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**Implementation of a System of Individual
Capitalization Accounts in Spain**

Joan Cortés García

Thesis supervisor: Mikel Esnaola Acebes

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ABSTRACT

The aim of this work is to analyse the hypothetical consequences of implementing a System of individual capitalization accounts in Spain. This possibility was introduced among other different measures in the latest National Reform Programme delivered to the European Commission by the Spanish Government. In order to assess the measure and its potential benefits for the Spanish Pension System, a model based on the Austrian Severance Pay scheme has been developed and simulated. The results obtained are promising. It was observed that under some scenarios, provision funds could help to offset the projected downward trend for replacement rates.

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1. INTRODUCTION

The Social Security System is a central pillar of the Spanish society. The system has undergone several reforms to adjust its functioning over the years, despite this, the coverage and the protective intensity of the system have increased progressively since its implementation.

The Spanish Pension System has to face important challenges that will place great strain on the system. Spain among all developed countries, has to tackle the threats originated from population ageing. As it will be explained later on, Spain has become the second country with the highest lifespan in the world, and this trend is projected to continue at least until 2060. In addition to this, another worrying demographic trend is the prolonged reduction in birth rates. The conjunction of these trends will cause old-age dependency rates to rise over time, compromising this way, the self-funding feature of the Spanish Pension Scheme.

In recent years, all European Countries have undertaken different measures to tackle the challenges triggered by population ageing. For the Spanish case, two main reforms were undertaken in 2011 and 2013. These reforms introduced substantial modifications of the key parameters of the system. Due to the implementation of these reforms, replacement rates are projected to decrease progressively over time. In the latest National Reform Programme delivered to the European Commission by the Spanish Government, the possibility of undertaking a gradual implementation of a system of individual capitalization accounts was introduced.

The aim of this work is to analyse the hypothetical consequences of undertaking a measure of this significance. In order to accomplish that, we have developed a model to simulate and assess the accumulation capacity of individual capitalization accounts in Spain. For this purpose, we tried to replicate the Austrian model, which introduced a system of individual capitalization accounts in 2002.

The work is set up as follows: section 2 introduces the Spanish Pension System. In this section, we will explain the main characteristics of the system and we will revise its main

reforms. In the third section, we will present and explain the most important trends that the Spanish Pension Scheme is facing. After that, we will cover and detail the functioning of the Austrian Severance Pay scheme. This section is highly important as we will try to replicate and adapt the system to the Spanish case. Next, the methodology used in conducting the simulation is presented. Subsequently, we describe the results delivered by the simulation. Finally, we introduce the conclusions extracted after completing this work.

2. THE SPANISH PUBLIC PENSION SCHEME

2.1 The main characteristics of The Spanish Public Pension System

The Spanish Public Pension System is characterized by the following features:

- Pension arrangements are provided by the state and are mandatory for workers and employers.
- Pension benefits are financed using current contributions (under the pay-as-you-go principle).
- Pensions entitlements are calculated with respect to the number of contributing years and salary. Thus, it is planned according to a defined benefit pension arrangement.
- Tax-payer bears those risks that affect financing retirement.

In the Spanish system we can differentiate pensions according to their nature, so we find contributory and non-contributory pensions. In this sense, the differences between them can be explained by the type of financing and coverage offered by each of them. Whereas, non-contributory or welfare pensions, are funded by taxes, contributory pensions are financed using social security contributions. Moreover, non-contributory pensions are granted to those with levels of income and wealth that fall below certain thresholds. On the other hand, contributory pensions are characterized by the fact that they are economic benefits of an indefinite duration that are granted of a minimum contribution period in addition to the other necessary requirements. (Hernández De Cos, Jimeno, & Ramos, 2017; Morales, 2015).

As explained by Hernández De Cos, Jimeno, & Ramos (2017) the public pension system in Spain, “covers a set of contingencies related to ageing (retirement), death (survivors’ benefits and family allowances) and illness (permanent disability)” (p.12).

Complementary to this, funded private pension arrangements and occupational schemes are also present in Spain, albeit have a very limited scope according to (Hernández De

Cos et al. (2017). Based on the Ageing Report elaborated by the European Commission (2015) 43.47% of the Spanish labour force was an active member of an occupational or a private scheme in 2013. Moreover, private pension expenditure accounted for 0,5% (GDP) in 2015.

2.2 Background of the Spanish pension system

The Spanish pension system has undergone a deep transformation in the last three decades. When Franco died in 1975, Spain began its transformation towards Democracy. A social protection system based on the Bismarckian model had been already implemented before Franco's death. However, the system was underdeveloped. (Palier, 2010, p. 183-188).

As explained by Palier (2010) "expansion in terms of coverage and expenditure rather than structural reform took place from the beginning of the transition to democracy in 1975 to the victory of the Socialist Party (PSOE) in 1982" (p.189).

Notwithstanding, major reforms were not put in place until the Socialist Party won the elections in 1982. (Palier, 2010, p.189).

The first significant reform of the Spanish pension system took place in 1985. The minimum contributory period increased from 10 to 15 years, and the number of years used to calculate the benefits rose from 2 to 8 years prior retirement. (Palier, 2010; Banco de España, 2009).

The reform would ease the financial pressure on the public pension scheme and helped to ensure the self-financing feature of the system. Nevertheless, contributory pension expenditure raised from 5,6% to 8,4% of GDP and the old-age dependency ratio decreased from 2.7 to 2.1 between 1980 and 1995. (Hernández De Cos, Jimeno, & Ramos, 2017; Banco de España, 2009).

By the middle of the 1990s, in a context of austerity and rapid population ageing, worries about the sustainability of the system arose again. The Spanish Parliament proposed to

prepare a report for the budget committee to tackle the future of the Social Security System. This report, is known as the Toledo Pact. (Hernández De Cos, Jimeno, & Ramos, 2017; Palier, 2010; Banco de España, 2009).

The 15 recommendations elaborated by the Toledo Pact set the basis for the agreement reached by the government and the two main labour unions. The second major reform of the Spanish Pension system was enacted in 1997. Among all the measures provided, the most outstanding were the increase in the number of years of contribution needed to calculate the benefits. It came to include the last 15 years instead of 8. The revaluation of pensions was linked to CPI projections, and a revision based on deviations was also established. A reserve fund was introduced in order to use social security surpluses to cover future needs. (Hernández De Cos, Jimeno, & Ramos, 2017; Palier, 2010; Banco de España, 2009).

Subsequently, in 2001, the government reached an agreement with other relevant social and economic parties (CCOO¹, CEPYME²) for the improvement of the system. Law 35/2002 of 12 July 20002 was adopted, and among other changes, the encouragement of retirement beyond 65 and early retirement from 61 (under some requirements) were the most notable. (Hernández De Cos, Jimeno, & Ramos, 2017; Palier, 2010; Banco de España, 2009).

