THE SPANISH PUBLIC PENSION SYSTEM: CURRENT SITUATION, CHALLENGES AND REFORM ALTERNATIVES

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Abstract

The Spanish Social Security System's deficit rose to 1.5% of GDP in 2015, in contrast to a pre-crisis surplus of 2.2% of GDP in 2007. This deterioration is primarily due to an increase in contributory pension spending (as a % of GDP), as a result of the rise in the dependency ratio, the increase in the pension replacement rate and the decline in the employment rate. Beyond this short-term situation, the Spanish public pension system, as is the case in other developed countries, faces major challenges arising from expectations of significant longevity gains and the attendant growth of the retirement-age population. In this context, this paper aims to contribute to the debate on the situation of the pension system through an analysis of its recent evolution, forward-looking projections that include the impact of the latest reforms and the challenges outstanding.

Palabras clave: pension systems, pension reforms, population ageing.

Códigos JEL: H55.

Resumen

El déficit del Sistema de la Seguridad Social español alcanzó un 1,5 % del PIB en 2015, que contrasta con el superávit observado antes de la crisis económica, del 2,2 % del PIB en 2007. Este deterioro se debe, sobre todo, a un incremento del gasto en pensiones contributivas (en % del PIB), como resultado del incremento de la tasa de dependencia, el aumento de la tasa de sustitución de las pensiones y la caída de la tasa de empleo. Más allá de esta situación de corto plazo, el sistema público de pensiones español se enfrenta, como los del resto de los países desarrollados, a retos importantes causados por la expectativa de un aumento significativo de la longevidad y, consecuentemente, de la proporción de la población en edad de jubilación. En este contexto, este documento tiene como objetivo contribuir al debate sobre la situación del sistema de pensiones mediante el análisis de su evolución reciente, las previsiones hacia el futuro, que incorporan el impacto de las últimas reformas, y los retos pendientes.

Keywords: sistema de pensiones, reforma de pensiones, envejecimiento de la población.

JEL classification: H55.

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Executive summary

Public spending on pensions, expressed as a proportion of GDP, depends on three types of factors. One is demographic: insofar as spending is essentially linked to retirement pensions, spending on pensions is greater when the corresponding age group is more numerous relative to the population of working age (i.e. when the dependency ratio increases). The second factor is related to the labour market situation: the lower the proportion of the population of working age in employment (i.e. the employment rate), the lower GDP will be and, therefore, the higher pension spending expressed in these terms will be. The third factor concerns the relationship between the average pension and the economy's average productivity, which is the product of the ratio of the average pension to the average wage (the pension replacement rate) and the weight of wages in GDP (the share of wages in GDP). Hence, the higher the pension replacement rate, the greater pension spending will be. Likewise, given the employment and replacement rates, such spending will also be greater the higher the share of wages in GDP.

As regards revenue, the main source of funding for the Social Security System in Spain are social contributions (approximately 85% of its total resources) and, to a lesser extent, State transfers to cover non-contributory pensions and top-ups to minimum pensions, which, since 2013, have now been fully funded with general taxes. In terms of GDP, social contributions revenue is determined by the product of the effective rate associated with these contributions and the share of wages in GDP.

The changes in the Spanish Social Security System's accounts in recent years are illustrative of the role played by the different determinants. Hence, the system's deficit amounted to 1.5% of GDP in 2015, in contrast to the surplus of 2.2% of GDP observed in 2007. This deterioration is due to the increase in the system's expenditure and, to a lesser extent, to a slight reduction in revenue over the period as a whole (both expressed as a proportion of GDP). Specifically, spending on contributory pensions rose by 3.1 pp of GDP over these years, which, in keeping with the previous determinants, responds in similar proportions to higher demographic pressure, i.e. to a higher dependency ratio, to an increase in the replacement rate and to the decline in the employment rate. The marginal 0.4 pp decline in the social contributions/GDP ratio is the outcome of the fall in the share of wages in GDP, while there was a small increase in the effective rate of social contributions. As a result of the growing deficits, the Social Security Reserve Fund, which stood at 6.2% of GDP in 2011, fell by 4.8 pp of GDP to stand at 1.4% of GDP at end-2016.

The challenges facing the public pension system are even more significant from a medium and long-term perspective, and arise essentially from the demographic outlook. Indeed, on available projections, the increase in longevity and, consequently, in the proportion of the population of retirement age, will exert substantial upward pressure on pension spending. Specifically, a 65-year-old today has an expected longevity of almost 6 years more than a person of the same age in 1975, and it is projected that he/she will live almost 8 years less than a

65-year-old in 2060. As a result, the population aged over 67, which accounted for around 10% of the total population in the early 1980s, today represents more than 16% and it is projected to account for more than 30% as from 2040.

The pension system reforms introduced in recent years have addressed this challenge by, among other measures, putting back the retirement age, introducing a sustainability factor linking the initial pension to the increase in life expectancy and approving a new mechanism making the annual rise in pensions conditional upon the system's revenue and expenditure being balanced, with ceilings and floors set in place.

On the estimates available, in benign macroeconomic scenarios in terms of expected employment and productivity developments and in which it is assumed inflation will stand at a rate of close to 2%, these reforms would largely be successful in countering the effect of the expected increase in the dependency ratio on pension spending and, therefore, would contribute to restoring the system's long-term sustainability. Without further increases in the system's revenue, the adjustment mechanism would operate chiefly through reductions in average pensions relative to the average wage, i.e. via a significant reduction in the public pension replacement rate. Indeed, according to the estimates in the European Commission's latest report on ageing, the decline in the replacement rate in Spain from 2013 to 2060 will be approximately 20 pp. The key mechanism for shoring up the sustainability of the System is the new indexation mechanism, which leads to below-inflation increases until equilibrium between revenue and expenditure is achieved.

In the short and medium term, and under the same macroeconomic assumptions and given no increases in revenue, the pension revaluation index along with the introduction of the sustainability factor from 2019 would reduce the public pension system deficit by approximately 0.1 pp of GDP per annum, thereby attaining an equilibrium position as from the second half of the 2020s. The functioning of the index would lead to annual increases in pensions of 0.25% (the floor established by the regulations) every year which, set against growth in the inflation rate of around 2%, would generate systematic pension purchasing power losses and progressive reductions in the replacement rate.

Given this outlook, the key is to define the replacement rates of our pension system that it is sought to ensure so that revenue can be adjusted so as to guarantee the system's sustainability. The implications for inter-generational and intra-generational equity of the decisions adopted should also be made explicit.

On one hand, maintaining the current replacement rates, which are high on international comparisons, would require most significant increases in the system's revenue. Specifically, under the most favourable macroeconomic scenarios considered in this paper, increases in the effective rate of taxation of the system of over 10 pp would be required in the long term. In this connection, other sources of funding far-removed from those currently used would be needed, given that social contributions are already at a high level and significant increases therein would have adverse effects on employment.

On the other, were it decided to reduce public pension replacement rates, a move that would follow from the strict application of recent reforms if no new revenue is forthcoming for the system, the advantages or disadvantages of other reform alternatives – such as a more balanced distribution between the adjustment arising from the reduction in the initial pension and that operating via the indexation mechanisms or through further pushing back the retirement age – should be studied. Against a backdrop of declining replacement rates, the role of other insurance and saving mechanisms that may help top up pensions provided by the unfunded public system, such as those set in place in other countries, should also be considered.

In any event, it is crucial that any reform strategy chosen should increase the system's transparency and strengthen its contributory character, i.e. the relationship between contributions and benefits, while at the same time providing for some flexibility to cover the heterogeneous needs of the population. Specifically, citizens should be given the necessary information about their future pension so that they can take optimal decisions on saving and labour market participation. In this respect, given its potential to improve transparency, make individuals' decisions more flexible and support the contributory nature of the system, one avenue of reform that has been adopted by a number of other European countries is to complete the transition towards a system of notional defined-contribution individual accounts.

Lastly, beyond the changes that may be made to the pension system, the challenges of population ageing must be tackled by means of a broad economic policy strategy. Firstly, it is vital that the path of fiscal consolidation should be resumed and that public debt should return to a downward trend, so as to meet the targets set in the Stability and Growth Pact at the European level and in the budgetary stability laws at the national level in the medium term, thereby better positioning public finances to address the issues arising from ageing. Secondly, from the macroeconomic standpoint, the sustainability problems of the public finances system may be alleviated if employment and productivity in the economy trend favourably. In this respect, there is much room for improvement in Spain and structural reforms are needed in many areas, such as the labour market and the market for goods and services, in addition to education and employee training. The long-term view that should be maintained in the analysis of the sustainability of the pension system is, moreover, perfectly compatible with the fact that many of the reforms needed to improve employment and, above all, productivity may only be deployed and come to fruition after a relatively extensive period of time.

1 Introduction

The economic and financial situation of the Spanish public pension system and the need to ensure its sufficiency and sustainability are recurrent topics in economic policy debates. The Social Security System's growing deficits and the diminishing resources available from its Reserve Fund have galvanised interest in these issues in recent years.

Indeed, the slower GDP growth and employment observed over the past decade have translated into rising pension expenditure and falling revenues from social security contributions, which are the main source of funding for this expenditure.[1] This has led to a substantial increase in the Social Security System's deficit. Beyond these conjunctural factors, the gradual ageing of the population has also pushed up pension expenditure in recent years and will continue to do so. Moreover, this trend is likely to intensify and become a permanent feature in the coming decades.

This paper aims to contribute to the debate on the economic and financial situation of the Spanish public pension system by analysing: i) trends in the system's revenue and expenditure and their determinants (Chapter 2); ii) pension expenditure forecasts for the coming decades, factoring in the impact of the latest reforms (Chapter 3); and iii) the challenges funding for this expenditure poses both now and in the future, and some of the possible reforms and their impacts on the system's sustainability and sufficiency (Chapter 4). The final chapter sets out the main conclusions.

The analysis presented here takes an aggregate perspective and aims primarily to be illustrative. Nevertheless, its findings are not qualitatively different from those obtained using more ambitious modelling of the interactions between the variables determining the public pension system's revenue and expenditure.

1 All references in this document to the public pension system's expenditure, revenues and deficits are expressed in GDP terms, unless otherwise stated.

2 The current situation of the Spanish public pension system

As a starting point, this chapter reviews the institutional framework of the Spanish public pension system and presents international comparisons of its main elements and characteristics. Secondly, it briefly describes the most significant reforms implemented in Spain in the last three decades. Lastly, it analyses the trends in the public pension system's revenue and expenditure and their determinants since 1980.

2.1 The institutional framework

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). There are two basic types of pensions, one non-contributory and the other contributory and compulsory. The first type are funded with general taxes and are for individuals with levels of income and wealth which fall below certain thresholds.[2] The contributory pensions are funded with the social security contributions of employers and workers (that is, under the pay-as-you-go principle).[3] The amount of these benefits is calculated on the basis of the individual's working life (contribution years and bases), that is, according to contributory and defined-benefit criteria. In addition, the pension amounts must fall within a legally established bracket with minimum and maximum pension levels.[4] In the case of Spain, private pension funds and plans have a very limited scope.[5]

Public contributory systems with unfunded and defined-benefit pension schemes also prevail in EU countries (see Table 1).[6] However, unlike Spain, these systems are often complemented with capitalisation funds (savings), either in the public sector or through the promotion of private funds. Some countries, such as Italy or Sweden, have defined-contribution systems which, although based on the pay-as-you-go principle, use an actuarial basis to convert accumulated contributions into lifelong pensions.[7]

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2 These are cash benefits paid to citizens who are in a situation entitling them to protection but whose incomes are below a certain level, even if they have never paid social security contributions or have not done so for long enough to entitle them to the benefits paid under the contributory system.

3 A pay-as-you-go pension scheme pays out benefits to cohorts of pensioners using pension contributions.

4 Apart from the contributory pensions paid by the social security system, there is a government employee Social Security scheme which pays out retirement and survivors' pensions to State civil servants and military staff.

5 Private pensions funds and plans may be occupational (linked to the company) or individual. The total assets accumulated in these funds in Spain account for 9.5% of GDP.

6 This information has been obtained from the *2015 Ageing Report* prepared by the Ageing Working Group, which reports to the Economic Policy Committee, which in turn, reports to the Council of the European Union. The group is chiefly made up of EU Member States and the European Commission and it cooperates closely with other institutions such as Eurostat. Its main task is to prepare ageing-related expenditure projections and to contribute to the long-term sustainability of public finances. Every three years, it prepares the aforementioned report on ageing which present long-term expenditure projections relating to pensions, health care, dependency and unemployment benefits (available at http://goo.gl/6S8ls4).

7 Under these systems (known as notional defined-contribution accounts), the contributions of employees and workers are accounted for in individual accounts to which a revaluation is applied on the basis of certain demographic and economic variables. The (notional) amount accumulated in this account and life expectancy at the time of retirement are among the factors that determine pension values. For a detailed description of the theoretical bases and issues relating to this system, see Devesa *et al*. (2004).

CHARACTERISTICS OF VARIOUS COUNTRIES' PENSION SYSTEMS

TABLE 1

	Public pension expenditure (a) 2013	Statutory retirement age (b) 2013	Effective retirement age (b) 2014	Dependency ratio (%) (c) 2013	Replacement rate (%) (d) 2013	Accrual rate (%) (e) 2013	Pension system type (f)
Belgium	11.8	65.0	61.9	36.3	42.5	1.5	defined benefit
Bulgaria	9.9	63.7	63.8	45.1	34.2	1.1	defined benefit
Czech Republic	9.0	62.7	63.1	40.3	42.8	2.2	defined benefit
Denmark	10.3	65.0	65.6	36.3	42.5	—	defined benefit
Germany	10.0	65.3	65.1	37.6	44.6	—	points system
Estonia	7.6	63.0	64.4	47.5	30.4	0.6	defined benefit (points)
Ireland	7.4	65.0	64.9	28.0	27.9	—	fixed benefit
Greece	16.2	67.0	64.4	36.6	65.6	2.2	defined benefit
Spain	11.8	65.0	62.8	28.9	59.7	2.3	defined benefit
France	14.9	65.8	60.8	43.9	51.3	1.8	defined benefit
Croatia	10.8	65.0	62.4	42.8	30.8	—	points system
Italy	15.7	66.3	62.4	39.6	58.8	1.9	notional account
Cyprus	9.5	65.0	64.9	23.3	64.4	1.4	defined benefit (points)
Latvia	7.7	62.0	64.6	43.6	27.7	1.1	notional account
Lithuania	7.2	62.8	62.8	46.8	35.1	0.5	defined benefit
Luxembourg	9.4	65.0	60.2	45.9	51.3	1.8	defined benefit
Hungary	11.5	62.0	63.0	41.6	40.8	2.1	defined benefit
Malta	9.6	62.0	62.0	30.9	48.3	1.9	defined benefit
Netherlands	6.9	65.1	65.5	35.0	35.9	2.0	fixed defined benefit
Austria	13.9	65.0	62.5	39.9	41.2	1.2	defined benefit
Poland	11.3	65.3	63.9	34.0	47.9	1.0	notional account and defined benefit
Portugal	13.8	65.0	64.3	37.1	61.8	2.0	defined benefit
Romania	8.2	64.7	64.0	39.7	37.0	—	points system
Slovenia	11.8	65.0	62.5	43.2	33.8	1.5	defined benefit
Slovakia	8.1	62.0	61.6	34.2	45.7	1.2	points system
Finland	12.9	66.0	63.6	39.2	52.1	2.9	defined benefit
Sweden	8.9	67.0	65.8	38.8	42.1	1.0	notional account
United Kingdom	7.7	65.0	64.9	31.5	36.4	—	fixed benefit
Norway	9.9	67.0	65.6	33.6	47.0	0.9	notional account

SOURCE: 2015 Ageing Report.
NOTE: The selection of programmes included under the concept of a "pension system" and the statistical variables used to calculate their parameters can vary depending on the source. Consequently the information about these parameters does not always match and can vary according to the source used.

a As a percentage of GDP.
b Corresponding to men.
c Number of pensioners relative to population aged 15-64 years.
d Defined as ratio of average pension to average wage. Note that in some countries with a comparatively low replacement rate, such as the United Kingdom, the Netherlands, Sweden or Denmark, the weight of private pensions is greater than in other countries.
e Rate at which pension rights accrue.
f Retirement pensions, main system.

