OPINION ON THE LONG-TERM SUSTAINABILITY OF THE GENERAL GOVERNMENT: THE IMPACT OF DEMOGRAPHICS

OPINION 1/23

March 24th, 2023

The mission of the Independent Authority for Fiscal Responsibility, AAI (AIReF) is to ensure strict compliance with the principles of budgetary stability and financial sustainability enshrined in Article 135 of the Spanish Constitution.

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EXECUTIVE SUMMARY

The mission of the Independent Authority for Fiscal Responsibility, AAI (AIReF) is to ensure effective compliance with the principle of financial sustainability by the General Government (GG) since this is a fundamental determinant of economic growth and the well-being of the population in the medium and long term. This requires analysing the challenges that public finances face in the medium and long term.

This first Opinion on Sustainability focuses on analysing the impact of demographics on the public accounts on the basis of a macroeconomic and fiscal scenario that is prepared with a time horizon up to 2050 and 2070. There are many challenges that can affect debt sustainability over such a long period of time. Climate and technological change, the possibility that the current geopolitical tensions will eventually lead to a new, more fragmented global order, structural reforms and other shocks that are certain to occur in the future will have an impact on the economy's capacity for growth and the path of public debt. However, there is undoubtedly one element that, slowly but surely, is already influencing the economic performance and public finances of the Spanish economy: the ageing population. Gaining an initial understanding of the implications of this challenge for the position of public finances is useful for designing economic policies that facilitate adaptation to said challenge.

The Opinion completes and updates AIReF's previous statements on the sustainability of the Social Security system with a comprehensive overview of the GG as a whole. Specifically, the Opinion is based on a baseline scenario that incorporates an update of AIReF's demographic projections and a set of assumptions in relation to the long-term growth scenario that are detailed in this document. On the basis of these estimates, the Opinion analyses their implications for public expenditure, extending previous analyses that focused

on pension expenditure to other expenditure items. Estimates of public revenue are also presented. These are conditional on economic growth and the long-term elasticities of the various taxes to GDP. These projections take into consideration the policies approved and legislated up to the preparation date of this Opinion. An analysis is also offered of the reforms to the Social Security system that have been approved recently. The analysis period extends until 2070, in line with the practice of other institutions. This makes it possible to illustrate the path of public finances once the impact of the retirement of the largest baby-boom generation fades.

This comprehensive and long-term outlook is particularly important at this time. Firstly, the public accounts are beginning to reflect the consequences of the retirement of the so-called baby boomers (born between 1957 and 1977), together with the growing longevity of the population and the fall in fertility over the last four decades.

Secondly, the legacy of the succession of shocks suffered over recent decades (financial and sovereign crisis, health crisis and the war in Ukraine) puts Spain in a vulnerable situation due to the persistence of the structural deficit and the high level of public debt reached.

Thirdly, if the European Commission's recent proposal is implemented, the future reform of the European fiscal framework will put the sustainability of public debt at the heart of the framework. According to this proposal, high-debt countries, including Spain, will have to establish four- or seven-year adjustment paths that will guarantee that debt remains on a downward path in the ten years following the adjustment period, incorporating the effects of ageing. Assessing compliance with these commitments will require target revenue and expenditure paths to be set with a horizon of at least 14-17 years that include the impact of demographics and the adjustment measures implemented. By means of this Opinion, AIReF aims to anticipate the information requirements that will be necessary for analysing medium- and long-term sustainability in this new framework.

The estimates presented in this Opinion should in no case be interpreted as forecasts. It is clear that the uncertainty inherent to any projection exercise rises significantly when such lengthy time horizons are considered. However, the usefulness of these estimates is to illustrate the pressures and challenges facing the public sector over the long term as a result of demographics in a hypothetical baseline scenario in which there are no fiscal rules and no economic policy response. The estimates do not take into account phenomena other than demographics that will certainly affect growth and the public accounts over that time horizon, such as climate change, technological advances and the application of fiscal rules.

In addition, the baseline scenario is dependent on certain assumptions about the medium- and long-term growth of the economy that are subject to a high

degree of uncertainty. On the one hand, demographic change itself is a complex phenomenon that can affect multiple dimensions of agents' behaviour (consumption and investment patterns, labour supply, productivity, determination of wages), with implications on the potential growth of the economy that are difficult to estimate as a whole. In addition, the Spanish economy has begun a process of capitalisation and structural transformation under the framework of the Recovery, Transformation and Resilience Plan that, if effectively translated into rises in productivity and permanent improvements in the functioning of the job market, could increase the potential growth of the economy. Conversely, the energy crisis could have a negative impact on productive capacity.

For all these reasons, in addition to the baseline scenario, the Opinion contains alternative scenarios and various sensitivity exercises. In the alternative scenarios, the aim is to illustrate, firstly, the potential impact on the sustainability of public finances of structural reforms that permanently raise the economy's potential growth. Secondly, an estimate is offered of the potential consolidation effort that the Spanish economy would have to make in the coming years in the event of application of a framework of fiscal rules consistent with the reform proposal recently published by the EC, the details of which are yet to be specified. Finally, given that the Spanish economy has undertaken to carry out a fiscal reform within the framework of the RTRP while assuming certain expenditure commitments, a scenario is presented that considers an alternative path of revenue and expenditure to that of the baseline scenario. In the case of the sensitivity exercises, the aim is to illustrate the sensitivity of the results of the baseline scenario to changes in some fundamental ingredients of the model (migratory flows, potential growth, etc.).

Baseline scenario

The baseline scenario is based on the demographic forecasts prepared by AIReF that have been updated to incorporate the most recent information on demographic phenomena published by the National Statistics Institute (INE) for Spain and by the United Nations (UN) for the rest of the countries. Based on this new information, the models used to project birth, mortality and demographic flows have been re-estimated, while some methodological improvements have been made.

The main results show that, the long term, the population in Spain will reach 50.3 million inhabitants by 2015 and 52.1 million by 2070. This increase in the population is mainly due to the dynamism of migratory flows (for which annual net inflows are estimated at around 235,000 people between 2020 and 2050, which rises to 339,000 people in the period between 2051 and 2070). Migration thus plays a crucial role in mitigating the effects of the negative natural population change over the horizon analysed. However, the ageing of the

population cohorts born in the 1960s and mid-1970s in Spain, the reduced fertility rates of recent decades and greater longevity are already causing a profound transformation of the population structure by age. In addition, the relative weight of the working-age population is estimated to fall from the end of the decade, with some delay compared with other European economies. The dependency ratio, which measures the percentage of the population over the age of 66 over the working-age population, would stand at 51.4% and 45.9% in 2050 and 2070, respectively, compared with 26.6% today.

As for the macroeconomic scenario, AIReF uses its latest medium-term scenario estimated up to 20261. In the longer term, AIReF assumes average annual GDP growth of 1.3% in real terms and 3.3% in nominal terms between 2027 and 2070. In a context of a lower working-age population, sustaining this potential growth of the economy implies apparent labour productivity growth of 1.1% in the projection horizon, which is much higher than that recorded since the financial crisis. This increase may be driven by the boost in capitalisation and structural transformation triggered by the RTRP, if it is appropriately implemented. Moreover, the baseline scenario assumes that lower labour abundance would lead to a gradual decline in the unemployment rate to 7% by 2050. The participation rates of women, the elderly and young people are also expected to increase to converge at European levels, based on the lower unemployment rates that would reduce the effect of discouraging labour market participation. In the case of older workers, the increase in their participation rates is further driven by the estimated impact of the reforms approved in 2011 and 2021 aimed at delaying the legal and effective retirement age.

On the basis of the demographic and macroeconomic scenario, AIReF builds a baseline fiscal scenario from 2026 (AIReF's aforementioned medium-term scenario is used up to that year) in which fiscal rules would not operate. This scenario shows a growing deficit from 2026 to reach a peak of 8.1% in 2055, to then fall to 7% in 2070. This path is mainly explained by the spending pressures of ageing coupled with rising interest expenditure as debt levels increase. The debt would follow an upward path throughout the period to reach a peak of 186% of GDP in 2070.

The weight of revenue over GDP would rise in the absence of economic cycles in the projection to 44.7% in 2050 and 45.6% in 2070, from 43.5% in 2021. This increase is due to the long-term elasticity of revenue over GDP being slightly above unity in line with historically observed patterns in Spain and other countries. As a whole, taxes on production, VAT and Special Taxes remain constant as a percentage of GDP over the projection horizon. Social contributions also evolve at the pace of GDP, including the impact of the complete roll-out of the reform of the system for self-employed workers and

[1] AIReF | Report General State Budget 2023

the impact of the solidarity quota, which means that its weight increases by a few tenths of a point during the projection period. It also includes the impact of the growth of the maximum contribution bases with the CPI as from 2050, given that this implies that contributions will grow at a rate somewhat lower than GDP for that period. On the other hand, Personal Income Tax (PIT) would change in line with the demographic structure, although above nominal GDP due to the fiscal drag of this tax. Furthermore, a higher elasticity than unity is also assumed for Corporate Income Tax, while other revenue would evolve with nominal GDP.

Expenditure would rise to a peak of 53% of GDP in 2058 and then stabilise, falling slightly to 52.6% in 2070. Firstly, this evolution would reflect the pressure from the ageing process, which is not only reflected in pension expenditure, but also in healthcare, education and long-term care. Secondly, the dynamics of debt accumulation coupled with rising interest rates would also increase the weight of interest expenditure to reach 6.9% in 2070.

Pension expenditure would start to accelerate, particularly from 2035 onwards, reaching a peak in 2049 of 14.8% of GDP for social security pensions and 16.3% including non-contributory and civil servant pensions. Subsequently, once the pressures of ageing ease, expenditure would fall to 13.4% and 13.9%, respectively, in 2070. These projections, which update the latest ones published by AIReF in 2020, incorporate the latest data available and changes in the starting assumptions. They also include the impact of the reforms already approved.

The pension reforms approved between 2021 and 2023 mean an increase in the deficit of 1.1 points of GDP by 2050. This figure includes the increase in line with the CPI, which means an increase in expenditure of 2.7 points with respect to the application of the Pension Revaluation Index (PRI).

The repeal of the sustainability factor will result in an increase in expenditure of 0.8 points in 2050. The modification of the conditions for early retirement has a neutral long-term effect. In contrast, the new incentives to delay retirement will result in lower expenditure in the baseline scenario of 0.8 points of GDP in 2050 if around 30% of workers delay their retirement. It should be noted, however, that the final outcome of this reform fundamentally depends on workers and companies changing their current behaviour. The impact may therefore vary between 0.2 points if only 10% opt for the delay and 1.5% if more than 55% opt for delayed retirement.

As for the latest measures approved, the modification of the calculation period for determining pensions from the 25 years prior to retirement to the best 27 years of the last 29 years leaves expenditure unchanged in 2050, and means a reduction in expenditure of 0.1 points in 2070. In addition, the growth in the maximum pension below the increase in the maximum contribution bases would result in a decrease in expenditure of 0.4 points in 2050 that would

be maintained between 2050 and 2070, when maximum pensions are expected to grow above the maximum bases.

As for the reforms approved on the revenue side, the Intergenerational Equity Mechanism (IEM) results in an annual increase of 0.4 points in revenue in national accounting terms. Apart from the schedule of financial contributions and disbursements to the Reserve Fund, it would result in lower debt for the GG as a whole of 11 points of GDP in 2050. The reform of the system of contributions of self-employed workers is neutral in this initial application. However, once the transitory period ends, it would result in an increase in revenue estimated at 0.5 points of GDP, including its potential effect of uncovering the black economy. In addition, the growth in the maximum contribution bases at the CPI plus 1.2 points in 2050 will lead to an increase in revenue of 0.4 points of GDP compared with evolution in line with the CPI. Finally, the solidarity quota would increase revenue by an additional 0.1 points of GDP.

With regard to other expenditure, it is worth noting a similar evolution due to ageing in healthcare and long-term care. In healthcare, spending would stabilise at around 8.4% of GDP from 2049, while in long-term care it would stabilise at by close to 2% by around 2060. In contrast, following the evolution of the younger population, expenditure on education falls to 3.6% in 2041 and then recovers to 4.2% of GDP in 2070.

Scenario of higher potential growth

One of the main determining factors of the results of the baseline scenario is potential growth, which is expected to reach 1.3% on average between 2027 and 2070. The uncertainty relating to this assumption is high. On the one hand, the succession of shocks suffered in recent years and, in particular, the energy crisis, may have had an impact on the economy's productive capacity. On the other hand, one of the main aims of the RTRP is to boost the potential growth of the Spanish economy in the medium and long term through reforms and investments. However, quantification of its impact is still uncertain.

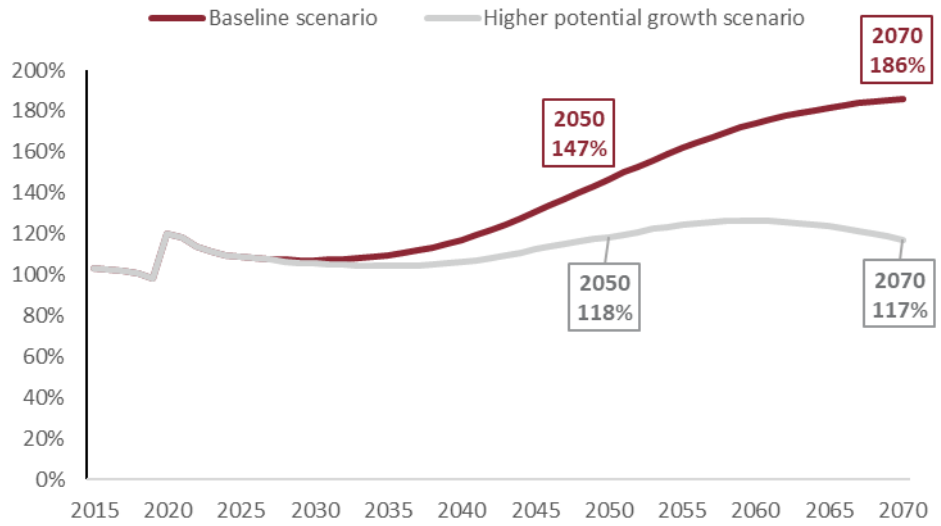
In this regard, it is useful to analyse the impact of an increase in the potential growth of the economy that might be associated both with the implementation of migration policies that mitigate the fall in the working-age population in the baseline scenario and with the implementation of structural reforms.

An alternative scenario is therefore incorporated in which average annual economic growth is assumed to be 0.3 points higher than the baseline scenario. This higher medium-term growth is driven by labour market, productivity and migration.

This analysis demonstrates the importance of economic growth for ensuring the financial sustainability of the General Government. In the alternative scenario, the weight of pension expenditure over GDP would fall to 13.5% of

GDP in 2050, 1.3 points below the baseline scenario. More generally, the public deficit would moderate to a peak of 5.4% in 2053 and fall to 2.7% in 2070. In turn, this would imply lower interest expenditure and a lower level of public debt that, after reaching a peak of 126% in 2060, would progressively fall to 117% in 2070.

FIGURE 1. EVOLUTION OF DEBT IN THE BASELINE SCENARIO AND HIGHER POTENTIAL GROWTH SCENARIO



Source: IGAE and AIReF

Scenario of application of fiscal rules

The baseline scenario presented excludes the effects of the activation of fiscal rules aimed at remedying public finance imbalances.

The European framework of rules is currently being revised. The European Commission published guidelines for the reform last November, which is still pending completion and approval. The main principles guiding the reform place debt sustainability at the heart of the framework. In particular, countries will establish medium-term spending commitments (four or seven years, depending on whether reforms are carried out or not) which ensure that debt remains on a downward path in the ten years following the adjustment period, incorporating the effects of ageing.