Following the renewal of the Toledo Pact, on 13 July 2006, the Spanish Government reached an agreement with UGT³, CCOO, CEOE⁴, and CEPYME that was later enacted as Law 40/2007. This norm raised the age for partial retirement to 61, provided that employees had worked at least 6 years in the same firm and had contributed for 30 years. It also modified the eligibility criteria for disability pensions, and modified the use of effective contribution days to calculate the pension benefit. (Hernández De Cos, Jimeno, & Ramos, 2017; Banco de España, 2009).

¹ The Trade Union Confederation of Workers' Commissions

² The Spanish Confederation of Business Organisations and the Spanish Confederation of Small and Medium-Sized Enterprises

³ General Workers' Union

⁴ The Spanish Confederation of Business Organisations

2.3 Current institutional framework

More recently, Spain has adopted two different laws in order to tackle the challenges triggered by population ageing.

Law 27/2011 of 1 August on the update, adaptation and modernisation of the Social Security System (in force from 2013), introduced different reforms of the main parameters of the system.

Pursuant to article 4 of 27/2011, the statutory retirement age raised from 65 to 67 years. Notwithstanding, the legal retirement age will be kept in 65 for those participants that contribute more than 38 years and 6 months. The implementation of this provision will be progressive, starting in 2013 and finishing in 2027.

Equally important, the third section of article 4, set the increase of the number of years used to calculate the pension benefit. Setting up a progressive increase from 2013 until 2022, from 15 to 25 years. Moreover, the fifth section of the same article, revised the contributory period required to be eligible for the 100% of the pension.

Lastly, article 8 introduced the Sustainability Factor. This is a mechanism designed to adjust the amount of pension entitlements to the evolution of the lifespan of Spanish pensioners.

The Sustainability Factor was later on regulated by Law 23/2013 of 23 December, regulating the sustainability factor and the revaluation index of the Social Security System. This provision also brought in a new revaluation system, uncoupling for the first time since 1997, the revaluation of pensions from CPI increases.

The new Revaluation system, came into force in 2014. It set the annual increase on the basis of a formula derived from the balance of the system's revenue and expenditure. (Hernández De Cos et al., 2017).

Notwithstanding, Law 23/2013 introduced an upper and lower limit for the annual pensions' updates. The revaluation could not be lower than 0,25% nor higher than 0,5% + CPI increase. Based on the structure of the formula and its components, together with the demographic and economic trends of the parameters that shape the Spanish Pension System, it was certain that it was going to deliver negative results systematically since its approval. Thereby, pensions were expected to be updated at 0,25% annually steadily. This was the case, until the Government passed the General State budget on 2018. The Government then, updated pensions on the basis of CPI, and has continued doing so until 14 January 2020⁵. Although the Socialist Party has committed itself to secure the former mechanism adopted in 1997, the revaluation of pensions has not been linked to CPI projections permanently yet.

Additionally, Law 23/2013 also regulated the Sustainability Factor. Its implementation was planned innately for 2019, but the General State budget on 2018 delayed its adoption until 2023. The adoption of this mechanism, placed Spain among the group of European countries⁶ that have introduced a sustainability factor and/or reduction coefficients. (European Commission, 2018, p.54).

The sustainability factor is defined in Law 23/2013 as an instrument that automatically links the amount of retirement pensions of the Social Security system to the evolution of life expectancy of pensioners, adjusting the amounts that will be received by those who retire under similar conditions at different time points. The sustainability factor will be applied only once to determine the initial amount of the new pensions.

Table 1 illustrates the projected evolution of the sustainability factor. The simulation elaborated by AFI (2017) suggests that new pensions are expected to decrease significantly over time due to the implementation of the new mechanism. Thus, replacement rates are going to fall progressively, restringing heavily the purchasing power of the group.

⁵ Royal Decree-Law 1/2020, of January 14, which establishes the revaluation and maintenance of pensions and public benefits of the Social Security system.

⁶ Germany, Finland, Italy, Latvia, Poland, Portugal, Sweden and Norway have also introduced a sustainability factor and/or other reduction coefficients.

Table 1 Projected evolution of the Sustainability Factor

Variables	2019	2020	2025	2030	2035	2040	2045	2050	2055	2060
Sustainability Factor	0.992	0.985	0.951	0.920	0.8927	0.8671	0.8438	0.8225	0.8026	0.7831
Quotient five-year Life expectancy	0.993	0.993	0.993	0.994	0.994	0.994	0.995	0.995	0.995	0.995
Life expectancy at 67	19.72	19.85	20.51	21.14	21.76	22.35	22.92	24.00	24.00	24.54

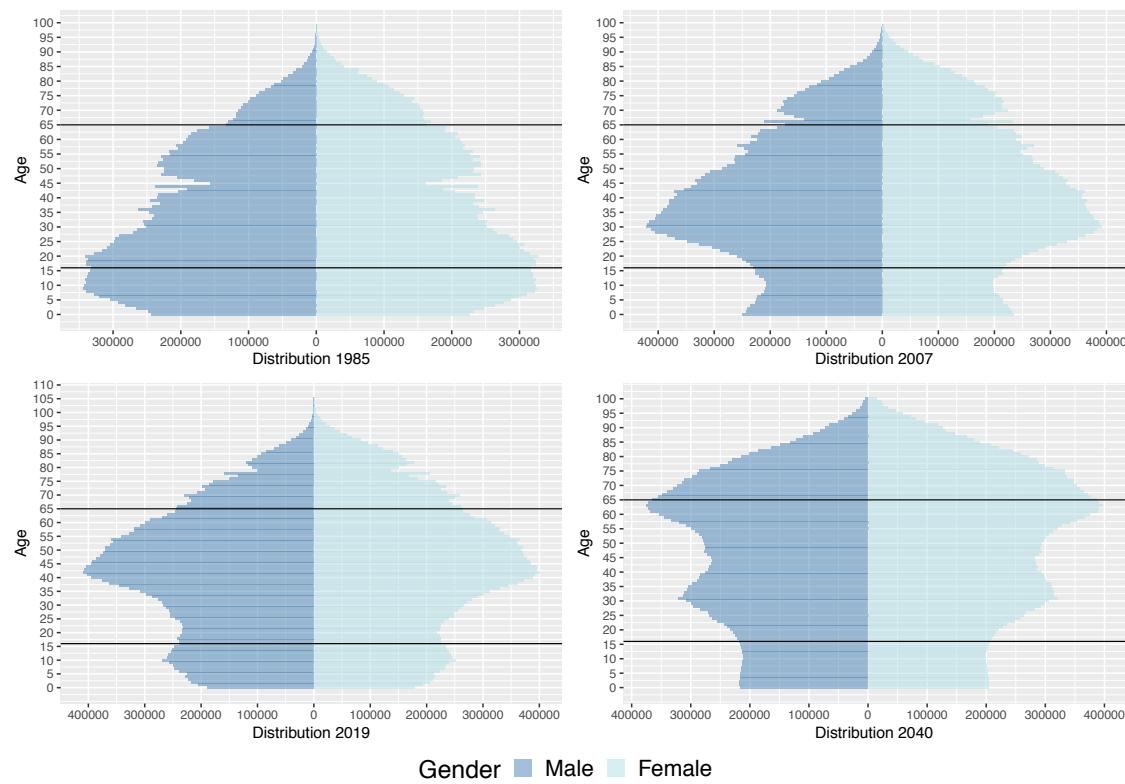
Source: Generated by the authors based on data extracted from Afi (2017)

3. TRENDS IN THE SOCIAL SECURITY SYSTEM

Among the demographic factors, the most relevant are the size of the generations and the lifespan. Size refers to the number of people that constitutes each one of the cohorts present in the demographic pyramid, result of births from the past, from mortality levels, and flows of exits and entrances by migration. The duration corresponds to life average that elapses since the birth of a cohort until all its members die and, for the purpose of calculating pensions, they retire until they die. (Esteve, Devolder, Rentería & Blanes, 2018, p,163).