The expenditure of the Spanish public pension system amounted to 11.8% of GDP in 2013, slightly above the EU average (10.5%), although the dependency ratio, defined as the number of pensioners relative to the working age population (15-64 years) is comparatively low (28.9% in Spain in 2013, only above that of Ireland and Cyprus).

Of this total, expenditure on welfare benefits (added to that relating to top-ups to minimum contributory pensions to meet the legal minimum at any given time) is approximately 1% of GDP (close to 0.25% of GDP, excluding the top-ups). Thirty-four percent of individuals aged over 65 receive welfare benefits, which is close to the OECD average (30%), although there is a high degree of dispersion between countries regarding this average. The average amount of welfare benefits, measured as a percentage of the average wage in the economy, is close to 20% in Spain, somewhat higher than the OECD average, which stands at 18.9%.

As regards contributions, measured as average values for the 2005-2015 period (see Table 2), around 60% of pensions and 68% of total expenditure corresponded to retirement;[8] 26% of pensions and 19% of expenditure to widowhood benefits; approximately 11% of both expenditure and number of pensions to permanent disability benefits, and 3.5% of pensions and 1.5% of total expenditure to orphans' benefits and family allowances. The past decade has seen an increase in the weight of retirement pensions which, on average, are 55% higher than the average for other types of pensions in 2015.

DISTRIBUTION OF CONTRIBUTORY PENSIONS BY CLASS **TABLE 2**

Percentage of total

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2005-2015
Permanent disability												
Number of pensions	10.4	10.5	10.7	10.8	10.8	10.8	10.7	10.6	10.3	10.1	10.0	10.5
Expenditure	11.8	11.9	12.0	11.9	11.8	11.6	11.4	11.2	10.8	10.5	10.3	11.4
Average pension (a)	700.1	731.6	760.7	801.5	831.5	849.9	869.5	887.3	907.6	915.6	923.3	2.8
Retirement												
Number of pensions	58.6	58.9	58.8	58.8	59.1	59.3	59.6	59.8	60.1	60.4	60.6	59.5
Expenditure	66.2	66.5	66.4	66.7	67.0	67.4	67.9	68.3	68.9	69.5	70.0	67.7
Average pension (a)	686.6	722.7	760.0	814.5	854.1	884.1	915.2	946.4	979.5	999.8	1,021.2	4.0
Widowhood												
Number of pensions	27.1	26.9	26.9	26.8	26.6	26.4	26.2	26.0	25.8	25.5	25.3	26.3
Expenditure	20.3	20.0	19.9	19.7	19.5	19.4	19.2	18.9	18.6	18.3	18.0	19.2
Average pension (a)	455.3	476.7	498.3	529.0	553.9	571.7	586.4	601.6	617.6	624.0	630.6	3.3
Orphanhood												
Number of pensions	3.3	3.2	3.1	3.1	3.1	3.1	3.1	3.2	3.4	3.5	3.6	3.2
Expenditure	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.4
Average pension (a)	268.0	285.9	300.9	325.0	339.7	350.3	359.1	366.6	371.1	369.4	370.4	3.3
For family members												
Number of pensions	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Expenditure	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3
Average pension (a)	349.9	374.6	398.2	428.2	446.8	459.4	472.4	485.7	500.9	508.4	517.2	4.0
All pension types												
Average pension (a)	609.8	641.9	673.7	719.7	754.1	779.5	805.0	829.8	856.4	871.0	886.8	3.8

SOURCE: Seguridad Social.

a Average pension in euros/month, paid 14 times a year. In this category, the 2005-2015 average is the average annual growth over the period.

8 Including disability pensions which are known as retirement pensions when the recipient reaches 65 years of age.

The contributory public pension system in Spain presents similarities with that of other European countries, but also has distinguishing features. Specifically:[9]

— The rate at which retirement pension rights accrue in Spain is relatively high compared with that of the other OECD countries. In Spain, this rate is 1.82% of the reference regulatory base for each contribution year, although it depends on the number of contribution years and the stage of the individual's working life, compared with the OECD average of 1.34%.[10]

— The number of years taken into account to calculate pensions is set at 20 in Spain (although it will gradually increase to 25 years by 2023), whereas in most OECD countries this calculation is based on the entire working life.

— In Spain, the contribution bases used for calculating the regulatory base of the pension are revalued in line with inflation, as in the majority of OECD countries.[11]

— The most common revaluation mechanism in the systems of developed countries consists of indexing linked to price growth, while in Spain, after the most recent reform, it is conditional upon the financial equilibrium between the system's expenditure and revenue, with ceilings and floors set in place (see Chapter 2.2).

— In total, 19 OECD countries have maximum pensions amounting to, on average, around 149% of the average wage in the economy, compared with 165% in Spain, where, as in other countries, individuals who sufficiently delay their retirement or receive supplementary maternity benefits may obtain benefits exceeding the maximum pension.

— The statutory retirement age, on average in the OECD and taking into account the legal framework of each country, is 64 years for men and 63.1 for women. In Spain, it currently stands at 65 years and five months, for both women and men, and will gradually increase to 67 years by 2027. Early retirement schemes are common in all countries, including Spain, with pension reductions depending on the length of the early retirement period. As a result, the effective retirement age in Spain (currently 64 years) is below the OECD average.

— In Spain, the retirement pension replacement rate, defined as the average pension to the average wage by employee, is significantly higher than that of the OECD (49.5%, compared with 42.1%). If measured as the ratio between the initial pension

9 For more details, see OECD (2015).

10 The accrual rate is the percentage of the regulatory base of the pension obtained for each year of contribution. In Spain, the rate is 2.3% between 15 and 37 years' contributions, as shown in Table 1. It is somewhat lower when compared with the average for other years in other countries, as pointed out in the text.

11 In some cases, there is a mixed system of revaluation via price inflation and wage growth rates.

and the last wage received before retirement, Spain is also among the countries with the highest replacement rates (81.9% in 2013, the highest in the EU). However, this comparison should take into account that in some countries, state pensions are significantly topped up with other private pension schemes.

2.2 Recent reforms of the Spanish pension system

Spain's pension system has undergone different far-reaching reforms in recent decades.[12] The first one was in 1985, when the minimum contribution base was raised from 10 to 15 years and the number of years used to calculate the regulatory base was increased from two to eight years prior to retirement. Although these measures substantially alleviated the system's financial position, the number of pensions and the average pension amount continued to rise. Between 1980 and 1995 contributory pension expenditure increased from 5.6% to 8.4% of GDP and the ratio of number of persons registered in the system to number of pensions decreased from 2.7 to 2.1.

This situation led to the approval by the Spanish Parliament in the plenary session of 15 February 1994 of a proposal to prepare a report for the Budget Committee on the problems and reforms of the Social Security System. This report,[13] known as the Toledo Pact, analysed both the background of the Social Security System and the factors that could condition its future operation, and included 15 general recommendations.

The 15 recommendations of the Toledo Pact set the basis for the Agreement on Consolidation and Rationalisation of the Social Security System reached on 9 October 1996 by the Spanish Parliament and the two major labour unions in Spain. This Agreement was subsequently enacted as Law 24/1997 on Consolidation and Rationalisation of the Social Security System, approved by Parliament on 15 July 1997. The changes introduced by this law included most notably the increase in the number of years used to calculate the regulatory base of pensions from 8 to 15, the revaluation of pensions on the basis of CPI projections and their revision based on deviations from CPI increases recorded in November, the setting up of a reserve fund to cover the system's future needs using Social Security surpluses and the gradual elimination of contributory limits below the maximum.

On 9 April 2001, the Government, the Trade Union Confederation of Workers' Commissions, the Spanish Confederation of Business Organisations and the Spanish Confederation of Small and Medium-Sized Enterprises entered into an Agreement for the Improvement and Development of the Social Protection System, which was subsequently implemented by Law 35/2002 of 12 July 2002, under which retirement beyond age 65 was encouraged and early retirement was permitted from age 61 to workers registered with the Social Security after 1 January 1967, provided certain requirements were met.

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12 For greater detail on reforms prior to 2009, see Banco de España (2009).

13 Approval by Parliament in plenary session of the wording approved by the Budget Committee in connection with the report on the proposal to analyse the Social Security System's structural problems and the main reforms to be implemented. Published in series E of the *Official Parliament Gazette* of 12 April 1995.

The Toledo Pact restricted its initial duration to five years, establishing that is was to be revised as from 2000. As a result of this revision, in the plenary session of 2 October 2003 Parliament approved the report prepared by the ad hoc committee to assess the outcome of the implementation of its recommendations. After the renewal of the Toledo Pact, on 13 July 2006 the Agreement on Measures Relating to Social Security Matters was entered into by the Government, the General Workers' Union, the Trade Union Confederation of Workers' Commissions, the Spanish Confederation of Business Organisations and the Spanish Confederation of Small and Medium-Sized Enterprises, which was enacted as Law 40/2007. The main changes introduced were the use of effective contribution days, instead of those relating to extra payrolls, in order to increase the number of effective years of contribution to 15 for pension calculation purposes; increasing the age limit for partial retirement to 61, provided the person had worked at least 6 years in the same firm and was able to provide evidence of having made contributions during 30 years; and the rationalisation of eligibility criteria for disability pensions.

The Social Security Reserve Fund was regulated by Law 28/2003 of 29 September 2003 and by Royal Decree 337/2004 of 27 February 2004. Under Law 28/2003, priority is to be given to allocating the majority of any revenues deriving from a contribution surplus or the outturn of each year's Social Security budget to the Reserve Fund. Setting up funds of this kind is customary in other countries, either for cyclical reasons (to cover transitory shortfalls caused by economic cycles) or more permanent reasons (to cover demographic imbalances that may hinder the Social Security's financial position over the course of future generations). In the case of Spain, the reasoning underlying the fund and the size reached relate more to the first option than the second one.[14]

More recently, Spain's public pension system has experienced two important reforms which mainly aim to adapt the system to the new demographic scenario projected for the future.[15] Law 27/2011 of 1 August on the update, adjustment and modernisation of the Social Security System (in force from 2013), introduced significant changes to retirement eligibility requirements, such as a phased-in increase in the legal retirement age, from 65 to 67; a gradual lengthening of the period considered to calculate the regulatory base of retirement pensions, from 15 to 25 years; and the obligation to provide evidence of having contributed to the system for at least 37 years in order to have access to 100% of the pension. This reform was completed through Royal Decree-Law 5/2013 of 15 March on measures fostering the lengthening of the working life of older employees and promoting active ageing, which revised, inter alia, the eligibility requirements for partial and early retirement, linking such eligibility to an increase in the retirement age.

This reform process gained momentum with Law 23/2013 of 23 December regulating the Sustainability Factor and the Social Security Pension System Revaluation Index. Under this reform, a new mechanism was established to calculate the annual revaluation of pensions

14 See, for example, the preamble of Law 24/1997 of 15 July on the consolidation and rationalisation of the Social Security System.

15 This scenario is detailed in Chapter 3.

AUTOMATIC ADJUSTMENT MECHANISMS IN VARIOUS COUNTRIES TABLE 3

Country	Sustainability factor	Automatic adjustment mechanism	Benefits linked to life expectancy	Retirement age linked to life expectancy
Denmark	X			X
Germany	X	X		
Greece	X			X
Spain	X	X	X	
France	X		X	
Italy	X		X	X
Cyprus	X			X
Latvia	X		X	
Netherlands	X			X
Poland	X		X	
Portugal	X		X	X
Slovakia	X			X
Finland	X		X	
Sweden	X	X	X	
Norway	X		X	

SOURCE: 2015 Ageing Report.

(starting in 2014) and the sustainability factor for retirement pensions was introduced (starting in 2019). The revaluation index uncouples annual pension updates from CPI increases, which had previously been linked, and sets the annual increase in pensions on the basis of a formula derived from the balance between the system's revenue and expenditure, although such revaluation cannot be lower than 0.25% nor higher than the sum of 0.5% to the CPI increase. The sustainability factor, which will be implemented in 2019, will automatically link the initial retirement pension amount to life expectancy changes, but refers only to retirement pensions at the legal age (67), not individually to the pension of each new pensioner at retirement age, as occurs in notional defined-contribution accounts systems.[16] The introduction of these elements placed Spain among the group of EU countries that have automatic adjustment mechanisms or sustainability factors for the public pension system. Thus, several countries link benefits or the legal retirement age to life expectancy (see Table 3).

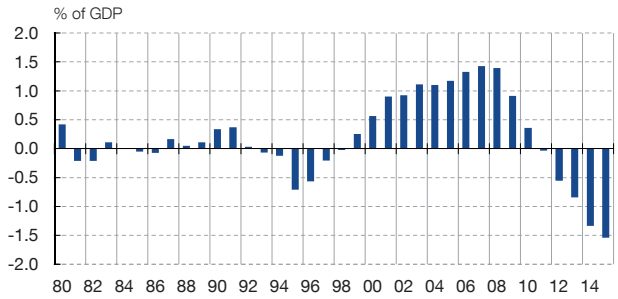
2.3 Recent trends in the public pension system's revenues and expenses and their determinants

The Social Security System's accounts have deteriorated significantly in recent years.[17] Specifically, widening deficits have been registered since 2011, reaching 1.5% of GDP in 2015. This contrasts with an average positive balance of 1.1% of GDP registered in the period 2000-2008 and the balanced budget observed in the 1980s and the early 1990s (see Chart 1.1).

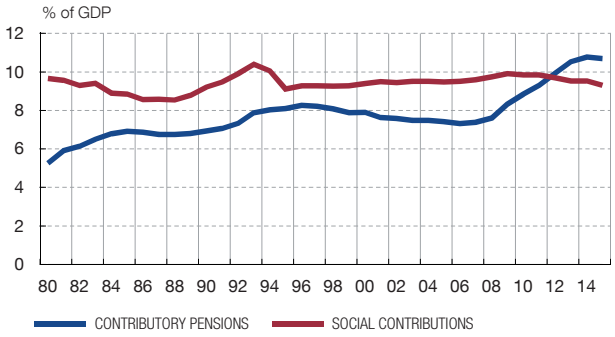
16 For a description of the mechanisms introduced by the 2013 reform, see Ramos (2014).

17 The Social Security System is defined as a series of schemes through which the State guarantees people within its scope adequate protection against certain defined contingencies, such as retirement, illness, disability, accident, survival, etc.

