Saving for Retirement Through Consumption: An Application for Portugal

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Saving through consumption uses advances in financial technology and behavioral science to encourage people to save for retirement, and can alleviate the increasing costs of longevity for the Portuguese pension system. This paper provides an introduction to multi-pillar systems, an overview of the Portuguese pension system, followed by the challenges this system faces related to its long-term sustainability. Afterwards, we introduce the behavioral science behind saving through consumption, along with how it has been successfully implemented in countries like Mexico and Spain. In the final section, we provide a brief proposal of how savings through consumption could be introduced in Portugal, and simulate the additional retirement savings this proposal can represent for an average household.

GLOSSARY

AUM Assets Under Management. i, 6, 16

AWG Working Group on Ageing Populations and Sustainability. i, 9

CGA Caixa Geral de Aposentações. i, 5, 9

CR Certificados de Reforma. i, 6, 19

DB Defined Benefit. i, 2, 3, 6

DC Defined Contribution. i, 2, 3

FEFSS Fundo de Estabilização Financeira da Segurança Social. i, 5

INE Instituto Nacional de Estatística. i, 21

JDM Judgement and Decision Making. i, 14

PAYG Pay-As-You-Go. i, 1, 2, 10, 12, 13

PPR Planos Poupança-Reforma. i, 5–7, 19, 23

RPC Regime Público de Capitalização. i, 6, 7, 13, 19, 23

SMarT Save More Tomorrow Program. i, 14–17, 22, 23

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1 OVERVIEW OF MULTI-PILLAR SYSTEMS AND PENSIONS IN PORTUGAL

Pension systems have multiple objectives that go beyond ensuring a minimum income during retirement. Pension systems must also address replacement rates, increasing longevity in populations, and mitigate different types of risks. Multi-pillar pension systems are composed of different programs, meant to address these elements along with what constitutes adequate and sustainable pension benefits, per OCA (2019). In this section we will present an overview multi-pillar pension systems, followed by an introduction to the Portuguese pension system.

1.1 Multi-pillar pension systems

As mentioned by Filgueira & Manzi (2017), pension systems are a relatively recent development. The earliest consolidated systems can be characterized as mandatory state-led pension systems, created to alleviate risks affecting the elderly (old age, disability, and spouse survival). Traditionally, the purpose of these systems has been to provide minimum, either flat and/or earnings-related retirement benefits for the population (Yermo (2002)).

These initial public pension plans have been historically Pay-As-You-Go (PAYG) financed, as was the initial case for Social Security in Portugal. According to Galasso (2019), in a PAYG system, workers pay social security contributions, matched in most cases by their employers, to the social security administration. The total amount of contribution collected yearly from all covered workers is immediately used to pay pension benefits to current retirees. Thus, in a PAYG pension system, current workers finance the pension benefits of current retirees.

The long-term sustainability of PAYG public plans came under scrutiny during the 1980s, as outlined by Hemming (1998). In general terms, two main sources of potential financial strain were identified. The first were the generous pension benefits awarded by these systems, which had overlooked their future cost and the the rising contribution rates required to finance them. The second, and arguably most important source of strain, was the prospective of population ageing.

James (1998) provides a thorough overview of the challenges that population ageing poses to PAYG pension systems. A combination of increasing life expectancy, along with decreases in fertility rates, could lead to exponential increases in public pension spending as population age. Although the calls for reform to the PAYG systems started in the 1980s, the challenges of population ageing remain relevant.

For example, Figure 1 includes recent projections by Clements et al. (2013) of pension

spending for advanced and emerging economies, for the periods 2010-2030 and 2030-2050. After discounting, the pension spending increases for advanced economies are projected to be 150% higher for the years 2030-2050, in comparison to 2010-2030. In the case of emerging economies, the discounted projected pension spending for 2030-2050 is 460% higher than that of 2010-2030.
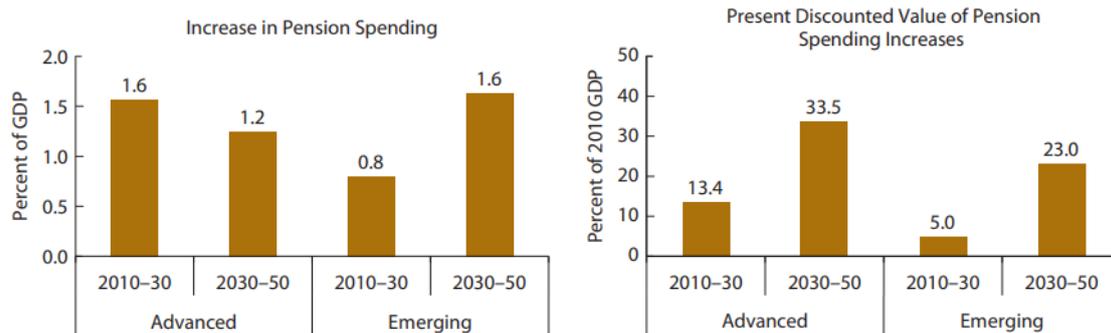
FIGURE 1: Projected costs of pension increases (Clements et al. (2013))

According to a seminal publication by the World Bank (1994), this population ageing inevitably leads to negative transfers for future cohorts in PAYG systems. Future generations are forced to bear the increasing costs of retirement, leading to labor market distortions and incentives to evade. Thus, the consensus among international organizations like the World Bank and the OECD was to reform these "single-pillar" PAYG public systems, in favor of multidimensional approaches. The underlying premise was that shifting savings towards younger years could "self-insure" a large part of old-age security (James (1998)).

Thus, the policy recommended by the World Bank (1994) was a significant shift from publicly managed PAYG Defined Benefit (DB) schemes, to fully funded Defined Contribution (DC) schemes. Fox & Palmer (2000) define this "second-pillar" as fully funded DC systems, where benefits depend on the assets in the individual's account at retirement. These systems can be centralized and government-managed funds, or individual financial account systems, where the participant's money is invested in privately-managed market funds.

As a result from these calls for reform, between 1988 and 2008, twenty-nine countries implemented systemic reforms and established a main funded pension pillar (Holzmann (2012)). The degree of reform was varied. The Chilean pension reform, later adopted by other countries, was the reference case of a complete substitution of the PAYG model for a DC scheme. This approach would later come under criticism, as it effectively privatized pensions with mixed results (see, for example, Mesa-Lago (2020)).

Other countries such as the Netherlands, Denmark, and Sweden, opted for a more balanced approach in which the first and second pillar coexist within the pension system; per Sørensen et al. (2016). These countries have a state-managed first pillar and quasi-mandatory occupational pensions as a second pillar. Their pension systems combine public and private pensions, and different modes of financing and accrual principles, enhancing their capabilities for risk sharing and risk mitigation.