The population pyramids presented in Figure 1 show that the Spanish population is expected to age significantly. The fall in the birth rate together with the increase of life expectancy have changed the structure of the Spanish population. As it can be observed, the base of the pyramids narrows progressively over time, whereas the top widens. Cohorts between 44 and 64 years who are also known as “Baby boomers” are putting strain in the system. The old-age dependency ratio is expected to increase considerably as they start retiring. This is clearly one of the biggest threats to the sustainability of the system.

Figure 1 Population pyramids for Spain



Source: Generated by the authors based on data from the Spanish Statistical Institute (INE)

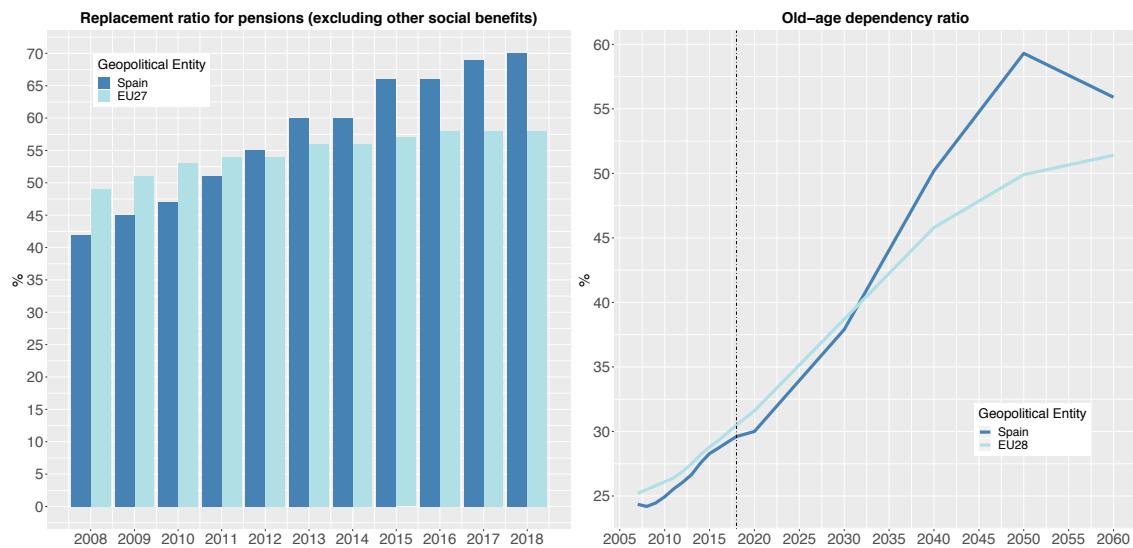
An important implication of the demographic developments highlighted is the projected increase of the old-age dependency ratio (people aged 65 and above relative to those aged 15 to 64). Considering the working age population to be between 16 and 66 years (current framework), the old-age dependency ratio is expected to increase progressively from 30% in 2018 to 42% in 2040, and 50% in 2060 (see Table 2). Nevertheless, this trend is common to most of European countries. The European Commission (2018) has forecasted the old-age pension ratio to be 51.2% in 2070 in the EU.

Table 2 Population projections by age cohort and Old-dependency ratios

Age cohort	2018	2040	2060
16-64	30262299	28654364	27311195
16-66	31240664	30135866	28373501
16-69	32668514	32248044	29979086
65+	8960678	14160461	15033001
67+	7982313	12678959	13970694
70+	6554463	10566781	12365109
65+/16-64	29.61	49.42	55.04
67+/16-66	25.55	42.07	49.24
70+/16-69	20.06	32.77	41.25

Source: In-house calculations based on INE projections

Figure 2 Replacement ratios progress and old-age dependency ratios projection



Notes: The replacement ratio indicator is defined as the ratio of the median individual gross pensions of 65-74 age category relative to median individual gross earnings of 50-59 age category, excluding other social benefits. The old-age dependency ratio is the ratio between the number of persons aged 65 and over (age when they are generally economically inactive) and the number of persons aged between 15 and 64 (EUROSTAT).

Source: Generated by the authors based on data from the EUROSTAT

Another relevant demographic trend is the persistence of low and late fertility rates, with levels below 1.5 children per woman since the mid-eighties (see Figure 3) and with a progressive postponement of motherhood. Fertility rates of women aged below 30 have halved since 1990, whereas fertility rates of women above 30 have raised substantially. (OCDE, 2019; Esteve, Devolder, Rentería & Blanes, 2018).

However, the fertility rate is projected to increase over time in all European countries, with the exception of France. (European Commission, 2018, p.17). While this is the case, all countries are expected to remain below the replacement rate (see Figure 3).

Another essential point that must be considered is the life expectancy. Based on the OCDE data, Spain has the second highest life expectancy in the world and will continue to be the case according to the European Commission (2018), who in their latest report assigned to Spain the highest life expectancy among European countries in 2070⁷.

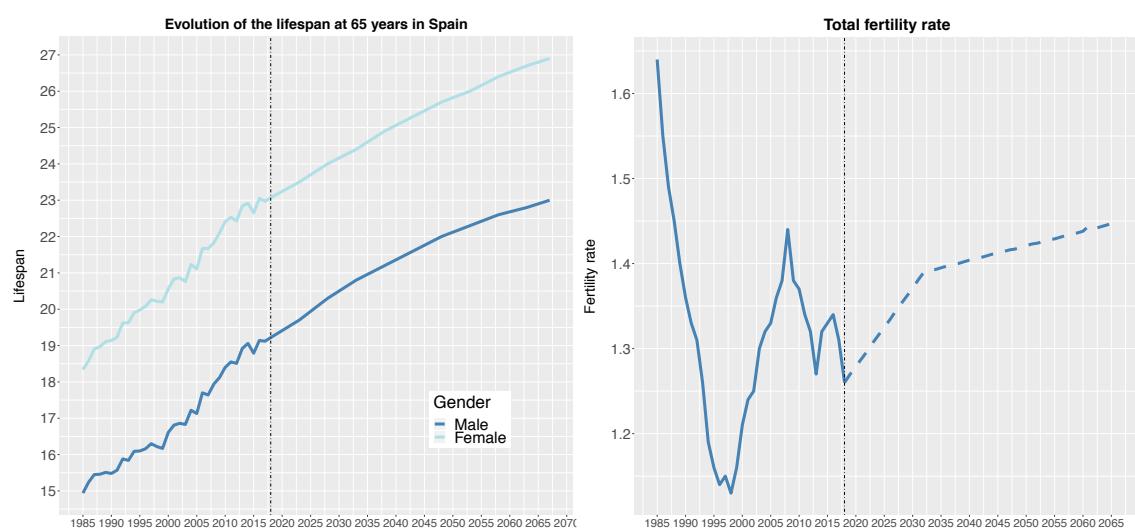
⁷ Life expectancy is expected to grow for the case of males from 80.5 years in 2016 to 86.9 years in 2070. Whereas, for the case of females the projected increase goes from 86 years in 2160 to 91.2 years in 2070.