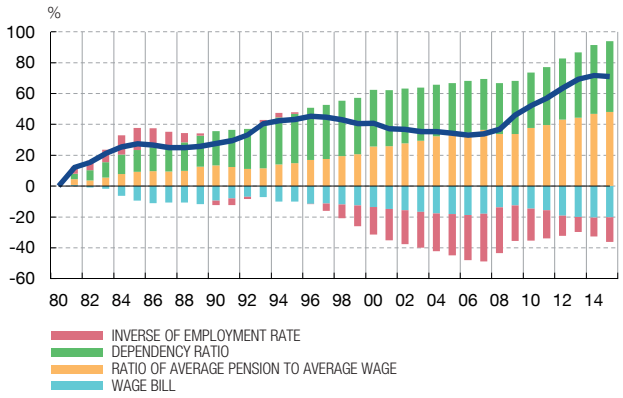
1 NON-FINANCIAL BALANCE OF THE SOCIAL SECURITY SYSTEM



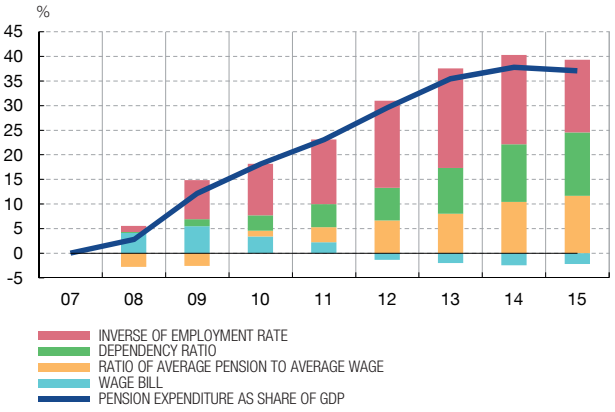
2 CONTRIBUTION INCOME AND PENSION EXPENDITURE



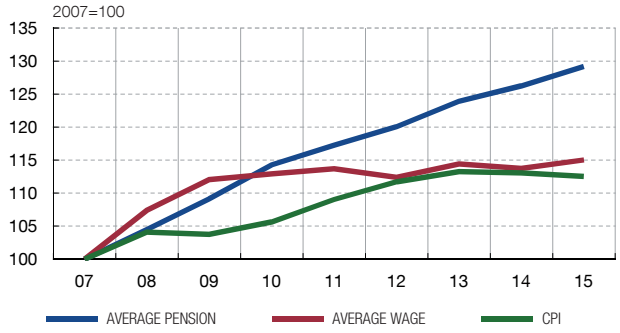
3 TRENDS IN THE DETERMINANTS OF PENSION EXPENDITURE
Proxied cumulative percentage change



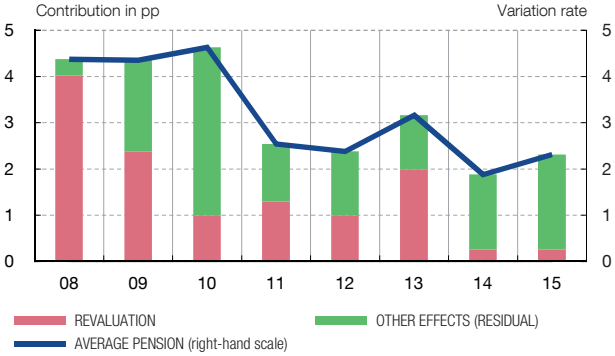
4 DETERMINANTS OF PENSION EXPENDITURE DURING THE CRISIS
Proxied cumulative percentage change



5 AVERAGE PENSION, AVERAGE WAGE, AND CPI



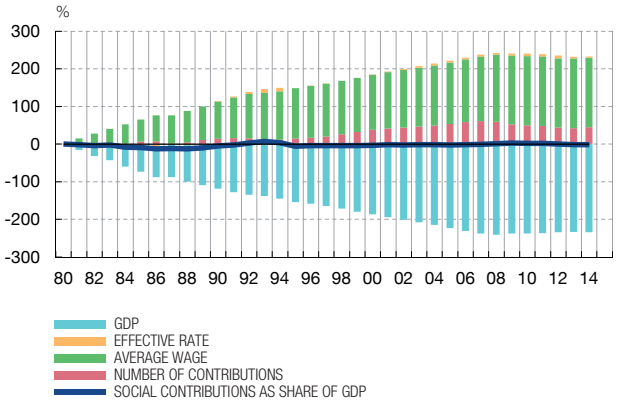
6 DECOMPOSITION OF GROWTH OF THE AVERAGE PENSION
Approximate cumulative rates of change



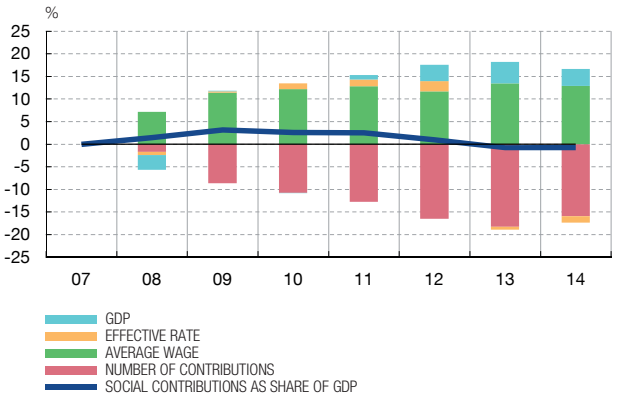
SOURCES: Seguridad Social and Banco de España.

The deterioration in the pension system's non-financial balance observed since the start of the decade is due to revenues remaining relatively stable while expenditure has been rising (both expressed as a share of GDP). Indeed, contributory pension spending (which represents approximately 82% of the social security system's total non-financial expenses) rose from 7.6% in 2008 to 10.7% in 2015 (see Chart 1.2). This increase of 3.1 percentage points of GDP is the result of stagnant nominal GDP growth (GDP being approximately the same in 2015 as in 2008) in conjunction with steady growth in contributory pension expenditure, although

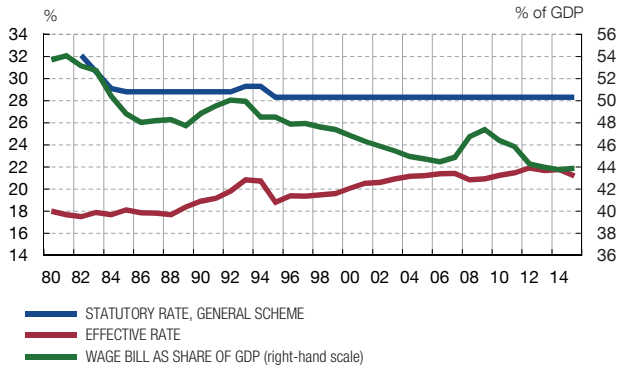
7 TRENDS IN DETERMINANTS OF SOCIAL CONTRIBUTIONS
Proxied cumulative percentage change



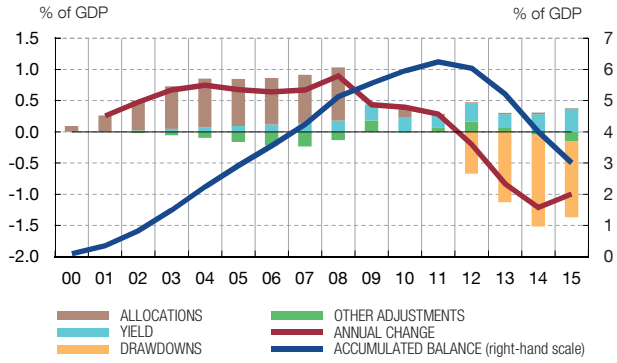
8 DETERMINANTS OF SOCIAL CONTRIBUTIONS DURING THE CRISIS
Proxied cumulative percentage change



9 CONTRIBUTION RATES AND WAGE SHARE OF GDP



10 CHANGE IN THE SOCIAL SECURITY RESERVE FUND



SOURCES: Seguridad Social and Banco de España.

the growth rate has been slowing over the period considered. This moderation is basically due to the lower rate of growth of the average pension, rather than the number of pensions, which grew at an average rate of 1.52% (1.84% in the case of retirement pensions) between 2005 and 2015, as can be seen in Table 4. Moreover, the increase in pension expenditure is due more to the growth in the number and average value of contributory retirement benefits than to other components of the public pension system (see Table 4).

From an aggregate perspective, pension expenditure as a share of GDP depends on three types of factor.[18] One is demographic: to the extent that pension expenditure is fundamentally linked to retirement pensions, this expenditure is greater the larger the relevant age group is relative to the working-age population (i.e. the higher the dependency ratio). The second factor is related to the state of the labour market: the smaller the proportion of the working-age population in employment (i.e. the lower the employment rate), the smaller GDP,

18 This decomposition is the result of the following identities: $\frac{PE}{Y} = \frac{NP}{L}\frac{AP}{Y/L} = \frac{NP}{WAP}\frac{WAP}{L}\frac{AP}{W}\frac{WL}{Y}$

Where PE is pension expenditure, Y is GDP; NP is the number of pensions; WAP is the working-age population; L is the number of people in employment; AP is the average pension; and W is the average wage.

CHANGE IN THE NUMBER OF PENSIONS, EXPENDITURE AND AVERAGE PENSION

TABLE 4

Percentage

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2005-2015
Permanent disability												
Number of pensions	2.17	3.24	3.37	2.03	1.55	1.40	0.51	0.51	-0.90	-0.61	0.23	1.23
Expenditure	7.45	7.11	9.07	5.75	4.90	4.94	1.69	2.41	1.41	0.25	1.10	4.19
Average pension	5.25	4.50	3.99	5.36	3.74	2.21	2.31	2.05	2.29	0.87	0.84	3.04
Retirement												
Number of pensions	1.27	2.80	1.12	1.51	2.07	2.02	2.06	1.60	2.28	1.97	1.49	1.84
Expenditure	7.04	7.40	7.82	7.09	6.62	6.89	4.74	4.67	5.87	4.07	3.66	5.99
Average pension	5.81	5.26	5.16	7.17	4.86	3.51	3.53	3.40	3.50	2.07	2.14	4.22
Widowhood												
Number of pensions	1.38	1.43	1.30	1.10	0.91	0.87	0.84	0.59	0.57	0.52	0.21	0.88
Expenditure	6.69	5.43	7.41	5.61	5.24	5.44	2.77	2.53	3.27	1.56	1.26	4.29
Average pension	5.36	4.71	4.53	6.16	4.70	3.22	2.57	2.58	2.67	1.04	1.05	3.51
Orphanhood												
Number of pensions	-1.45	-0.95	-0.80	0.50	1.84	1.80	1.57	4.44	6.96	6.79	3.94	2.24
Expenditure	6.00	4.80	5.98	6.90	6.07	6.36	3.73	5.82	8.32	6.32	4.12	5.86
Average pension	7.85	6.68	5.26	8.01	4.51	3.12	2.52	2.08	1.24	-0.46	0.26	3.73
For family members												
Number of pensions	-2.28	-2.37	-2.10	-1.30	-0.19	-0.14	0.58	0.86	-1.30	1.65	1.65	-0.45
Expenditure	4.43	3.78	5.52	4.54	3.78	3.95	3.00	2.87	1.84	3.20	3.46	3.67
Average pension	6.92	7.05	6.32	7.52	4.36	2.80	2.84	2.81	3.13	1.49	1.74	4.27
All pension types												
Number of pensions	1.28	2.33	1.33	1.41	1.68	1.63	1.55	1.30	1.63	1.49	1.12	1.52
Expenditure	7.00	6.92	7.86	6.63	6.13	6.36	3.99	4.01	4.91	3.22	2.96	5.45
Average pension	5.75	5.27	4.96	6.83	4.78	3.37	3.27	3.08	3.20	1.71	1.81	4.00

SOURCE: Seguridad Social.

and therefore, the higher pension expenditure will be when expressed in GDP terms. The third factor has to do with the ratio between the average pension and average productivity in the economy, which is the product of the ratio between the average pension and the average wage (the pension replacement rate) and wages as a share of GDP (the labour income share). Thus, the higher the pension replacement rate, the greater pension expenditure. Similarly, for any given employment and replacement rates, this expenditure will be greater the higher the wage share of GDP.[19]

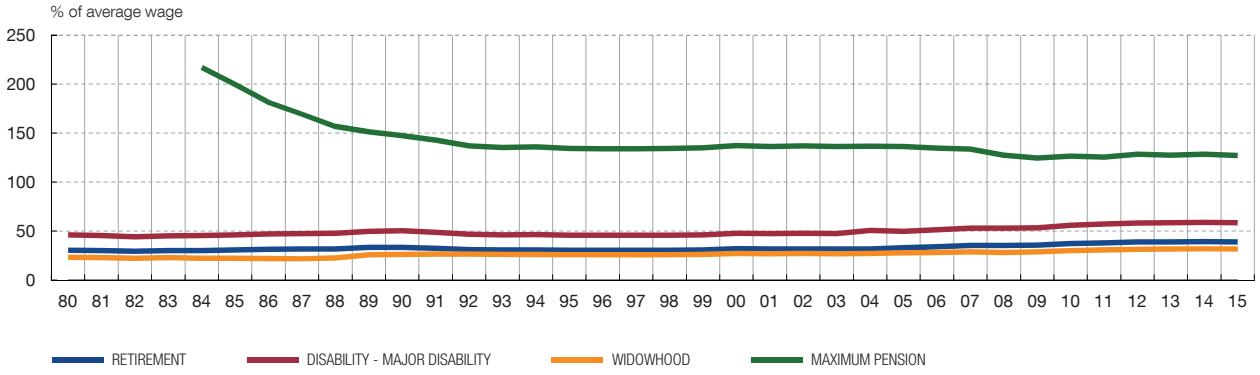
Using this decomposition (see Chart 1.3) it can be observed that the increase in pension expenditure since 1980 is due, in approximately equal measure, to both increased demographic pressure (i.e. a higher dependency ratio) and a higher replacement rate (the ratio of the average pension to the average wage). The employment rate, whose increase played a major part in pension expenditure containment in the period from 1995-2007, has fallen over

19 For any given employment and average wage, a higher share of wages in GDP implies lower apparent labour productivity.

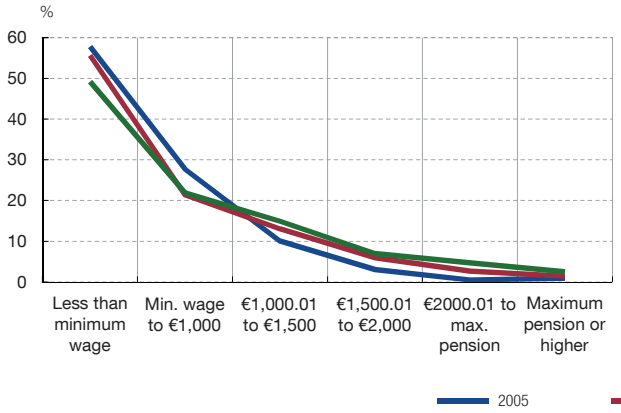
the past decade as a consequence of the crisis, and has therefore contributed to increasing the weight of pension expenditure as a share of GDP (see Charts 1.3 and 1.4). In recent years, moreover, the average pension has grown significantly faster than the average wage or the CPI. This effect is partly due to pension revaluation (except in 2014 and 2015) and partly to other factors, such as the substitution effect (see Charts 1.5 and 1.6), which includes the fact that the pensions of new retirees joining the system tend to be higher than those of pensioners who die. Moreover, part of this increase in the replacement rate is due to lower productivity growth, which averaged 1.6% in real terms, compared with average pension growth of 1.8%. Other factors, such as the increase in minimum pensions have also contributed. In this regard, the three panels of Chart 2 show the main determinants of the trend in the average pension with respect to its composition in terms of pension amount brackets. First of all, minimum pensions can be seen to have been on an upward trend since the early 1990s, resulting in a slight increase in their ratio to the average wage. Secondly, it is worth noting that the maximum pension fell relative to the average wage between 1984 and 1992, and to a lesser extent as of 2007. In the case of the most recent period (2005-2015), it can be seen that the weight of maximum pensions has risen considerably, while that of smaller pensions has declined. This change is particularly marked in the case of retirement pensions.