Table I summarizes the results of these reforms by tabulating how many countries adopted each pillar, under different models. As of 2011, only 6 OECD countries had a second pillar, though this number was 15 for European and Central Asian countries. When looking at the global totals, 155 countries have the first pillar, while 34 have the implemented the second pillar.

	Pillar 0		Pillar 1			Pillar 2	
	Targeted	Basic	Notional DB	Notional DC	Provident Funds	Financial DC	Financial DB
East Asia & Pacific	4	3	8	1	10	1	0
Europe & Central Asia	11	4	28	5	0	15	0
OECD	8	9	16	2	0	3	3
Latin America & Caribbean	16	2	29	0	0	9	0
Middle East & North Africa	1	1	17	0	0	0	0
South Asia	3	0	2	0	3	1	0
Sub-Saharan Africa	3	2	30	0	4	2	0
2011 Total	46	21	130	8	17	31	3

TABLE I: Pension system architecture by region (Pallares-Miralles et al. (2012)

The "Pillar 0" shown in Table I, is defined by the World Bank (2008) as a non-contributory zero pillar which is typically financed by the State. This pillar is meant to ensure that people with low lifetime incomes are provided with basic protection in old age, including those who only participate marginally in the formal economy. This pillar is usually complementary to the other two pillars, as it's meant to address deficiencies in pension coverage. and alleviate poverty.

Additionally, a third pillar was also recommended by the World Bank in publications such as Holzmann et al. (2008). The third pillar is defined as funded and voluntary pension

individual pension plans, which can include other setups. This third pillar is also meant to be complementary to the first two pillars, and can be used to provide greater pension coverage or supplement benefits for higher income groups.

Figure 2 illustrates the taxonomy of the World Bank multi-pillar pension systems, acting as a summary of this classic model. Additionally, comparative case studies on successful adoptions of multi-pillar pension models in different countries can be found in Campani & Rodrigues (2019) and Sørensen et al. (2016).

World Bank Taxonomy

Pillar 0	Pillar 1	Pillar 2	Pillar 3
Universal, Basic/Means tested/Minimum	Earnings related DB, PAYG	Funded, DC	Voluntary pension savings
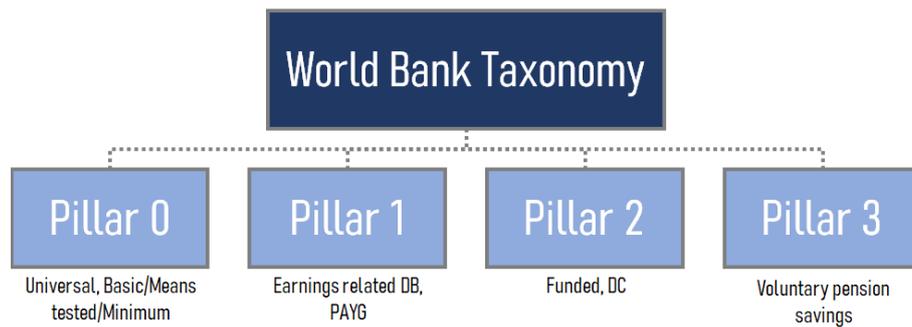
FIGURE 2: World Bank pension system taxonomy

The next subsection will provide a short introduction to the Portuguese pension system.

1.2 Introduction to the Portuguese pension system

In Portugal, the pension system comprehends the public pension system, along with the occupational and personal private pension schemes. Like in most European Union countries, pensions are primarily provided trough the public system, with gross public pension expenditure reaching 12,7% of GDP and private occupational pensions accounting for 0,3% of GDP in 2019, according to GPEARI (2021). The Portuguese public pension system establishes three levels of social protection, mirroring the World Bank three pillar model.

Reforms related to the zero pillar, such as the creation of the Solidarity Supplement for the Elderly in 2008, have aimed at fighting poverty among the elderly (OECD (2019*b*)). These types of measures fall under the *Subsistema de solidariedade* or Solidarity Subsystem, which covers all Portuguese citizens. The subsystem offers pensions and benefits which do not depend on contributions, and are distributed based on the attributes of vulnerable groups (see Gouart & Camacho (2014) for reference). At the end of 2019, the Solidarity Subsystem covered 323.000 pensions and benefits, and is directly financed through the general government budget.

4

The welfare contributory system, or Pillar 1 in World Bank taxonomy, comprises two different defined benefit schemes. The first is the scheme established by the Social Security System rules, covering private sector employees as well as the new civil employees since January 2006. The second is the Caixa Geral de Aposentações (CGA) scheme, which covers civil employees enrolled in the public sector until the end of 2005. Additionally, in order to mitigate poverty risk, the Social Security System also includes additional non-contributory benefits for the elderly, to ensure a minimum level of income to retirees and pensioners.

Portugal has a significant percentage of beneficiaries of non-contributory pensions. Throughout its history, the pension system has incorporated population groups with short contribution track, such as women with a brief involvement in the labor market (OECD (2019a)). The overall contributions are mandatory and split between employees and employers according to the nature of the employment arrangement (GPEARI (2021)). In general, contributions are equal to 34,75% of gross earnings and are split between employee (11%) and employer (23,75%), though only 22,65% is allocated to old age pensions and survivor allowances. The rest is allocated to disability, unemployment, sick leaves, and parenting allowances. The expenditure of non-contributory benefits is covered by taxes (OECD (2019a)).

It is worth noting that to safeguard any future deficits, the system comprises a financial buffer, the Social Security Trust Fund or Fundo de Estabilização Financeira da Segurança Social (FEFSS). The FEFSS aims to cover 24 months of pension expenditures and is managed on a funded basis. In 2019, FEFSS had €20,4 billion in assets (9,6% of GDP), according to GPEARI (2021).

On the other hand, the funded occupational pensions of Pillar 2 are still not compulsory, and only 2,5% of the working population is covered by these plans, per OECD (2019b). These occupational pensions have been traditionally negotiated by syndicates in Portugal, to either complement or substitute perceived deficiencies from the public system, as outlined by Romano (2013). Examples include the social security system negotiated by the banking syndicate, and the *Caixa de Previdência* set up by lawyers and solicitors.

With regards to Pillar 3, voluntary funded pensions can be divided into private and publicly managed. Portugal has seen a growth in voluntary private pensions, in particular the Planos Poupança-Reforma (PPR). These can have private insurance contracts, pension funds, or investment funds as financing vehicles and represented 10,7% of GDP in 2019 (GPEARI (2021)). Furthermore, according to OECD (2019c), approximately 16% of the working population in Portugal is adhered to a private personal pension plan of some sort,

the majority being PPRs.

