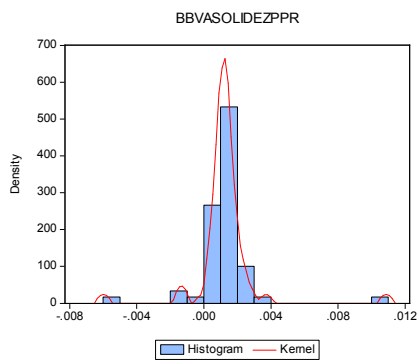
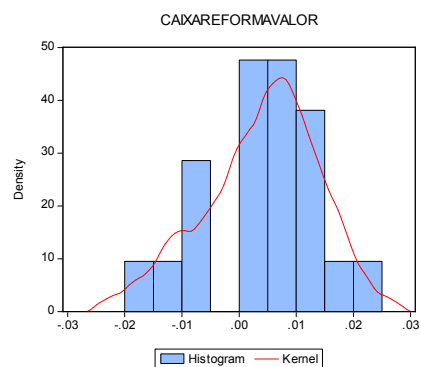
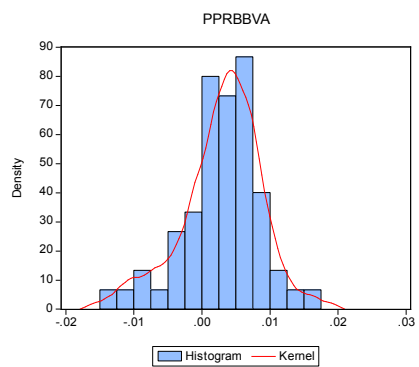
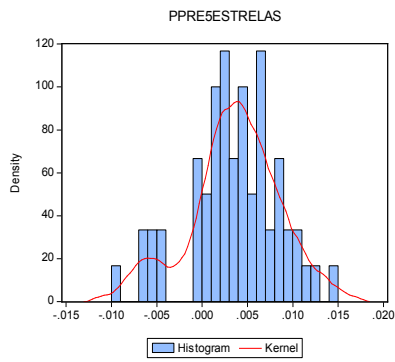
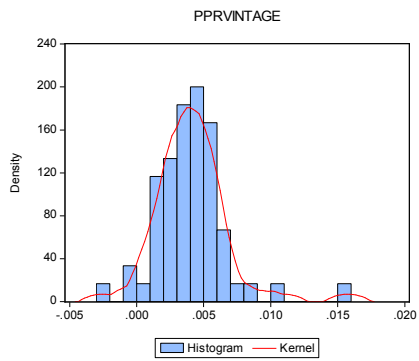
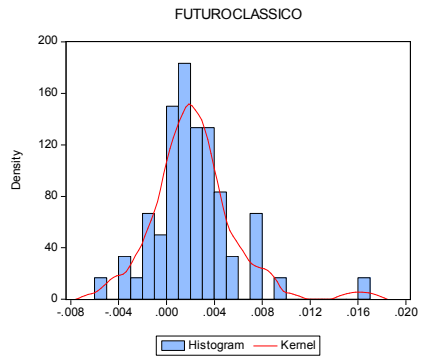
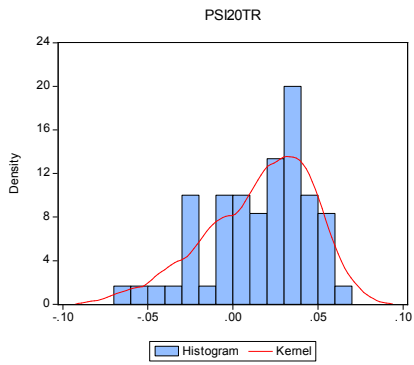
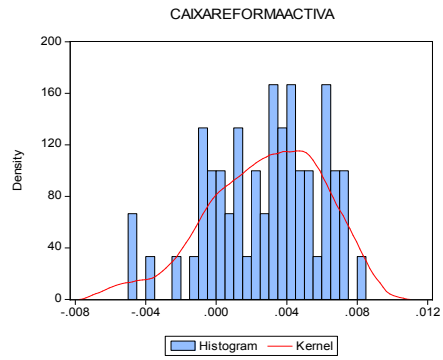
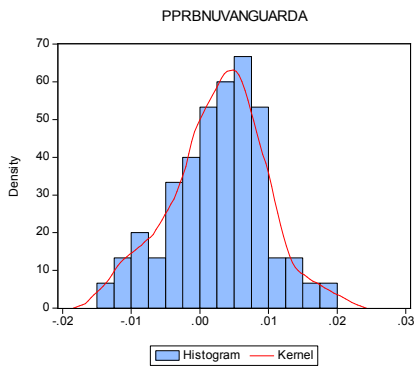
$$JB = \frac{n}{6} \left((Skew\ x_s)^2 + \frac{(Kurt\ x_s)^2}{4} \right)$$