TRENDS IN MINIMUM AND MAXIMUM PENSIONS AND DISTRIBUTION OF PENSIONS BY AMOUNT CHART 2

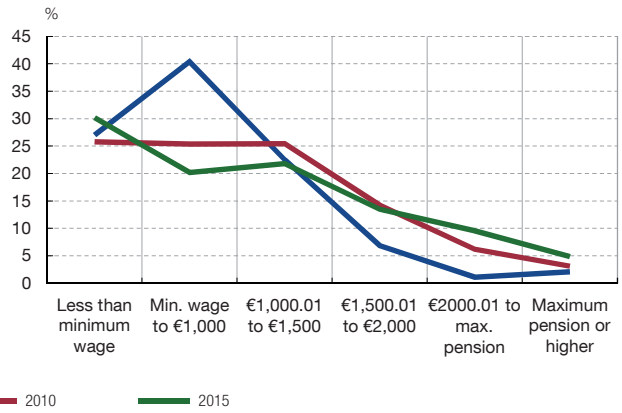
1 MINIMUM PENSION BY CLASS AND MAXIMUM PENSION



2 DISTRIBUTION OF PENSIONS BY AMOUNT



3 DISTRIBUTION OF RETIREMENT PENSIONS BY AMOUNT



SOURCE: Seguridad Social.

With regard to income, social contributions are the Social Security System's main source of funding (accounting for approximately 85% of its total resources), followed by transfers from central government to cover non-contributory pensions and minimum pension top-ups, which have been financed entirely from general taxes since 2013. In GDP terms, income from social contributions are defined as the product of the effective rate of social security contributions and the wage share of GDP. The ratio of social security contributions to GDP has remained relatively constant at around 9.4%, with a drop of a few tenths of a percent during periods of crisis (1979-1985, 1992-1994 and, most recently, 2010-2015 – see Chart 1.2). This is a result of an increase in the effective rate of social security contributions and a decrease in the wage share of GDP. The latter has also behaved somewhat procyclically since the mid-1990s (see Charts 1.7 to 1.9). As regards other sources of income, it is noteworthy that the contribution of financial revenues to the Reserve Fund came to 0.4% of GDP. However, this has decreased recently as a result of the decline in accumulated capital and falling interest rates on Spanish public debt, this being the asset in which the largest share of this capital has been invested.

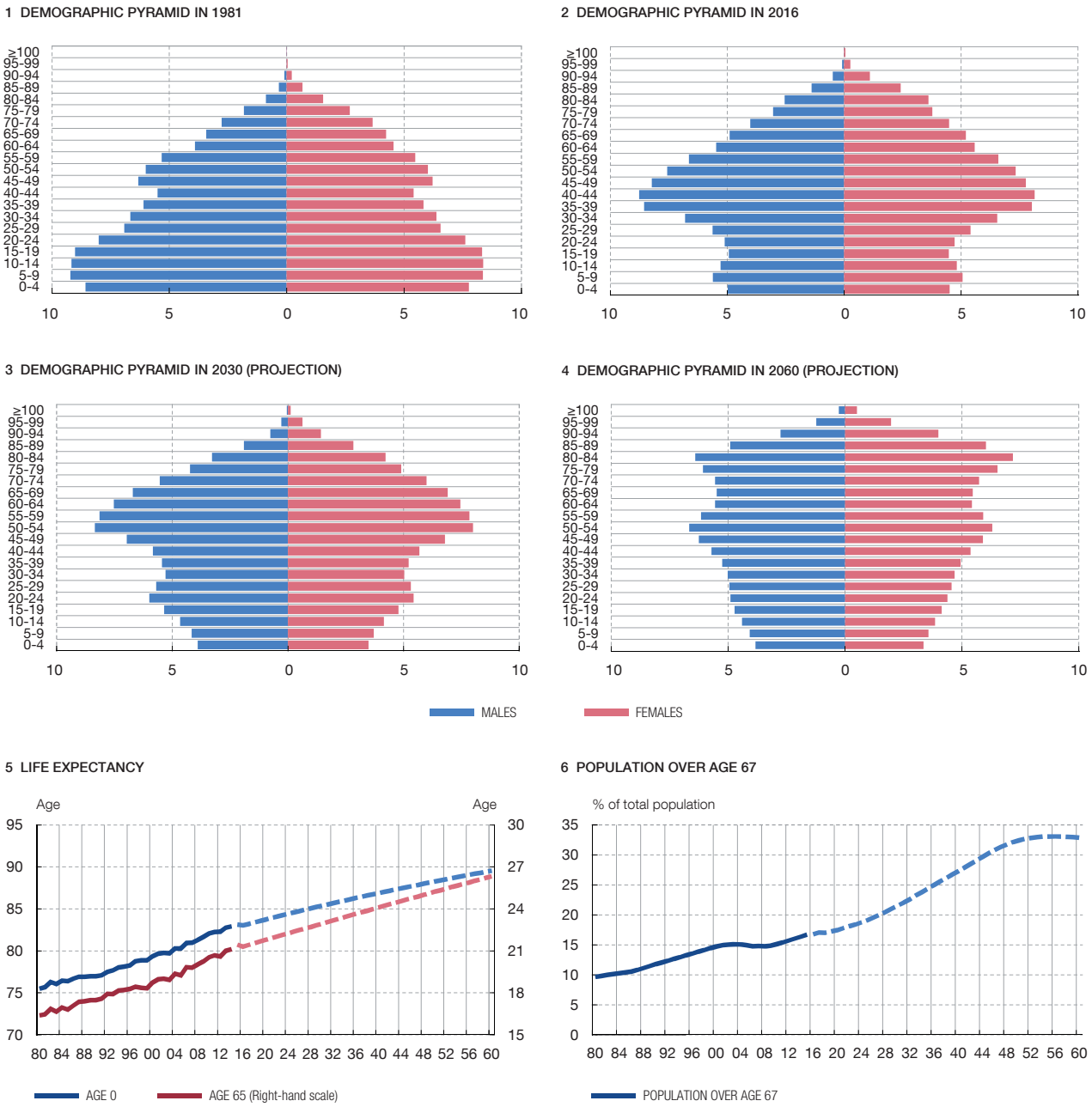
Indeed, after various allocations, the Reserve Fund reached 6.2% of GDP in 2011. Subsequently, the system's deficits have caused this to drop by 4.8 pp of GDP to 1.4% of GDP at the end of 2015 (see Chart 1.10). The Reserve Fund's current allocation is equivalent to approximately 13% of annual expenditure on contributory pensions.

3.1 Demographic scenario

The profound demographic transformation experienced in recent decades, characterised by a sharp fall in the birth rate and an increase in life expectancy, has substantially changed the structure of Spain's demographic pyramid, which has narrowed at the base and widened at the top (see Charts 3.1 and 3.2).

DEMOGRAPHIC CHANGES AND PROJECTIONS, SPAIN
% total population

CHART 3



SOURCE: INE.

The increase in longevity and the progressive ageing of the population are trends that are common to most developed countries. However, according to the demographic projections available, Spain is one of the countries where the weight of the retirement-age population will increase the most. Specifically, the latest projections by the National Statistics Institute (INE), published in 2016, predict that the ageing process will step up in the coming decades. On one hand, the birth rate, which in 2015 stood at 9.0 births per one thousand persons (less than half that of 1975), is expected to decline to 6.6 births in 2030 and to 5.6 in 2060. On the other, life expectancy, which has risen substantially in recent decades, is expected to continue to do so in the future, at possibly higher rates. Specifically, today's 65-year-olds are expected to live almost 6 years longer than those aged 65 in 1975, and almost 8 years less than those who will be 65 in 2060 (see Chart 3.5). Finally, migration projections point to a small net inflow of persons until the end of this decade, in contrast to the strong inflow of working-age immigrants that came to Spain during the economic boom.

The combination of these three factors, together with the weight of the baby boomers (those born between the late 1950s and the mid-1970s), who will reach retirement age from the second half of the upcoming decade, will speed up the process of transforming Spain's demographic pyramid into what will increasingly look like an inverted pyramid (see Charts 3.3 and 3.4). Indeed, the 67+ age group, which accounted for around 10% of the population in the early 1980s, today accounts for more than 16% and is expected to represent more than 30% starting in 2040 (see Chart 3.6).

3.2 Illustrative estimates of the impact of population ageing on the pension system

Addressing the increase in spending associated with the projected rise in the dependency ratio is a major challenge for public pension systems in developed countries. Based on the breakdown of pension spending relative to GDP as a product of the dependency ratio, the inverse value of the employment rate, the replacement rate (defined as the average pension to average wage ratio), and the share of wages in GDP (see footnote 18), it is possible to extrapolate the changes in pension spending to the outcome of the changes in such factors and to proxy the impact of changes in each of these factors on pension spending.[20] The analysis set out under this caption has an aggregate perspective and a basically illustrative purpose. Nonetheless, its results are not qualitatively different from those reached by means of a more ambitious modelling of interactions between the variables determining public pension system expenditure and revenue (see Section 3.3).

There is some uncertainty as to the performance of the foregoing four factors. The dependency ratio will basically depend on the effect of immigration and on legal changes to the retirement age that will influence the size of the working-age population.[21] The employment rate, for its part, will depend on developments in the labour market and on the age cohorts

20 In exercises of this kind it is customary to assume that the revenue-to-GDP ratio remains stable if there are no legislative changes impacting the effective rate.

21 With such a short horizon as that envisaged, the effects of the uncertainty associated with changes in the birth rate and in longevity, further to changes already made in the population projections available, are less significant. An analysis of the sensitivity of the demographic projections to starting point assumptions can be found, for the case of Spain, in Hurtado (2001).

considered to be in the working age population.[22] The pension replacement rate depends on future regulatory changes to the calculation of contributory pensions, together with those already made (sustainability factor and revaluation index) and the productivity growth rate.[23] The weight of wages in GDP is also affected by cyclical factors but its variation range is limited.

To illustrate how potential changes in these factors may impact the performance of public pension system expenditure, we consider below several alternative scenarios. For the demographic scenario we use the population projections by the INE (see Table 5), considering the working age population to be between 16 and 66 years old.[24] Consequently, the ratio of number of pensions to working age population would be 42.7% in 2035 and 64.3% in 2050.[25] As regards employment rates, two alternative scenarios are envisaged: one where the current values are maintained (approximately 60%) and another much more favourable one, where it is assumed that the rate increases to 70%.[26] Two scenarios are also considered for the replacement rate: one where the current levels are maintained and another one where the rate is reduced to approximately one half owing to matters such as, for example, the impact of the sustainability factor and the revaluation index, other already approved legal changes to the calculation of retirement pensions and greater productivity growth.[27] Finally, the assumption for the wage

POPULATION PROJECTIONS BY AGE GROUP AND RELATED DEPENDENCY RATIOS **TABLE 5**

	2050	2035	2016
Number of persons			
16-64	22,992,139	27,225,548	30,262,643
16-66	24,092,281	28,579,049	31,213,084
16-69	25,911,500	30,552,931	32,611,027
65+	15,608,868	12,775,829	8,701,380
67+	14,508,726	11,422,328	7,750,938
70+	12,689,507	9,448,446	6,352,996
Demographic factor*			
65+/16-64	72.5%	50.1%	30.7%
67+/16-66	64.3%	42.7%	26.5%
70+/16-69	52.3%	33.0%	20.8%

SOURCES: INE (2016) and in-house calculations.
*Includes the factor corresponding to the current ratio of the number of pensions to the population of retirement age (1.068).

22 Employment rates for individuals close to the legal retirement age are usually lower than average. Therefore, retirement age increases can be expected to be associated with a decrease in the employment rate.

23 Increases in the productivity growth rate instantaneously pass through to average wages, whereas current pensions, which depend on prior year wages and are not revalued based on productivity increases, do not change. Accordingly, such increases in the productivity growth rate give rise to transitory decreases in the average retirement pension replacement rate. However, insofar as existing pensions are indexed below the increase in productivity, productivity growth generates a permanent decline in expenditure through the decline in the replacement rate.

24 Data from INE's demographic projections for 2016-2066 (http://www.ine.es/inebaseDYN/ propob30278/propob_inicio.htm).

25 Under the assumption that the ratio of number of pensions to retirement-age population currently observed remains unchanged (1.068).

26 The full employment objective under the EU 2020 strategy consists of attaining an employment rate of 75% among the population aged 20 to 64. Bear in mind that the calculations in this paper consider the working age population to be that comprising individuals between 16 and 66 years old and, accordingly, the value established in the simulation at hand does not differ much from the objective set by the EU.

27 Notably, the reform of 2013 implies a decline in the future replacement rate from the current levels (see caption 3.3). Thus, the simulations of Table 6, where the current replacement rate is maintained, aim to illustrate the consequences on pension expenditure that would arise from a higher replacement rate under the demographic scenario projected for the medium and long term.

bill/GDP ratio is that it will remain at around 48%, which is the approximate average value observed during the 1980-2015 period (see Chart 1.9).

The six scenarios in Table 6 show the results of such calculations, and the messages drawn from them are clear. A highly favourable performance of employment (reaching an employment rate of 70% of the population aged 16 to 66 in 2035) would enable maintaining pension expenditure below 13% of GDP in 2035 with a replacement rate similar to the current one (0.44), but it would rise to 19.4% of GDP in 2050 under this scenario. Under the least favourable scenario, with an employment rate of 60% of the population aged 16 to 66, pension expenditure in 2035 would be 15% of GDP if the replacement rate were to remain stable, at 44%, and the latter would have to fall to 35.1% in order to maintain pension expenditure at 12% of GDP; however, reaching the same level of expenditure in 2050 under this scenario would require the pensions replacement rate to decrease to 23.3%. These calculations evidence the importance of the behaviour of employment: a 10 point increase in the employment rate enables pension expenditure relative to GDP to decline by 3.2 pp (if the current replacement rate is maintained) or by 2 pp (if it falls to 25%). In any case, even if the employment rate were to perform very favourably, in order for pension expenditure to remain similar to its current level, the pension replacement rate would have to decline significantly unless there is an increase in the revenue used to fund this expenditure.

Obviously, in addition to the uncertainty associated with the performance of the employment rate, the scenarios envisaged in Table 6 may also change in the event of changes to the demographic variables impacting the dependency ratio and which may give rise to scenarios differing from those projected by the INE in 2016. In this connection, there are probabilistic projections allowing bands of statistical significance around these demographic estimates to be established. Annex 1 includes those relating to two dependency ratio measurements (relating to persons aged over 65 and 70) and, as can be seen, the difference between such rates under the baseline scenario and their lowest value, with a probability of 95%, is approximately 10%. If it is also considered that the ratio of the number of pensions to number of retirement-age persons is reduced to one (instead of the current 1.068), the demographic factor values would be approximately 18.5% lower than those envisaged in Table 6. Therefore, under this extremely favourable (and unlikely) demographic scenario, pension expenditure and the effective tax rates on social contributions required to sustain pensions would be those of Table 6 multiplied by a factor of 0.815, while the replacement rates necessary to maintain pension expenditure at 12% of GDP would be those of Table 6 multiplied by 1.227 (=1/0.815).