Meanwhile, publicly managed voluntary pensions were established through the creation of the Regime Público de Capitalização (RPC) in the 2007 pension reform. According to OECD (2019c), the RPC was aimed at individuals who wanted to keep their benefits at pre-reform levels, by increasing personal contributions in individual account, as will be discussed in the next section. Participation in the RPC is based on individual membership, although the administration has recently approved a change which allows employers to pay contributions to employee accounts.

A detailed description of how the RPC works is available in Instituto da Segurança Social (2019). The basic mechanism behind the RPC is that participants pledge a contribution rate (can be 2%, 4%, or 6%) that is deducted from their monthly salaries. The contributions that go into a publicly managed fund are known as Certificados de Reforma (CR). Benefit withdrawal is possible at the statutory retirement age and can be made as a lump-sum payment, a pension, or be transferred to a child or spouse's pension plan.

The RPC is ultimately meant to promote savings to supplement public pensions, but is still heavily underutilized and relatively unknown. OECD (2019c) states that the RPC only has 9.000 members, with membership falling after the Portuguese economic crisis of the early 2010s. The total Assets Under Management (AUM) of the RPC are very low in comparison to the other voluntary pension schemes, as shown in Figure 3. The RPC only has €40 million in AUM, in comparison to the €14.000 million of PPR insurance contracts, and the €17.000 million of occupational DB plans.
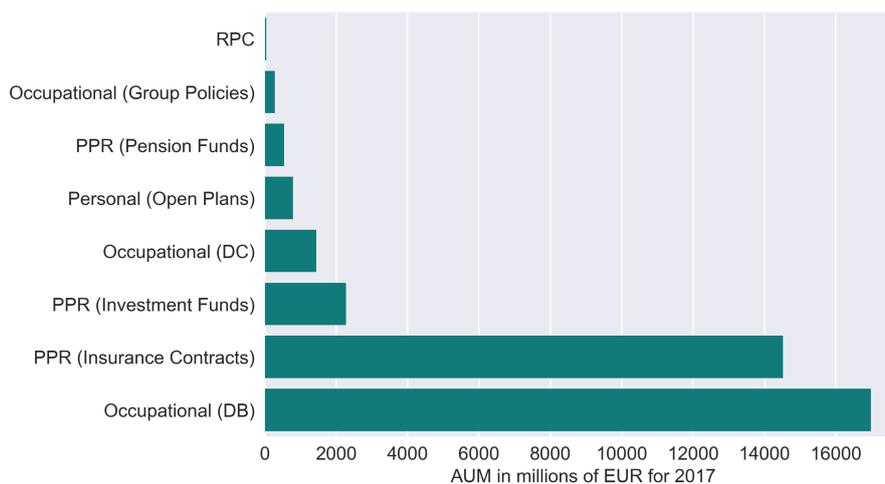
FIGURE 3: AUM by plan type in Portugal for 2017 (OECD (2019c))

In this sense, the RPC has so far been a missing opportunity to promote pension savings among low to middle income earners, though it has a lot of potential. Addition-

ally, according to the OECD (2019*c*), policy settings around the voluntary system are not currently encouraging enough participation, and are not markedly improving retirement income outcomes for people who do participate. Thus, the central issue becomes how to promote more savings through the RPC, especially among those who do not have access to PPRs and private occupational plans.

Section 2 will discuss the challenges the Portuguese pension system faces, including the stagnation of personal savings over the last decade. The impact of population ageing on the long-term sustainability of the system will also be addressed.

Population ageing, as shown in Section 1, represents a challenge for all pension systems. In this section we cover how population ageing challenges the Portuguese pension system's sustainability. Additionally, we will discuss the impact past pension reforms have had on addressing these challenges.

2.1   Challenges to the pension system's sustainability

According to studies and research conducted over the past two decades, the ongoing structural socio-economic changes continue to challenge the Portuguese pension system's sustainability. Population ageing, already evident in the 1990s, and a strong decline in GDP in the following decade, due to the slowing down of productivity and the fall in employment, pressured public accounts. Pension commitments and expenditures continued on an upward path, leading to the 2007 reform of the public pension system (Cardoso (2019)). Figure 4 illustrates the rising Social Security pension expenditures over time:
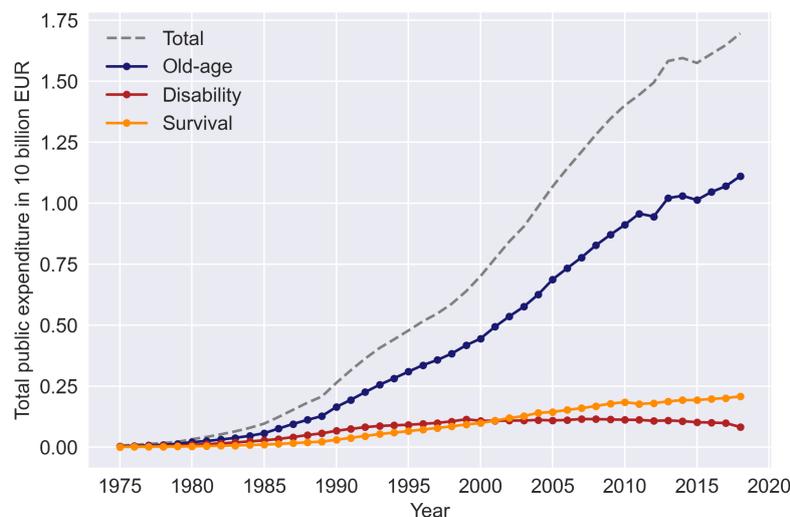
FIGURE 4: Social Security pensions expenditures in Portugal (compiled from PORDATA)

Additionally, the demographic trend has intensified during the last decade and is expected to persist in the medium term, while the financial crisis has hurt disposable income and household savings. According to the last Ageing Report projections, Portuguese population is likely to decline nearly 18%, between 2019 and 2070. In the same period, very low fertility rates combined with longevity gains will lead to a sharp increase in the old-age dependency ratio (30% increase to 67,3% in 2070), as highlighted in GPEARI (2021).

European Commission (2021) highlights the demographic factor capture by the projected evolution of the dependency ratio as the main driving factor behind the pension expenditure growth in Europe, in the next decades. However, in Portugal, under the assumptions implicit in the Working Group on Ageing Populations and Sustainability (AWG) baseline scenario, the adjustment mechanisms already in place will have a mitigating effect; projections of total pension expenditure slightly decrease from 13% in 2019 to 9,7% in 2070.

Table II summarizes these demographic projections for Portugal that will impact the pension system.