Projections elaborated by The National Statistics Institute (INE) contemplate a growth in life expectancy of 2 months and half per year at birth in the next 50 years. (Afí, 2017, p.8). Nevertheless, this is not a specific phenomenon, life expectancy has been increasing in most of developed countries in the world since 1960. The European Commission (2018) reported that in the EU:

“life expectancy at birth for males is expected to increase by 7.8 years over the projection period, from 78.3 in 2016 to 86.1 in 2070. For females, life expectancy at birth is projected to increase by 6.6 years for females, from 83.7 in 2013 to 90.3 in 2070, implying a convergence of life expectancy between males and females”(European Commission, 2018, p.3).

Tackling this trend is crucial as it puts pressure on the sustainability of the system as the old-age dependency ratio increases. Some countries like Denmark, Estonia, Italy and, Netherlands have linked their statutory retirement ages to life expectancy to ensure the financial sustainability of their pensions’ schemes. (OCDE, 2019, p.42). In the case of Spain, as examined earlier, it has adopted the sustainability factor and has raised the statutory age of retirement.

Figure 3 Relevant demographic trends



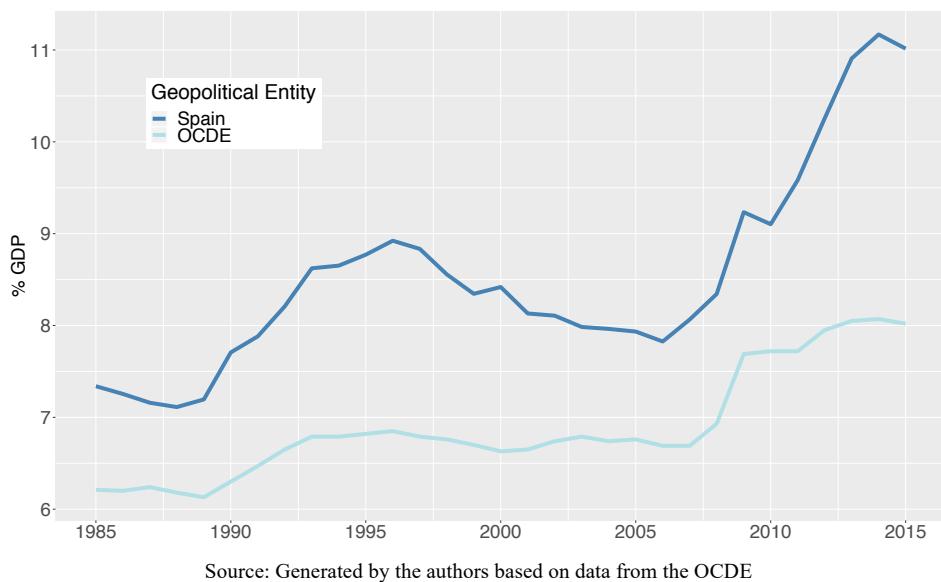
Notes:

Source: Generated by the authors based on data from the Spanish Statistical Institute (INE)

In addition, the evolution of the public expenditure on pensions must also be highlighted (Figure 4). Public expenditure on pensions has increased systematically since the mid-eighties. The reforms of 2011 and 2013 helped to ease pressure on the financial sustainability of the system and slowed down the upward trend. The estimates elaborated by the European Commission (2015) identified containment and showed stabilization throughout the whole horizon period analysed (2013-2060). Notwithstanding, the latest Ageing Report elaborated by the European Commission (2018) has increased the projection, albeit still showing containment. The estimates elaborated in 2015 showed a progressive containment process (in% of GDP) between 11,8% in 2013 and 11% in 2060 with a peak in 2045 of 12.5%. Contrarily, the estimates delivered by the Ageing report in 2018 revealed another containment process throughout the period from 2016 (12,2%) to 2070 (10,7%) with a peak of 13,9% in 2040 and 2050.

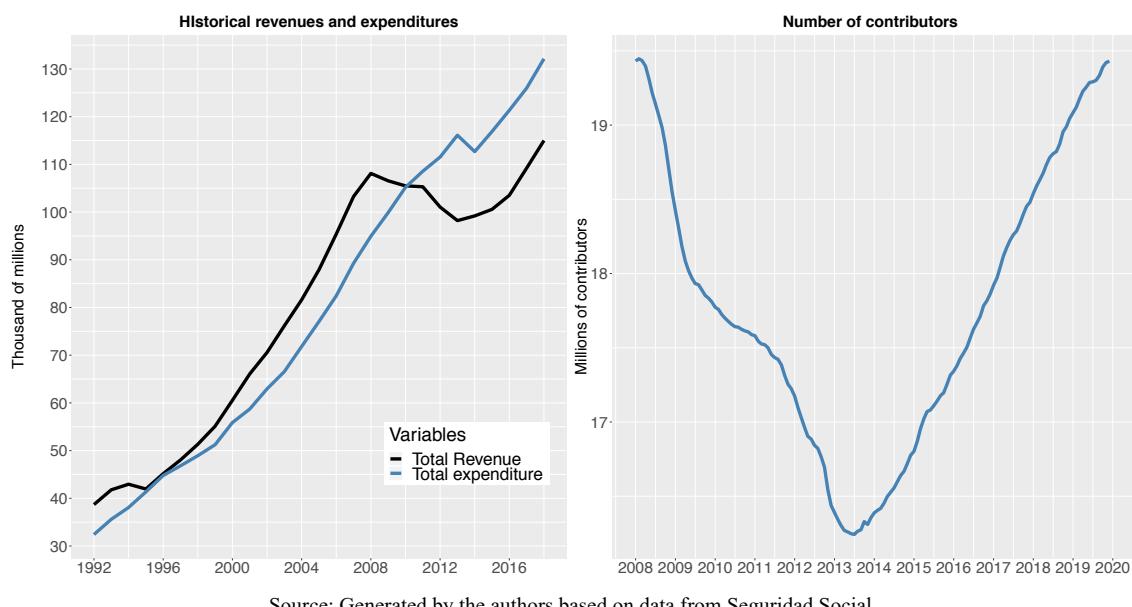
If the revaluation of pensions is linked to CPI again we may observe another increased upwards of the estimates in the following publications.