Table 6 includes pension expenditure associated with the combination of employment scenarios with a more benign dependency ratio, which could be achieved, for example, by increasing the retirement age. The results show that with a dependency ratio of 52% (the demographic factor resulting from assuming the working-age population to comprise the population aged between 16 and 69 years), i.e. 12 points below the baseline scenario ratio, and a favourable performance of employment, if it is intended to maintain the pensions replacement rate at its current level (43.9%), pension spending would stand at 15.8% of GDP in 2050, almost 4 points less than that associated with a dependency ratio of 64.3%. In any event, such a level of public expenditure to GDP in 2050 is about 5 points higher than that seen currently.

ILLUSTRATIVE SIMULATIONS OF PENSION EXPENDITURE UNDER ALTERNATIVE SCENARIOS

TABLE 6

Percentage

	Scenario	Pension expenditure as a % of GDP	Demographic factor *d*	Replacement rate *b*	Employment rate *e*	Wage bill α	Effective rate of social contributions sustaining pension expenditure (a)
Current situation		10.7	31.0	43.9	55.8	43.9	21.2
					2050		
Current replacement rate							
Unfavourable employment	1	22.6	64.3	43.9	60.0	48.0	47.1
Very favourable employment	2	19.4	64.3	43.9	70.0	48.0	40.4
1 + lower dependency ratio		18.4	52.3	43.9	60.0	48.0	38.3
2 + lower dependency ratio		15.8	52.3	43.9	70.0	48.0	32.8
Reduced replacement rate							
Unfavourable employment	3	12.9	64.3	25.0	60.0	48.0	26.8
Very favourable employment	4	11.0	64.3	25.0	70.0	48.0	23.0
3 + lower dependency ratio		10.5	52.3	25.0	60.0	48.0	21.8
4 + lower dependency ratio		9.0	52.3	25.0	70.0	48.0	18.7
Pension expenditure 12% of GDP							
Unfavourable employment	5	12.0	64.3	23.3	60.0	48.0	25.0
Very favourable employment	6	12.0	64.3	27.2	70.0	48.0	25.0
					2035		
Current replacement rate							
Unfavourable employment	1	15.0	42.7	43.9	60.0	48.0	31.3
Very favourable employment	2	12.9	42.7	43.9	70.0	48.0	26.8
1 + lower dependency ratio		11.6	33.0	43.9	60.0	48.0	24.2
2 + lower dependency ratio		9.9	33.0	43.9	70.0	48.0	20.7
Reduced replacement rate							
Unfavourable employment	3	8.5	42.7	25.0	60.0	48.0	17.8
Very favourable employment	4	7.3	42.7	25.0	70.0	48.0	15.2
3 + lower dependency ratio		6.6	33.0	25.0	60.0	48.0	13.8
4 + lower dependency ratio		5.7	33.0	25.0	70.0	48.0	11.8
Pension expenditure 12% of GDP							
Unfavourable employment	5	12.0	42.7	35.1	60.0	48.0	25.0
Very favourable employment	6	12.0	42.7	41.0	70.0	48.0	25.0

SOURCE: In-house calculations.
NOTE: *d, b, e* and α, are defined in Chapter 4 of this document.

a The current value is the effective rate of social contributions, calculated as revenues from social contributions as a percentage of compensation of employees less social contributions. The effective rate sustaining pension expenditure would be 24.4%.

All of the foregoing calculations lead us to conclude that, in the absence of pension system revenue increases, the replacement rate would have to decrease to ensure the sustainability of the pension system. It should be noted, however, that a decline in the pension replacement rate does not necessarily mean that the absolute value of the pensions will be lower. Sufficient average wage increases could enable positive growth rates in the average pension to continue while pension replacement rates decline. Indeed, given the duration of the calculation period for the regulatory base of pensions and retirement, the higher the wage growth rate (which, in principle relates in

the medium term to the productivity growth rate), the lower the replacement rate, even if pensions increase at the pace productivity grew over the working lives of retirees.[28] For example, in a situation where the calculation period for the regulatory base of a pension is 25 years of working life (as will be the case in 2023), assuming a 20-year retirement period without revaluation of pensions in line with wage growth, the average replacement rate during the entire retirement period would be 80% of the pension rights generated in connection with the latest wage if annual productivity grew at a rate of 1%, but would be 65% of such an amount if the annual productivity growth rate were 2%. In short, higher productivity growth rates would allow retirement pensions to be higher even when their replacement rate were lower, thereby improving the standard of living of retirees even though their income relative to working age population cohorts would decrease.[29]

3.3 Projections of public expenditure on pensions

Beyond the merely illustrative projections discussed in the preceding caption, the Ageing Working Group (AWG) of the European Commission regularly prepares long-term public pension expenditure projections for all the EU countries on the basis of models prepared by each of them, which include features specific to each national pension scheme and are based on common demographic and macroeconomic projections. These projections are published in the "Ageing Reports" (see footnote 6). The two most recent reports were drawn up in 2012 and 2015, which, in the case of Spain incorporate the reforms of 2011 and 2013, respectively. Additionally, other authors (see, for example, Díaz-Giménez and Díaz-Saavedra (2016), and Sánchez (2014)), have recently projected long-term expenditure on pensions in Spain on the basis of general equilibrium models that try to take into account interactions between all the significant variables.[30, 31]

The main conclusions of these papers can be summarised as follows:

— Under the 2011 reform,[32] it would be possible to save between 30% and 40% of the long-term projected pension expenditure in the absence of these measures, although, if the demographic projections described were to be confirmed, they

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28 If wages grow at a constant rate, e.g. $w_t = (1+\gamma)w_{t-1}$, where γ is the productivity growth rate, the regulatory base of the retirement pension relative to the wage in the first retirement period (t) would be:

$$b_0 = \frac{1}{25}\sum_{s=1}^{25}\frac{w_{t-s}}{w_t} = \frac{1}{25}\sum_{s=1}^{25}(1+\gamma)^{-s}$$

The average replacement rate over the retirement period would be:

$$\frac{1}{20}\, b_0 \sum_{s=0}^{19}\frac{w_t}{w_{t+s}} = \frac{1}{20}\, b_0 \sum_{s=0}^{19}(1+\gamma)^{-s}$$

It is assumed that the calculation period for the regulatory base of the retirement pension, such as that which will be reached in 2023 in Spain, is the last 25 years of working life. A 20-year retirement period is assumed. This calculation does not take into account the possible impact of the pension ceiling, which could lower the replacement rate calculated previously by several percentage points. Additionally, an upturn in productivity growth gives rise to an additional transitory decline in the replacement rate during the period in which the cohorts that experienced lower productivity growth over their working life begin retirement.

29 These calculations assume that pensions are revalued on the basis of the inflation rate. Otherwise, the aforementioned replacement rates would be lower, by approximately 6.5 pp and 5 pp, respectively, per inflation point.

30 For example, demographic changes will have consequences not only on the dependency ratio, but also on many macroeconomic variables impacting the remaining factors that determine pension expenditure (see Aksoy *et al.*, (2015)). Also, increases in the effective rate of social contributions have an adverse effect on employment and, therefore, reaching the employment rates assumed in Table 6 may be incompatible with the effective rate associated with each case. Likewise, the macroeconomic assumptions in this Table may not be entirely consistent with the demographic developments assumed and the impact on income and interest rates of changes in the public pension system parameters included in the projections.

31 For a description of several pension expenditure projection methods, see Jimeno *et al.* (2008).

32 Its main features were an increase in the legal retirement age, the extension of the period used to calculate the regulatory base and an increase in the number of years required to opt for 100% of the regulatory base.

would not ensure the sustainability of the system on their own.[33] For example, the 2012 AWG report on ageing, incorporating the reform of 2011, estimated that pension expenditure would change from accounting for 10.1% of GDP in 2010 to 13.7% in 2060 (see Chart 4.1), i.e. an increase of 3.6 points of GDP as compared with the estimate of the report prior to the reform, which forecast an increase of nearly 8 points. Therefore, the reform contributed significantly to reducing the expected increase in pension spending, but the system's financial sustainability was still not ensured without resorting to new spending cuts or revenue increases.[34]

— The reform of 2013[35] has made substantial headway in stabilising public expenditure on pensions relative to GDP. For example, pursuant to the latest Ageing Report published in May 2015, which therefore incorporates the effects of the 2013 reform, pension spending will remain stable during much of the projection horizon, accounting for 11.8% of GDP in 2013, 11.9% in 2040, 12.3% in 2050 and 11.0% in 2060 (see Chart 4.2). The studies by Díaz-Giménez and Díaz-Saavedra (2016) and Sánchez (2014), which simulate the effects of the 2013 reforms, also coincide in pointing out that the introduction of the sustainability factor and the new revaluation index would have improved the system's long-term financial sustainability considerably, without incorporating additional revenue increases, in a scenario where inflation would return to values close to the ECB's target, around 2%, and the aforementioned revaluation indices and sustainability factor would reach full effectiveness. Indeed, a simple simulation exercise enables us to see that the 2013 reform reduces both initial pensions and annual pension revaluations, automatically improving the system's balance (see Annex 2). Notably, however, as mentioned above, the reform of 2013 establishes that the revaluation of pensions cannot be lower than 0.25% or higher than the result of adding 0.50% to the CPI increase. This makes it possible to prevent pensions from declining in nominal terms, but limits the automatic pension expenditure adjustment mechanism. Thus, adverse macroeconomic scenarios, in particular those associated with inflation rates below 2%, could still cause imbalances in the system, as illustrated by certain alternative scenarios considered by the Ageing Report and, especially, by Sánchez (2014,Charts 4.4 and 4.5).

— In accordance with these estimates, the stabilisation of pension expenditure at levels similar to the current ones would be achieved through a substantial reduction of the replacement rate. Under the post-reform baseline scenario of Sánchez's simulation (2014), the actual pension of a person retiring in 2015 is projected to be 7% and 24%

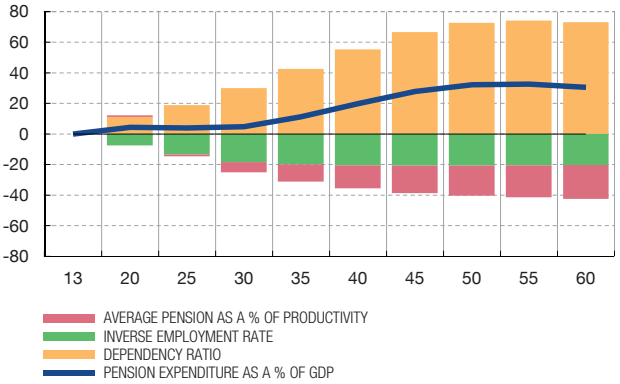
33 In the 2012-2015 Stability Programme Update, the Spanish government forecast a saving of approximately 40% of the projected increase in pension spending between 2010 and 2050 prior to the reform. De la Fuente and Doménech (2013) estimate a saving of 33% in 2050 relative to projected expenditure without the reform; Conde-Ruiz and González (2013) calculate a saving of 29% and Banco de España (2011) of 43%.

34 The work by Díaz-Giménez and Díaz-Saavedra (2016) and Sánchez (2014), simulating the impact of the reform on overlapping generation models of general equilibrium, reached the same conclusions.

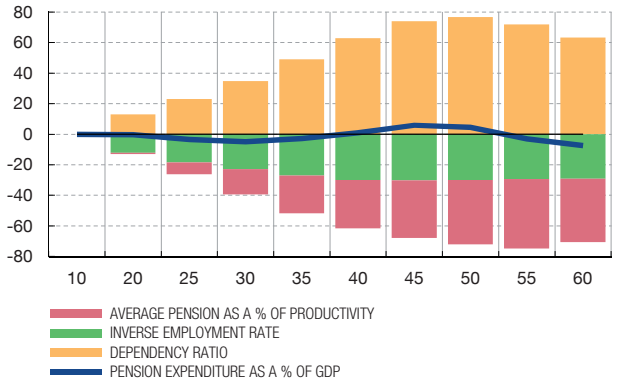
35 Its salient features were the deindexation of pensions from the CPI and the introduction of a sustainability factor affecting the initial pension.

PENSION EXPENDITURE SCENARIOS, 2020-2060 CHART 4

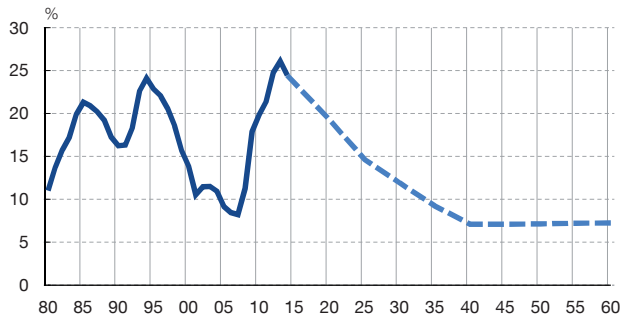
1 2012 AGEING REPORT (BEFORE THE 2013 REFORM)
Proxied cumulative percentage change



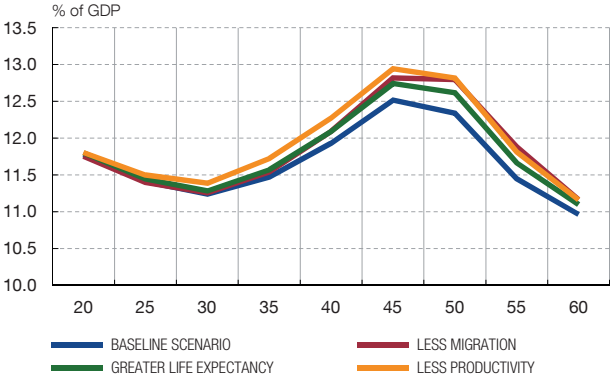
2 2015 AGEING REPORT (AFTER THE 2013 REFORM)
Proxied cumulative percentage change



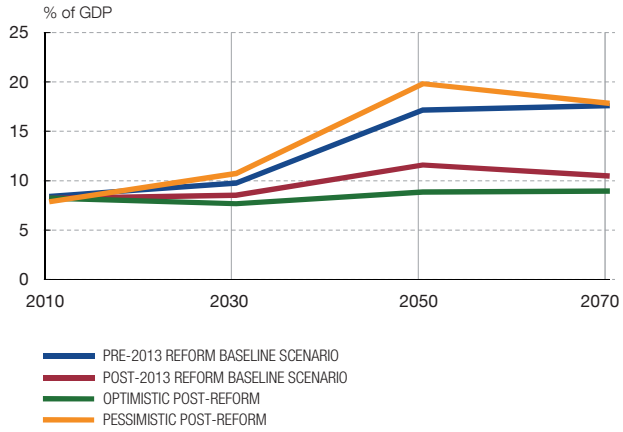
3 HISTORICAL UNEMPLOYMENT RATE AND 2015 AGEING REPORT PROJECTION



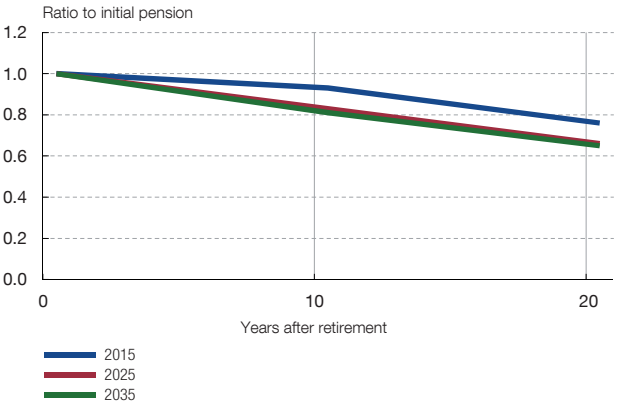
4 PENSION EXPENDITURE: 2015 AGEING REPORT SCENARIOS



5 PENSION EXPENDITURE: SÁNCHEZ SCENARIOS (2014)



6 CHANGES IN ACTUAL PENSIONS ON THE BASIS OF RETIREMENT YEAR – SÁNCHEZ (2014) –



SOURCES: 2012 and 2015 ageing reports, International Monetary Fund and in-house interpolation on the basis of Sánchez (2014).

lower 10 and 20 years, respectively, after retiring (see Chart 4.6). To this, one would add the operation of the sustainability factor, which would reduce the initial pension by approximately 10% in 2030 and 20% in 2050. Also, Díaz-Giménez and Díaz-Saavedra (2016) estimate that average pensions in 2050 will be approximately 30% lower than average pensions under the regulatory period prior to the 2013 reform.