Demographic Variable	2019	2030	2040	2050	2060	2070	Change from 2019 to 2070
Population (thousands)	10284	10076	9769	9353	8888	8463	-1821
Population growth rate	0,00	-3,00	-0,40	-0,50	-0,40	0,10	-0,40
Fertility rates	1,43	1,47	1,51	1,53	1,56	1,59	0,20
Old-age dependency ratio	37,3	47,2	59,6	68,8	67,9	67,3	30,0
Life expectancy for men at 65	18,4	19,4	20,4	21,4	22,3	23,2	4,8
Life expectancy for women at 65	22,2	23,2	24,1	25,0	25,9	26,7	4,5

TABLE II: Demographic variable projections from GPEARI (2021)

The AWG projections include the main Portuguese pension systems: the public system (Social Security and CGA) and the private occupational system implemented through pension funds, though total expenditure is mainly explained by public pensions. According to projections, the public pension expenditure will decrease by 3,2 percentage points of GDP, from 12,7% of GDP in 2019 to 9,5% in 2070 (after reaching a peak of 14,6% of GDP in 2035). The occupational pensions spending is expected to slightly decrease (from around 0,3% of GDP in 2019 to 0,2% of GDP in 2070), due to a downward trend in the number of define benefit schemes and members, even though pension expenditure of the defined contribution schemes may increase over the time horizon (GPEARI (2021)).

Moreover, in line with macroeconomic assumptions of the AWG projections, the labor market effect over pension expenditure is generally low and negative, as changes in the labor market tend to reduce pension value. This is also true for the Portuguese labor market envisage dynamics, which will lead to a decline pensions expenditure (-1,1% of GDP until 2070). Yet the most significant effects emerge from the projected fall in overall contributions which may endanger the system sustainability (GPEARI (2021)).

According to Eurostat's population projections, the Portuguese labor force will decline by 28% between 2019 and 2070, a fall higher than one projected for total population, even considering the beneficial effects of migration flows over fertility rates and labor force projections in the next decades. This demographic trend has a negative impact over a PAYG system, as overall contributions are expected to decrease from 13,3% in 2019 to 9,6% in 2070, driven by a decreasing trend in employment levels throughout the projection period (GPEARI (2021)). Figure 5 showcases the projected public contributions and net public pension expenditures, along with the negative balance over time:
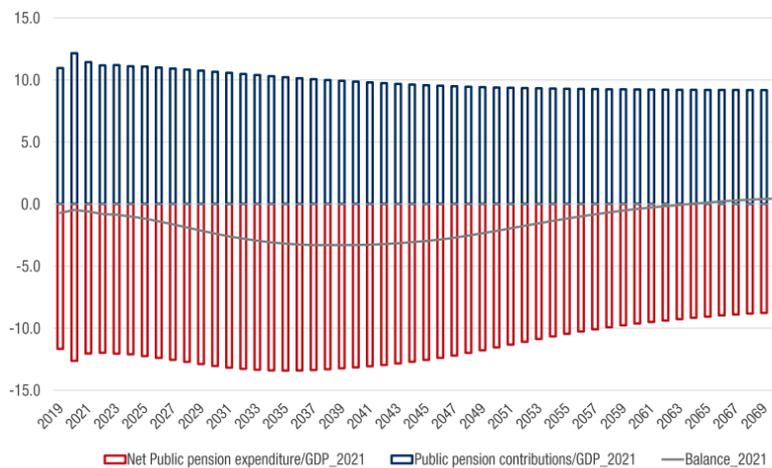
FIGURE 5: Projected balance of public pension system (GPEARI (2021))

Even before the international financial crisis of 2008, Portugal was already confronting growing structural vulnerabilities, exacerbated by fiscal instability, a fall in employment, a near stagnation of economic growth and a growing burden of external indebtedness. This hindered the confidence in the economy to create jobs and generate income, spreading concerns about the financial system solvency and injured the sovereign credit rating (per Cardoso (2019)).

Hence, the economic and budgetary difficulties worsened the pressure on the disposable income of households and the cuts in fiscal incentives on savings for retirement, obstructed voluntary savings, particularly in the case of personal retirement saving plans. The international financial crisis would further aggravate these problems, particularly in countries such as Portugal, where the level of indebtedness reached by the economy would require a huge deleveraging effort. Under these circumstances, it is not surprising that the complementary pension system would stagnate, especially in what concerns the capitalization component contribution. This is due to protracted low interest and return rates (Cardoso (2019)).

Following the public pension system reform of 2007, which will be addressed with more detail in the next subsection, the drop of retirement income should motivate on its own a significant increase in household's voluntary savings. However, this is not perceived in the data. Figure 6 illustrates the evolution of individual gross savings as a percentage of disposable income. It is clear from Figure 6 that individual savings have gradually decreased over time, and have not returned to pre-crisis levels.
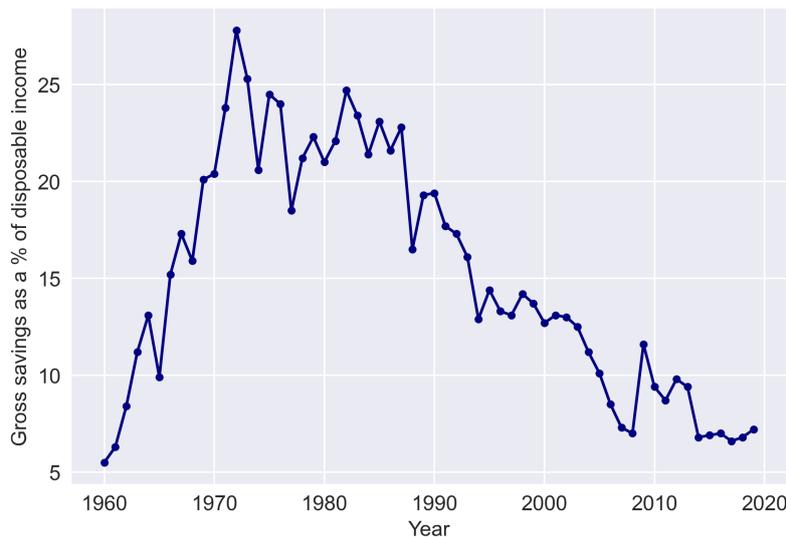
FIGURE 6: Individual gross savings in Portugal (compiled from PORDATA)

Three reasons are frequently given for this behavior of household savings in Portugal by (Cardoso (2019):

i Insufficient income to allow for savings, coupled with expanding levels of household debt.

ii Low levels of financial literacy. This hinders the perception of financial and longevity risks, in particular as these perils tend to materialize in the long term. It also constraints the selection of the most appropriate financial instruments for retirement savings. In this respect, remember the weight of bank deposits in the composition of households' financial assets basket. The line is thin between savings for retirement and saving for other purposes, with liquidity pressures and safety concerns often shaping the financial decisions away from long term commitments.

iii The financial crisis effect, which reduced substantially the profitability of financial investments and the confidence in financial markets.