Figure 4 Public expenditure on pensions (as % GDP)



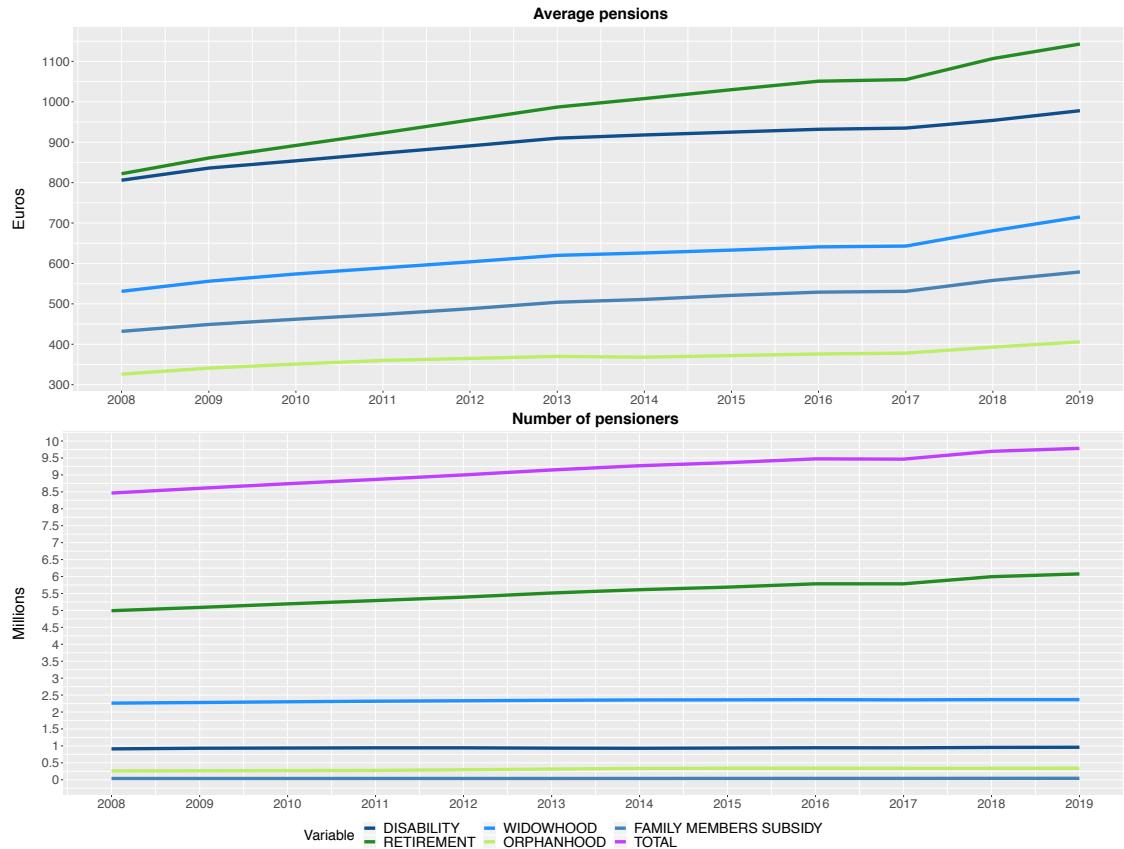
Another key element that has to be brought into the discussion is the evolution of the Social Security System's account. As it can be seen depicted in Figure 5, the system's account has deteriorated substantially in recent years. According to Hernández De Cos, Jimeno, & Ramos (2017) "widening deficits have been registered since 2011, reaching 1.5% of GDP in 2015" (p.18).

Figure 5 Trends in the Social Security System



With regard to income, contributions are the main source of funding, amounting approximately to 85% based on the findings of Hernández De Cos, Jimeno, & Ramos (2017). Figure 5 shows the evolution of number of contributors, it is shown as a u-shape. With the onset of the crisis back in 2008, unemployment rate increased critically in such way that the number of contributors decreased progressively until mid-2013 reaching a reduction of 16% respect to the 2008 level. This reduction contributed to a large extent on the start of the deficit. Despite the positive evolution described by the numbers of contributors since 2013, the system's accounts have continued to deliver deficits. It is worth mentioning that in December 2019, the number contributors reached 2008 levels for the first time since the beginning of the crisis.

Figure 6 Evolution of the average pensions and the number of pensioners



Source: Generated by the authors based on data from Seguridad Social

With respect to the expenditures of the social security system, attention should also be drawn to the increase of the number of pensions. The number of pensions has increased 16% since 2008 (see Figure 6). The growth is mainly driven by the raise of the number of retirement pensions that accounted for more than one million since 2008, that represents an increase of 21% respect to the number of retirement pensions in 2008. In the same way, as it can be observed in Figure 6, the average retirement pension has raised 40% since 2008. It rose from 882 euros in 2008 to 1143 euros in 2019.

This trend is crucial when it comes to the sustainability of the system, as Blanco-Encomienda & Ruiz-García (2017) claim, the evolution that the average pension and the number of retirement pensions are undergoing threaten the present and future sustainability of the system.

Based on the report elaborated by Afi (2017), the Social Security System's account will not be balanced until 2027. Shortly after that year, around 2030, considering that the sustainability factor and the revaluation index continue to work (which is no longer the case), the sharp increase in the retirements of baby boomers and the continued decline in the number of affiliates would re-open the deficit gap. Notwithstanding, the measures included in the most recent reforms would contain the expenditure slightly above 13% of GDP. Afi (2007) concluded that the Social Security would end up generating a debt equivalent to 80,5% of GDP in 2065.

As it is been mentioned, the forecast elaborated by Afi (2017) was performed under the assumption of no modifications of the statutory framework. However, the revaluation index as we explained earlier has not been employed since 2018 and it is likely to be removed permanently. Therefore, it is reasonable to expect estimates to worsen.

4. THE AUSTRIAN SEVERANCE PAY SCHEME

In 2002, Austria adopted the Federal Act on Corporate Staff and Self-Employment “Betriebliches Mitarbeitervorsorgegesetz”, also known as “Abfertigung Neu”.

Hofer (2007) highlights that “the reform replaces the former defined-benefit, final-salary severance payments scheme by a defined-contribution, fully funded system” (p.46). Formerly, Austria's regulation stated that severance pay had to be paid by employers in case of termination of the employment contract. Provided that contracts were terminated either by the employer or by mutual agreement, employees were entitled to receive a severance pay if they had worked for the employer for at least 3 years. (World Bank, 2011, p.178).

The severance pay stipulated by the former law acknowledged payments equivalent to two months' wages after three years of work, and up to a maximum payment of one year's wage after 25 years of work. (World Bank, 2011, p.178).