These expenditure commitments could be derived, among other possible alternatives, from medium- and long-term revenue and expenditure projections such as those presented in this Opinion. Therefore, in AIReF's opinion, these projections provide highly useful information for establishing the path of public finances in the absence of corrective measures and the feasibility of the commitments that may be established, as well as for analysing the reasons for any non-compliance.

A quantification of the commitments that would need to be made if the EC

proposal were to materialise – according to AIReF's interpretation – suggests that the adjustment required to meet the debt reduction commitment would lie in a range between 0.32 and 0.43 GDP points per year depending on the parameters used.

Discretionary changes in revenue and expenditure

Beyond the trends described in the baseline scenario, the evolution of revenue and expenditure is subject to the set of discretionary decisions adopted by governments to develop public policies. On the one hand, the RTRP contains, without any explicit quantification, commitments to increase revenue mainly through tax reform, as well as objectives for the modernisation of the GG and reinforces processes to improve efficiency such as the Spending Review. Along the same lines, maintaining the actions initially financed by the RTRP may involve a structural increase in expenditure. On the other hand, the Government must meet various commitments to raise spending on policies such as defence, education and R&D&I as a result of laws or international treaties, whose financing is not specified.

Illustratively, a structural reduction in the deficit, via revenue or expenditure, of one additional point from 2027 would result in a reduction of 25 points of GDP in debt in 2050 and 47 points in 2070. In the opposite direction, a structural increase in the deficit, via revenue or expenditure, of one additional point from 2027 would result in an increase of 25 GDP points of debt in 2050 and 47 points in 2070.

Risk analysis

AIReF also presents a sensitivity analysis showing the impact of changes in the key variables. In this regard, a 15% reduction in migratory flows would increase debt by 28 points, while an increase in flows by a similar amount would reduce it by 25 points in 2070. The impact associated with lower revenue elasticity relative to nominal GDP has also been explored. This will keep the weight of revenue over GDP constant, which would raise debt by 85 points. Another element with a major impact on debt projections, given the high levels of this variable both in the starting situation and throughout the horizon studied, is the level of interest rates: in particular, an increase of 50 basis points throughout the horizon of the exercise would raise the debt ratio by 30 points in 2070, while a parallel reduction would reduce debt by 25 points.

Conclusions

The public sector in Spain is vulnerable due to the persistence of the structural deficit and the high level of debt inherited from successive crises. In addition, the ageing process imposes a great deal of pressure on public finances, which could place the debt ratio in a hypothetical baseline scenario without measures at 186% of GDP in 2070. As higher debt levels are reached, the associated financial burden - even in a scenario in which markets do not react by demanding higher risk premiums - also puts significant pressure on debt

levels themselves.

The spending pressures associated with the ageing of the population mean that reaching debt levels that make it possible to sustain a composition of public spending that is favourable to economic growth requires a medium-term fiscal consolidation process. Such a process should include spending review exercises as an essential ingredient for making economic growth compatible with the reduction of the structural deficit. The design of a rule-based framework in line with the European Commission proposal can also contribute to this aim. In addition, the effective deployment of the reforms and investments associated with the RTRP are also a pillar of the financial sustainability of the General Government.

Proposals

In this context, it becomes necessary to open a process of reflection, both across society as a whole and internally in each public authority on how to meet the challenges of the sustainability of the GG. The holding of different elections over the course of this year should not be an obstacle to this process, quite the opposite. As this constitutes one of the main challenges facing the Spanish economy in the coming years, it may be appropriate for the different parties to present their approaches to the public to start building the social consensus necessary to address it. After the electoral cycle at all tiers of government, a new legislature will be opened and with it a window of opportunity to begin to implement less short-term approaches. This will lead to a healthier public accounts position, which will reduce vulnerability to possible changes in the perception of debt markets. Therefore, AIReF proposes structuring a national medium- and long-term fiscal strategy with the participation of all tiers of government that includes a comprehensive reform of the national fiscal framework to ensure the sustainability of the GG.

The pressure that ageing will exert on the public accounts and, in particular, on pension and healthcare expenditure should lead to a more in-depth analysis and evaluation of its determining factors, as well as the effect of any reforms that may be implemented. In the case of pensions, the reforms and developments of the system must be studied both from the perspective of their impact on future spending and sustainability, and from the perspective of sufficiency and contributory and intergenerational equity. In addition, AIReF also makes a proposal on the need to continue with the evaluations of healthcare expenditure.

In addition, the new pension expenditure rule shows design weaknesses, such as the lack of justification of the chosen quantitative limits, the lack of coherence with the fiscal framework and the restrictions imposed on independent supervision by AIReF. AIReF therefore announces its intention to accompany the report provided for in the Royal Decree-Law with an update of this Opinion to provide institutions and society in general with an

independent and detailed analysis of pension expenditure and the position of public finances as an objective element for decision-making. Along the same lines, it makes several proposals to the Government aimed at addressing these weaknesses and at increasing the transparency of the process: ensuring coherence and consistency between all the fiscal rules, the attendance of AIReF representatives at the sessions of the Working Group on Ageing as observers, establishing an agreement between AIReF and the Government for the implementation of the pension expenditure rule and for the Government to publish the forecasts, assumptions and methodology used to determine the expenditure levels and impact of measures.

The appropriateness of this fiscal strategy being accompanied by economic growth highlights the importance of achieving appropriate implementation of the RTRP, both in terms of investment and in terms of driving a structural transformation of the economy. AIReF therefore proposes that the Government design a governance model for evaluating the RTRP over the coming years. In this regard, and following the scheme proposed in the study on the institutionalisation of evaluation drawn up by AIReF with the assistance of the OECD, governance is proposed based on three levels: an internal coordination and planning institution, the evaluation of the management centres themselves and evaluation by external independent agents.

Finally, AIReF, as stated in the Opinion on Fiscal Transparency2, proposes preparing a report on specific fiscal risks, beyond those listed in this Opinion, which sets out the possible risks that may affect fiscal projections. Once the fiscal risks have been identified and analysed, it is important to assign probabilities to their materialisation and to quantify their impact. Furthermore, the risk mitigation strategy should be made explicit, either for the risks as a whole or for individual risks.

[2] Opinion on Fiscal Transparency in the GG in Spain

1. INTRODUCTION

The main function of the Independent Authority for Fiscal Responsibility, AAI (AIReF) is to ensure the financial sustainability of the General Government. One of the tools provided by Organic Law 6/2013, of November 14th, on the establishment of AIReF is the issuance of opinions. Furthermore, Article 23(b) of the said Law identifies the long-term sustainability of public finances as one of the specific issues that may be the subject of an Opinion.

So far, AIReF's reporting horizon has focused on the short term, but the latest report has included a medium-term scenario that will be updated twice a year. AIReF analyses the situation of public finances in the short term in the reports provided for in its Law around the main milestones of the annual budget cycle. However, as from the Report on the Main Budgetary Lines and Draft Budget of the General Government published in October 2022, AIReF will provide a medium-term perspective on the performance of the GG. It will prepare its macroeconomic and budgetary scenario with a high degree of detail for a five-year horizon twice a year (previously only adopting this perspective in the report on the Stability Programme Update).

With a long-term vision, AIReF regularly conducts debt sustainability analyses and has published two opinions on the sustainability of the Social Security System, in 2019 and 2020. AIReF issued the Opinion on the Sustainability of the Social Security System on January 9th, 2019. For this purpose, demographic projections and a long-term growth scenario were developed as the basis for the pension expenditure projections.

According to these estimates, the net effect of demographic factors, the long-term growth scenario and the pension reforms approved in 2011 and 2013 (with the exception of the PRI, which was not being applied in practice and therefore was not incorporated in this scenario) would result in an increase in pension expenditure of close to 3 percentage points (pp) of GDP between 2018 and 2048. In September 2020, AIReF updated its demographic and pension expenditure forecasts, which confirmed the conclusions contained in the previous Opinion. In addition to the pension expenditure projections, AIReF regularly conducts debt sustainability analyses included in the reports and in the Debt Monitor. These project the evolution of debt subject to certain assumptions regarding the primary deficit, interest payments and economic growth.

This Opinion completes AIReF's long-term analysis of public finances by incorporating a full revenue and expenditure scenario. With this Opinion, the estimates of the future path of debt are based on the analysis of the activity of the General Government, also including the revenue side and, in the case of expenditure, those policies that are strongly affected by the ageing process of the Spanish population, such as healthcare and long-term care. Furthermore, the time horizon is extended until 2070 to make the exercise more comparable with that of other institutions such as the European Commission.

AIReF believes that a major part of its usefulness lies in the dissemination of data and analyses that can help to measure the challenges facing the public accounts and facilitate the design of a medium-term fiscal strategy that will guarantee the sustainability of public finances. As a starting point for developing a realistic and credible fiscal strategy, a detailed analysis of the state of public finances in the short, medium and long term is necessary[3]. This type of analysis is particularly appropriate at the present time after overcoming the crisis caused by COVID-19 and with the current energy price crisis intensified by Russia's invasion of Ukraine and with

3 The preparation of this type of long-term sustainability analysis has a long tradition in the United States and the United Kingdom (see CBO's Long-Term Projections and OBR's Fiscal sustainability Report. In both cases, the time horizon is 50 years. The 2021 Long-Term Budget Outlook | Congressional Budget Office (cbo.gov). Fiscal risks and sustainability – July 2022 - Office for Budget Responsibility (obr.uk)

the Recovery, Transformation and Resilience Plan (RTRP) in full implementation. The European Commission's proposal for reform of the fiscal framework will also rely on an analysis of this nature as it places greater focus on debt sustainability and on the evolution of public finances in the medium term, incorporating the impact of the ageing of the population.

The long-term budgetary and macroeconomic scenario and the debt estimates obtained should under no circumstances be interpreted as forecasts. These estimates illustrate the pressures and challenges facing the public sector over the long term as a result of demographics in a hypothetical framework in which there are no fiscal rules and no economic policy response. It is important to bear in mind that the uncertainty inherent to any forecasting scenario rises significantly as the time horizon considered increases. Phenomena such as climate change, technical developments and reforms to be adopted may have strong implications for public accounts and economic growth over such a long period of time.

This Opinion focuses on the implications for GG of the ageing of the population. This is a complex phenomenon which, with a high degree of uncertainty, conditions and will condition public finances in the coming years. AIReF's demographic forecasts and the estimates of other institutions unanimously point to a progressive ageing of the population and a significant increase in the dependency ratio in the coming years, as baby-boom generations retire. The implications of this phenomenon on the public accounts need to be assessed as accurately as possible. However, this analysis also has its limitations, as there is a great deal of debate about how the change in population structure may affect a wide variety of issues including consumption and savings patterns, incentives for technological change or robotisation, and political decision-making processes.

The Opinion is structured with the presentation of a macroeconomic and fiscal baseline scenario on which risks and measures are subsequently analysed. AIReF does this by preparing its own demographic forecasts and setting out a long-term macroeconomic scenario, on which the estimates of the baseline evolution of the GG's revenue and expenditure are based. Subsequently, risk and sensitivity analyses are performed on this baseline scenario. In particular, AIReF sets out three alternative scenarios which aim to provide a tentative illustration of the impact on the sustainability of public finances arising from higher potential growth, from the application of a framework of fiscal rules consistent with the main lines of the reform proposed by the EC and from discretionary decisions by governments in relation to revenue and expenditure.

2. LONG-TERM MACROECONOMIC SCENARIO

The ageing of the population cohorts born in the 1960s and mid-1970s in Spain, the reduced fertility rates of recent decades and greater longevity are causing a profound transformation of the population structure by population age and a fall in the relative weight of the working-age population. While these demographic trajectories are common to other advanced economies, they have reached Spain with some delay, but intensely. Thus, although at the start of the century Spain was one of the countries with the highest percentage of young population, the available demographic projections coincide by noting that in 2050, we will be one of the countries with the highest percentage of elderly people - over one third of the population will be over the age of 65 and the average age of the resident population will exceed 48. These trends have important implications for economic growth, pension systems and spending on other social policies such as healthcare, education and dependency.

This section presents, firstly, AIReF's demographic projections and, secondly, the scenario of growth, employment and productivity that underlies the long-term revenue and expenditure projections. The population projections are obtained from the projection of its main determining factors: fertility, longevity and migration.

Unlike the National Statistics Institute's estimates, which are based on a survey of demographers, AIReF's estimates are based on statistical and econometric models that incorporate the latest information available. These models have undergone an in-depth mythological revision compared with the previous update of AIReF's forecasts. It also presents the scenario for growth, employment and productivity, which acts as the basis for determining the long-term evolution of government revenue, as well as the behaviour of some of its expenditure components, such as, for example, unemployment expenditure.

Both demographic projections and projections for growth, productivity and employment are subject to uncertainty that rises as the projection horizon is extended. This Opinion presents estimates up to the year 2070 in line with the practice of other national and international institutions. However, it is worth highlighting the uncertainty inherent to the consideration of such an extensive projection in which many phenomena, such as the green transition and digitisation, will have significant implications for growth and the public accounts.

In addition, economic activity and population dynamics are interrelated through multiple channels. On the one hand, projections of the population and its structure by age and gender affect long-term growth projections by determining such important aspects as working-age population, the overall participation rate, productivity growth, the rate of accumulation of human capital and the economy's savings rate, which in turn determines the accumulation of physical capital[4]. Along the same lines, economic growth and development have a significant impact on the evolution of the population pyramid, affecting mortality, fertility and external migratory movements. Although AIReF's projections take some of these interactions into account, the complexity of their quantification adds another source of uncertainty to the projections.

AIReF's demographic projections point to a significant transformation in the age structure of the population over the coming

4 See for example, Prskawetz, A., Fent, T., Barthel, W., Crespo-Cuaresma, J., Lindh, T., Malmberg, B., & Halvarsson, M. (2007). The relationship between demographic change and economic growth in the EU. Report for Tender VT/2005/035.

decades and an increase in the dependency ratio. Box 1 provides a comparison of AIReF's projections with those of the National Statistics Institute (INE) and Eurostat - drawn up in 2019. Despite differences in the expected population size, all estimates unanimously point to an ageing population and a significant increase in the old-age dependency ratio (population over 66 years of age as a percentage of the working-age population). The comparison with other major European economies according to the figures of the European Commission's latest Ageing Report[5] (AR2021) points to Spain recording one of the largest increases in the dependency ratio in Europe up to 2070, placing this indicator at levels close to 46% by that year.

2.1. Demographic projections

AIReF has reviewed the statistical and econometric models used to obtain the demographic projections of this Opinion. In addition to incorporating the latest figures from the INE on fertility, mortality and migration flows, as well as the latest data from the United Nations, the current estimates are based on a re-estimation of the models used to project demographic phenomena. The most significant changes include the incorporation of new baseline information for the projections of migration flows. In particular, these flows are derived from the five-year population estimates published by the United Nations since 1990, supplemented with the World Bank's decennial data going backwards, in contrast to the baseline figures used in the previous estimates, which used the latter data available up to 2010 and extended with UN estimates for later years, with these new figures, the gravity models used to explain and project migration flows have been re-estimated. Compared with previous estimates, there is now greater stability in migration dynamics over the forecast horizon. Migration models only incorporate factors of an economic, demographic and sociological nature among their determinants: per capita income differentials, size of the working-age population and fixed effects such as geographic and linguistic

5 The 2021 Ageing Report: Economic and Budgetary Projections for the EU Member States (2019-2070) (europa.eu)

proximity, together with so-called network effects[6]. Therefore, they can barely capture migratory movements associated with geopolitical factors that in recent years have gained major importance, but whose evolution is uncertain.