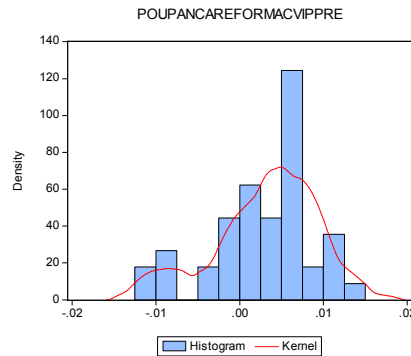
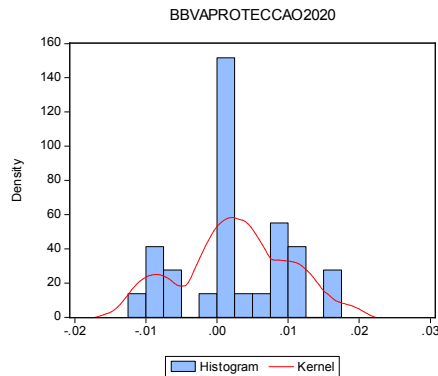
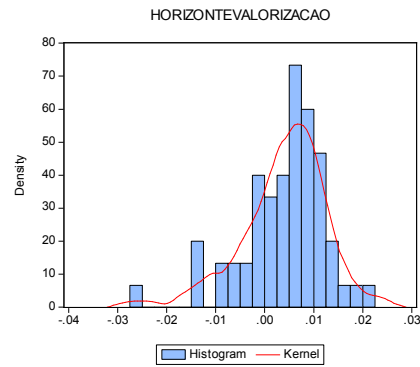
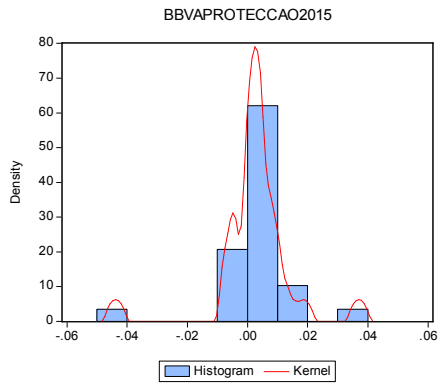
. For large sample sizes, the test statistic has a chi-square distribution with two degrees of freedom.

level and so the test rejects the null hypothesis that the distribution is normal. This fact is corroborated when observing the return distribution on the 20 schemes (Figure 12).

Figure 12: *PRSF* returns distribution using the kernel density estimation







Source: Author's estimates

Under a non normality distribution assumption, efficient frontier models (drawn from CAP-model) may underestimate⁹⁷ the true risk level involved in a scheme as they exclusively rely on risk-return analysis⁹⁸ (that is, on the first two moments of the return distributions) to evaluate schemes performance measures. Also, it is important to determine the stationarity of returns for each fund. Table 15 (last column) shows the results of the ADF test (Augmented Dickey-Fuller Test.). The test reveals that all schemes are stationary in levels, when considered with a trend, at a 5% significance level. This implies that, at each period, returns are derived from the same distribution.

4.6.4.1 The CAP model

It should be stressed that the core of this study is not to test the validity of CAP-model on each underlying assumption, but simply to assess performance measures on 20 *PRSF*.

⁹⁷ This fact will have tremendous impact on the Sharpe and Treynor measures since these are measures that rely entirely in mean-variance analysis.

⁹⁸ Record that in a risk-return analysis, diversification is achieved with a lower standard deviation level, while under a non normal distribution sample, a portfolio is diversified if it increases skewness and decreases kurtosis.

Nevertheless, the results are carried out using an ex-post version of the CAP-model (equation 9) as to insure more predictable returns and approximate returns variations to the true risk level.

A look at table 17 shows that each *PRSF* has given risk-adjusted returns lower than the market returns (that is, $\alpha_p < 0$). This suggests that investment managers do not have the security selection skills to build up a risk-adjusted portfolio capable of out performing market's index. When considering alpha's significance value (from OLS regression), all 20 schemes registered an alpha value statistically different from zero. With regard to the beta parameter all schemes incurred in a lower systematic risk relatively to the market index. This is due to the fact that a large fraction of portfolio's composition is concentrated in low risk asset classes. For each beta, the t-value is significant at a 5% significance level.

Table 17: The CAPM model on *PRSF* and *E/RS* funds

	Alfa	t-value	Beta	t-value
BBVA Protecção 2015	-0.024758	-8,8917	0.244940	3,1351
BBVA Protecção 2020	-0.025100	-10,5720	0.198482	2,9793
BBVA Solidez PPR	-0.023336	-21,3381	0.111050	3,3618
Caixa Reforma Activa	-0.021611	-17,9453	0.125221	3,4426
Caixa Reforma Valor	-0.024427	-7,1894	0.230903	2,6543
Futuro Clássico	-0.022477	-18,4206	0.093345	2,5327
Horizonte Valorização	-0.019852	-12,0430	0.191129	3,8387
MultiReforma	-0.020023	-15,6636	0.135333	3,5050
Poupança Reforma CVI PPR/E	-0.021551	-11,9767	0.138055	2,5015
PPR BBVA	-0.021602	-15,0081	0.115063	2,6467
PPR BNU/Vanguarda	-0.021276	-14,0819	0.179339	3,9299
PPR Vintage	-0.020636	-17,3195	0.096246	2,6743
PPR/E 5Estrelas	-0.020895	-17,0486	0.120084	3,2437
PPR/E Europa	-0.020432	-12,8131	0.204575	4,2474
PPR/E Garantia de Futuro	-0.022827	-19,9277	0.098758	2,8543
PPR/E Platinum	-0.020187	-13,4577	0.132795	2,9309
PraemiumS	-0.023440	-19,0728	0.101386	2,7312
PraemiumV	-0.019681	-11,2333	0.234213	4,4259
Vanguarda PPR	-0.021634	-10,9268	0.152897	2,5566
Viva	-0.020385	-15,5341	0.149973	3,7836
PSI20TR	0,0000	-	1,0000	-
Average	-0,0218	-	0,1527	-

Source: Author's estimates

Note 1: Market's alpha is 0 under the equation 15;

Note 2: For most schemes, it was detected autocorrelation in the residuals as well as heteroscedasticity, which require a New-West correction. The exception goes for the *BBVA2015* and *Vanguarda PPR* schemes' that only exhibited heteroscedasticity, thus demanding a White test.