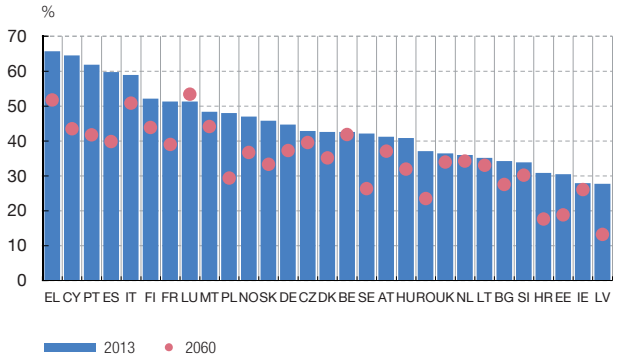
As for the projections of the AWG report, based on the macroeconomic scenario assumed[36] (see Chart 4.3) around 35%-50% of the increase in expenditure arising from population ageing can be countered, while the impact of the 2013 reform on the replacement rate neutralises the rest of pressures on pension expenditure, which remain constant as a percentage of GDP, although it does so by means of a substantial decline in the replacement rate. Indeed, based on the estimates of this report, Spain would experience one of the sharpest declines in the replacement rate between 2013 and 2060 (approximately 20 pp), changing from having the fourth largest replacement rate in 2013 to the ninth in 2060 (see Chart 5).

— The key mechanism from the viewpoint of making headway in the sustainability of the system is the new revaluation mechanism (which leads to increases below the inflation rate for so long as a balance between the system's revenue and expenditure is not achieved) and, to a lesser extent, the sustainability factor. The latter links retirement pensions to each generation's longevity, aiming for part of the adjustment of the expense arising from the increase in life expectancy to be assumed by the generation enjoying it. By means of the revaluation index for retirement pensions, which is established on the basis of available funds, the reform makes pensioner generations participate at each point in time in the adjustments required to rebalance the system.

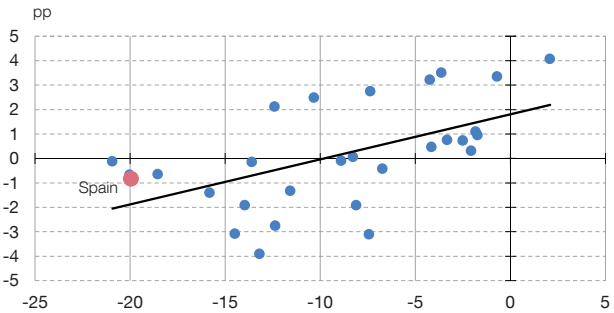
— More favourable scenarios in demographic or macroeconomic terms (measured by a lower increase in the dependency ratio or improved performance of the employment rate) enable the sustainability of the system to be achieved with lower decreases in the replacement rate of average pensions.

PENSION REPLACEMENT RATE LEVEL AND PROJECTION (2013 - 2060) CHART 5

1 PENSION REPLACEMENT RATE IN 2013 AND 2060



2 PENSION EXPENDITURE (VERTICAL AXIS) AND REPLACEMENT RATE (HORIZONTAL AXIS): CHANGES 2013 - 2060



SOURCE: 2015 Ageing report.

36 The unemployment rate is projected to converge from levels in excess of 20% and 25% in the base years to around 7% from 2040-2045, while the participation rate would increase by 5.4 pp between the base year and 2040, when the minimum unemployment rate would be reached.

4 Public pension system reform: challenges and alternatives

Decisions concerning the design of a pension system have at least three dimensions. The first is the desirable size of the system, in terms of the public expenditure intended to be devoted to providing pensions. The greater the level of expenditure, the better able the system will be to provide an adequate income to replace wages or to act as a mechanism insuring against longevity and other covered contingencies. Secondly, for any chosen level of expenditure, the level and composition of the system's funding sources need to be analysed to ensure that the system is financially sustainable. Finally, it also needs to be borne in mind that decisions about the foregoing factors have a major impact on how expenditure and the financial burden of pensions is distributed between various population groups and cohorts, i.e. in terms of the inter- and intragenerational equity of the public pension system.

As is clear from the pension expenditure projections discussed in Chapter 3, the relationship between the financial sustainability and sufficiency of public pensions hinges on the determinants of the system's revenues and expenses. If the spending-to-GDP ratio is:

$$g = db\alpha / e,$$

where g is the ratio of public pension expenditure to GDP, d is the ratio of the number of pensions to the working-age population, e is the employment rate, b is the ratio of the average pension to the average wage, α is wages as a share of GDP, and revenue is given by

$$i = \tau\alpha + \beta$$

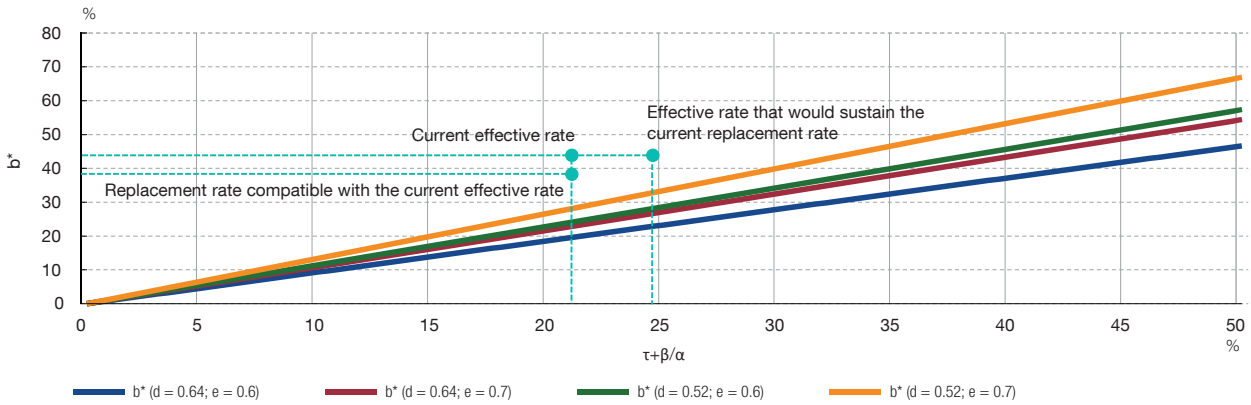
where i is the ratio of public pension system revenue to GDP, τ is the effective tax rate of social contributions and β represents other resources used to finance the pension system in terms of GDP; then, for expenses to equal revenues (g = i), the replacement rate at which the system is in equilibrium is:

$$b^* = (\tau + \beta/\alpha)e/d$$

In this static environment, this condition illustrates the trade-off between the availability of the public pension system's resources and its sufficiency. In other words, the maximum pensions replacement rate that balances the system at all times depends on the taxes used to finance it (social security contributions and other taxes), demographic factors, and the employment rate. Sufficiency (measured as the ratio of the average pension to the average wage at any given moment in time, b*) may be higher when the employment rate and available resources (e, τ and β) are higher, when the demographic factor (d) and (provided that $\beta > 0$) wages as a share of GDP (α) are lower.

Consequently, the financial equilibrium constraint implies that to address the impact of demographic trends on the public pension system (which will cause the dependency ratio to

REPLACEMENT RATE TO ENSURE SUSTAINABILITY (2050) CHART 6



SOURCE: Banco de España.

rise significantly), there are only two alternatives in this partial equilibrium framework once full employment has been achieved: i) reducing the pension replacement rate; and ii) broadening the sources of funding. Chart 6 illustrates this trade-off by comparing the situation prevailing in 2015 with the combinations of revenues and pension replacement rate that would be feasible in 2050 given the projected demographic factor (d=64%) combined with two alternative employment scenarios (e=60% and e=70%), and on a scenario of a lower dependency ratio, associated, for example, with a further increase in the retirement age (d = 52%). The chart shows that even on the most optimistic scenario the effective rate that would balance the system given the current replacement rate would fall a long way short of balancing it in 2050. Thus, on all scenarios, maintaining the current replacement rate in 2050 would require a significant increase in the system's resources. Moreover, the chart also shows that the current effective rate is below the rate that would balance the system at present, such that, given this effective rate, the replacement rate should be approximately 6 pp lower for the system to be in equilibrium. Alternatively, the replacement rate could be maintained with an effective rate approximately 4 pp higher.

In short, it may be concluded that, even on these relatively favourable scenarios, maintaining current replacement rates over the long term would require a significant increase to the system's resources in 2050.

4.1 Reforms to curb rising expenditure

The projections presented in the previous section illustrate how, under the adverse demographic scenario outlined by the latest available projections, strict application of the recent reforms, on the assumption that the system's revenue remains basically constant over the projection period, would imply that keeping expenditure levels stable would require a significant reduction in the replacement rate. This reduction would be achieved via the sustainability factor, which would reduce the initial pension received by new cohorts of pensioners in line with life expectancy, and, above all, via the pension revaluation index, which would imply a cut in pensions' purchasing power until the system's financial equilibrium is restored.

In a context in which it is decided that the system's resources should not be increased, there are other mechanisms that could generate the same reduction in the pension replacement rate, while increasing the extent to which the system is contributory, i.e. making the relationship between the contributions individuals pay and the benefits they receive closer. The contributory principle may be desirable, firstly, because it has positive effects on workers' participation in the labour market, which has a positive impact on the system's revenue and creates an incentive for them to extend their working life, and, secondly, because it facilitates pension saving decisions. One possible option would therefore be to further increase the number of years of contributions included in the calculation of the regulatory base for the retirement pension,[37] for example, by extending the calculation period to the individual's whole working life. Applying this measure would bring the Spanish system closer to that in a number of other European countries, such as Finland, Poland, Portugal and Sweden. Nevertheless, in the absence of other adjustment mechanisms, the reduction in expenditure obtained by this parametric reform is limited.[38]

With the same aim, the percentage of the full pension to which the minimum contribution period gives entitlement (currently set at 50%) could be reduced, as could the rate at which this initial percentage rises with each additional year of contributions, thereby increasing the number of years needed in order to obtain 100% of the full pension. The current legislation assumes that the majority of pension rights are generated in the first 15 years of an individual's working life (creating entitlement to 50% of the pension, while the following 15 years generate an entitlement to a further 34%) such that the adjustment to these parameters may make benefits more proportional to the number of years of contributions. In any event, it should be noted that the 2011 reform has already made the requirements stricter.[39]

Expenditure could also be curbed by further raising the retirement age. Following the recent reforms, the statutory retirement age will gradually rise to 67 years, although the effective age is around 64 years, as a result of the impact of early retirement. Raising the statutory retirement age can be justified by individuals' longer life expectancy, their joining the workforce later, the reduced physical demands of most jobs today, and people's better health at more advanced ages.

Thus, any additional measures discouraging early retirement and allowing individuals to extend their working lives beyond the age of 67, following on from some of the measures already adopted in recent years, would have positive effects on financial sustainability, reducing the need for substantial cuts in the retirement pension replacement rate. Indeed, some countries (see Table 3) have opted to build in an automatic link between life expectancy

37 The 2011 reform extended the period used to calculate the amount of the reference value of the pension (the "regulatory base") from 15 to 25 years gradually at a rate of one month a year between 2013 and 2022.

38 See, for example, Sánchez (2014).

39 This established that 37 years' contributions will be necessary to qualify for 100% of the regulatory base of the pension, whereby the first 15 years of contributions entitle pensioners to 50%, while the remaining 50% is obtained on a proportional basis with between 15 and 37 years' contributions, using a month-by-month calculation. In this case a transitional period has also been set, commencing in 2013 and concluding in 2027. It is further established that, in the event of gaps in contributions, those relating to the first 24 months will be topped up with the minimum contribution base, and those exceeding 24 months, with 50% of the base. This contrasts with the current legislation, where all gaps are supplemented with the minimum base (except in the schemes for the self-employed and domestic staff).

and the permitted retirement age in their sustainability mechanisms. By way of illustration, as can be seen in Tables 5 and 6, raising the effective retirement age to 70, for example, would make it possible to reduce the dependency ratio by 12 points, compared with that associated with a retirement age of 67 years, which would enable pension spending to be reduced by between 2 and 4 points of GDP in 2050, depending on the scenario considered.[40] For these purposes, however, the wide range of variation between different individuals' working lives needs to be borne in mind. Systems allowing more flexible retirement at different ages are therefore superior to those not allowing earlier (or later) retirement, or which impose penalty (or accumulation) factors differing from those resulting from purely actuarial calculations that depend on contributions made over the course of the individual's working life and differences in life expectancy and age at retirement.

The reforms alluded to above can be implemented by adjusting the current unfunded defined-benefit system's parameters rather than modifying it. Nevertheless, extending the period over which the pension's regulatory base is calculated to include the individual's whole working life, equalising the rate at which pension rights accrue according to contributions paid, and applying the sustainability factor introduced by the 2013 reform individually (rather than applying it by cohorts as envisaged in the reform), are elements bringing the public pension system closer to the alternative chosen by some countries that have made reforms to their pension systems in recent decades, such as the individual notional defined-contribution accounts system.

This system has a number of advantages. Firstly, it makes the relationship between individuals' contributions and their pensions closer. Secondly, it reduces the negative impact of a drop in contributions at ages close to retirement on pension rights. Thirdly, the way pension rights are defined and benefits calculated takes place under more transparent conditions, creating incentives for the labour supply and complementary savings. Moreover, it automatically incorporates a sustainability factor to the extent that benefits are calculated as the annuity corresponding to the amount of accumulated contributions and life expectancy at the time of retirement, which also introduces more transparency and flexibility in decisions about when to retire. And this can all be achieved while still setting pension floors and ceilings to accommodate the degree of intragenerational distribution considered desirable.[41]

In any event, it should be noted that the adoption of a notional defined-contribution accounts system of this type would necessarily be a gradual process, and would not eliminate the trade-off between the public pension system's sufficiency and available resources alluded to above. To satisfy the financial sustainability condition, the notional defined-contribution accounts system requires precise calculations adjusting (notional) returns on accumulated contributions in individual accounts and the annuities constituting the retirement benefits in the prevailing demographic and macroeconomic scenario.

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40 Sánchez (2014) presents an evaluation of the 2011 pension reform, which basically affected these parameters, and shows that these parametric reforms are insufficient to entirely eliminate the expenditure growth caused by demographic change.

41 See Jimeno (2003).

4.2 Changes in the funding sources

The alternative to reducing the pension replacement rate is to obtain additional revenues, either by increasing intergenerational transfers, which would mean a substantial rise in the effective rate of social security contributions, or by drawing on other taxes to pay for pension expenditure.

In this regard, it is worth bearing in mind that, for reasons of economic efficiency, in a globalised world, with freedom of movement of capital and labour, the tax rate of social contributions cannot be much higher than it already is.

One way of raising the effective rate of social contributions without changing statutory rates is to eliminate the floors and ceilings on the contribution base and the rebates reducing revenues from social security contributions. This measure would make the growth rate of contributions depend strictly on nominal wage growth, which does not currently happen for all income brackets as a result of the existence of floors and ceilings, which are updated in line with expected inflation (normally below growth in nominal wages).