The statistical models used to project survival have been revised. Currently, Lee and Carter models are employed. These are commonly used in the literature on mortality and life expectancy projections. These make it possible to take into account both the specific mortality patterns for each age group and the trajectories common to all of them. All these changes are discussed in detail in the Technical Paper on Demographic Projections (see Technical Paper 1/23).

2.1.1. Fertility

In recent years, Spain has continued to show a very low total fertility rate in historical terms. In 2021, the number of children per woman was 1.19. This result reflects a certain recovery in fertility in mothers of Spanish nationality, which stood at 1.16 children per woman after the fall observed as a result of the health and economic crisis. In the case of mothers of foreign nationality, the intense fall observed in the total fertility rate in 2020 has continued in 2021, to stand at 1.39 children per woman.

Although the fertility patterns of immigrant and Spanish mothers have gradually converged, differences still persist that make it advisable to treat the two groups differently when projecting future fertility trends. Despite the gradual convergence in the fertility of Spanish mothers and residents with foreign nationality, a gap remains that narrows in times of crisis as a result of the greater job insecurity of the foreign population and their greater vulnerability to adverse shocks. These different dynamics make it recommendable to use differentiated treatment by place of birth when projecting fertility rates.

6 The existence of a country with a high number of immigrants of the same origin facilitates future inflows of the same origin due to the possibility of reducing the costs of migration (for example, by the possibility of sharing housing, facilitating the search for employment, etc.).

FIGURE 2 RECENT TRENDS IN THE FERTILITY OF SPANISH AND FOREIGN MOTHERS

FIGURE 2 A. NUMBER OF CHILDREN PER WOMAN. ACCORDING TO THE MOTHER'S NATIONALITY

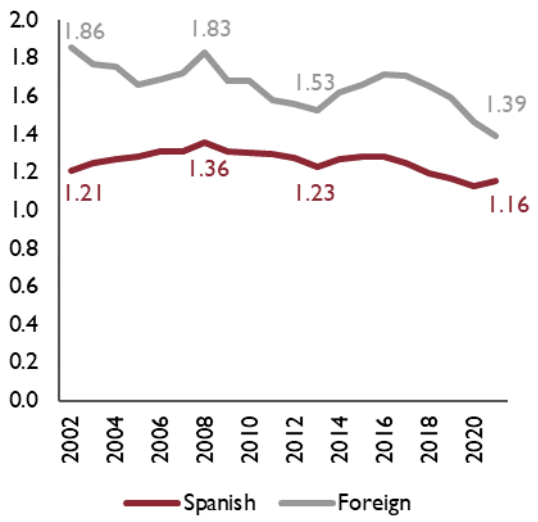
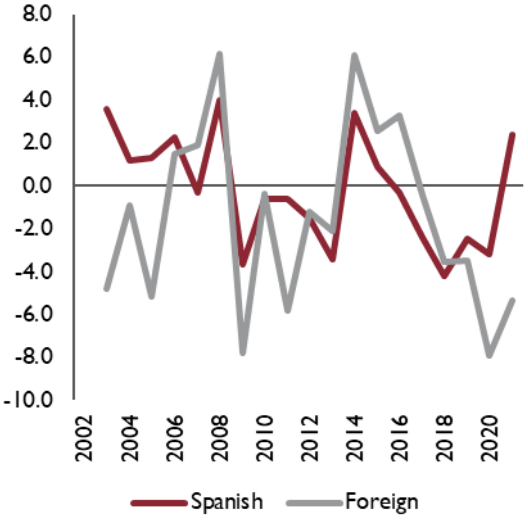


FIGURE 2 B. NUMBER OF CHILDREN PER WOMAN. ACCORDING TO THE MOTHER'S NATIONALITY. RATE OF CHANGE



Source: INE

The fall in the total fertility rate has been common to many economies[7]**, but Spain is among the countries with the lowest fertility rates in Europe**. As shown in Figure 3.A., the average fertility rate in immediate neighbouring European countries fell in the 1970s and 1980s and subsequently stabilised at an average of around 1.5 children per woman. In Spain, fertility also recorded a notable fall in the 1970s and 1980s and has been below 1.5 children per woman for over three decades.

The reasons behind Spain's low fertility are structural in nature and are closely linked to the precariousness and instability of youth employment and to difficulties in accessing housing. This causes a delay in the economic and residential emancipation of young people, with the consequent postponement of the decision to have children and the reduction in the propensity to have a second child[8]. In each

7 According to UN data, in 2021, the average fertility rate in the world stood at 2.3 children per woman, almost half of the 5 children per woman observed in 1950. In addition, the UN projects a further decrease in the fertility rate to 2.1 children per woman in 2050.

8 Esteve, A., Lozano, M., Boertien, D., Mogi, R., & Cui, Q. (2021). Tres décadas de muy baja fecundidad en España, 1991-2018. [Three decades of very low fertility in Spain, 1991-2018.]

generation there are increasingly fewer women of childbearing age and the average age of motherhood is already 32.2 years on average in Spain, four years older than in 1980, compared with 30.1 in Europe.

However, the reproductive preferences of Spanish people have remained stable over the last decades. According to the 2018 Fertility Survey carried out by the INE, the average number of children that both men and women want still stands at around two (a figure equal to that observed in other European countries). Spain is therefore among the countries with the largest gap between the average number of children desired and the number they eventually have[9].

Taking these considerations into account, AIReF's projections are based on the assumption of convergence of the number of children per woman towards the countries closest to us in 2070. Although it is highly unlikely that the fertility of mothers of Spanish nationality will reach values close to the threshold of generational replacement (2.1 children per woman[10]), it should be possible to somewhat attenuate the gap between reproductive desires and realities. This is particularly the case if the recently implemented structural reforms manage to reduce the precariousness of labour relations. Therefore, AIReF's projections on the fertility rate of Spanish mothers are based on the assumption of convergence in the long term, that is, in 2070, to 1.47 children per woman, which is the average recorded in other advanced European countries[11].

9 Teresa Castro, Teresa Martín, Julia Cordero & Marta Seiz (2020). La muy baja fecundidad en España: la brecha entre deseos y realidades reproductivas [The very low fertility in Spain: the gap between reproductive desires and realities], demography-changes-in-the-reproductive-model.pdf (aragon.es)

10 The replacement rate refers to the minimum fertility required for the population to remain constant over time, assuming zero migration. It is estimated to be around 2.1 children per woman.

11 The factor analysis reveals that there is similar fertility behaviour among European countries, with the first common factor in 2020 recording a value of 1.47 children per woman. This is the convergence value used for the projection of fertility rates.

FIGURE 3 INTERNATIONAL ENVIRONMENT AND CONVERGENCE ASSUMPTIONS

FIGURE 3 A. NUMBER OF CHILDREN PER WOMAN. NEIGHBOURING COUNTRIES.

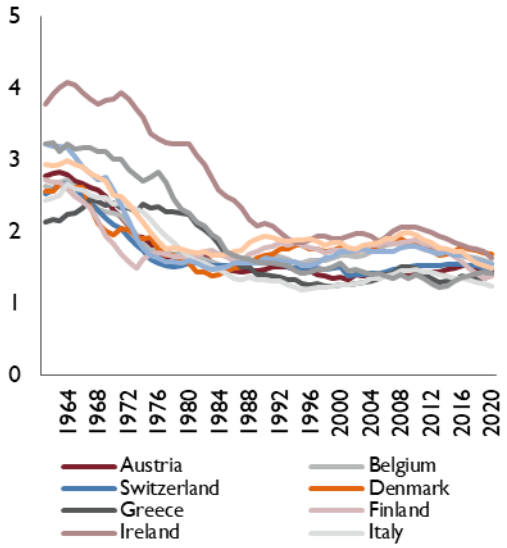
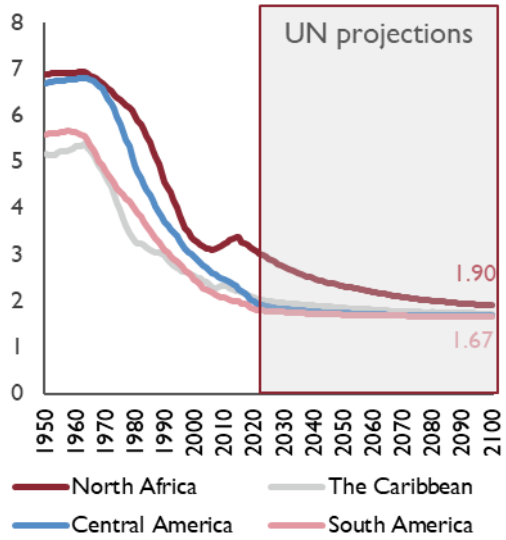


FIGURE 3 B. NUMBER OF CHILDREN PER WOMAN. VARIOUS GEOGRAPHICAL AREAS



Source: Eurostat and UN

In the case of foreign mothers, the total fertility rate is expected to rise to 1.62 children per woman by 2070. The fertility ratios of the emerging economies from which the majority of the foreign population migrating to Spain comes have also fallen significantly and the United Nations projections suggest that this trend will continue over the coming decades with a progressive convergence towards values of 1.74 children per woman at the end of this century (Figure 4.B.). Taking into account these estimates and the process of gradual assimilation with the patterns of mothers of Spanish nationality, it is assumed that mothers of foreign nationality will converge to 1.62 children per woman by 2070. This figure stands at an intermediate point between the convergence value for mothers born in Spain (1.47) in that year and the convergence value estimated by the United Nations for the countries of origin of immigration to Spain. AIReF's projections therefore imply a gradual convergence between the fertility rates of Spanish and foreign mothers. Over the projection period, this convergence is due not so much to the fact that the immigrant population assimilates national fertility patterns, as to the increase in the fertility of Spanish mothers.

FIGURE 4. PROJECTIONS OF NUMBER OF CHILDREN PER WOMAN. BY NATIONALITY

FIGURE 4.A. NUMBER OF CHILDREN PER WOMAN. MOTHERS OF SPANISH NATIONALITY

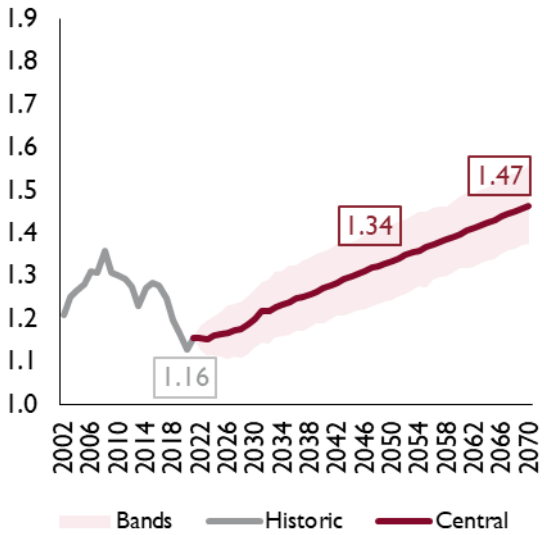
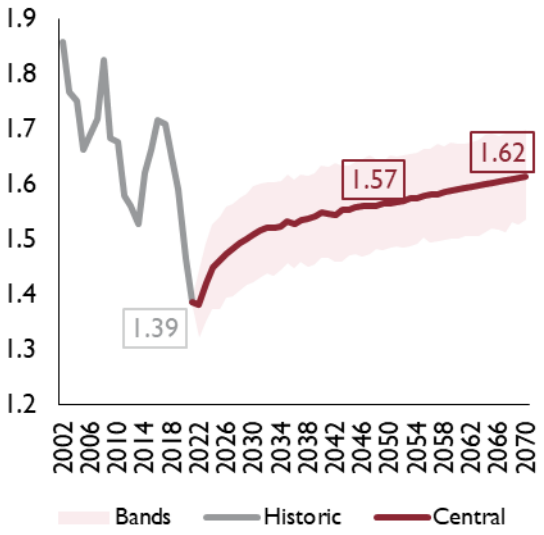


FIGURE 4.B. NUMBER OF CHILDREN PER WOMAN MOTHERS OF FOREIGN NATIONALITY



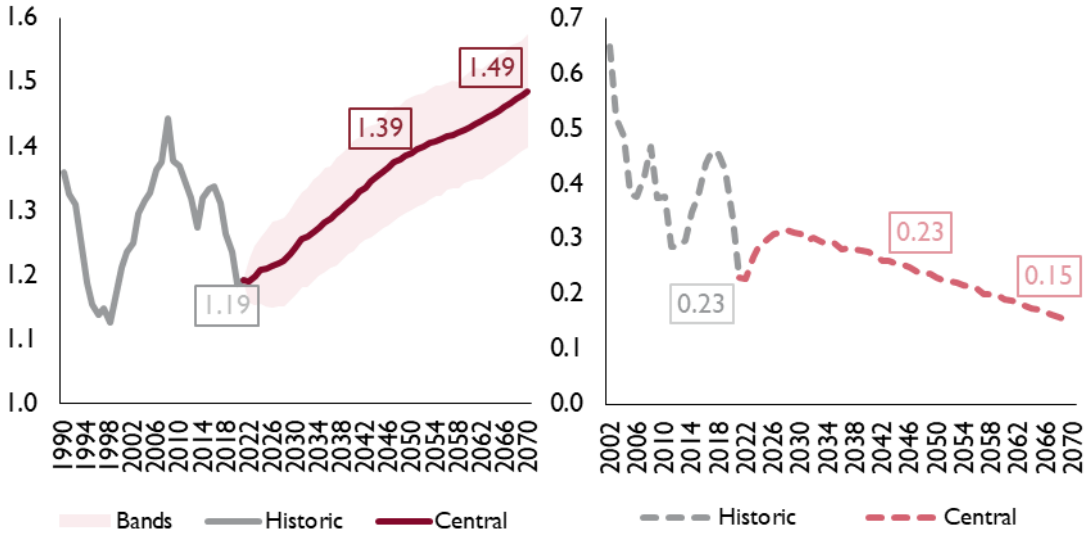
Source: INE and AIReF

On average, the number of children per woman is projected to stand at 1.39 in 2050, rising to 1.49 in 2070, both below the replacement rate. These projections represent a slight downward revision of fertility compared with previous AIReF estimates. These estimates do not consider fertility effects associated with the COVID-19 pandemic during the projection period.

FIGURE 5 PROJECTIONS OF THE NUMBER OF CHILDREN PER WOMAN AND THE DIFFERENCE BETWEEN MOTHERS OF FOREIGN AND SPANISH NATIONALITY

FIGURE 5 B. NUMBER OF CHILDREN PER WOMAN

FIGURE 5 B. DIFFERENCE IN THE NUMBER OF CHILDREN PER WOMAN OF MOTHERS OF FOREIGN AND SPANISH NATIONALITY



Source: INE and AIReF

2.1.2. Survival

From the mid-20th Century up to the outbreak of the coronavirus, life expectancy at birth in Spain followed a growing trend. On the one hand, a greater proportion of each generation survives until reaching advanced ages and, on the other hand, survival rates at advanced ages are increasingly higher (life expectancy at 65 years has increased by 1.4 years per decade). This favourable evolution in life expectancy of over two years per decade has mainly been due to medical advances, improved nutrition and a reduction in some social habits such as smoking.

Longevity gains have slowed over the last decade (with life expectancy at birth rising by 1.3 years). This result is due to the fact that the decrease in infant mortality seems to have exhausted its downward trend and therefore the increase in life expectancy is concentrated in the most advanced age groups. In addition, the most recent gains in life expectancy have been greater in the case of men and so the differences in life expectancy between men and women have narrowed.