4.6.3.2 The Mazuy- Treynor model

A look at table 18 reveals that most investment managers are able to foresee short-run market deviations and to adjust scheme's portfolio accordingly ($\gamma > 0$). As for *Vanguarda*

PPR, Praemium S and BBVA Solidez PPR schemes, all three presented negative market timing⁹⁹. The gamma coefficient indicates that all schemes do not compute market timing significantly different from zero. All PRSF registered an $\alpha_p < 0$, indicating that investment managers have no selection ability to identify schemes performing higher risk-adjusted returns. As for the beta parameter, all schemes were exposed to lower systematic risk relatively to the market index. Each alpha and beta values are significant at a 5% significance level.

Table 18: The Treynor and Mazuy model on PRS and E/RS funds¹⁰⁰

	Alfa	t-value	Beta	t-value	Gamma	t-value
BBVA Protecção 2015	-0,0249	-7,4840	0,2547	2,0543	0,2027	0,1031
BBVA Protecção 2020	-0,0269	-9,7633	0,2980	2,9033	2,0578	1,2648
BBVA Solidez PPR	-0,0231	-18,8908	0,0940	1,8994	-0,3771	-0,4651
Caixa Reforma Activa	-0,0219	-16,2411	0,1427	2,6182	0,3871	0,4334
Caixa Reforma Valor	-0,0263	-7,4357	0,4425	2,6579	3,4888	1,4747
Futuro Clássico	-0,0231	-17,1098	0,1383	2,5274	0,9954	1,1100
Horizonte Valorização	-0,0205	-11,1810	0,2368	3,1882	1,0114	0,8310
MultiReforma	-0,0204	-14,3070	0,1620	2,8046	0,5899	0,6233
Poupança Reforma CVI PPR/E	-0,0220	-11,2036	0,1727	2,1414	0,7981	0,5936
PPR BBVA	-0,0223	-13,9606	0,1634	2,5262	1,0694	1,0091
PPR BNU/Vanguarda	-0,0215	-12,7387	0,1968	2,8757	0,3859	0,3442
PPR Vintage	-0,0208	-15,6183	0,1089	2,0170	0,2793	0,3158
PPR/E 5Estrelas	-0,0214	-15,6800	0,1542	2,7913	0,7542	0,8334
PPR/E Europa	-0,0207	-11,6043	0,2230	3,0873	0,4071	0,3440
PPR/E Garantia de Futuro	-0,0229	-17,8995	0,1072	2,0644	0,1862	0,2189
PPR/E Platinum	-0,0213	-12,9451	0,2094	3,1440	1,6957	1,5536
PraemiumS	-0,0232	-1,6901	0,0871	1,5652	-0,3155	-0,3460
PraemiumV	-0,0200	-10,1824	0,2533	3,1916	0,4220	0,3245
Vanguarda PPR	-0,0214	-9,6689	0,1386	1,5443	-0,3169	-0,2155
Viva	-0,0210	-14,3844	0,1908	3,2316	0,9037	0,9341
Average	-0,0223	-	0,1887	-	0,7313	-

Source: Author's estimates

4.6.3.3 The Treynor ratio, Sharpe Ratio and Sharpe measure

Table 19 shows that all schemes¹⁰¹ present negative Sharpe and Treynor ratios. There are two reasons why the Treynor ratio may be negative:

- fund's excess return over a risk-free rate is negative and the fund's beta is positive

⁹⁹ Such difficulty in immediately reallocating the funds to market fluctuations may be due to the nature and time horizon of asset classes.

¹⁰⁰ This measure of market timing may bias the results obtained (e.g Grinblatt and Titman, 1989) since there may be funds recording a negative market timing simply because they are more exposed to time variation in market risk and to market risk premium (Ferson and Schadt (1996).

¹⁰¹ Record that the sample's distribution is, in some cases, non normal and consequently, the estimates obtained are seen as approximations to the true risk values.

- fund's excess return over a risk-free rate is positive and the fund's beta is negative

Since the estimates, computed on table 15, yield a positive value for all 20 schemes, fund's negative Treynor ratio is attributable to portfolio's poor performance, which happens to be well suited to fund's systematic risk but unmatched to the returns on the risk-free asset. The same conclusion applies to the Sharpe ratio, since portfolio volatility has to be non-negative and therefore a negative Sharpe ratio could be only achieved if fund's excess return over a risk-free rate is negative.

Table 19: The Treynor and Sharpe ratios and the Sharpe measure

	Treynor ratio	Sharpe ratio	Sharpe Measure	
	Fund	Fund	Unsystematic risk	r^2
BBVA Protecção 2015	-0,108945	-2,170394	0,001002	0,045800
BBVA Protecção 2020	-0,134330	-3,618130	0,001003	0,057257
BBVA Solidez PPR	-0,219921	-13,923603	0,000901	0,000092
Caixa Reforma Activa	-0,182359	-7,366129	0,000901	0,316184
Caixa Reforma Valor	-0,121934	-2,942314	0,001213	0,414294
Futuro Clássico	-0,250568	-6,930074	0,000901	0,015078
Horizonte Valorização	-0,113641	-2,577430	0,000899	0,378561
MultiReforma	-0,157731	-4,327184	0,000901	0,243718
Poupança Reforma CVI PPR/E	-0,167666	-3,827216	0,000849	0,243249
PPR BBVA	-0,197511	-3,959923	0,000901	0,395531
PPR BNU/Vanguarda	-0,128411	-3,449004	0,000901	0,336782
PPR Vintage	-0,224188	-7,967873	0,000901	0,027717
PPR/E 5Estrelas	-0,183781	-4,497453	0,000901	0,134119
PPR/E Europa	-0,109652	-2,877373	0,000900	0,392443
PPR/E Garantia de Futuro	-0,179172	-14,516779	0,000901	0,003501
PPR/E Platinum	-0,161792	-2,644308	0,000900	0,247063
PraemiumS	-0,240973	-7,275462	0,000901	0,026243
PraemiumV	-0,093804	-2,216058	0,000898	0,299413
Vanguarda PPR	-0,151273	-2,030463	0,000899	0,105361
Viva	-0,126337	-3,166277	0,000901	0,221361

Source: Author's estimates

As a result, investment managers could have achieved better investment performance by, simply, holding risk-free assets instead of open-ended schemes. This suggests that participants could have invested in a risk-free asset (with a superior return) without incurring in the administrative cost of a privately managed retirement saving fund.