Eliminating these limits would mean equalising the effective rate for social security contributions with the statutory rate (28.3%) and, consequently, increasing this effective rate by approximately 8 pp (see Chart 6).[42] This relatively large increase would raise labour costs, which could have negative consequences for employment and productivity. Finally, this measure could also raise future pension expenditure by increasing the regulatory base, which is the reference value used to calculate pensions, although this effect could be mitigated if the maximum pension is kept constant. However, if this is the case, it would lower the replacement rate and undermine the contributory principle for individuals accumulating pension rights exceeding the maximum pension. This is what has happened to a certain extent in recent years, by means of a process Conde and González (2014) have described as a "silent reform" (with increases to the maximum contribution base that exceed those of the maximum pension).

Additional revenues and social security contributions could also be obtained by curbing the use of rebates and exemptions. The empirical evidence on the impact of rebates shows that they cause a substantial deadweight component and displacement effects. This results in their being of limited effectiveness as an incentive for new hiring. Restricting these incentives to well defined groups with employability problems would make them more effective and reduce their budgetary cost.

Alternatively, general taxes could be drawn upon to increase the revenues available to pay for pensions. One frequently cited example is France's "generalised social contribution". This social security contribution finances a portion of social security expenditure, of which the largest item is pension expenditure. It is "generalised" because it is paid by all taxpayers (including pensioners and recipients of capital income as well as workers) as a supplement on income tax (at rates that vary according to the amount of income and its nature).

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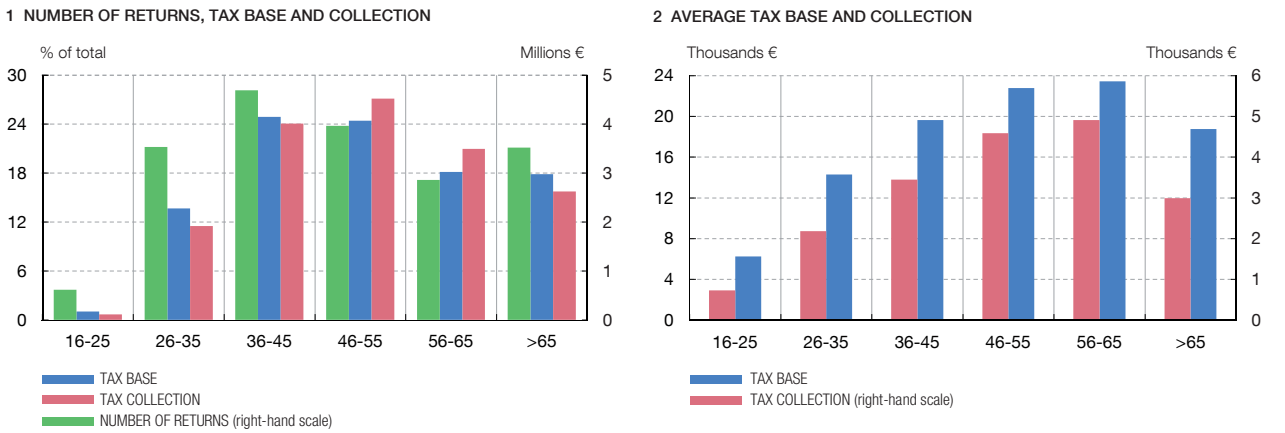
42 Removing the ceiling on the maximum contributory basis for common contingencies could generate additional revenues of up to €10 billion.

A similar proposal to the above is to restrict the concept of contributory pensions to retirement pensions, which would continue to be funded from social security contributions, while other pensions (basically survivors' pensions) would be funded from general taxes. This model would allow retirement pensions to remain contributory, while general taxes would be used to pay for other types of pension. Nevertheless, it should be noted that this measure would mean increasing general taxes or reducing other budgetary expenditure in order to be able to pay for those pensions transferred to central government from the social security fund.

Using general taxes to finance pensions raises at least two types of issue, however. One concerns the political economy facet of the pension system. An unfunded contributory system rests on transfers of income between different generations of workers and its essence is that there is a direct and transparent relationship between income and benefits that is separate from the redistributive role of general taxes and the political debate to which this redistribution is subject. The system's contributory components may be considered to be smaller in the case of non-retirement pensions (survivors' benefits and family allowances), however, which, as discussed, could justify taking these benefits out of the contributory system.

One issue that arises when resorting to general taxes to pay for pensions is the dilution of the pay-as-you-go principle when the pension system is not only paid for by intergenerational transfers. Increasing general taxes in order to pay for pensions would affect the population as a whole, including pensioners as well as workers. Thus, depending on how these taxes are distributed across the various age groups, it could happen that an increase in general taxes intended to pay for income for the retired population could largely fall on the very population whose income it was intended to protect. In effect, while an increase in the tax burden on wages is equivalent to an increase in the effective rate of social security contributions, if a share of these additional resources to fund pensions come from increased tax pressure on other income, including that from capital gains and monetary transfers such as pensions, even though the value of pensions remains unchanged, the population over the retirement age would see their

INCOME TAX DISTRIBUTION BY AGE BRACKET (2013) CHART 7



SOURCE: In-house calculations using 2013 IEF-AEAT income tax sample (return filers).

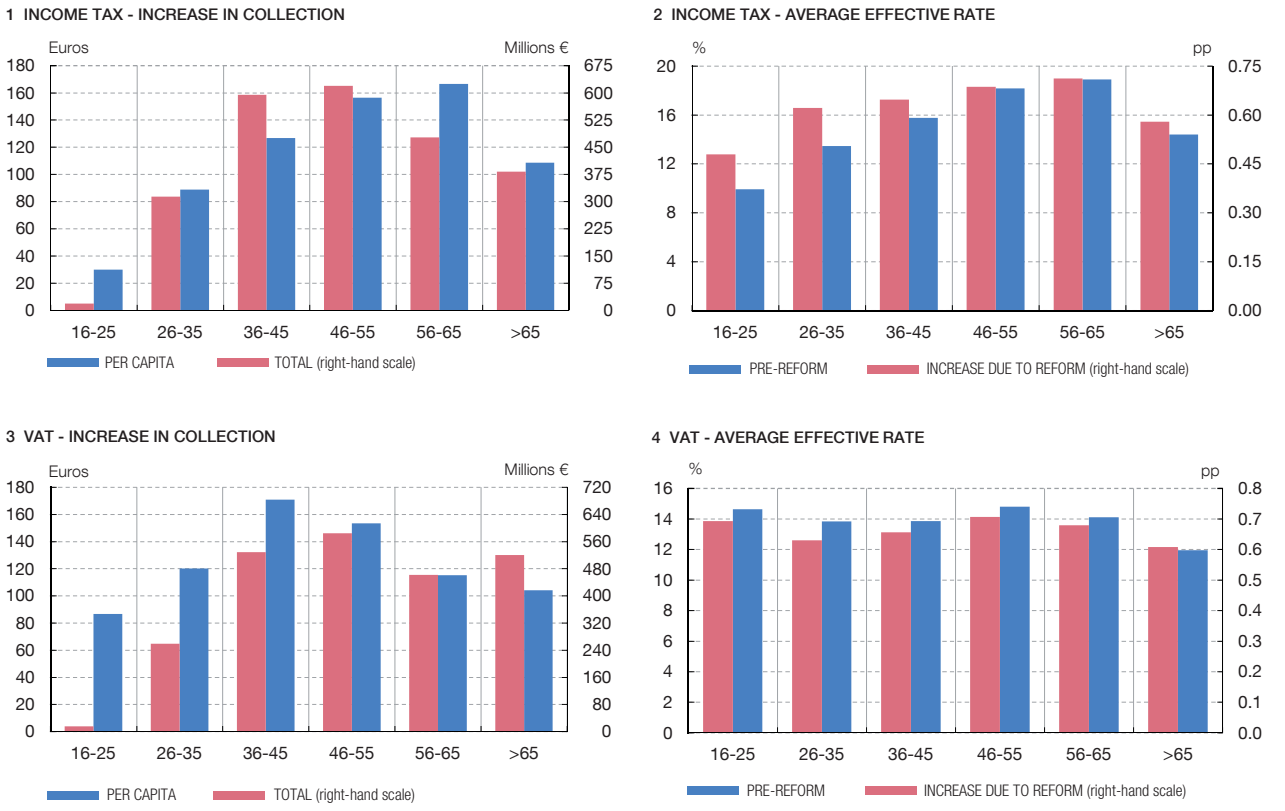
net income reduced by the impact of higher taxes. In other words, this measure at least partially resembles a cut in the replacement rate.[43]

It needs to be borne in mind here that the retired population receives the largest share of both capital income and transfers from the social security fund. Income tax microdata for 2013 show taxpayers aged over 55 to be a highly significant population group for this tax (see Chart 7).[44] Thus, in 2013 18.4% of all taxpayers were aged over 65 and almost 15% aged between 56 and 65 years. The bulk of tax returns (around 65%) were filed by taxpayers in the 26 to 55 age group, with only a small number of returns from taxpayers aged under 25 (barely more than 3%; see Chart 7.1). The 56 to 65 age group also has the highest average tax base. Consequently, it is the group that pays most per return, at approximately €4,900 (see Chart 7.2). For their part, taxpayers aged over 65 provided almost 16% of the tax collected, 5 pp more than tax payers in the 26 to 35 age group (see Chart 7.1).

A simple exercise can be used to simulate a one percentage point rise in the general and savings income tax rates in order to analyse the impact on different age groups.[45] The

SIMULATION OF A 1 PP INCOME TAX AND VAT INCREASE

CHART 8



SOURCE: In-house calculations using 2013 IEF-AEAT income tax sample (return filers), Household Expenditure Survey and CPI (INE).

43 The relevant replacement rate from the individual's point of view is the ratio of their pension to their final salary, net of taxes in both cases. Whether this replacement rate rises or falls will depend on the differential effect of the tax increase on wages and pensions.

44 The unit of measure is the tax return, i.e. including both individual and joint returns.

45 Specifically, the baseline scenario was obtained by applying the rate schedule in force in 2015 to the 2013 income tax microdata. The reform scenario was subsequently generated by simulating a 2 pp increase in general national rates and rates on savings income for all taxpayers.

results show that tax collection would increase by approximately €2.4 billion, with about 50% of this increase falling on the 36 to 55 age bracket. It is particularly noteworthy that workers aged over 55 would finance over 35% of the increase. The 56 to 65 age bracket would experience the biggest increase in the tax burden in per capita terms, and taxpayers aged over 65 would see their tax burden rise to a level close to that of 36 to 45 year olds (see Charts 8.1 and 8.2).

Another alternative way of financing public spending on future pensions might be to resort to increasing indirect taxes. This is in fact the preferred option among experts proposing alternatives for reforming the Spanish tax system,[46] both for reasons of efficiency and as a result of the fact that, in the case of indirect taxes, the Spanish tax system continues to apply effective tax rates that are significantly lower than in comparable countries.[47] In terms of the foregoing discussion of the possible distribution of a hypothetical tax increase across the different age brackets, a VAT increase of 1 pp on non-exempt goods would increase collection by €2.4 billion, with the population aged over 65 providing just over 20% of this increment. The 36 to 55 age bracket would bear the brunt of the adjustment (47%) although the increase in tax paid by age groups close to retirement age would also be significant, both in per capita terms and in terms of the average effective rate (see Charts 8.3 and 8.4).

4.3 Increased savings

Against the background of a significant rise in the dependency ratio and reductions in the pension replacement rate, it might also make sense to extend the role of retirement saving to complement the resources of the public contributory system with the accumulation of financial assets supplementing future public pensions. In fact, a significant number of countries already have a relatively strong funded pillar to supplement the public pay-as-you-go pillar. However, it should be borne in mind that the funded system has its pros and cons. In particular, it is less vulnerable to demographic factors, making it potentially a good strategy in terms of risk diversification compared to the current pay-as-you-go model. However, the funded model is more sensitive to inflationary crises, and to financial market instability, as the experience of recent years has shown. Therefore, any steps in this direction need to be accompanied by the definition of better prudential systems to guarantee transparency and the protection of beneficiaries.

In any event, implementing a funded system is complex and requires detailed prior analysis of issues such as the length of time needed to implement it, whether it is voluntary or compulsory, the returns that can be offered in a scenario of demographic stagnation and sluggish productivity growth, or how the costs associated with implementing this change are to be shared out between different generations. This analysis goes beyond the scope of this paper.

4.4 Distributive aspects of the reform

The distributive consequences of the public pension system are very important and are not limited to intergenerational income transfers or the varying contributions to general taxes made by the different age brackets discussed above. Benefit calculation formulae that vary according

46 See *Comisión de Expertos para la Reforma del Sistema Tributario Español* (2014).
47 See Hernández de Cos and López (2014).

to income levels also have repercussions for intragenerational inequality in ways that affect social equity. Thus, the existence of welfare benefits and floors and ceilings on contributory benefits, reduces intragenerational inequality. Moreover, the current formulae for calculating benefits in the existing system, which place greater weight on the years and contribution bases in the later stages of the individual's working life, increases the inequality between each generation of pensioners, given that employment and wage inequalities are much wider among workers close to retirement than among young people starting out on their careers.[48]

Consequently, any reform strategy, whether opting to curb expenditure restraint or boost income, makes it necessary to take into account the distributive consequences of changes to the parameters of the public pension system. In particular, in a purely contributory system in which benefits are calculated on the defined benefits principle, benefits are higher for those individuals who completed a longer working life and earned higher wages. Pay-as-you-go funding implies income transfers from younger cohorts to older ones, while tax funding implies transfers from higher income individuals (to the extent that the income tax system is progressive) to the retired population.

There are two issues that need to be taken into account regarding intergenerational income transfers. First of all, to the extent that at a certain point in time the retired population took its saving and labour supply decisions in the light of certain expectations of benefits, making the burden of spending adjustment fall solely on that generation would imply reducing their levels of income and welfare disproportionately. On the other hand, making the whole weight of the reform fall on future generations of workers by raising intergenerational income transfers would also mean disproportionately reducing that generation's income and welfare levels, which could also respond to these increases by reducing the labour it supplied.

In the case of the most recent reform (2011 and 2013), for example, the available estimates, which assume that there would be no additional changes to taxes or spending parameters, indicate that the bulk of the cost of the adjustment would fall on those generations born between 1960 and 2000, and in particular the generation born in the 1990s.[49]

Thus, any reform strategy has to consider: i) the extent to which the adjustment to pensions or the increased taxation necessary to rebalance the pension system's financial situation falls on each generation; ii) over how many generations this adjustment is intended to be spread (i.e. how gradual the reform is to be); and iii) the extent to which pensions are intended to be used as a mechanism to address intragenerational inequality. Making the answers to these questions explicit should enable the reforms to be more transparent, and consequently, more comprehensible to the public.

48 The rates at which pension rights accumulate are higher at ages close to retirement, as the regulatory base depends on the contributions made in the last 25 years of the individual's working life, and the penalties applied in the case of early retirement do not follow actuarial principles precisely. These rates also depend on wage variability, given the combination of floors and ceilings on both contribution bases and pensions.