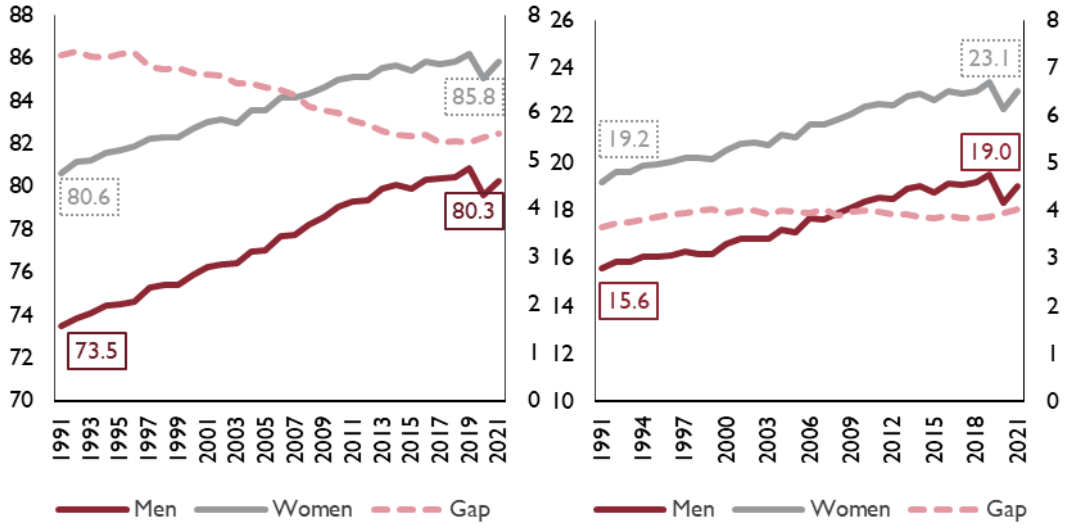
In 2019, there was a peak in life expectancy at birth for Spanish men and women. Life expectancy was 80.9 years for men (compared with 73.5 years in 1990) and 86.2 years for women (80.6 years in 1990). In 2020, the high mortality

due to the COVID-19 pandemic produced a sharp drop in life expectancy, of more than one point, which has not yet recovered. In 2021, life expectancy stood at 85.8 years for women and 80.3 years for men (Figure 6.A.).

FIGURE 6 LIFE EXPECTANCY. BY SEX (YEARS)

FIGURE 6 A. LIFE EXPECTANCY AT BIRTH. ACCORDING TO SEX

FIGURE 6 B. LIFE EXPECTANCY AT 65. ACCORDING TO SEX



Source: INE and AIReF

Spain stands out internationally for having a comparatively high longevity, especially in the case of women. The analysis of the life expectancy of neighbouring European countries points to a convergence towards levels of 80.3 years for men and 84.7 for women in 2020[12]. In the case of women, Spain is the country with the highest longevity in the EU.

12 Specifically, these convergence values are obtained by means of a factor analysis of life expectancy in the different European countries considered. The estimated first common factor has a value of 80.3 years for men and 84.7 for women in 2020. The following countries are considered in the estimates: Portugal, Italy, Belgium, Austria, Switzerland, Sweden, Denmark, Greece, Finland,

FIGURE 7 LIFE EXPECTANCY AT BIRTH BY SEX IN NEIGHBOURING COUNTRIES (YEARS).

FIGURE 7 A. MEN

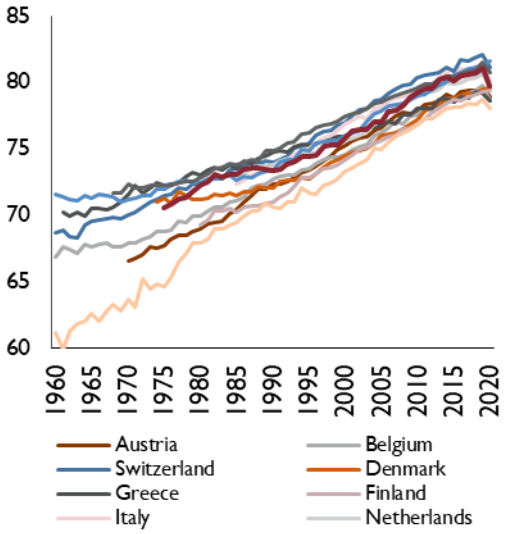
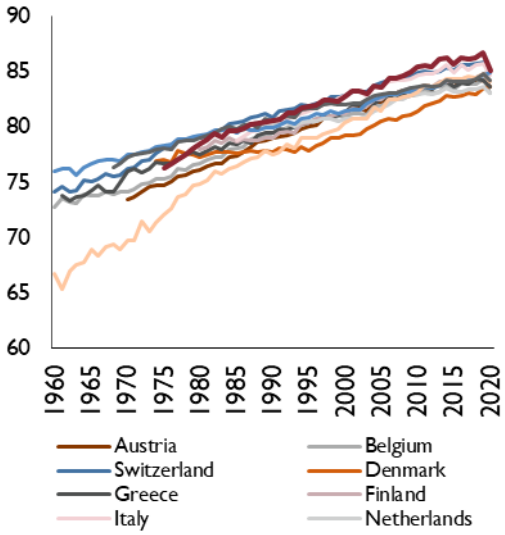


FIGURE 7 B. WOMEN



Source: Eurostat

AIReF's projections of survival rates take into account both the historical evolution of life expectancy and the synchrony in the patterns seen in comparable countries. As explained in the Technical Paper on Demographic Projections (see Technical Paper 1/23), AIReF projects mortality rates based on bi-factor Lee-Carter models estimated in a differentiated manner for three age groups (under 16, working-age population and over 66) and by gender. These statistical models tend to extend the recently observed rate of increase in life expectancy into the future. Therefore, we have introduced a hypothesis of convergence in 2100 towards the average life expectancy values projected by the United Nations and Eurostat for neighbouring countries, that is, 90 years for men and 93.6 years for women[13].

Norway, France and the Netherlands. Germany and the United Kingdom have not been incorporated due to lack of data for the full period considered.

13 It cannot be ruled out that advances in biomedicine will eventually lead to increases in longevity at rates similar to those observed in the past.

In addition, a downward adjustment is added in 2022 and 2023 to consider the excess mortality caused by COVID-19. Specifically, the life expectancy at birth of men is estimated to be 80 years and 80.9 years, respectively, in 2022 and 2023, instead of the 81.1 and 81.3 years that could have been reached in the absence of a pandemic. In the case of women, life expectancy at birth in 2022 is estimated at 85.6 years in 2022 and 86.4 years in 2023, compared with the estimate of 86.6 years in the absence of the pandemic[14].

Overall, AIReF estimates that life expectancy at birth will stand at 87 years in 2050, rising to 89.1 years in 2070. Life expectancy will reach 89.4 years in 2050 for women and 84.8 years for men (see FIGURE 9.). This gap will narrow by 2070, when women's life expectancy is estimated at 91.2 years and men's at 87.1 years. The persistence of a longer life expectancy at 65 years old in the case of women means an increase in the proportion of the female population in the most advanced ages.

FIGURE 8 PROJECTIONS OF LIFE EXPECTANCY (YEARS).

FIGURE 8 A. LIFE EXPECTANCY AT BIRTH

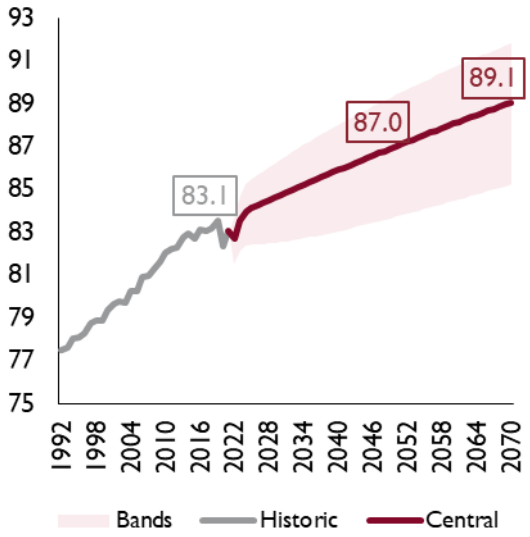
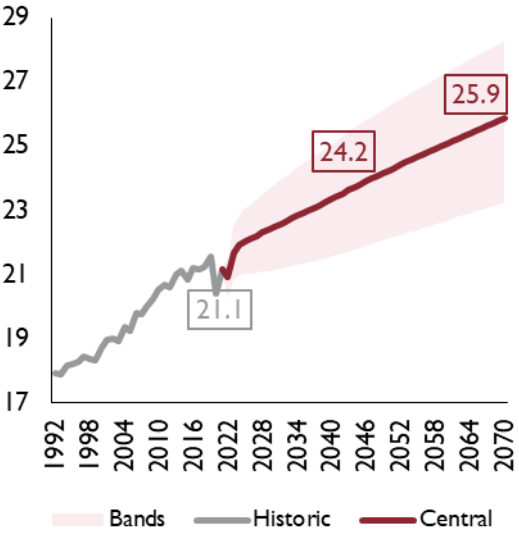


FIGURE 8 B. LIFE EXPECTANCY AT 65



Source: INT, Eurostat and AIReF

14 According to INE statistics, in 2022 the mortality rate could also have been influenced by heat waves.

FIGURE 9 PROJECTIONS OF LIFE EXPECTANCY. BY SEX (YEARS).

FIGURE 9 A. LIFE EXPECTANCY AT BIRTH

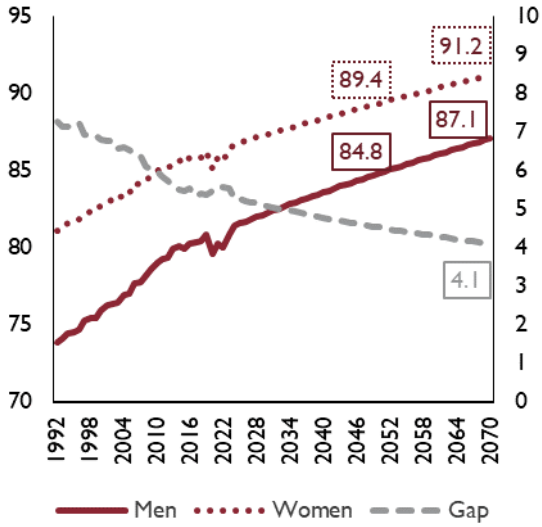
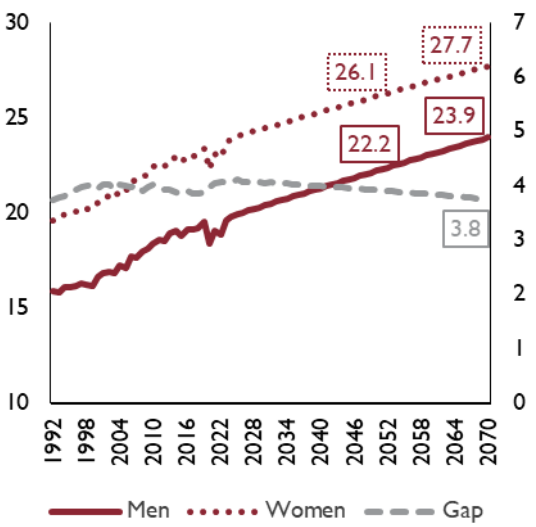


FIGURE 9 B. LIFE EXPECTANCY AT 65



Source: INE and AIReF

2.1.3. Migrations

Immigration has been a key determining factor for the size of the Spanish population over recent decades. Since 1990, four stages in the evolution of migration flows in Spain can be distinguished. A first phase, between 1990 and 2007, with positive and growing net immigration flows, mainly from 2000, which led to a net inflow of over 730,000 people in 2007. In a second stage, the outbreak of the international financial crisis in 2008 resulted in a sharp fall in net inflows, which became net outflows from 2010. In 2014, a third stage began, marked by a significant recovery in inflows, which continued until the outbreak of COVID-19. The fourth phase began with the outbreak of the pandemic and the introduction of mobility restrictions that resulted in a significant fall in incoming and outgoing flows in 2020. In 2021, the recovery in migration flows was greater in the case of outflows due to the return of immigrants to their countries of origin.

FIGURE 10 OBSERVED MIGRATION FLOW (THOUSANDS OF PEOPLE)

FIGURE 10 A. FLOWS OF IMMIGRATION AND EMIGRATION

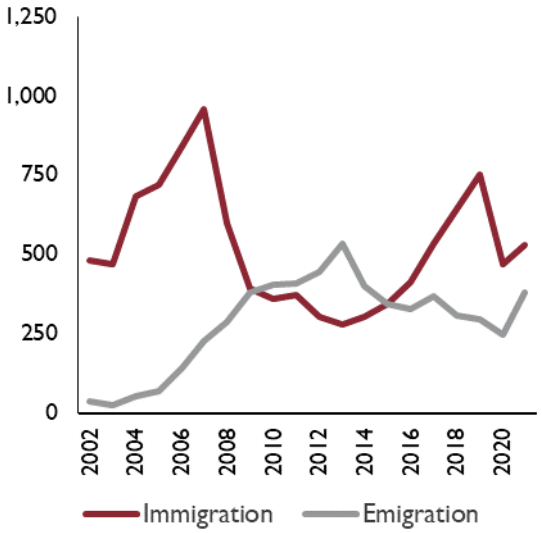


FIGURE 10 B. NET FLOW OF IMMIGRATION

Source: INE and Eurostat

AIReF bases its projections of migration flows on a gravity model estimated for most countries in the world. The model was initially developed by Fernández-Huertas Moraga, J., *et al* (2018) and has been revised to incorporate new available information and some technical improvements (see Technical Paper 1/23)**.** According to this model, the main determinants of the probability of emigrating between each pair of countries are fixed factors (such as geographical distance, the use of a common language and historical and cultural ties); the demographic structure of each country (specifically, the working-age population); economic conditions that are proxied using GDP per capita between the countries of origin and destination of immigration; and a network or call effect, proxied by the number of immigrants born in the country of origin and resident in the country of destination. When projecting migration flows, explanatory variables relating to demographic phenomena are obtained from UN demographic projections, while growth forecasts are obtained from the IMF up to 2027 and, in the longer term, as the median sample value of the GDP growth rate for each country - calculated using the IMF's observed and forecast values. It is assumed that there are no changes in the migration policies of Spain or the other countries considered in the gravity model.

It is assumed that the restrictions on international mobility imposed in the context of the health crisis have had a transitory impact on migration flows, with a return to normality as early as 2024. Short-term adjustments are therefore made to the projections provided by the model in 2022 and 2023 (see Box 4 of Technical Paper 1/23). However, no effect has been introduced associated

with the increase in inflows linked to Russia's invasion of Ukraine, which was noted in 2022. The possibility of most refugees returning to their country of origin at the end of the war justifies not considering them in order to isolate the projections from any possible influence. As from 2024, the estimated values are those that come directly from the gravity model.

The results point to an average annual net inflow of around 235,000 people between 2020 and 2050, rising to almost 339,000 people in the period 2051-2070. Both immigration and emigration flows show an upward trend, which is greater in the case of inflows, which produces a positive and growing net flow over time.