Comparing the Treynor ratio for a portfolio return with the Treynor ratio for a market index ($T_{m,t} = R_{m,t} - R_{f,t} = -0,0098$), it turns out that all schemes under performed the market index since $T_{m,t} > T_{p,t}$. Applying the same procedure to the Sharpe ratio reveals that

$\frac{R_{m,t} - R_{f,t}}{\sigma_{m,t}} > S_{p,t}$ and thus indicating a poor performance relatively to the market index ($S_{m,t} = -0,3256$).

Taking a glance at the Sharpe measure result's in table 19 suggest that the average unsystematic risk is very high¹⁰² ($\sigma^2 = 0,0009, \sigma = 3,04\%$) with a modest degree of diversification at 19,52%. Meaning that, investment managers have a high scope to improve diversification as well as fund's performance.

4.6.3.4 The Jensen an Fama measures

Table 20 shows that all sample funds registered negative Jensen and Fama measures. This is due to portfolio's poor performance, which is corrected from the systematic risk but does not cover the returns on the risk-free asset nor on the market index. In fact, investment managers are likely to achieve superior investment performances through actively purchasing risk-free assets (such as cash, deposits and T-bonds) or more risky assets (such as stocks, hedge funds, etc) instead of *PRSF*. The same conclusion applies to Fama's measure results.

Table 20: Jensen and Fama measures

	Jensen Measure	Fama Measure
BBVA Protecção 2015	-0,0260	-0,0232
BBVA Protecção 2020	-0,0262	-0,0246
BBVA Solidez PPR	-0,0244	-0,0239
Caixa Reforma Activa	-0,0223	-0,0218
Caixa Reforma Valor	-0,0252	-0,0234
Futuro Clássico	-0,0233	-0,0223
Horizonte Valorização	-0,0200	-0,0190
MultiReforma	-0,0206	-0,0197
Poupança Reforma CVI PPR/E	-0,0219	-0,0206
PPR BBVA	-0,0216	-0,0209
PPR BNU/Vanguarda	-0,0218	-0,0209
PPR Vintage	-0,0214	-0,0207
PPR/E 5Estrelas	-0,0215	-0,0205
PPR/E Europa	-0,0208	-0,0199
PPR/E Garantia de Futuro	-0,0238	-0,0233
PPR/E Platinum	-0,0202	-0,0188
PraemiumS	-0,0243	-0,0233
PraemiumV	-0,0202	-0,0187
Vanguarda PPR	-0,0219	-0,0194
Viva	-0,0209	-0,0199

Source: Author's estimates

¹⁰² The average unsystematic risk is very high and is approximately the same amount of the market risk level. See Table 15 for a risk comparison.

The results imply that schemes returns were determined by security selection. The negative values for $F_{p,t}$ and $J_{p,t}$ indicate that investment managers are in the position to identify their inaccuracy as funds earned less than expected returns and lie below the *CML* line and *SML* line, respectively. If investment managers do not correct their actions, the welfare gains of purchasing a PRSF are little and thus participants could be better off by investing in those assets on their own.

4.6.3.5 Correlation between portfolio performance measures

A balance between Sharpe and Treynor ratio's allows fund's managers to adjust their investment policy to a risk structure, while a balance between Jensen and Fama measures will give them the ability to select funds with superior returns. Next, it is examined the schemes ranks for each performance measure presented above. This study is done through the commonly used Spearman coefficient (Table 21). The results suggest that there is a positive and highly significance correlation between Fama and Jensen measures and between Sharpe and Treynor ratios, although with some differences in magnitude. However, for a completely diversified, Sharpe and Treynor ratios should give identical ranks, thereby the differences between the two ratios derived directly from differences in diversification and from risk metrics.

Table 21: Rank correlations of performance measures

	Treynor-Sharpe	t-ratio	Fama-Jensen	t-ratio
PRSF and E/RSF	80,15%	5,6865*	90,38%	8,9579*

* Highly significant at a 5% level of significance

Source: Author's estimates

4.7 Problems with portfolio performance measures

Investment managers typically attempt to provide *PRSF* participants with superior returns. However, the experience shows that achieving higher returns must not be the primary goal of performance measures as this may be only due to:

- 1) investment manager's ability to generate better returns,
- 2) to luck, or

3) to the investment in risky assets whose net effect is likely to increase portfolio's return for an acceptable risk level.

Consequently, negative movements on the earlier conditions will immediately affect scheme's investment strategy as well as performance measures contribution. Hence, performance measures may not be suitable in every circumstance. The recent sub-prime crises has aware investment managers on the need to frequently reprice financial assets as they may appear to vary less than they really do. Every time investment managers ignore this fact, participants are more exposed to higher variations in returns, which may lead to significant divergences in the estimates computed by the performance measures.

Also, because performance measures are drawn to follow the normal distribution assumption, the results on returns may be bias. In this study, half of the sample exhibit asymmetrical returns. For a risk-averse investment manager, the presence of negative skewness (with 16 schemes) and positive excess kurtosis (5 schemes) are unappealing as they may indicate a higher probability of large losses than in the case of normally distributed returns¹⁰³. Meaning that, the Sharpe ratio may fail to estimate the true level of risk as it focus merely in a mean-variance analysis, without accounting for non symmetrical-return distributions. Another crucial problem with these measures is autocorrelation. Evidences from the Durbin-Watson correlation test proved that almost all schemes were correlated with itself over the under studied period and this may lead to an underestimation of the standard deviation of returns. Consequently, once more the Sharpe ratio is likely to be overestimated.