49 See Sánchez (2014).

5 Concluding remarks

The substantial growth in the population of retirement age relative to the working-age population brought about by improvements in longevity implies serious challenges for the Spanish public pension system. The reforms introduced in recent years have sought to address them by progressively raising the retirement age, defining a sustainability factor linking initial pensions to future trends in life expectancy, and introducing a new pension indexation mechanism that is conditional upon the system's financial position being in equilibrium. Although these reforms have shored up the system's sustainability considerably, adapting it to a progressively older population remains a major challenge. Specifically, in the absence of additional changes to the system's sources of revenue, the main adjustment mechanism is via a cut in the average pension, which, in the context of marked growth in the dependency ratio, will lead to a substantial decline in the pension replacement rate, accompanied by a major risk of the retired population's losing purchasing power in the event of an unanticipated rise in inflation. This would be a consequence of the new revaluation index, which could lead to systematic reductions in pensioners' real income if inflationary scenarios of this kind materialise.

In this context it is first of all essential to define the pension replacement rate the public system aims to guarantee so as to be able to analyse whether the system's revenues are sufficient to ensure its sustainability. The implications for intergenerational equity of the decisions made should also be made clear.

The conclusion that can be drawn from the existing analyses is that maintaining the system's current replacement rates, which are high in comparison with those of other countries, would demand a considerable increase in the system's revenues. If it were therefore decided that new revenues should be found to finance the desired level of spending, it seems reasonable that funding sources other than those currently being drawn upon should be sought, given that social security contributions are already high, and raising them could have a negative impact on the demand for labour.

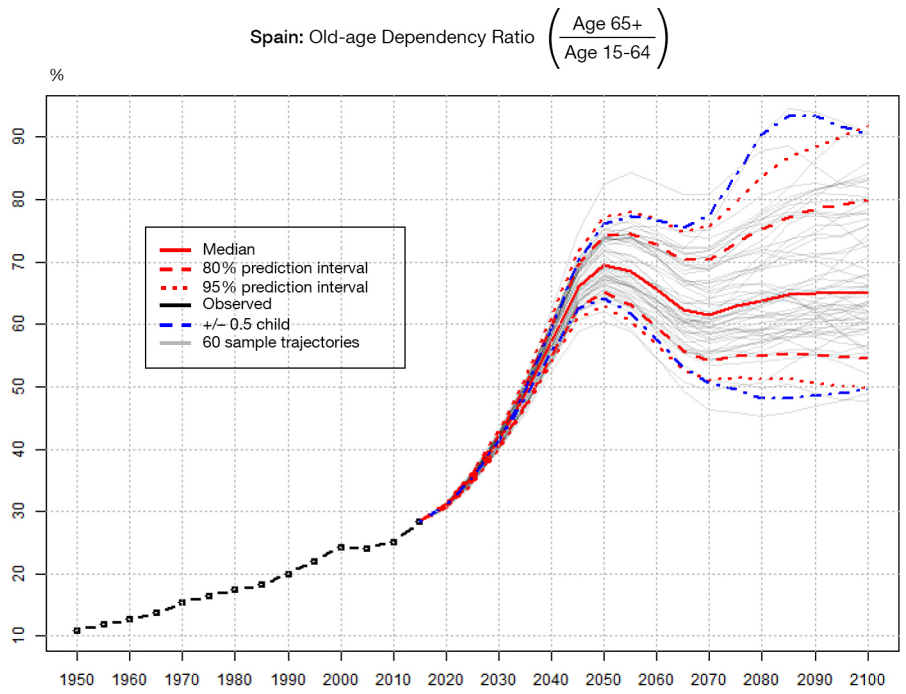
If it is decided that replacement rates should be reduced, the pros and cons of implementing this through a cut in initial pensions rather than changing the indexation of existing pensions, and the role the retirement age should play in the adjustment, need to be studied. Moreover, in this case the intended role of other forms of insurance and savings mechanisms to back up pensions from the public pay-as-you-go pension scheme in the future, such as those already implemented in other countries, should be defined.

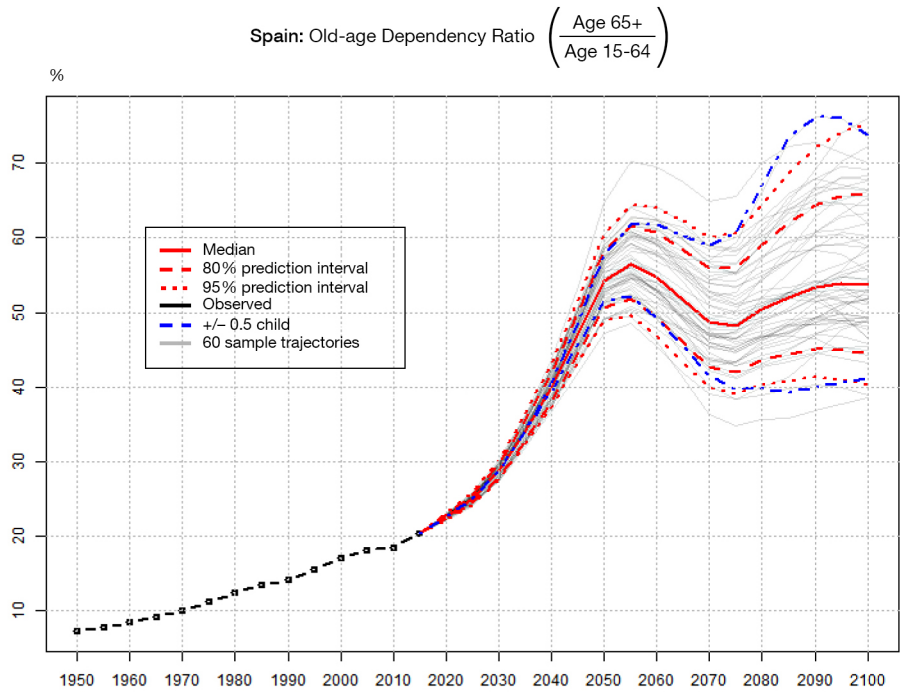
In any event, recent reforms increase the uncertainty over future developments in pension levels, whether by application of the sustainability factor or the revaluation index, such that it needs to be implemented in the most transparent way possible in order to give the public the necessary information about the sufficiency of future pensions and allow individuals to make optimal savings decisions.

Moreover, following a series of reforms the Spanish public pension system retains a wide variety of contributory features, such that the rates at which pension rights accrue varies depending on the age at which contributions are made and variations in wages over the course of the individual's working life. This ultimately means that retirement pensions are highly dependent on individuals' job performance in the later years of their working lives. Thus, one potentially attractive avenue of reform –which has been followed by a number of other European countries aiming to simultaneously make the system more transparent and strengthen its contributory aspect– is to make the transition towards individual notional defined-contribution accounts. However, this approach does not resolve the basic questions of how generous the system should be and how it should relate to the resources used to pay for it.

Finally, beyond the adjustments made to the pension system, the challenges of population ageing need to be tackled as part of a broad economic policy strategy. First of all, it is essential to return to the path of fiscal consolidation and to resume the downward trend in public debt and meet the targets set in the Stability and Growth Pact (at European level) and the budgetary stability laws (at national level) over the medium-term, so as to ensure the public finances are better placed to address the issues raised by population ageing. Secondly, from the macroeconomic standpoint, the system's fiscal sustainability problems could be alleviated by the economy's making favourable progress in terms of employment and productivity. In this regard, Spain's room for improvement is considerable and calls for structural reforms in various areas, such as the labour market, and goods and services markets, as well as education and training of workers. A long-term view needs to be taken to analysing the sustainability of the pension system, and this is perfectly compatible with the fact that many of the reforms needed to improve employment, and above all, the economy's productivity, can only take effect over a relatively long period.

Annex 1. Probability forecasts of dependency ratios





SOURCE: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision,* http://esa.un.org/unpd/wpp/.

Annex 2. An illustration of the effect of the sustainability factor and the pension revaluation index

The 2013 pension system reform introduced two automatic adjustment mechanisms with a view to ensuring the financial sustainability of the pension system. Firstly, the sustainability factor reduces the initial pension as a function of increases in life expectancy. Secondly, the revaluation index links the annual growth of existing pensions to the system's budgetary constraints.

This section presents a simple simulation exercise illustrating the effects of these mechanisms on the initial pension, pension revaluations, and the pension system's budgetary balance. The simulation starts out with a series of demographic and macroeconomic assumptions in order to apply the pension indexation formula and the sustainability factor and thus forecast the growth in average pensions and pension system expenditure. It should be recalled that the indexation formula takes into account the system's revenues, the number of pensions, the substitution effect, and the system's balance, taking moving averages of 11 annual values centred on t + 1 (see Box 1 in Ramos, 2014).[50]

The macroeconomic and demographic scenario assumed is in line with the 2015 European Commission report on ageing. An inflation rate of 2% has been assumed over almost the entire forecast period. Growth rates of around 1.8% have been projected for real GDP, in line with potential GDP trends in the report on ageing. Thus, the unemployment rate should gradually drop from its current level to around 7% in 2040-2045, while the participation rate should rise by 5.4pp between the base year and 2040. As regards productivity trends, long-term growth of around 1.5% in productivity per hour is assumed. The rise in the number of pensions is forecast to start accelerating in the coming decade as the baby boom generation reaches retirement age. The growth rate of new pensions would be approximately 2.2% a year after application of the

ASSUMPTIONS AND RESULTS OF THE ACCOUNTING SIMULATION

TABLE A

Average

	2016-2020	2021-2025	2026-2030	2031-2040
Real GDP (rate of change)	2.3	1.9	1.8	1.8
Inflation (%)	1.4	2.0	2.0	2.0
System income (% of GDP)	10.6	10.7	10.7	10.7
Income (rate of change)	3.8	3.9	3.8	3.8
Number of pensions (rate of change)	1.6	1.8	2.0	2.6
Substitution effect (%)	0.9	1.0	1.2	1.5
System expenditure (% of GDP)	11.6	11.2	10.9	11.2
System balance (% of GDP)	-1.0	-0.4	-0.2	-0.4

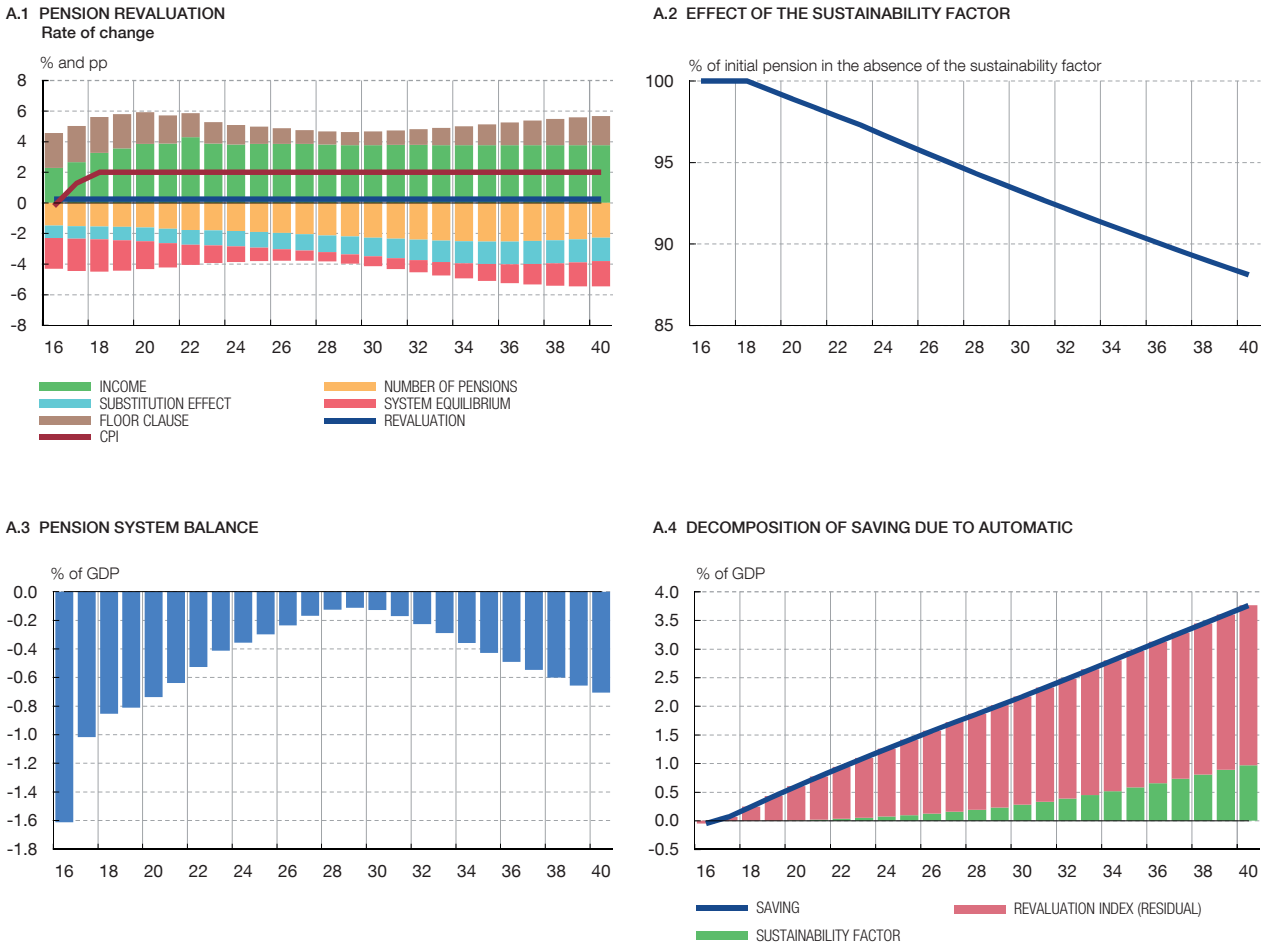
SOURCE: Banco de España.

50 The problem of the circularity of the revaluation formula has been resolved by keeping the revaluation constant and using the substitution effect observed in year t. For a description of the problem of the circularity of the revaluation formula and alternative methods for solving it, see Moral-Arce and Geli (2015).

sustainability factor, which has been calculated using the latest INE forecasts.[51] The substitution effect, i.e. the growth of average pensions in the absence of revaluation, would be approximately 1 pp a year. The pension system's main sources of revenues for the calculation of the revaluation index are taken as being exogenous and are estimated at 10.7% of GDP over the forecast period, which is approximately the level reached in 2015. The simulation's assumptions are summarised in Table A.

The results can be seen in Chart A. On these assumptions, pensions will not rise by more than 0.25% at any time during the forecast period. In the first few years, revaluations would be weighed down by the need to correct the pension system's deficits stemming first from the crisis and then from the increase in the number of pensions (see Chart A.1). For its part, the sustainability factor would reduce the initial pension by around 7% in 2013 and 12% in 2040 (see Chart A.2). The operation of the sustainability factor and the revaluation index would reduce the system's deficit by approximately one tenth of a percent of GDP a year (despite upward pressure on expenditure from the increase in the number of pensions and the substitution effect), such that

SIMULATION OF THE SUSTAINABILITY FACTOR AND THE PENSION REVALUATION INDEX, 2016-2040 CHART A



SOURCE: Banco de España

51 For simplicity, it is assumed that the sustainability factor is applied to all benefits, not just retirement pensions.

the system would reach a state of equilibrium in the second half of the 2020s (see Chart A.3). This deficit correction would mainly be achieved through the revaluation index (see Chart A.4). This is because the sustainability factor only affects new pensions, whereas the revaluation index is applicable to the stock of existing pensions. Note that the calculation of the savings achieved by the reform takes a simulation in which pensions are linked to the CPI as its reference.

The results of this simulation must be interpreted with caution, given that it is highly simplified and there is uncertainty surrounding the macroeconomic and demographic scenario, as well as over trends in the social security fund's revenues. Nevertheless, this exercise illustrates the functioning of the automatic adjustment mechanisms introduced by the 2013 reform.

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