FIGURE 11 PROJECTED MIGRATION FLOWS (THOUSANDS OF PEOPLE)

FIGURE 11 A. FLOWS OF IMMIGRATION AND EMIGRATION

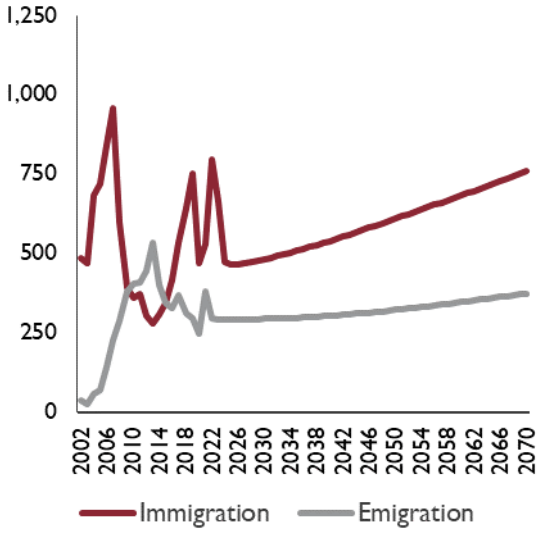
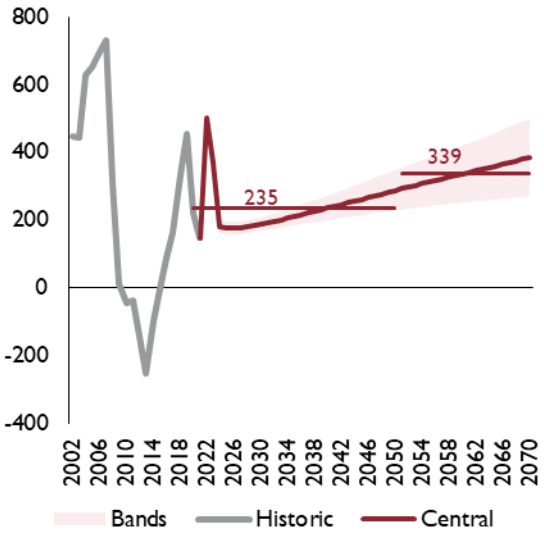


FIGURE 11 B. NET FLOW OF IMMIGRATION



Source: INE, Eurostat and AIReF

The breakdown of emigration flows by country shows a continuation of the patterns observed recently. The main destinations of the migration are Germany, Belgium, France, United Kingdom, United States and, later on in the projection period, Romania. In the case of immigration flows, the historical distribution, predominantly from South America, Central America and the Maghreb, remains only in part of the projection period.

The main countries of origin of the inflows are Morocco, Venezuela, Colombia, Peru and Argentina. However, after the first two decades, there are significant flows from low-income Central African countries, such as Senegal and Nigeria[15].

15 According to the projections of international institutions such as the IMF (see, for example, "The Macroeconomic Effects of Global Migration"), Africa will become the main region of origin of migration in the coming years.

FIGURE 12. MAIN DESTINATIONS OF EMIGRATION AND ORIGINS OF IMMIGRATION

FIGURE 12 A. ORIGINS OF IMMIGRATION

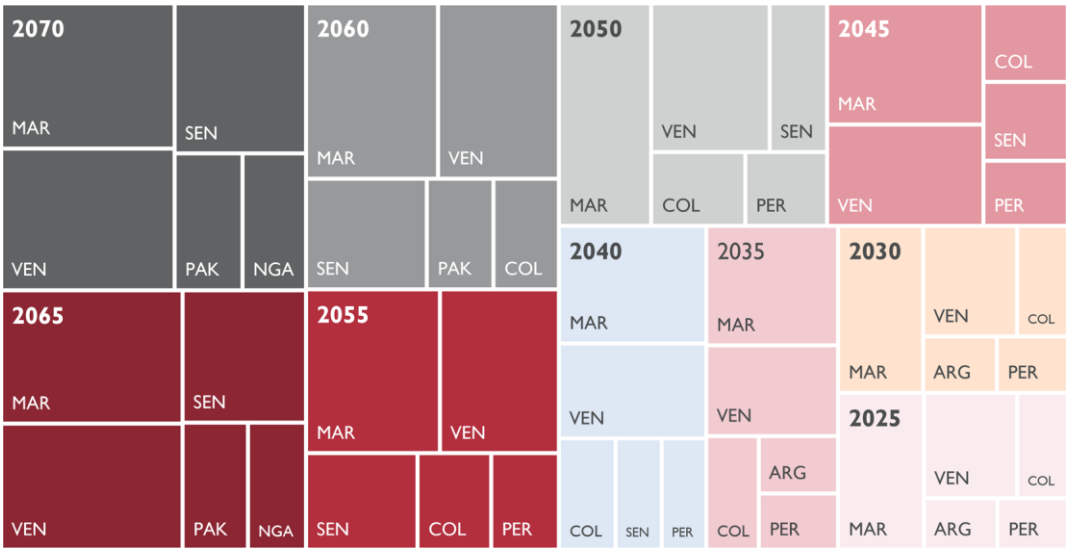
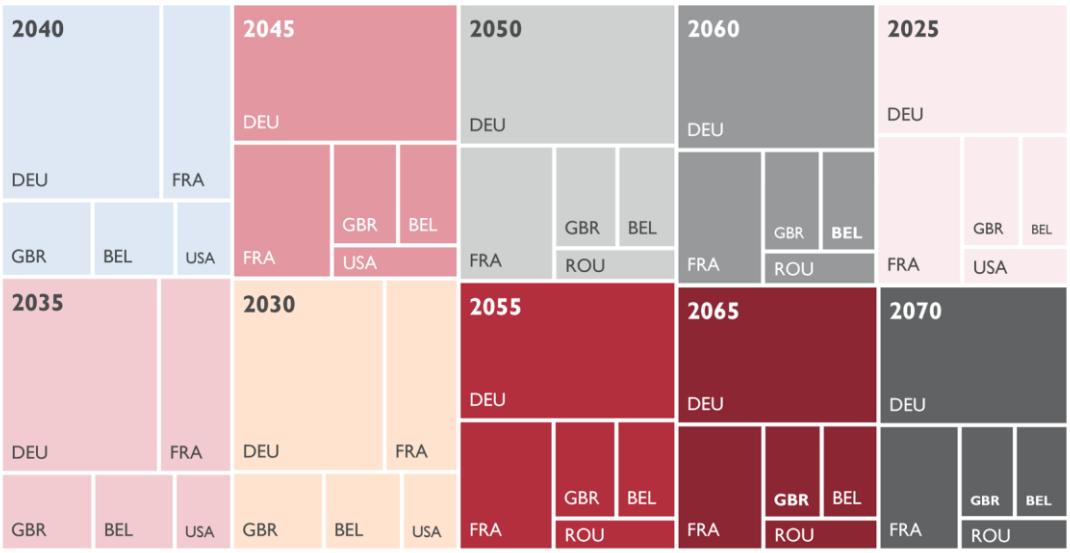


FIGURE 12 B. DESTINATIONS OF EMIGRATION



Source: prepared by AIReF

The weight of the population with foreign nationality over the total population would increase from 11.4% on January 1st, 2022 to 16% in 2050 and 20.1% in 2070. This is a high percentage, comparable only with those countries with the highest proportion of immigrants today (e.g. Sweden, Canada).

2.1.4. Population projections

AIReF estimates in the baseline scenario that the total population of Spain on January 1st will increase from 47.4 million in 2022 to 50.3 million in 2050 and 52.1 million in 2070, due to the gradual increase in longevity and net external migration.

For its part, the working-age population will remain constant until 2030, to begin a progressive decline until 2050, when it would resume an upward trend. The working-age population, defined as the population between 16 and 66 years old - both inclusive - is expected to remain more or less stable, around 32.3 million, until 2030. From that moment on, a gradual decline is estimated that would reach its minimum value of 28.8 million in 2051. This decline in the working-age population is a result of the retirement of the population cohorts born in the 1960s and 1970s. From this moment on, the working-age population would return to positive growth rates leading to a working age population of 30.9 million on January 1st, 2070.

FIGURE 13 TOTAL POPULATION (THOUSANDS OF PEOPLE)

FIGURE 13 A. TOTAL POPULATION

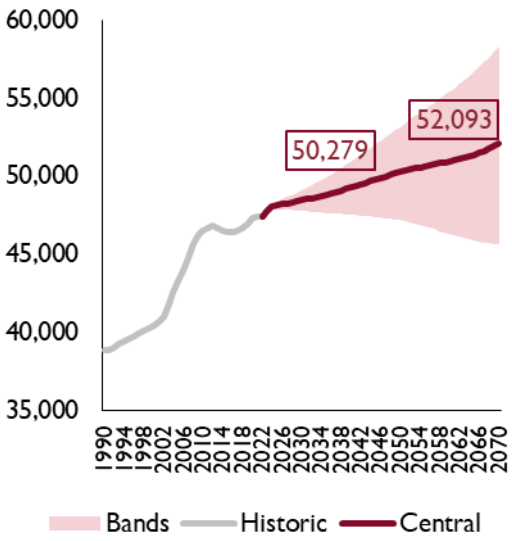
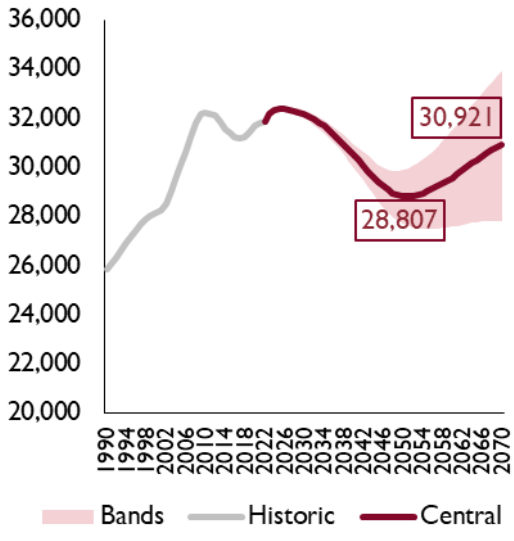


FIGURE 13 B. WORKING-AGE POPULATION



Source: INE and AIReF

The fall in the working-age population has been evident for some years in other advanced economies. The fall in the working-age population is a feature that has been seen in some European economies for several years, including those that have policies for the admission and integration of immigrants that are as favourable or more favourable than those of Spain and less precarious labour markets.

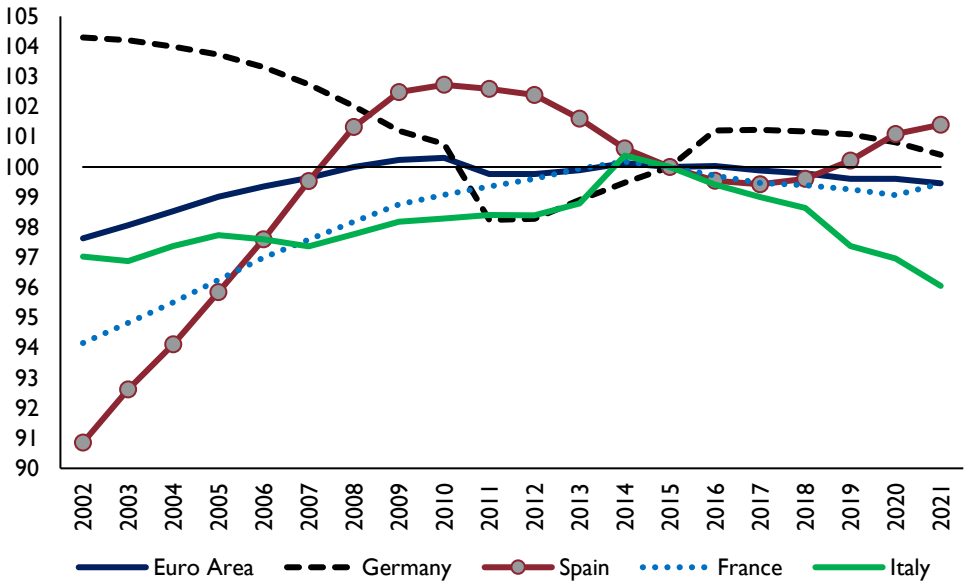
For example, Germany has seen a fall in the working-age population since the early 2000s, which has only slowed down in recent years with the arrival of refugees[16]. In the case of France, the fall in the number of working-age people is more recent.

However, the fall in the working-age population could be attenuated if social policies and policies to reduce temporary employment and precariousness in the labour market are effective. These policies include the recent reform of the regulation on foreigners. Among other aspects, this reform seeks to make it easier for immigrants to enter the labour market, especially in those sectors where there are greater difficulties in finding workers[17]. However, currently the Catalogue of Difficult to Fill Positions, which, in theory, should be one of the main routes for the arrival of regular immigration, has a very narrow list of professions. The only occupations continuously listed are those related to the Navy and professional sport, despite the seeming shortage of labour in sectors such as construction and hospitality following the pandemic. For its part, the labour market reform, if it results in greater employment stability, could trigger both higher fertility and more immigration.

16 Measuring and Comparing Immigration, Asylum and Naturalization Policies Across Countries: Challenges and Solutions by Justin Gest, Anna Katherine Boucher, Suzanna Challen, Brian Michael Burgoon, Eiko R. Thielemann, Michel A. R. Beine, Patrick G. McGovern, Mary Elizabeth Crock, Hillel Rapoport, Michael J. Hiscox: SSRN & Migrant Integration Policy Index (MIPEX) - Items - KCMD (europa.eu)

17 BOE.es - BOE-A-2022-12504 Royal Decree 629/2022, of July 26th, amending the Regulation of Organic Law 4/2000, on rights and freedoms of foreigners in Spain and their social integration, following its reform by Organic Law 2/2009, approved by Royal Decree 557/2011, of April 20th.

FIGURE 14 POPULATION FROM 16 TO 66 YEARS OLD AT JANUARY 1st (INDEX 2015=100)



Source: Eurostat

The evolution of the population pyramid would reflect both the ageing of the population and the greater weight that the foreign resident population acquires over the horizon considered. Therefore, in 2070 the differences in the population pyramids estimated for those born in Spain and the resident foreign population are accentuated. In the case of the population born in Spain, an increase in advanced age groups and a maintenance or decrease in the others is estimated for 2070. In contrast, in the case of the resident foreign population, there is an increase in all age groups, with a structure of greater relative importance of the young and working-age population.