In the following subsection we will discuss recent reforms which aimed to address these challenges, along with their impact on the future outlook of Portuguese pensions.

2.2 *Impact of reforms and future outlook*

Overall, the Portuguese public pension system has undergone several reforms throughout its history (covered, for example, in OECD (2019*a*)). Firstly, reforms have aimed at increasing its coverage, broadening the benefits granted and the contribution base, creating minimum pensions, and non-contributory benefits to mitigate the risk of poverty. More recently, by revising the pensions' indexation rules, linking the statutory retirement age to life expectancy gains, and adjusting the parameters for pensions calculation (like, the reference salary or the sustainability factor rules). These changes have sought to safeguard the system's sustainability in the medium and long term.

Recently, the 2007 Pension Reform fully maintained the option for the PAYG system, while strengthening the sustainability of the system with important parametric changes, which would result in an extension of working life and a reduction of future pensions' values. The impact of the reduction of the benefit ratio (or replacement rate, commonly expressed by the relation between the last salary earned and first pension received) was likely to have an enormous effect in households consumption and savings behavior, dictating a gradual application of the new rules. This reform should generate new incentives for individual savings for precautionary reasons, to prevent an abrupt drop in income after retirement.

For example, Pinheiro & Cunha (2007) simulated the average Social Security pension benefits before and after the 2007 reform. Figure 7 illustrates the post-reform benefits of the Alternative II posed by the authors, in which participants retire at the statutory age in spite of possible penalization. There is a clear decrease in all three benefit types following the 2007 Reform.
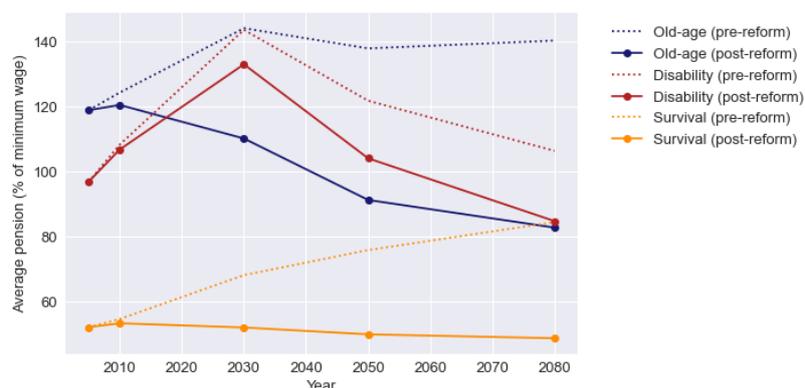
FIGURE 7: Projected pension benefits after 2007 reform (Pinheiro & Cunha (2007))

Moreover, the pension system remains concentrated in the public sector, and continues to require a high level of contributions. The only improvement in this area was limited to

a clear reference in the law to the establishment of a complementary system, the RPC, as well as complementary collective and individual initiative regimes (which already existed in Portugal). As such, the incentives for the development of the Complementary System did not materialize and no additional efforts were observed, neither to make households aware of their future needs, nor to strengthen the means at their disposal for the purpose of long-term savings (Cardoso (2019)).

Looking forward, Portugal is facing an increasing number of older people who are living longer, raising the old-age dependency ratio, which challenges the balance between the system's financial sustainability and pension adequacy. This could even disturb the potential protection of the pension system against poverty. This is due to the prevalence of a significant number of low pensions arising from short or interrupted years of contribution, and from irregular or low salaries (low salaries remain a main feature of Portuguese labour market despite the increase in minimum salary observed in recent years, per SPC and DG EMPL (2021)).

A coherent and holistic approach to addressing challenges in the Portuguese pension system is called for, to reduce old-age poverty and support extended working lives (SPC and DG EMPL (2021)). This holistic approach implies going beyond relying on the PAYG public pillar, and promoting broader and more inclusive complementary pension schemes from the multi-pillar model. This can also include, additionally, offering new and attracting savings opportunities to households, and going beyond the traditional three pillars by applying behavioral science, according to World Economic Forum (2017).

Research and advances in behavioral science have found new ways to "nudge" people into saving more for retirement, and to turn behavioral biases into opportunities. We propose that saving through consumption, one such application of behavioral science, provides powerful mechanisms to encourage people to save for retirement. Saving through consumption has been implemented in countries like Mexico, Spain, and most recently China.

In the following section, we will present a theoretical overview of behavioral science and how it has been used to improve retirement savings. Afterwards, we will focus on saving through consumption, how it works, and present a few case studies. Lastly, in Section 4 we will simulate how saving through consumption can generate additional pension supplements for households in Portugal. This can help alleviate the challenges the pension system currently faces, and prevent the need for future reforms which may further curtail benefits.

Behavioral science has challenged traditional economic frameworks, including theories related to savings and retirement planning. This section will begin with a brief theoretical overview of behavioral science, followed by a case study of the Save More Tomorrow Program (SMarT) program, one of the first applications of behavioral science to retirement planning. Lastly, we cover saving through consumption and recent experiences in Spain, Mexico, and China.

3.1   *Theoretical introduction to behavioral science*

Standard economic theories of saving, according to Benartzi & Thaler (2007), contain two suspect implicit assumptions about the behavior of households. The first implicit assumption is that households have the cognitive ability to solve the complex optimization problem required by classic utility-based models. The second implicit assumption is that households also have sufficient "willpower" in the long-term to execute this optimal plan.

Behavioral science, along with its applications in economics and finance, challenges these two assumptions. As outlined by Knoll (2010), empirical findings in the areas Judgement and Decision Making (JDM) and behavioral economics, depart from the notion of people being economically rational, illustrating instead that people often act in ways that are economically sub-optimal. This may be due to people having incomplete information and/or limited cognitive ability, as well as people relying on biases and heuristics or "rules of thumb".

For example, the complex decisions required for retirement planning, such as choosing a savings rate or asset allocation, often leads to procrastination by households, per Beshears et al. (2006). The authors found that participation rates in workplace plans increased by simplifying this decision into a binary choice. Another alternative to the problem of complexity in retirement planning is the introduction of a "default" option, such as automatic enrollment in a plan, which can stimulate household participation (see Madrian & Shea (2000)).