Many researchers have criticized Sharpe ratio's reliance on the unsystematic risk as a measure of risk. According to the academic community, this fact may bias the estimated results as it accounts upside volatility and downside volatility in the same way. In order to discriminate these two types of volatilities, it was developed in 1994 the Sortino ratio.

¹⁰³ The skewness in the data may be due to the fact that some funds simply don't voluntarily report their returns giving rise to selection bias. Moreover, *PRSF* participants face some difficulties in identifying their schemes performance since pension plans sponsors publish their reports in an anonymous way.

Moreover, portfolio's estimates on alpha and beta depend on the use of a specific index as the benchmark of market's portfolio. Because there isn't an exact indicator to estimate market's portfolio, investment managers use a proxy to the market index. Roll (1977, 1978) condemned any measure that attempted to estimate the market portfolio through a proxy index (in his case (S&P500) and in the case-study (PSI20TR)). The reasons may be summarized in two points: 1) difficulties in measuring a portfolio whose returns are repeated over time, and 2) small changes induced to the proxy variable may very well result in different ranks on the market return performance.

In the same line, measuring risk free assets may lead investment managers to misleading results. Notably, T-bills give very low returns and thus allowing investment managers to earn higher returns by simply choosing a risk-free asset that earns a very low interest rate. Lehman and Modest (1987), studied performance measures vulnerability to changes induced to CAP and APT¹⁰⁴ models. They concluded that shifts in a model structure generate different ranks on portfolio's returns. And thus, investment measures performance depends on investment policy strategy, on its constraints and time horizon.

¹⁰⁴ Arbitrage pricing theory.

5. Conclusion

This thesis assessed personal retirement savings plans performance, in Portugal. At first, the welfare gains of purchasing a *PRSP* upon retirement were expected to be significant, under the assumption that a scheme's superior performance is achieved, mostly, through pension plan sponsors and investment managers privileged access to information and sophisticated techniques of performance evaluation rather than by a financially myopic individual. Nonetheless, the estimation results on the return, risk, security selection and market timing performance of a sample of 20 representative personal retirement savings funds, showed that:

1. *PRSF* absolute performance was positive during the period 2003-2007 but insufficient to out perform the market index. When considering the amount of commissions applied at the entry and withdrawal level, scheme's positive returns could be negligible for investment managers. This suggests that investment manager's reports should be computed in net terms, providing a feasible and observable scheme return to plan's participants;
2. *PRSF* relative performance was not able to out perform a benchmark. In part, this is due to investment managers' reluctance to follow Decree-Law Nr.158/2002 rules that stipulated the elimination of the minimum limits imposed to scheme's asset allocation policy. One possible reason for such behaviour may be due to managers' investment policy of purchasing illiquid and low return asset classes such as real estate. Another argument is that the investment in non-domestic shares constraints managers' skills to adjust their asset allocation policy to international market movements as their access to private and public information on foreign markets is more restricted than under a domestic environment;
3. *PRSF* risk-return analysis generated low returns and correspondent low risk levels. In addition, participants could have improved their future retirement income if their savings had been better applied elsewhere (i.e. banking deposits, retirement certificates (expected to earn 5% rate each year));
4. under the CAP-model, each *PRSF* has given lower risk-adjusted returns. This suggests that there is a financial margin for an improvement in fund's efficiency. This improvement

could be achieved through the investment in other asset classes such as derivatives, allowing investment managers to build a short or a long position on an underlying asset (i.e.: shares) and, at the same time, providing an hedge on potential risks;

5. under the Mazuy-Treynor model, investment manager's selectivity skills remained significantly poor. Simultaneously, all schemes registered lower systematic risk levels relatively to the market index. This is in line with portfolio's composition in low risk asset classes. Also, all schemes presented positive, but not significant, market timing skills, reflecting investment managers' ability to foresee market movements and adjust scheme's risk levels accordingly;
6. in the context of Treynor and Sharpe ratios, schemes' negative results indicated that participants could have accumulated a greater financial wealth upon retirement if they had hold risk-free assets instead of a *PRSF*. Hence, investment managers' access to information and sophisticated techniques of performance evaluation are likely to have a residual impact on a fund's performance if it ignores the need for an active asset allocation policy. Similarly, the Sharpe measure results pointed to a large scope for diversification and thus for the improvement of fund's performance;
7. in the context of Jensen and Fama measures, *PRSF* negative values suggested that investment managers' poor selectivity skills prevent them from identifying undervalued schemes.

On balance, these results indicated that *PRSF* performance is compromised by managers' poor asset allocation policy, timing and security selection skills. Future improvements in schemes performance will depend on:

1. investment managers' talent to correctly evaluate market movements and adjust asset classes within a fund;
2. pension plan sponsors' ability to minimize the level of *PRSF* commissions (particularly, the ones charged at the time of subscription) in order to provide a significant net return on

retirement savings funds and, at the same time, compete with social security retirement savings accounts;

3. participant's ability to: i) plan for retirement; ii) accumulate an adequate level of income upon retirement; iii) save in the long term and iv) invest in a PRSF when they are already enrolled in an occupational pension scheme. A look at *PRSF* performance results would induce lower participation rates over total and active population. However, the figures indicated that individual's participation in these schemes continued to increase, motivated by the favourable tax treatment addressed to these savings schemes.
4. State policies appear to favour *PRSF* tax relief rather than inducing a growing consciousness on the need to plan for retirement. This may bias individuals' savings preferences as they may be joining these schemes for a tax deduction purpose and not for pension savings motives. Empirical researches were not conclusive on whether greater fiscal incentives could guarantee an increase in private savings. However, a criticism pointed out to retirement savings plans *status quo* is that the fiscal incentives associated to such schemes tend to discriminate lower-income households. Consequently, state social measures should start to focus on an effective three pillar model rather than the traditional Bismarkian pension regime and, in this way, distribute individual's financial ability to save for retirement through each pension pillar. Such procedure is being followed by many European countries.
5. academic community skills to develop new performance measures for investment managers use and address some solutions to the problems of portfolio performance measures.