The new system was enacted at the beginning of 2003. Entitlements in the new system do not depend upon the type of termination, and start in the second month of the employment relationship. Employers have to remit every month 1.53% of worker's gross wages every month into a fund. However, this just applies to new contracts and employees that want to transfer from the old system to the new one. Existing severance pay entitlements remained unchanged. (Hofer, 2007; World Bank, 2011).

According to Hofer (2007) "the aim was to extend entitlement to a wider range of situations and to introduce an option of using payments to fund occupational pensions" (p.44). Similarly, the World Bank (2011) maintains that "one original objective of the Austrian reform was to contribute to the expansion of the underdeveloped second pillar of the Austrian pension system" (p.180). As identified by the World Bank (2011), Austrian's policy makers might have reformed the system in order to smooth the expected reduction in replacements rates in the Austrian's PAYG system after the implementation of different reforms that tried to tackle the sustainability of the Austrian's PAYG system.

4.1 Capital Accumulation and the New Severance Pay Scheme

Severance pay are now transferred to the employee provision funds, also known as, Mitarbeitervorsorgekassen. These funds are completely independent from employers and work on a profit base. As explained by Hofer (2007), "they are allowed to charge operating fees and are entitled to retain an administrative fee of 1% up to 3.5% of annual severance pay contributions" (p.45).

Employers must remit a contribution of 1.53% of the worker's gross salary into the fund every month. Contributions will be systematically performed until the termination of the contract. Once the contract is terminated, accumulated entitlements can be left in the fund until retirement. Contributions performed by other employers will be accumulated in the same fund. (Hofer, 2007; World Bank, 2011).

The BMSVG Federal Act (2002) provides different scenarios where it is not possible to withdraw the funds after the termination of a contract. Firstly, if those contracts terminated by justified reasons. Secondly, for contracts terminated by unjustified

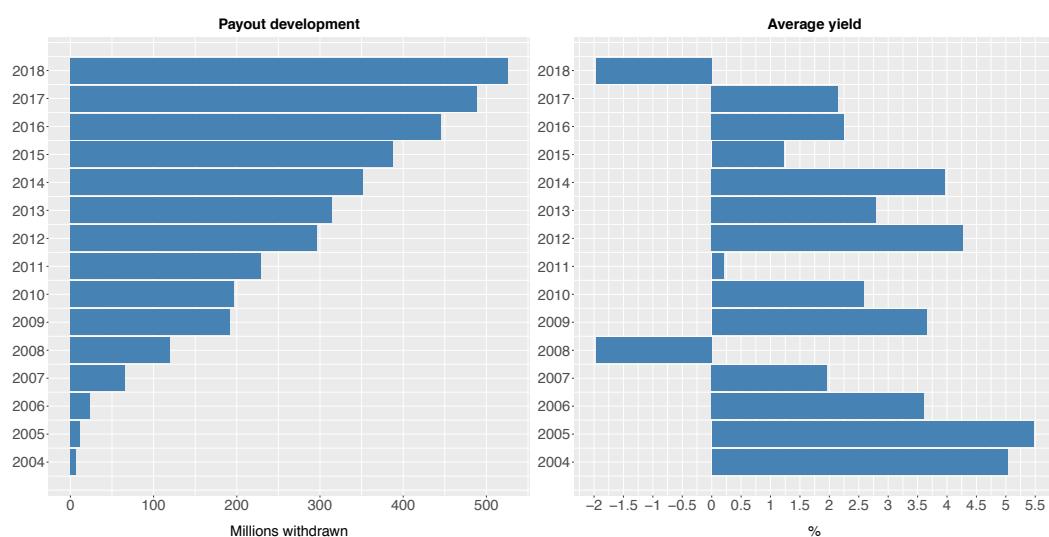
premature resignations, and finally, for those employees that have not performed more than 36 contributions.

In the event of a right to dispose, beneficiaries can decide whether they need the money immediately or whether they would like to use it for his personal pension. Many Austrians also consciously choose their capital to be left in the pension fund. This is an attractive option - including taxation - to make provisions for the pension. (The Austrian Economic Chamber, 2018)

It must be highlighted that in the new system, “the level of severance payment depends on the performance of the employee provision funds on the capital market. Only the nominal contribution paid by the employer is guaranteed by law” (Hofer, 2007, p. 45).

After 16 years on the market, the volume of contributions has also increased significantly. The assets managed by the pension funds amounted to 11.5 billion euros in 2018. It seems remarkable that the portfolio of assets continues to grow, albeit more than 526 million euros in benefits were paid out since 2003 (Figure 7). Therefore, since the new system was enacted at the beginning of 2003, 4,6% of the total entitlements accumulated in the employee provision funds have been extracted. (Austrian Economic Chamber, 2008, p.2).

Figure 7: Performance of Severance Pay Funds

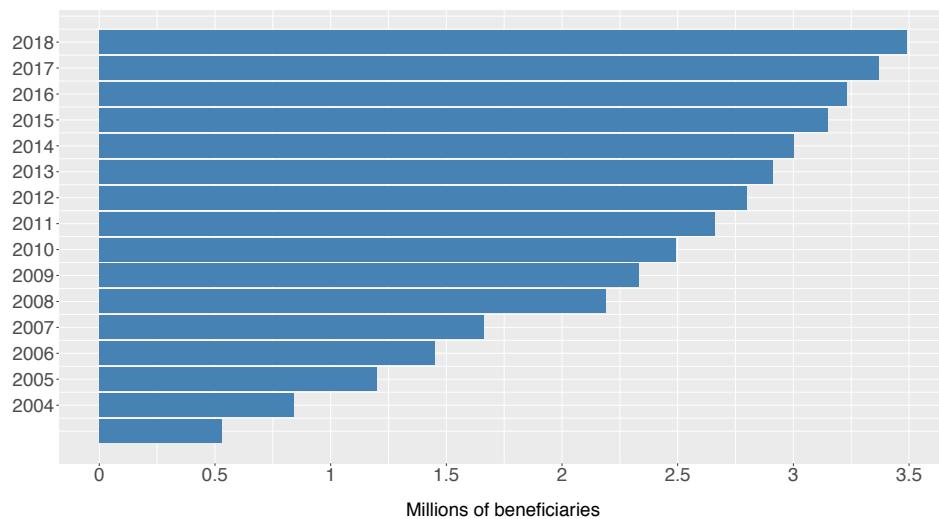


Source: Generated by the authors based on data from the Austrian Economic Chamber

Another advantage of the occupational pension provision is that the pension fund clients also benefit from the investment success. On average for over many years, the provision funds achieved a performance of 2.3% (see Figure 7). In 2018, the funds delivered a negative result of 1.97%. (Austrian Economic Chamber, 2008, p.2).

Company pension funds continue to grow (Figure 8). 3.5 million Austrians were operating within the new severance payment scheme at the end of 2018. (Austrian Economic Chamber, 2018, p.2).