This "default behavior" is related to an important bias present in retirement planning: the status quo bias. In their key study, Samuelson & Zeckhauser (1988) define the status quo bias as the decision to do nothing and keep the status-quo, which can have a substantial impact on retirement decisions. The authors found that participants in an occupational pension fund chose not to alter the initial asset allocation offered, even at the cost of sacrificing considerable asset returns. Few participants had a justification for not changing their allocation, exemplifying how it can be "easier" to do nothing.

Another important bias in retirement planning identified by behavioral science is loss aversion. According to Benartzi & Thaler (1999), loss aversion means that individuals weigh reductions in wealth much more heavily than increases in wealth. This bias is important in the context of retirement planning as long-term goals require long-term strategies, and understanding that increased risk exposure can lead to increased returns, per Clark et al. (2019). For additional literature on biases and heuristics in retirement planning, see Zhang & Sussman (2017), Goda et al. (2018), and Mitchell & Utkus (2003).

3.2 Applications of behavioral science: the Save More Tomorrow Program

Perhaps most important for the purposes of this paper, is how behavioral scientists have applied their insights of these biases to promote retirement savings and improve retirement outcomes. In this sense, the SMarT program developed by Thaler & Benartzi (2004), represents a pioneer program that applied behavioral economics to promote increases in retirement savings. The SMarT program essentially allowed employees to commit in advance a portion of their future salary to increase retirement savings. Increases in contribution rates were also aligned with pay raises, mitigating the potential loss aversion employees could perceive from these salary "cuts".

The results from the initial implementation of the SMarT program were highly successful, according to Benartzi (2008). The program was originally optional and 78% of the possible participants enrolled. Once the SMarT program was implemented with automatic enrollment, acceptance rates among employees have exceeded 90%. As for the improvements in savings, Figure 8 shows the yearly increases of the average savings rates for SMarT participants in blue. Those who didn't receive financial advice or enrolled in the program had consistently low savings rates throughout the 5 year evaluation period.
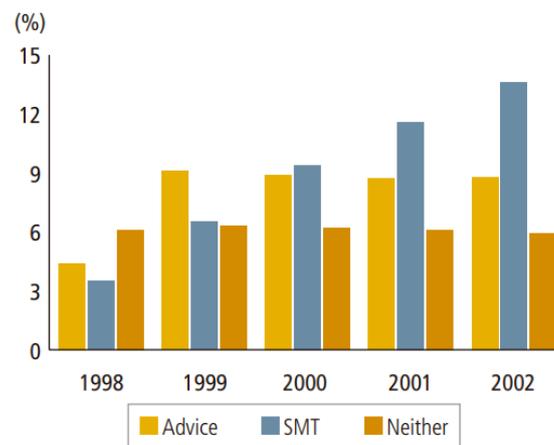
FIGURE 8: Average savings rate for SMarT participants (Benartzi (2008))

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3.3 Saving for retirement through consumption

Saving through consumption is a more recent application of behavioral science that builds on the advances of the SMarT program, by flipping behavioral challenges into behavioral solutions. At its core, saving through consumption consists in a system where customers automatically set aside a percentage of their consumption expenditures towards a special retirement account (Hernández et al. (2020)). This system can be implemented through a financial app, a credit card that works similarly to brand loyalty programs, among others. In this regard, two recent experiences with saving through consumption will be highlighted: the *Pensumo* program in Spain, and *Millas para el retiro* or Miles for Retirement in Mexico.

Pensumo is a Spanish start-up created in 2013, that generates micro savings for customers each time they consume in an establishment associated with their company (Benavides (2019)). In essence, *Pensumo* is a free mobile app, were users receive a savings "contribution" after making purchases from associated vendors. The amount of these contributions is determined by each vendor. The micro savings earned by users are backed by an insurance firm, with a guaranteed minimum annual return of 0,5%, although the mean return has been around 4,5%, per España & Godoy (2020).

The biggest potential of the app-based savings system of *Pensumo* is the ability to achieve greater coverage than traditional pension pillars, particularly with the propagation of smartphones. The growth of this app depends on greater exposure to the Spanish population and the affiliation of bigger companies, such as large retailers. Furthermore, since the Spanish pension system has no individual savings account, the *Pensumo* account is not a proper pension account. Thus, individuals can withdraw their savings without penalization after five years, or before five years with up to a 20% penalization, per Benavides (2019).

That is why, as of 2022, *Pensumo* has started developing a new app which would link users directly with a private pension fund. According to Infoprovincia (2022), development for this app has began where users would be able to send their voluntary savings contributions to a pension account associated with the fund *Ibercaja*. This pension fund is currently fourth in Spain in terms of market share and has €7.640 million AUM.

Another similar experience with saving through consumption is the Mexican app *Millas para el retiro* or Miles for Retirement. According to Hernández et al. (2020), Miles for Retirement first asks users to register a credit or debit card in their platform. Afterwards, the user provides information on the individual savings account they want to associate with the platform, which can be a public pension account or a private pension plan. The

user then defines a program of voluntary savings, that can be a fixed amount or a percentage of the spending they make each time they purchase something with their registered card. This app streamlines the entire process, as users only have to input their credentials to sign up, preventing inertia, for example.

Thus, each time a user makes a purchase, a proportion of their consumption spending is automatically sent to their individual retirement account. Behavioral experiments like España & Godoy (2019) have shown that automatic enrollment, like the mechanism behind Miles for Retirement, can increase participation from individuals, turning behavioral problems like inertia into solutions. Furthermore, Miles for Retirement constantly encourages users to save more "miles" through mobile push notifications, which have shown the potential to nudge behavioral change in studies like Valle et al. (2020).

As of March 2022, the Miles for Retirement app has 150.759 downloads. Approximately 33.000 users have registered their retirement accounts to save through the app. Additionally, 50.000 users have signed up to save through cash-backs from brands like Amazon, which is similar to the *Pensumo* system. Figure 9 illustrates these main components of Miles for Retirement, and shows the latest offer for customers to save directly from their payroll, which draws inspiration from the SMarT program.
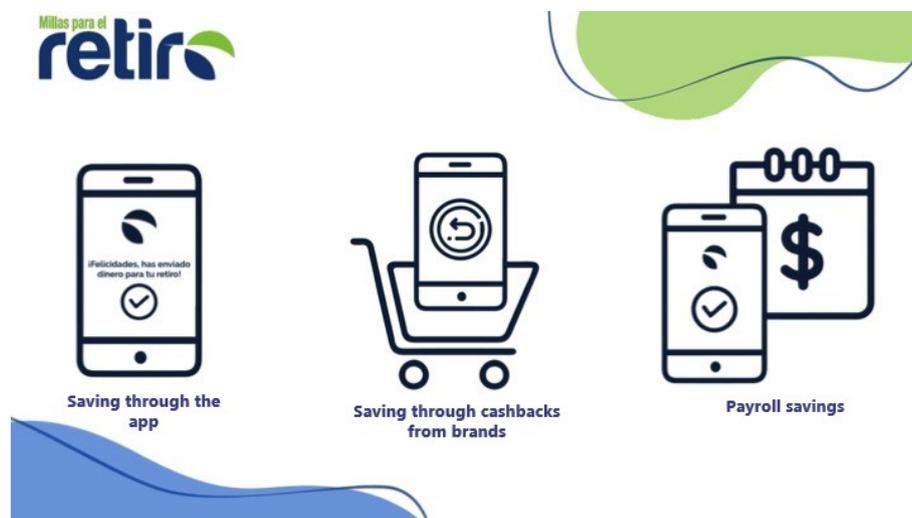
FIGURE 9: Illustration of the main components of Miles for Retirement (Hernández et al. (2020))