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Annex 1: Summary on Legal and Regulatory framework regarding *PRSP*

Year	Legal Document	Statement
1989	Decree-Law Nr.205/89	Set up a system of personal retirement saving plans
1989	Ministerial Order Nr.872-A/89	Endorsement of the juridical regime regarding personal retirement saving plans (<i>PRSP</i>)
1990	Decree-Law Nr.145/90	Establishment of specific rules to the composition of the assets represented in a <i>PRSP</i>
1991	Decree-Law Nr.415/91	Adjustments introduced in the regime covering the constitution and management of pension funds
1991	Rule Nr.298/91	<i>PII</i> classification of <i>PRSP</i> hold in the form of pension funds
1995	Decree-Law Nr.204/95	Set up the legal regime of the equity savings plans (<i>Eq.SP</i>)
1999	Decree-Law Nr.357/99	Establishment of the educational savings plans (<i>ESP</i>)
2002	Decree-Law Nr.158/2002	Aggregated savings plans framework relating <i>PRSP</i> , <i>ESP</i> and <i>E/ RSP</i>
2002	Ministerial Order Nr.1451/2002	Determined that the net value of a saving fund may involve a brand of assets
2002	Ministerial Order Nr.1452/2002	Specified rules for withdrawals carried out each year and subject to the annual limits
2002	Ministerial Order Nr.1453/2002	Announcement of the circumstances required to withdrawal
2002	Law Nr.32/2002	Set up the legal framework of the Social Security System, the roles of the social security institutions and its articulation with private entities with analogous purposes
2003	Regulation Nr.6/2003R	Regulation of the conditions of reimbursement, transfers and discriminative publication of savings fund asset portfolio by <i>PII</i>
2006	Decree-Law Nr.12/2006	Introduced amendments referring to pension plans investment policy, evolution of the arrangement rights and, ultimately, financial standing of pension funds.
2007	Law Nr.4/2007	Approved the Framework Law of the Social Security System
2008	Decree-Law Nr. 26/2008	Set up the rules of a public complementary pension regime

Source: Author's

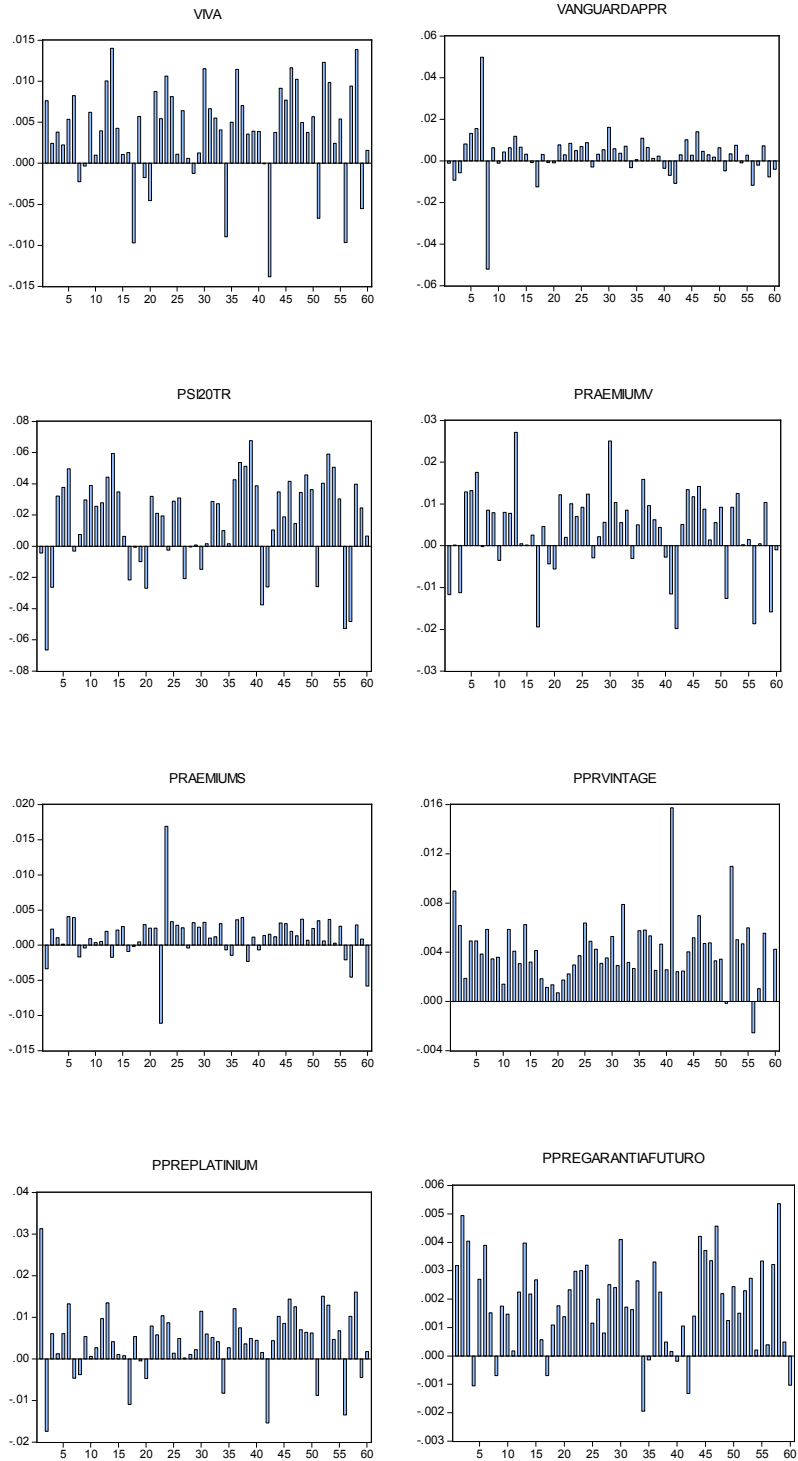
Annex 2: Arguments supporting private and public *PRSP*