FIGURE 15. POPULATION PYRAMIDS (THOUSANDS OF PEOPLE)

FIGURE 15 A SPANISH RESIDENT POPULATION. THOUSANDS OF PEOPLE. FIVE-YEAR AGE GROUPS

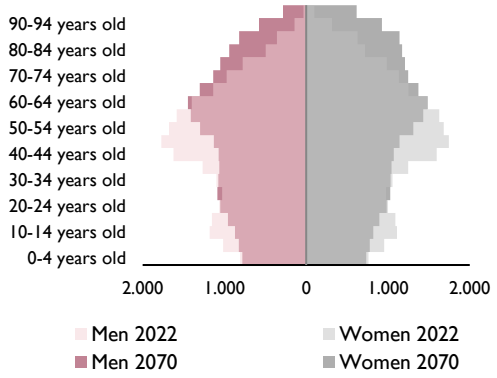


FIGURE 15 B FOREIGN RESIDENT POPULATION. THOUSANDS OF PEOPLE. FIVE-YEAR AGE GROUPS

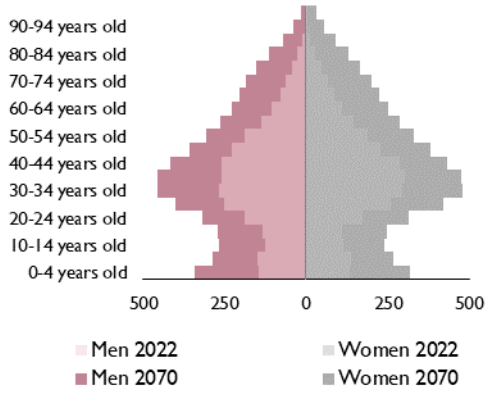
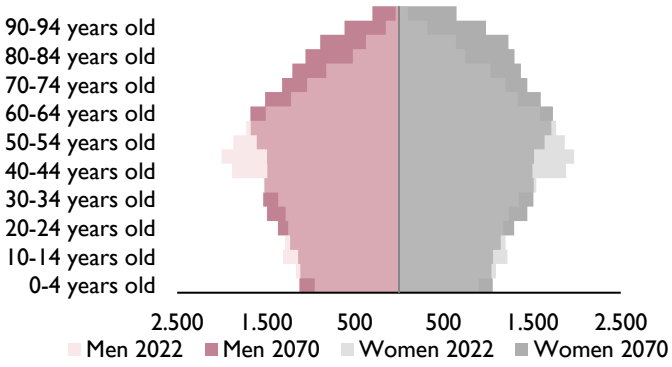


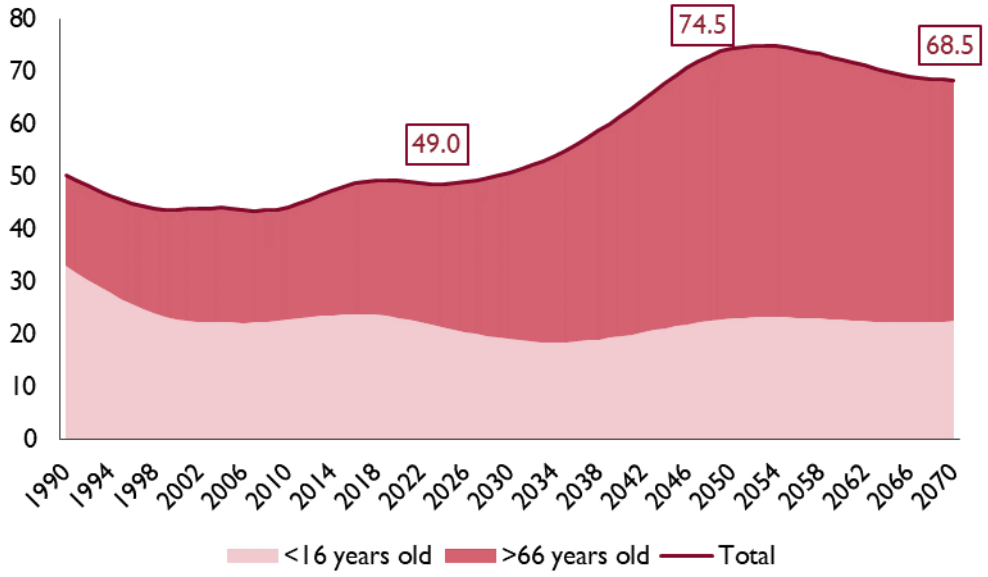
FIGURE 15 C TOTAL RESIDENT POPULATION. THOUSANDS OF PEOPLE. FIVE-YEAR AGE GROUPS



Source: INE and AIReF

While the dependency rate shows an upward trend until the mid-2050s as a result of the progressive ageing of the population, it begins to gradually reduce thereafter. The dependency ratio, defined as the proportion of the population under 16 and over 66 years of age over the working-age population (aged between 16 and 66) rises from 49% on January 1st, 2022 to 74.5% and 68.5% on January 1st, 2050 and 2070, respectively. Its behaviour is mainly determined by the evolution of the old-age dependency ratio (population aged 66+ over the working-age population), rather than the young-age dependency ratio (population aged under 16 over the working-age population), which remains more or less stable throughout the projection horizon. The old-age dependency ratio grows steadily until well into the 2050s, almost doubling the current value from 26.6% on January 1st, 2022 to 51.4% on January 1st, 2050. However, it then starts a downward path until it reaches 45.9% on January 1st, 2070.

FIGURE 16 BREAKDOWN OF THE DEPENDENCY RATIO (% OF THE WORKING-AGE POPULATION)



Source: INE and AIReF

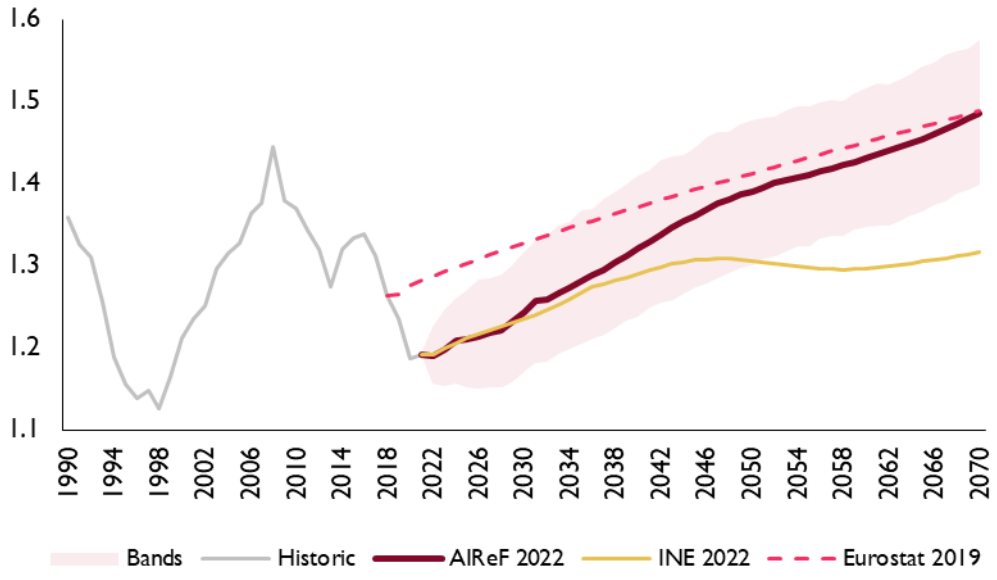
BOX 1. COMPARISON OF AIREF DEMOGRAPHIC PROJECTIONS WITH THOSE OF OTHER ORGANISATIONS

This box provides a comparison of the demographic projections recently prepared for Spain by different institutions. In particular, the projections of the National Statistics Institute (Spanish acronym: INE) updated in 2022 up to 2072 and those of Eurostat that were made in 2019 are considered. The different methodologies and assumptions for the evolution of the various demographic phenomena used by these organisations - births, deaths and migratory movements - give rise to different population dynamics.

FERTILITY

All the institutions have revised their fertility projections downwards in the most recent update. Particularly noteworthy is the revision of the fertility projections by the INE, which makes its estimates on the basis of surveys of demographers. This institution currently projects stagnation of the total fertility rate at around 1.3 children per woman from 2040 (only slightly above the current figure of 1.19). Both Eurostat and AIReF project a total fertility rate that converges to 1.5 children per woman in the long term. However, AIReF projects much lower figures than Eurostat in the short and medium term.

FIGURE RE_1.1. TOTAL FERTILITY RATIO (NUMBER OF CHILDREN PER WOMAN)

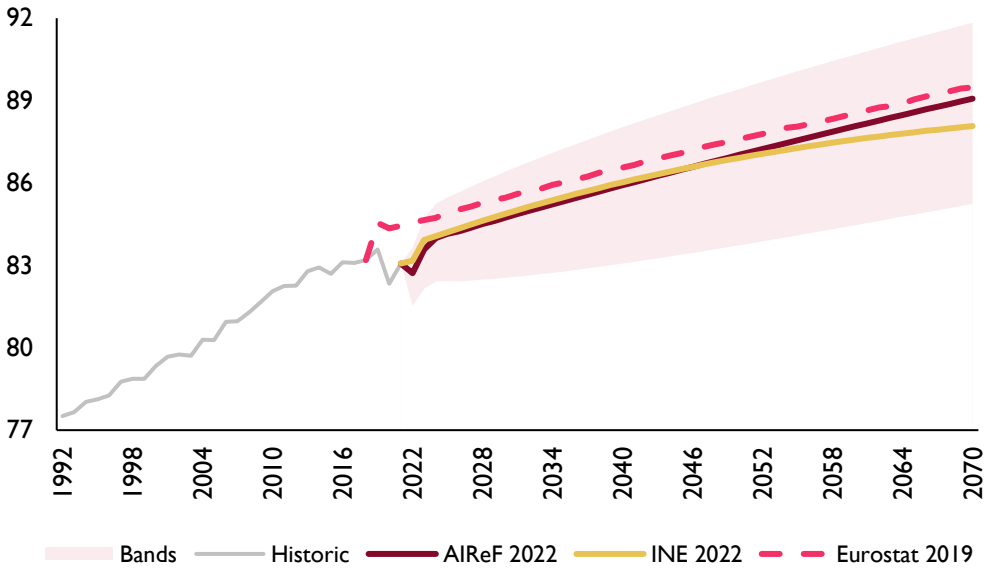


Source: Eurostat, INE and AIReF

MORTALITY

In the case of mortality, the differences are smaller. Specifically, both the INE and AIReF present a similar evolution of life expectancy at birth up to 2050, with some discrepancy noted as from that year. In 2070, the INE projects life expectancy at birth somewhat lower than that of AIReF (86 years in men and 90 in women, compared with 87.1 and 91.2% for AIReF). Eurostat's projections were made before the pandemic and therefore do not take into account the excess mortality recorded over recent years.

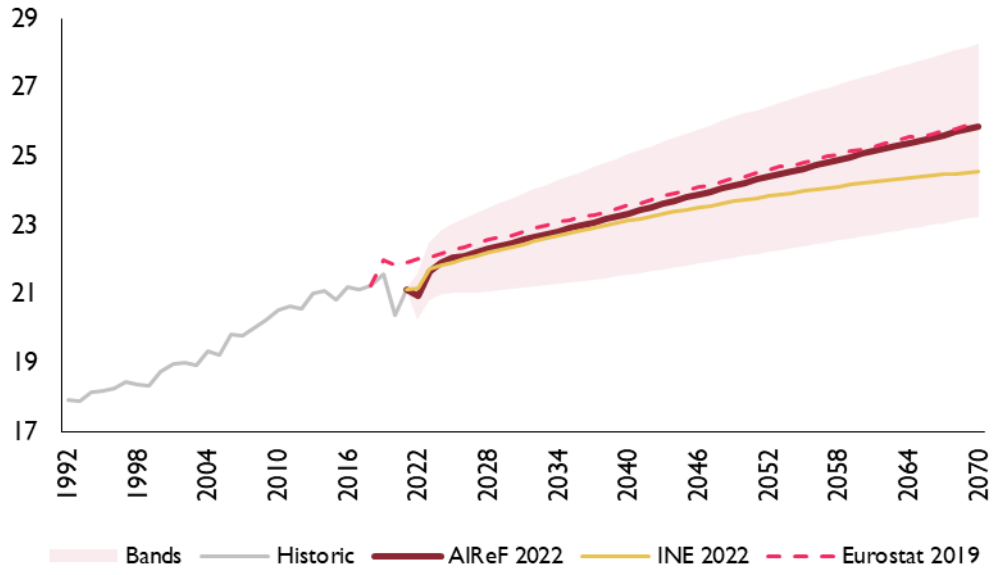
FIGURE RE_1.2. LIFE EXPECTANCY AT BIRTH (YEARS)



Source: Eurostat, INE and AIReF

The differences in life expectancy at 65 projected by the INE compared with those of AIReF are larger and more persistent.

FIGURE RE_1.3. LIFE EXPECTANCY AT 65 (YEARS)

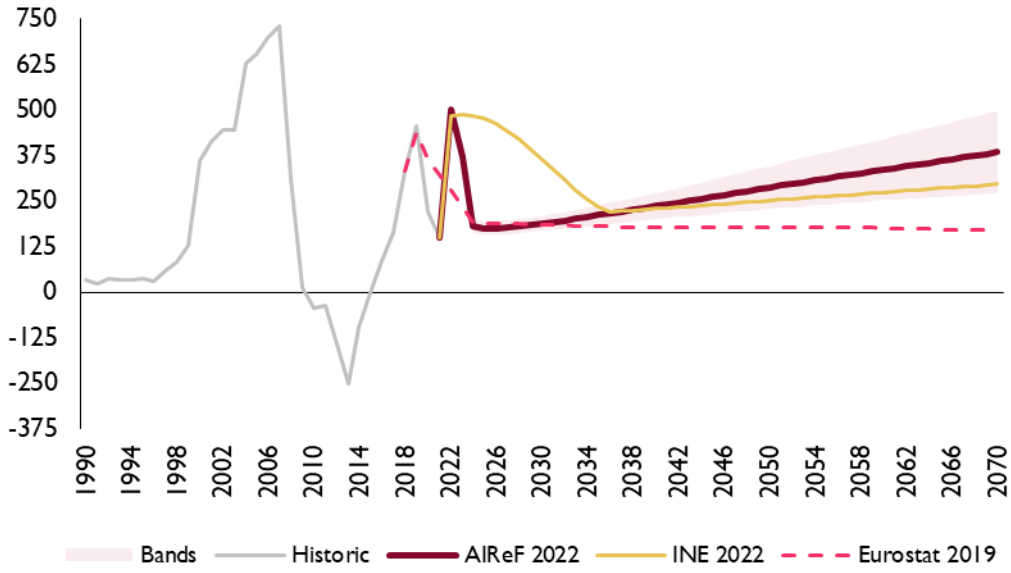


Source: Eurostat, INE and AIReF

MIGRATORY MOVEMENTS

The biggest differences are in the projections of net immigration flows. On the one hand, the INE projects comparatively high net migration flows in the short and medium term compared with other institutions. This result could reflect the fact that the INE estimation procedure tends to project the high estimated net immigration flows for 2022, when there is both an extraordinary influx of refugees from Ukraine and a recovery of the migratory movements that were suppressed during the pandemic, towards the period 2023 to 2025 (meto_propob_2022_2072.pdf (ine.es)). From 2040, AIReF projects greater net immigration than the INE - with a net flow that rises from 236,000 in 2040 to 385,000 people in 2070. For its part, Eurostat proposes net migration flows that have remained constant since the last observed value and are relatively low. Eurostat's most recent estimates establish an annual average of 178,500 net immigrants between 2025 and 2070.

FIGURE RE_1.4. NET IMMIGRATION (THOUSANDS OF PEOPLE)

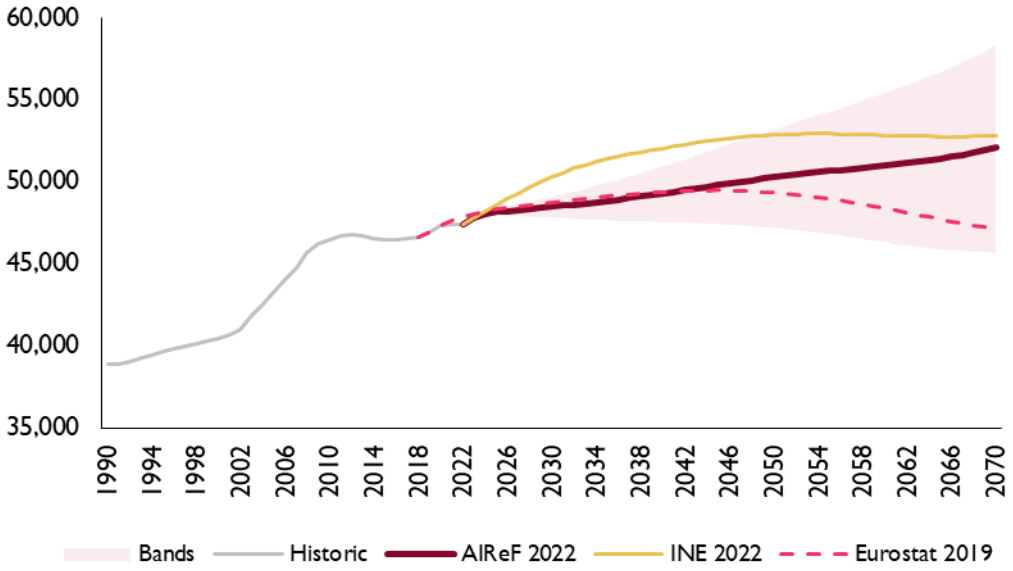


Source: Eurostat, INE and AIReF

POPULATION PROJECTIONS

Considering the three demographic phenomena together results in different population estimates. Eurostat projects a fall in the Spanish population as from 2050. In contrast, both the INE and AIReF forecast an upward path for the population to stand at over 50 million inhabitants in both cases by 2070. The INE's population projections exceed those of AIReF over the entire projection horizon as a result of greater migration flows in the early years.