Applications like *Pensumo* and Miles for Retirement have become a new model for voluntary retirement savings through consumption, that can complement traditional pension pillars. Recently China, a country which faces severe population ageing, has incorporated saving through consumption as a matter of public policy. According to sources like Pensumo (2021) and FIAP (2021), China has launched a regulated app called *Banju*.

In the next section, we present a brief proposal of how saving through consumption can be implemented in Portugal. We also simulate the additional retirement savings this proposal can represent for an average Portuguese household.

In this section, we propose an implementation along the lines of Miles for Retirement for Portugal, as this savings system offers more simplicity and uses different behavioral science mechanisms to nudge users into saving through consumption. Afterwards, we simulate the supplemental pension benefits this proposal can represent for an average Portuguese household.

4.1   Implementing saving through consumption in Portugal

The main idea would be for users to associate a credit card or bank account to what we will call "the platform". A predetermined contribution, either a fixed amount or a percentage, is set aside each time the user makes a purchase with this card. Additionally, users can also receive contributions from vendors through loyalty programs, though this will not be quantified for the time being in the simulation.

The users would then decide if they want the platform to send their contributions to an individual account in the RPC, a private PPR, or a corporate pension fund. In the case of the RPC in particular, the key for this implementation is simplicity. Users would only have to input details about their Social Security account to open a CR, in order to begin saving there. Users can also decide to change the contribution size as a percentage of their purchases with their associated credit card or bank account.

In order to project the potential impact the implementation of saving through consumption can have on a Portuguese household, we must make some assumptions. The first assumption is with regards to the consumption of an average household, since this will be the base on which to estimate potential yearly savings. Figure 10 illustrates how the average yearly Portuguese household consumption is distributed among different items.
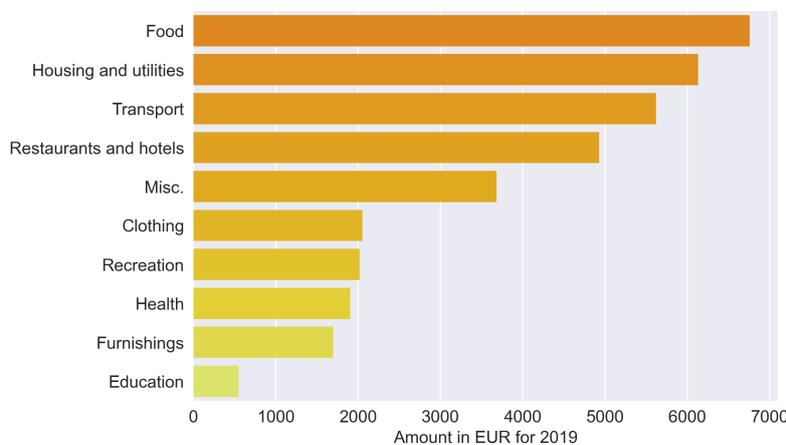
FIGURE 10: Average household consumption by item in 2019 using PORDATA figures

For the sake of simplicity, we will assume the savings platform will be used by an individual representing the household. We will call this individual the "user", who uses the platform for day-to-day expenses like purchasing food, buying clothing, eating out, etc. Additionally, we will remove spending on housing and utilities, transport, furnishings, health, and education; as they represent non-discretionary spending. This leaves a total of €18.547 for what we identify as annual discretionary spending, used in the following subsection for our simulation.

4.2 Simulating pension supplements from saving through consumption

In our first savings projection, we will assume that a user age x sets a 1% savings target on their discretionary spending, and that their spending will grow 1,25% each year. This is an average of the projected GDP per capita growth rate for 2030 and 2040 for Portugal, according to the European Commission (2021). The contributions will be sent by the platform to the user's pension account in the middle of each year, assuming a constant yearly return rate of 1%.

Figure 11 illustrates the projected retirement savings over the years if a user age 25 began saving through consumption in 2022, under the assumptions presented previously. Upon reaching the current Portuguese retirement age of 66, the user's savings will have accumulated to a total of €12.390, according to our model.
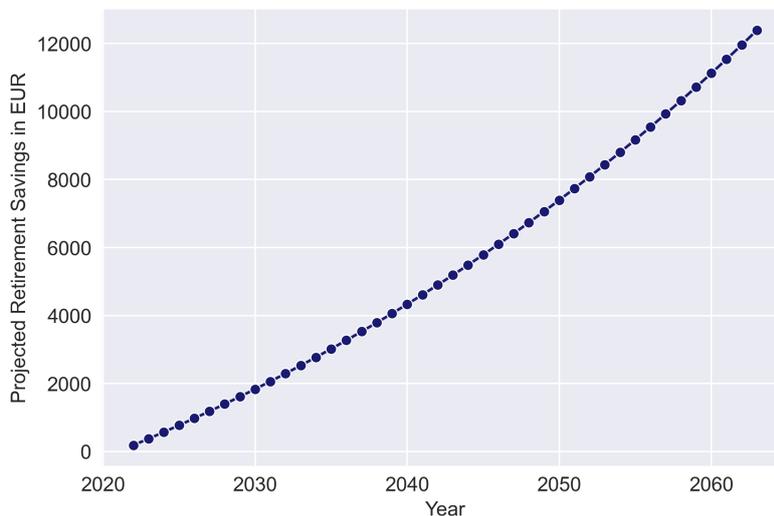
FIGURE 11: Projected retirement savings through consumption for an individual aged 25

We can use this total savings to estimate a yearly pension supplement (PS), as a whole life annuity, that can complement pension the user will receive upon reaching the current statutory retirement age. For an individual retiring at age 66 (assuming no early

withdrawals or death), for each 1% of discretionary spending, PS is given by:

$$PS = \frac{RS_{x=66}}{a_{66}} \tag{1}$$

where $RS_{x=66}$ is the accumulated Retirement Savings for the individual at age 66, and a_{66} is the actuarial present value of a whole life annuity for an individual aged 66.