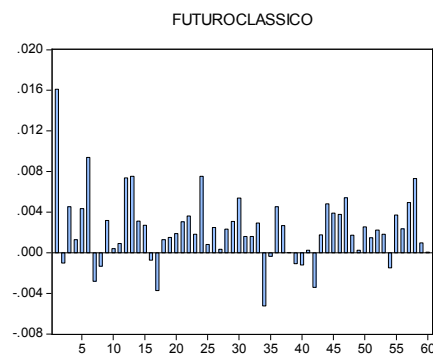
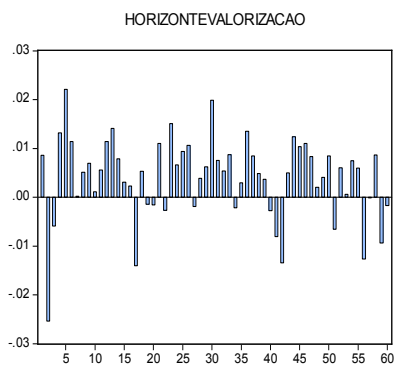
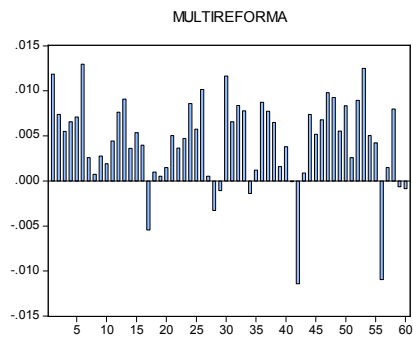
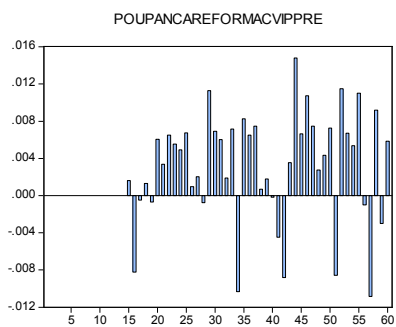
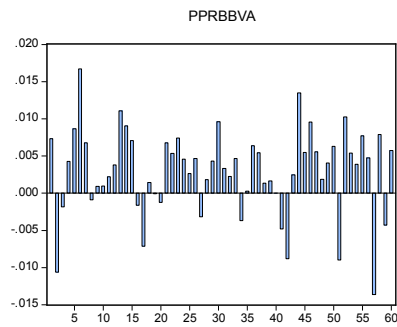
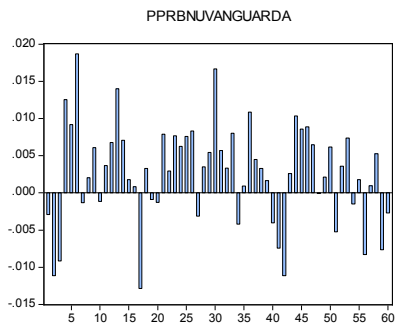
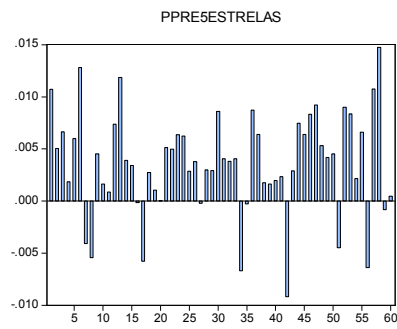
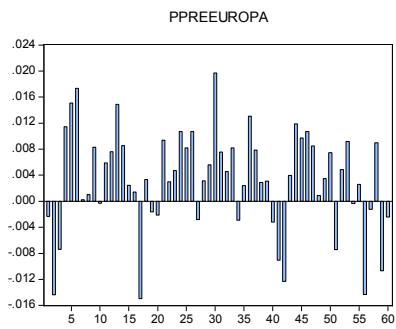
	Private <i>PRSP</i>	Retirement certificates (Public <i>PRSP</i>)
Characteristics	Nominative certificates of a retirement saving fund, represented by participation units contained in the fund.	Personal accounts, represented by participation units (“retirement certificates”) of a retirement certificate fund, managed by the Capitalization Fund Management Institute of Social Security.
Periodic deliveries	Free: per month, per trimester, per semester or per year	One possibility: per month and stable during a minimum period of 12 months
Exceptional deliveries	Free: Whenever individuals feel free, so long they deliver to the manager the minimums imposed (from 1€, depending on rules of <i>PRSP</i> subscription)	Absent: Retirement certificates don’t specify the possibility of exceptional deliveries
Amount of Investment	Free: Individuals are free to choose the amount they wish to invest, so long they deliver to the manager the minimums imposed (from 1€, depending on rules of <i>PRSP</i> subscription)	Constrained to: <ul style="list-style-type: none"> • 2 to 6% of the monthly average salary or • 2 to 4% of the monthly average salary or • up until 6% of the monthly average salary in case it reports to an individual aged 50.
Investment profiles	Free: a number of choices are available to individuals depending on their preferences and profiles such as: guaranteed rate, guaranteed capital, conservative investors, prudent investors, capital concentrated in stocks (up until 55% of <i>PRSP</i> portfolio invested in stocks.	One possibility: the retirement certificate is invested in a conservative fund, managed by the Capitalization Fund Management Institute of Social Security
Fiscal benefits associated	20% of the invested income: With an annual limit from 300€ to 400€ per person or from 600€ to 800€ per couple, depending on savers age.	20% of the invested income: With an annual limit of 350€, no matter the age. However, individuals shall only reach the plafond so long as they earn a monthly income upper to 3650€ (and a discount of 4%) or upper to 7300€ (and a discount of 2%).
Fiscal regime applied to invested income or/and good-wills	Capital withdrawal: After 8 years of investment in <i>PRSP</i> plan, it is applied an 8% income personal tax (<i>IPT</i>) against good-wills obtained with <i>PRSP</i> deposits (excluding capital). Before this period, the <i>IPT</i> is 20%. Life income withdrawal: the <i>IPT</i> against life income (capital + good-wills) is 15%.	Capital withdrawal: Presently unknown. Life income withdrawal: the income personal tax against life income (capital + good-wills) is 15%.
Eligibility	All	Contributors: Merely individuals making discounts to the social protection system
Subscription commission and withdrawal commission	Variable: From 0%, depending on <i>PRSP</i> and on the its managing policy. However, there are few <i>PRSP</i> exhibiting high commissions.	<0,1%