FIGURE RE_1.5. POPULATION (THOUSANDS OF PEOPLE)

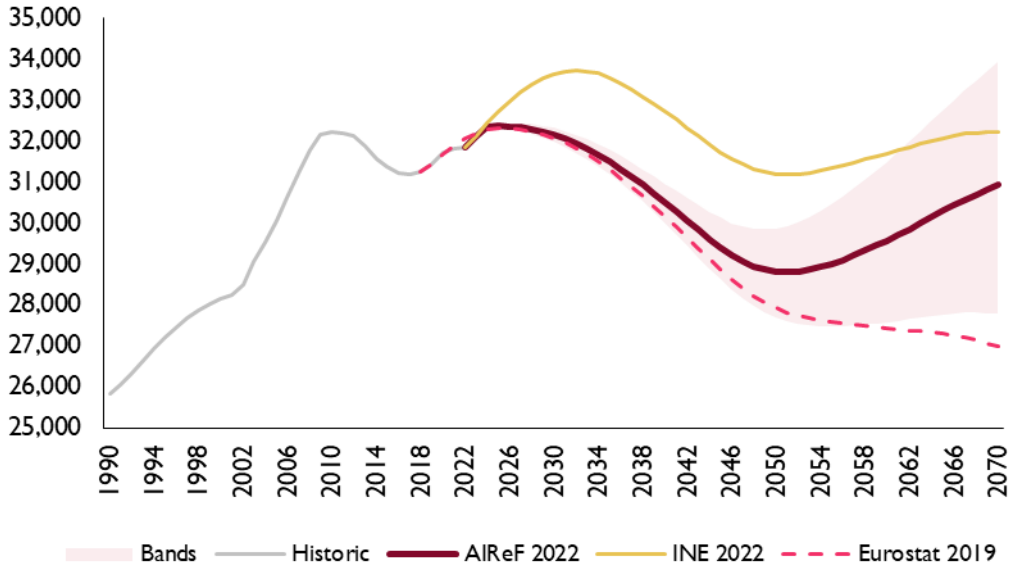


Source: Eurostat, INE and AIReF

These differences also apply to the working-age population. According to AIReF's projections, the working-age population is set to fall as from 2026-2027. This profile is very similar to that projected by Eurostat in the early years of the projection period. From 2051 onwards, AIReF projects a slight increase in the working-age population linked to the higher flow of net immigration.

In the case of the INE, the fall in the working-age population is due to high net migration expected in the early years of the projection horizon. The working-age population projected by the INE would stabilise at around 32 million people in the 2060s and 2070s.

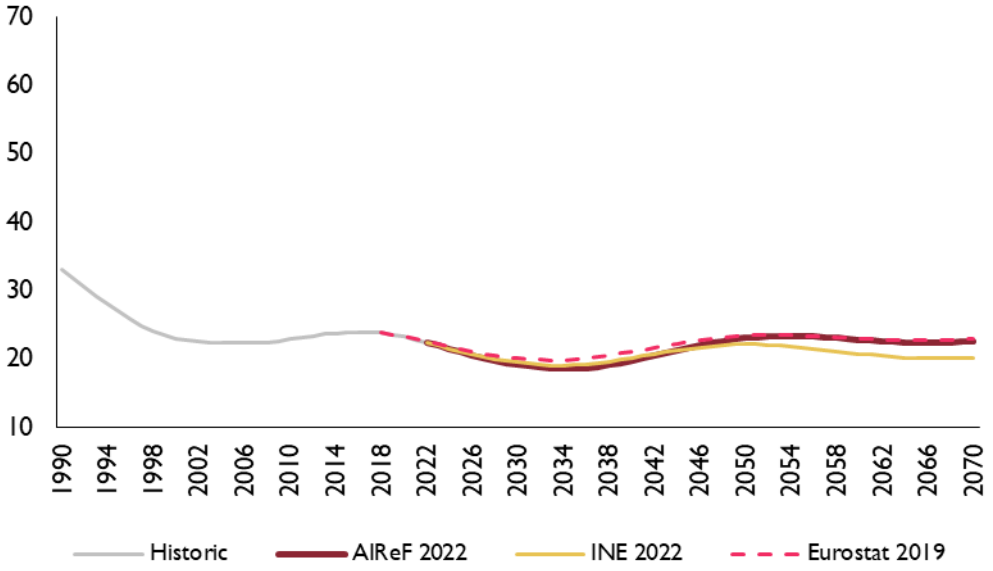
FIGURE RE_1.6. WORKING-AGE POPULATION (THOUSANDS OF PEOPLE)



Source: Eurostat, INE and AIReF

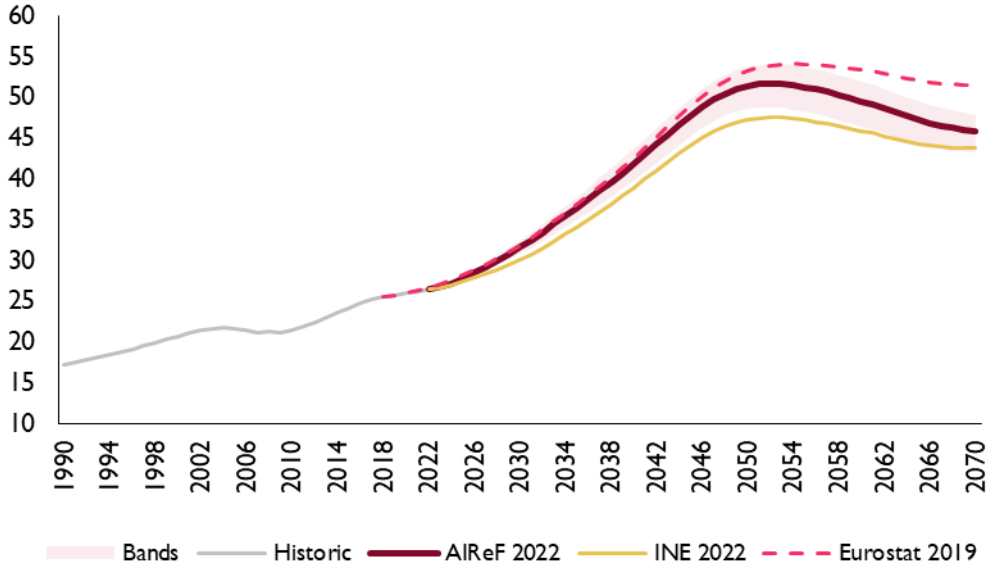
Consistent with this evolution, the dependency ratio - measured by the ratio of those under 16 and over 66 to the working-age population - is expected to continue to rise, closely linked to the component of those over 66. All the projections suggest that a peak in the over-66 dependency ratio would be reached around the 2050s - although the range of estimates is wide, varying from 47.6% in 2052 according to the INE and 54.1% according to Eurostat in 2054.

FIGURE RE_1.7. DEPENDENCY RATIO. UNDER 16s.



Source: Eurostat, INE and AIReF

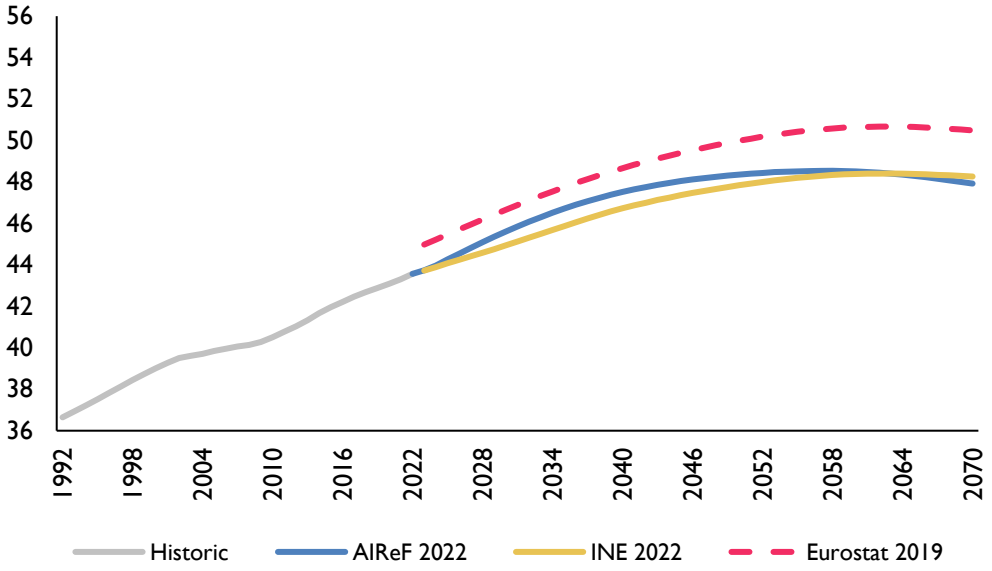
FIGURE RE_1.8. DEPENDENCY RATIO. OVER 66s



Source: Eurostat, INE and AIReF

The average age of the resident population would rise from around 43.6 years old in 2022 to about 48.3-48.5 years old in the middle of the 2050s in the projections of the INE and AIReF, respectively. Eurostat's projections put the maximum average age at around 50.7 years at the start of the 2060s.

FIGURE RE_1.9. AVERAGE AGE (YEARS)



Source: Eurostat, INE and AIReF

The following table summarises the demographic projections of these two institutions and AIReF.

TABLE RE_1.1. SUMMARY OF DEMOGRAPHIC PROJECTIONS FOR VARIOUS YEARS

		2023	2030	2040	2050	2060	2070
Total population (Thousands)	INE 2022	47.796	50.298	52.040	52.861	52.835	52.809
	Eurostat 2019	48.063	48.746	49.377	49.349	48.385	47.104
	AIReF 2022	47.794	48.479	49.298	50.279	50.980	52.093
Working-age population (Thousands)	INE 2022	32.137	33.626	32.708	31.196	31.695	32.211
	Eurostat 2019	32.181	32.070	30.165	27.923	27.432	27.001
	AIReF 2022	32.135	32.149	30.502	28.816	29.573	30.921
Dependency ratio (%)	INE 2022	48,7	49,6	59,1	69,4	66,7	63,9
	Eurostat 2019	49,4	52,0	63,7	76,7	76,4	74,5
	AIReF 2022	48,7	50,8	61,6	74,5	72,4	68,5
Number of children per woman	INE 2022	1,20	1,24	1,29	1,31	1,30	1,32
	Eurostat 2019	1,29	1,33	1,37	1,41	1,45	1,49
	AIReF 2022	1,20	1,24	1,32	1,39	1,43	1,49
Life expectancy at birth (Years)	INE 2022	83,9	84,9	86,0	86,9	87,6	88,1
	Eurostat 2019	84,7	85,5	86,6	87,6	88,5	89,5
	AIReF 2022	83,6	84,7	85,9	87,0	88,1	89,1
Life expectancy at 65 (Years)	INE 2022	21,7	22,4	23,1	23,7	24,2	24,6
	Eurostat 2019	22,1	22,7	23,6	24,4	25,2	25,9
	AIReF 2022	21,7	22,5	23,4	24,2	25,1	25,9
Net Immigration (Thousands)	INE 2022	487	364	229	252	274	297
	Eurostat 2019	235	185	178	179	176	169
	AIReF 2022	371	188	236	288	336	385

Source: Eurostat, INE and AIReF

2.2. Macroeconomic forecasts

The preparation of the long-term macroeconomic outlook distinguishes two time horizons. The short and medium term, which in this exercise refers to the years from 2022 to 2026 and corresponds to AIReF's medium-term macroeconomic and budgetary scenario; and the long term, between 2027 and 2070, which is prepared under the assumption of convergence of the economy's growth to certain reference values.

2.2.1. Short- and medium-term assumptions (2022-2026)

For the short and medium term (2022-2026), AIReF starts from the macroeconomic outlook of the Report on the Main Budgetary Lines and Draft Budget of the General Government published in October 2022. These forecasts come from the full macroeconomic and budgetary scenario prepared by AIReF on the basis of certain exogenous assumptions on interest rates, world trade growth, commodity prices, etc. The forecasts consider relatively high real growth in 2022, which moderates in 2023 in the context of the energy crisis. In 2024, real growth would rise to rates close to 3%, underpinned by the investment boost from the Recovery, Transformation and Resilience Plan. It will then converge towards the economy's potential growth, which AIReF places at around 1.3% of GDP (very close to the average growth observed in the last two decades (1.2%)). In the case of inflation, it is assumed that the tensions currently observed will ease over the forecast horizon and therefore growth in the GDP deflator will be close to the ECB's monetary policy reference rate from 2024. As a result, nominal growth in the economy would remain at relatively high rates in 2023 and 2024 and would subsequently slow to slightly above 3%.

TABLE 1. MACROECONOMIC SCENARIO

	MACROECONOMIC SCENARIO					
	2021	**2022**	**2023**	**2024**	**2025**	**2026**
Nominal GDP (rate)	7.9	8.2	5.9	5.0	3.9	3.4
Real GDP (rate)	5.5	4.4	1.5	2.7	1.8	1.6
GDP deflator	2.3	3.6	4.3	2.2	2.0	1.8
Total FTE employment	6.6	2.9	0.3	1.5	0.9	0.6

Source: AIReF

2.2.2. Long-term assumptions (2027-2050)

In the long term, the forecast relies on the approach based on the production function developed in Pastor, A. & Vila, M., (2019)[18]. Under this approach, GDP is determined as a combination of the labour factor *(L)* and apparent labour productivity (ALP), which includes the effect of capital and technical progress. For its part, the labour factor is the result of the product of the working age population *(*WAP), the participation rate (*PART*) and the employment rate (1 minus the unemployment rate (U)).

$$\text{GDP} = L * \text{ALP}$$

$$L = \text{WAP} * PART * (1 - U)$$

In this context, real GDP growth is derived by making assumptions about the evolution of the labour force participation rate, the unemployment rate and labour productivity. These assumptions take into account the interactions between demographic projections and growth, as well as any possible reforms to pensions that may have an impact on labour market participation decisions. How each of these elements is estimated is explained below. The working-age population is obtained from the demographic projections in the previous section.