We will use a 1% discount rate to value the annuity, along with the 2018-2020 Portuguese HM mortality tables (no sex differential) from Instituto Nacional de Estatística (INE). Thus, the yearly lifetime pension supplement for this individual, for each 1% of discretionary spending, is given by:

$$PS = \frac{RS_{x=66}}{a_{66}} = \frac{12389,818}{16,479} = 751,85 \tag{2}$$

To put this simulated pension supplement in context, we can present it as a replacement ration. As of 2019, the average yearly remuneration in Portugal is €12061,20. If we assume the user represents two incomes within a household, this figure is €24122,40. Furthermore, we will also assume the remuneration grows each year by 1,5%, as was the case for consumption expenditure. Thus, after performing this projection, the replacement ratio (RR) for the same user aged 66, for each 1% of discretionary spending, is given by:

$$RR = \frac{PS}{w_{x=66}} = \frac{751,85}{40143,65} = 1,87\% \tag{3}$$

where $w_{x=66}$ is the projected remuneration for the user at age 66.

We can also estimate how the replacement ratio from this pension supplement can increase by assuming the user sets higher savings targets, as illustrated in Figure 12:
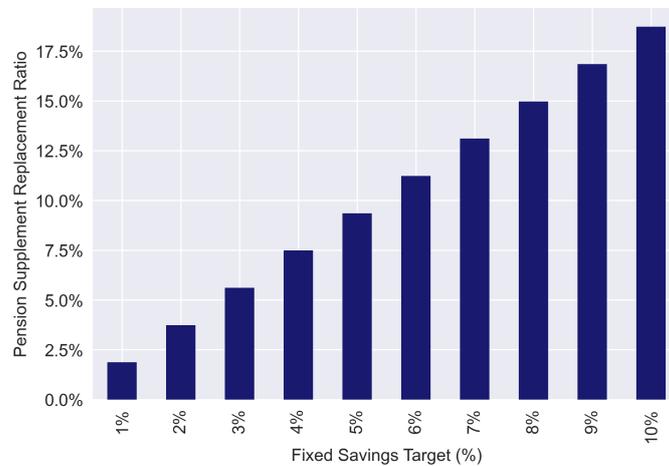
FIGURE 12: Projected replacement ratios using different savings targets

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Recall that in the base model we assumed the user sets a 1% savings target, which yields a projected replacement ratio of 1,87%. Note that if the user sets a 10% savings target, the projected replacement ratio from pension supplement is now 18,73%, i.e. ten times larger.

Additionally, users could set automatic yearly increases to their savings target until reaching a certain threshold, turning this model into an application of the SMarT program. For example, suppose a user starts with a savings target of 1%, and increases this target by 0,5% each year until reaching a maximum of 10%. The projected pension supplements using this "SMarT" savings target is shown in gold in Figure 13.
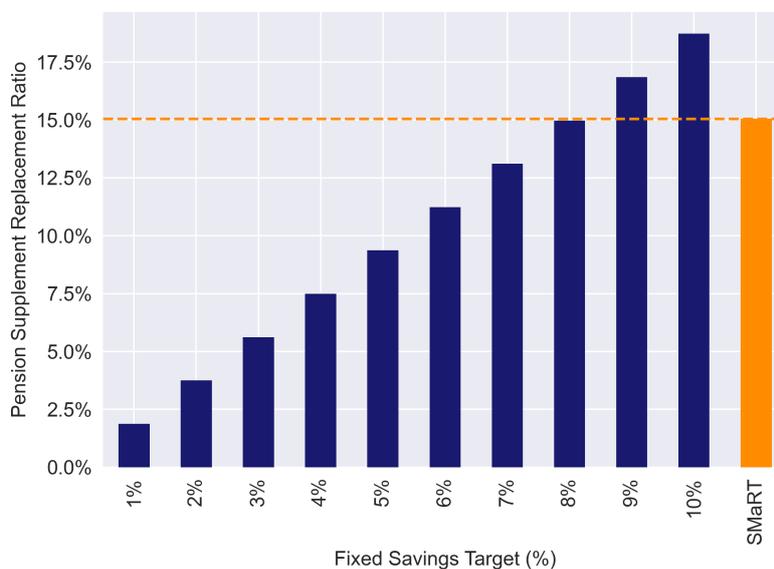
FIGURE 13: Projected replacement ratios using SMarT savings target

Figure 13 shows how the SMarT savings target leads to considerably higher replacement ratios in comparison to the baseline model. Since the increases in the contributions are gradual, users are less likely to feel loss aversion. It is important to mention that under ideal conditions, individuals would participate as early as possible, in order to accumulate more savings.

Although our model uses relatively simple assumptions, it does highlight the significant retirement savings that can be achieved with saving through consumption. In particular, by setting higher savings targets or the proposed SMarT targets, Portuguese households can achieve pension supplements with significant replacement ratios to complement Social Security and private plans. Saving through consumption represents an innovative approach to stimulate retirement savings, which can alleviate the challenges longevity poses to the Portuguese pension system.

5 CONCLUSIONS

Saving through consumption is a simple and powerful mechanism that allows people to save money for retirement from day-to-day purchases. By incorporating advances from behavioral science, like nudging and automatic enrollment, saving through consumption can transform problematic behaviors like inertia into better saving outcomes. Furthermore, saving through consumption can be implemented in Portugal by taking advantage of individual accounts in the public RPC. Thanks to the widespread use of smartphones, saving through consumption can reach individuals who may not have access to private PPRs or occupational accounts, and can also increase financial literacy among younger generations.

As we have seen in Section 2, the sustainability of the Portuguese pension system faces many challenges related to population ageing, among others. Recent reforms, like the 2007 reform, have addressed the increased burden of ageing on the system by performing parametric adjustments like curtailing benefits and increasing the retirement age. Thus, a more holistic and multidimensional approach is required to alleviate the pressure on Social Security. In Section 3, we have presented how behavioral science has made significant advances in promoting savings through innovative approaches, such as the SMarT program, and saving through consumption.

Lastly, our simulations from Section 4 have shown how implementing saving through consumption can generate significant pension supplements for households in Portugal. In this sense, the key is simplicity in associating potential users with their individual accounts in the RPC, promoting higher savings targets, or using the proposed SMarT savings target which addresses issues like loss aversion. This proposal to implement saving for retirement through consumption can help offset future retirement costs for the public system, while providing incentives for households to take retirement planning into their own hands.

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