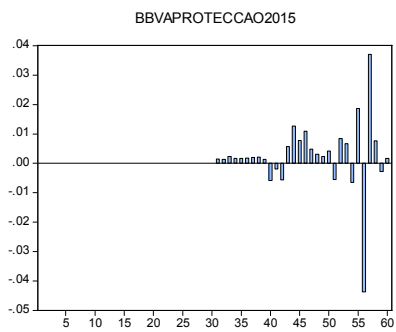
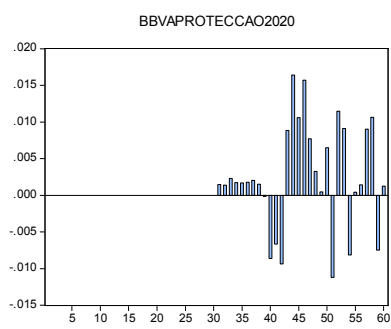
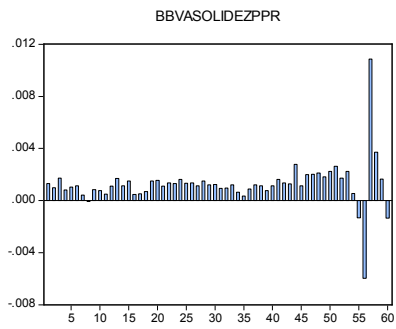
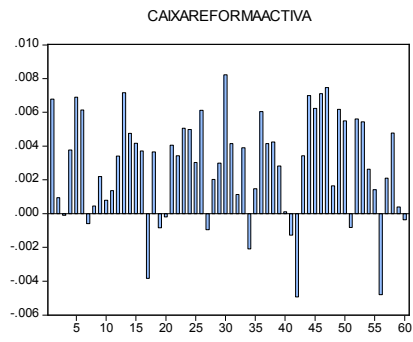
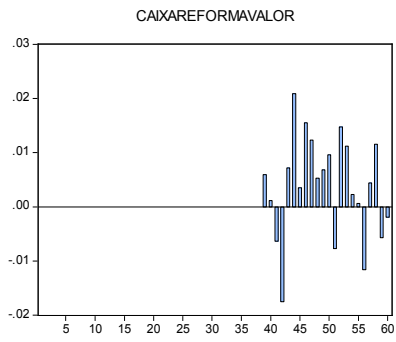
Financial Penalty due to payment default	None: There is no penalty in case of monthly payment default	When the payment of a contribution is missing, participants incur in proceedings and administrative expenditures (0,50€ for each default). If the payment default persists during a period of 3 consecutive months or if there is an absence of capital in the personal account to cover default expenses, the obligation to contribute to public PRSP plans is suspended.
Conditions to withdrawal	Free: Individuals are free to withdraw their savings, partially or entirely, whenever they wish and according to the already inferred circumstances. However, they are constrained to penalties in case withdraw occurs before the 5 years <i>PRSP</i> contract.	Constrained: Individuals may only withdraw their savings by the time they reach retirement or in case of permanent inability.
Returns	Guaranteed or non-guaranteed return rates: Many <i>PRSP</i> guarantee a return rate of 3% or more (this is mostly the case of <i>PRSP</i> hold in the form of life insurance).	Non-guaranteed return rate: The retirement certificate does not offer a guarantee rate. The income depends of the managing performance of the Capitalization Fund Management Institute of Social Security. In October 2007, the annualized benchmark return rate was roughly 5,5%.
Risk	Retirements saving funds depend on the categories of the Portfolio investment. Particularly, funds integrated in category A, that is, with a 0% to 5% exposition to stocks are classified as low risk (conservatives). The higher the risk they offer, the higher the return obtained.	The public fund exhibits a conservative profile, of low risk, in line with the Financial Stabilization Fund of the Social Security, managed by the Capitalization Fund Management Institute of Social Security.
Transfers	Free: Whenever individuals feel like, they may transfer their retirement savings to an alternative <i>PRSP</i> with a different profile and different manager	Absent: In the context of retirement certificates, savings are not allowed to transfer to other managers. Moreover, the amounts invested are managed by the Capitalization Fund Management Institute of Social Security until individual's retirement.
Suspension	Free: Whenever individuals wish to close their <i>PRSP</i> .	Constraint to: <ol style="list-style-type: none"> 1. participant intention by the time of renewal 2. participant claim due to permanent inability or sickness 3. unemployment

Source: Author's

Annex 3: Further Empirical Evidence on *PRSP* Performance







Source: Author's calculations