Figure 8: **Number of beneficiaries**



Source: Generated by the authors based on data from the Austrian Economic Chamber

4.2 The expansion of the second pension pillar in Austria.

Hofer (2007) maintain that “originally, the government did not wish to provide for the possibility of paying severance pay directly to employees on the termination of their employment relationship, but favoured a model in which severance pay entitlement went purely to fund occupational pensions”. (p.46). However, at the end, social partners reached an agreement with the government in order to incentivise Austrians to save, instead of obliging employees to keep their entitlements until retirement.

The employees’ consumption–savings decision depends to a large extent on the rate of return of the funds. As it is was mentioned before, funds are currently delivering on

average yields close to 2.3%. This result differs greatly from the 6% initially expected by the government. (Hofer, 2007, p.45).

The World Bank (2011) identifies two interdependent reasons for the poor performance of the funds. On one hand, the employee provision funds are forced to guarantee the nominal value of the contributions. And on the other hand, participants may dispose of the money after 3 years of contributions. For this reason, the funds must maintain high levels of liquidity in order to be able to ensure withdraws. (p.182).

Upon retirement, employees can either withdraw their entitlements in a lump-sum payment or convert their entitlements into annuities. The first method is taxed at a rate of 6%, whereas annuities are tax exempt. (Hofer, 2007; World Bank, 2011).

Hofer (2007) argues that the contribution rate may be too low in order to provide sufficient funds to preserve the current level of Austrian replacement rates. Koman et al. (2005) for example, found that an increase up to 5% would be more suitable for the government's purpose of sustaining future replacement rates.

Increasing contributions rates would help to tackle the potential capacity of accumulation of the funds. Equally important, some measures may have to put in place in order to ensure the existence of funds upon retirement. The World Bank (2011) explored the idea of implementing different measures such as raising the minimum contribution period and shifting to the original plan and restricting pay outs until retirement.

5. QUANTITATIVE ANALYSIS

The object of this work is to understand the functioning of the Austrian Severance Pay Scheme and explore the possible implications of its implementation in Spain. As already stated, the latest National Reform Programme delivered to the European Commission by the Spanish Government, introduced the possibility of putting in place a “gradual implementation of the system of individual capitalization accounts for mobility” (p.69). For this reason, its study and understanding is of great importance.

In addition to this, as has also been explained, replacement ratios are expected to worsen progressively over time. Based on the demographic and economic trends, it is quite likely that new measures will be introduced to tackle this tendency. New mechanisms have to be explored in order to ensure the maintenance of the purchasing power of pensioners. Otherwise, poverty rates will increase dangerously among old people.

To conduct the empirical analysis proposed, we have had to simulate the employment history and the contributions flows of the individuals selected. Once the stream of contributions was generated, we had to simulate individual pension funds for all contributors.

5.1 Projection methodology

To produce the simulation, we had to employ the Continuous Sample of Working Histories of Social Security (Muestra Continua de Vidas Laborales (MCVL) of 2018. The MCVL correspond to a sample randomly selected from affiliates to the Spanish Social Security System and Spanish Social Security pensioners during the last year. The sample size is over one million contributors.

Table 3 shows the filters applied to the MCVL 2018 without tax data, obtaining a final sample of 211164 individuals.

Table 3 Filter process

Filters applied	Size sample
Date of birth missing	1247894
Foreign	1135137
Not having contributed to the general system (Régimen general) uninterruptedly for the last 3 years.	239489
People older than 67	237947
Average contribution of the last 3 years < 12600 o > 48840	211164

Source: Own formulation

Furthermore, to simulate the employment history of the individuals present in the sample, we employed labour market transitions probabilities. The probabilities have been extracted from the Labour Force Survey (Encuesta de Población Activa) elaborated by the National Statistical Institute of Spain. In the model carried out, 4 different status were considered: “Employed”, “Unemployed”, “Inactive”, “Retired”. Individuals can change from one status to another (“Employed”, “Unemployed”, “Inactivate”) at any new period, however, they become “Retired” when reaching 67 of years. The probabilities employed in the model discriminate by age in order to tackle the heterogeneity of the different cohorts.

After having determined the probabilities, we proceeded to simulate the working history paths for all individuals. In order to achieve this, we employed a 1st-order Markov chain.

Thereafter, we estimated the average annual contribution of the last 3 years for all individuals. Simultaneously, it was assumed that contributions were going to grow at the same pace as wages, which in turn, will increase parallel to labour productivity. An average annual growth of 1.1% between 2016 and 2040 and an average growth of 1.6% between 2041 and 2070 was therefore assumed⁸.

Once the working paths and the contributions flows are determined, we have the key elements for the calculation of the pension funds. For this, 3 different scenarios have been presented. Following the Austrian model, in the first scenario, we have assumed the

⁸ The forecast was extracted from the European Commission (2018) Ageing report

contribution rate to be 1.53%. Then a second scenario where a contribution rate of 3% has been imposed. Finally, for the third scenario, we followed the work of Koman et al. (2005) and imposed a contribution rate equal to 5%.

Contributions therefore are accumulated into the funds annually until retirement. More importantly, pensions entitlements depend on the annual net yield delivered by the fund. As we stated formerly, provision funds are invested in capital markets. This is why we have assumed an annual rate of return of 2%, which corresponds to the average yield generated by the Austrian provision funds since the system came into force in 2002.

The simulation covers the period from 2019 to 2065, when the last individuals of the sample retire. Unlike the Austrian case, we have restricted withdraws until retirement. This limitation was imposed in order to asses the potentials gains derived from the provision funds.

The simulation developed allowed us to project the potential gains generated over time by the mechanism selected and explore the capacity of this type of mechanisms to tackle the expected decrease of future replacement rates.

5.2 Limitations of the study

Like in any economic simulation, in order to address an economic issue we have to simplify a complex phenomenon. When conducting a model, assumptions regarding the behaviour of specific variables are made. In addition to this, some relevant variables are not considered due to the underlaying complexity. The existence of assumptions, and more important, the absence of some other, constitute the main limitation of this study.

The presence of high degree of uncertainty in present information regarding the government intentions limited the study greatly as we had to assumed a specific framework based on the Austrian case.

Finally, although the sample size is considerable large (over 200000 contributors), we are unable to gather the heterogeneity of the whole population.

5.3 Findings

In this section, we are going to assess the potential gains that Spanish pensioners would obtain from a hypothetical implementation of a system of individual capitalization accounts. As it was indicated earlier, we obtained the results based on the Austrian Severance Pay Scheme.

Table 4 exhibits the results delivered by the simulation. The transformation undergone by the funds during the period simulated has been displayed. As it can be noticed, results are discriminated by Scenarios. We recall that scenarios differ based on the contribution rate assumed (1.53%, 3% and, 5% in this order).

Table 4 Simulation Results

	Scenario I				Scenario II				Scenario III			
	Mean	Median	Min	Max	Mean	Median	Min	Max	Mean	Median	Min	Max
2019	447.48	411.24	194.93	750.43	877.42	806.36	382.22	1471.44	1462.36	1343.93	637.04	2452.39
2020	899.88	827.28	213.54	1533.49	1764.47	1622.12	418.71	3006.85	2940.77	2703.54	697.85	5011.41
2025	3395.01	3143.02	240.36	5780.71	6656.89	6162.79	471.29	11334.73	11094.82	10271.31	785.49	18891.22
2030	5964.15	5474.31	298.53	10726.43	11694.41	10733.93	585.35	21032.21	19490.68	17889.89	975.59	35053.68
2035	8680.41	7965.07	234.94	16272.82	17020.42	15617.78	460.67	31907.49	28367.37	26029.64	767.78	53179.15
2040	11765.89	10798.30	256.10	22765.46	23070.37	21173.16	502.15	44638.17	38450.62	35288.58	836.92	74396.94
2045	14426.62	12978.91	692.69	30398.74	28287.49	25448.84	1358.21	59605.38	47145.81	42414.73	2263.68	99342.30
2050	16914.63	15292.46	599.45	36415.48	33165.94	29985.21	1175.38	71402.90	55276.56	49975.35	1958.97	119004.84
2055	18233.78	16597.54	2216.79	45304.55	35752.50	32544.19	4346.64	88832.44	59587.50	54240.32	7244.40	148054.07
2060	18603.51	18326.71	3752.49	39819.43	36477.47	35934.72	7357.82	78077.31	60795.79	59891.21	12263.03	130128.86
2065	30535.28	30535.28	25506.29	35564.28	59873.10	59873.10	50012.33	69733.87	99788.50	99788.50	83353.88	116223.12

Source: Own formulation

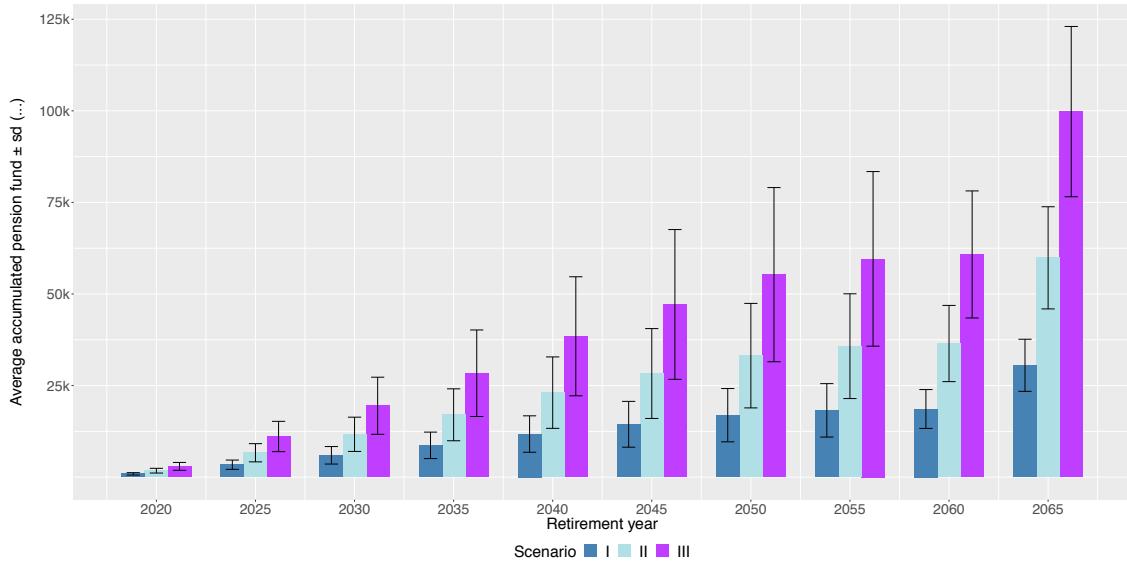
At first sight, it can be quickly seen that the accumulation capacity of funds differ greatly from one scenario to another. Whereas in the first scenario (same contribution rate than the Austrian model), the average benefit obtained after having contributed into the fund over 45 years was 30535 euros, in scenario II the amount was doubled, and in the third case the average entitlement increase more than triple respect to the first scenario.

Both the capacity of the mechanism to smooth consumption during the retirement period and compensate the projected decline of replacement rates improves as time goes by. At the same time, the impact of the measure varies widely from scenario to scenario. It seems clear, that the contribution rate applied in the first scenario would not be sufficient in the short run nor the long run. However, this issue falls beyond the scope of this work. We

would have to undertake another study to assess the suitability of the resources generated upon retirement by taking into consideration future replacement rates levels delivered by the Spanish PAYG system.

Figure 9 allows us to appreciate the difference in magnitudes among scenarios and the dispersion of the results for each case. In the first place, it is easy to assess the accumulation capacity of funds in each scenario. Despite of the fact that all scenarios differ substantially, scenario I is clearly insufficient and displays a discouraging performance during the whole simulation horizon. Notwithstanding, there is a noticeable sharp increase experienced by all funds in the last period. As to be expected, the dispersion around the mean increases substantially with the enlargement of the contribution rate.

Figure 9 Accumulation process of the individual capitalization accounts



Source: Own formulation based on the simulation results

Overall, it may be said that results help to understand the magnitude of the consequences of undertaking a mechanism that favours individual capitalization accounts. The outcome of the simulation provides an understanding of the implications derived from the selection of the contribution rate and the progressive capacity to tackle reductions in replacement rates. Nevertheless, it is important to highlight that, although it was the initial idea for the Austrian case and it is still considered by the Austrian Government, withdrawals have not been considered in order to assess the potential gains.

6. CONCLUSIONS

The Spanish Pension System has recently undergone several reforms that will have significant implications in the long run. Although the Revaluation Index approved in 2013 is no longer employed, the Sustainability factor is still in place and is expected to gradually reduce the purchasing power of pensioners.

Despite the high degree of uncertainty in present information, if the self-funding feature of the Spanish PAYG System wants to be ensured, it is quite likely that new measures will have to be introduced. It is reasonable to assume that in the case of new reforms, these, would follow the restrictive trend displayed among European Countries and would not improve in any case the estimates that point to a general decrease in replacement rates.

Following the OCDE (2016) recommendation of diversification and anticipating future measures that the Spanish Government could undertake, we explored the mechanism of individual capitalization accounts.

Taking into consideration the lack of awareness of the Spanish population in regard the side effects of the recent and upcoming reforms, is very unlikely to expect an effective response. For this reason, in a patronising way, the implementation of this mechanism could to tackle the underlying myopia issue.

As we have shown in this work, the implementation of this new policy could be promising in several scenarios. Implanting the mechanism in its original form, i.e. impeding or restricting withdraws, together with the used of high contribution rates (3% to 5%) could help to offset the negative consequences of recent and future reforms.

In conclusion, undertaking a reform of this magnitude seems unlikely in the present moment, even though it appeared in the latest National Reform Programme. The degree of uncertainty is high regarding future policies and the political landscape is not favourable. Notwithstanding, the development of these simulations can help to enrich debates and contribute to improve the current system by offering more and updated information.

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