2.2.2.1 Apparent labour productivity

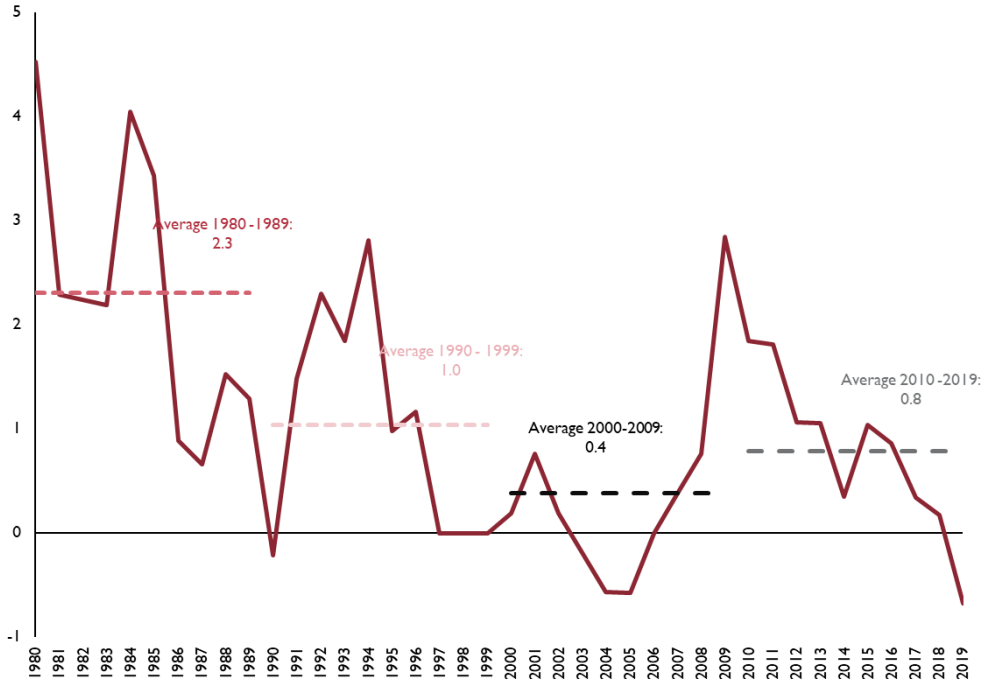
AIReF assumes that growth in apparent labour productivity will converge to 1.1 pp in 2035. The reference value adopted is the average progress of apparent productivity observed from 1980 to 2019. This average excludes the sharp drop recorded in 2020 as a result of the lockdown during the pandemic and the subsequent recovery. This development differs from that of the AR2021, which assumes that labour productivity growth converges to 1.5 pp. However, it should be noted that this institution includes capital deepening in productivity and uses productivity per hour instead of per employee.

Apparent labour productivity growth in Spain has slowed significantly in recent decades. Thus, from 2010 to 2019, apparent labour productivity grew, on average, by 0.8%, lower than assumed in the Opinion. In fact, it was only in the

18 Alvaro Pastor & Marta Vila (2019). AIReF model of projection of expenditure on pensions in Spain. 190206_WP_Pensiones_final.pdf (airef.es)

1980s that apparent labour productivity growth averaged over 1%. The growth in apparent labour productivity has also been lower than that recorded in the European Union as a whole in recent years (1% on average in 2010-2019 for the EU as a whole).

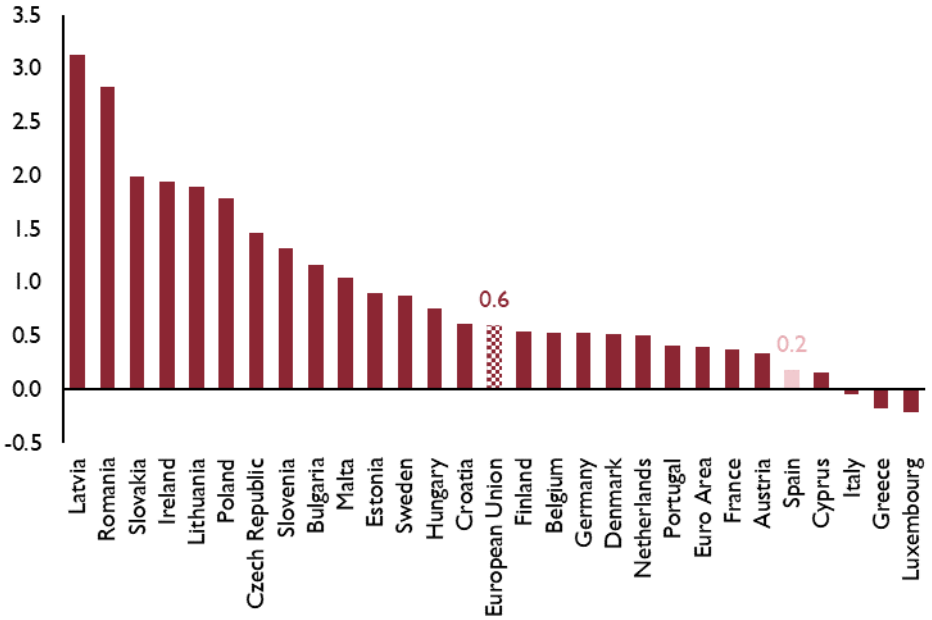
FIGURE 17 APPARENT PRODUCTIVITY PER PERSON (%)



Source: European Commission

There is a great deal of uncertainty about the evolution of productivity over the coming years. This variable is the result of total factor productivity (TFP), which approximates the degree of efficiency with which productive factors are used, and the accumulation of physical capital. Spain stands out for being one of the countries where the TFP has developed unfavourably over recent years. In this regard, according to data from the European Commission, Spain has been among the countries that have recorded the lowest growth in TFP in the last two decades.

FIGURE 18 AVERAGE GROWTH IN TOTAL FACTOR PRODUCTIVITY BETWEEN 1999 AND 2019 (%)



Source: European Commission

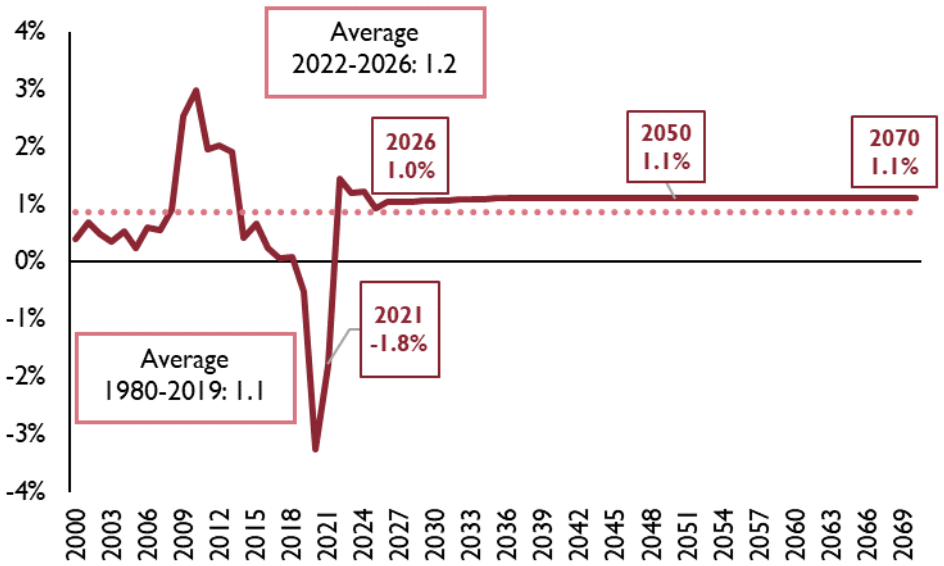
However, it is very difficult to determine its behaviour over the coming years as there are several factors that might have a negative impact. On the one hand, an older population might have less incentive to innovate, as well as less ability to adopt any new technologies that emerge. In the opposite direction, the reduction in the working-age population might encourage process automation, which would raise the economy's productivity[19]. The impact of immigration is also uncertain as it crucially depends on the sectoral allocation of workers. For example, a great deal of the migration recorded in the Spanish economy at the start of the century had a negative impact on productivity as it was concentrated in sectors such as construction, with lower average productivity compared with other sectors.

In contrast, the reforms being implemented associated with the RTRP could have a positive impact on productivity and the potential growth of the economy if they are effective. In this context, AIReF assumes in its baseline scenario that apparent

19 Acemoglu, D. & Restrepo, P. (2017). "Secular stagnation? The effect of aging on economic growth in the age of automation". American Economic Review Jimeno, J. F., A. Lacuesta, M. Martínez-Matute and E. Villanueva (2016). Education, labour market experience and cognitive skills: evidence from PIAAC, Working Papers, No. 1635, Bank of Spain.

productivity will be the long-term average recorded since 1980, which is higher than that recorded in the last three decades. An alternative scenario is presented below to illustrate the impact of higher or lower labour productivity growth on sustainability.

FIGURE 19 GROWTH RATE OF LABOUR PRODUCTIVITY



Source: INE and AIReF

2.2.2.2 Unemployment rate

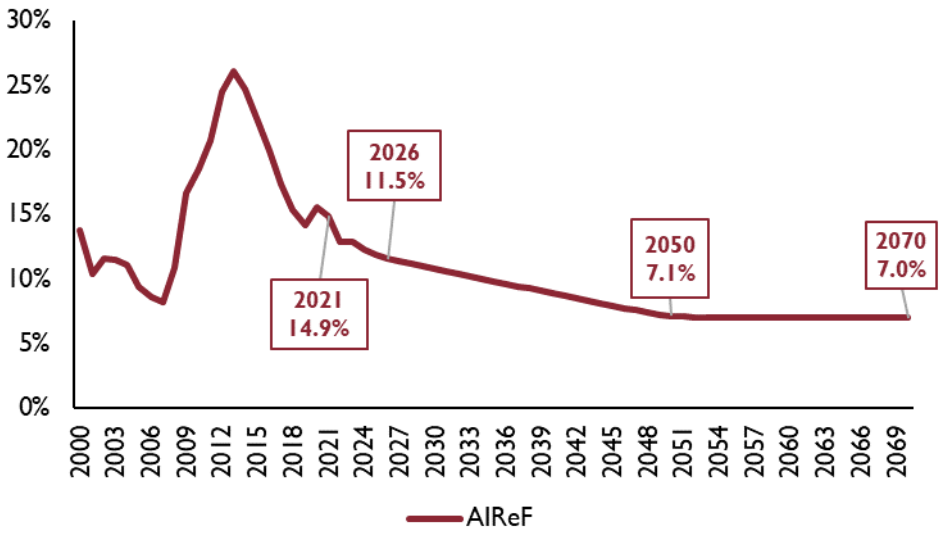
The unemployment rate is defined as the ratio of unemployed people aged 15-74 to the active population of the same age. The historical data and its breakdown by age are obtained from the Labour Force Survey (LFS). In the baseline demographic and economic scenario, in which the working-age population falls while economic growth, and thus labour demand, remain around trend values, the observed and structural unemployment rate can be expected to gradually fall.

AIReF assumes a progressive convergence from current unemployment levels to an unemployment rate of 7% by 2050[20], which is maintained until 2070. This convergence value, in line with other empirical work performed for the Spanish economy, is determined on the basis of the median unemployment rate recorded in European countries which, according to the

[20] The distribution of this unemployment rate by age and sex is assumed to be identical to that observed in the base year for Spain.

AR2021, is estimated at 6.8% for the age group between 20 and 74 years old and at 7.2% for the age group between 15 and 64 years old. Although the fall in the working-age population under this scenario explains the fall in the unemployment rate, the historical experience of the Spanish economy in this area suggests that reaching these unemployment rates on a permanent basis may require changes in the labour market that eliminate its structural deficiencies in terms of job creation capacity. In addition, it should be noted that the new pension expenditure rule means that social contributions are the adjustment variable in the event of the system's expenditure exceeding its revenue and no agreement to implement other measures is reached. Future increases in contributions could hamper the dynamism of job creation (see Box 2). The uncertainty surrounding this assumption suggests that scenarios of pension expenditure sensitivity to this variable should be carried out (see Section 5.1).

FIGURE 20 UNEMPLOYMENT RATE



Source: SEPE and AIReF

BOX 2. EFFECTS OF THE PENSION REFORM ON TAXES ON WORK, EMPLOYMENT AND ITS HETEROGENEITY

Royal Decree-Law 2/2023 introduces increases in social contributions that are heterogeneous by wage level. In addition, a new expenditure rule is established which means that, in the event of an excess of pension expenditure, in accordance with set criteria (see Box 6), social security contributions will be the variable that ultimately ensures compliance with the rule.

The academic literature documents several channels through which an increase in labour costs can affect employment levels and productivity. Thus, taxes on wage income and social security contributions would have disincentivising effects on both labour demand, by increasing labour costs for companies, and on the labour supply, by reducing the real wage of workers and discouraging participation in the labour market.

SIMULATION OF THE IMPACT ON EMPLOYMENT OF AN INCREASE IN THE EFFECTIVE RATE OF SOCIAL CONTRIBUTIONS

FIGURE RE_2.1 Shock on effective rate (pp difference)

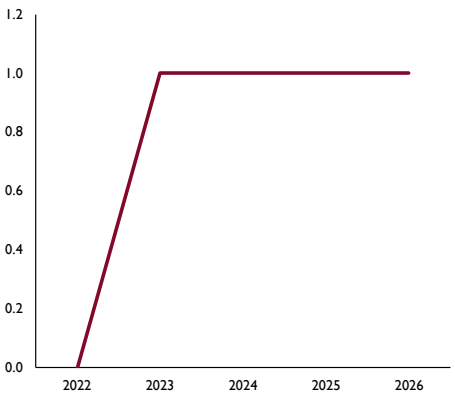
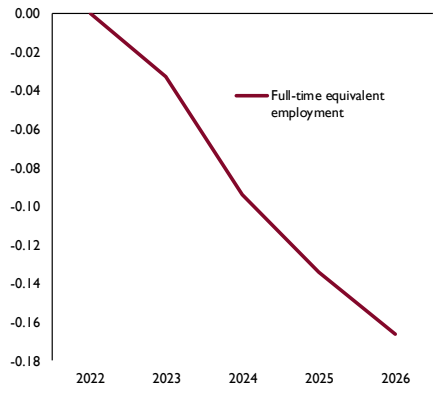


FIGURE RE_2.2 Difference as % over no-reform scenaric



The negative impact of taxation on employment will depend on the level of competition in the labour and product markets and on the elasticities of supply and demand in these markets. In general, the impact of an increase in business contributions will be greater if the elasticity of labour supply is greater, as is usually the case with unskilled labour. There is also evidence showing that an increase in contributions among

higher-skilled workers may reduce incentives to train or increase their mobility to lower-tax countries, while reducing the attraction of more productive migrants. This may end up negatively affecting countries' competitiveness and potential growth (Trostel (1993) and Kleven *et al.* (2020), among others[21]).

Moreover, the employment effects of increases in taxes on work depend on labour market institutions. In theory, the negative effects on employment will be greater if rigidities in the labour market limit wage flexibility. In economies with higher levels of informal employment, an increase in labour costs may provide an incentive to move from formal to informal employment. Empirical evidence at an international level tends to conclude that an increase in social contributions has a negative impact on employment. However, the specific effects differ from country to country, depending on the complex interactions with labour market institutions (Bertola (2016)[22]).

In the case of Spain, empirical evidence shows that a 1 percentage point increase in tax on work would raise unemployment by 0.2 pp (see Andrés *et al*., 1996 and Melguizo, 2007[23]). In this regard, the estimates made by AIReF with its quarterly model (AQM), the Oxford Economics model and the EC QUEST model suggest that an increase of 1 pp in the effective rate of social security contributions or taxes on work over a baseline scenario has a negative impact on employment of 0.1 points at the end of the first year as a result of the rise in the effective rate and of 0.2 points after two or three years,

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21 Trostel, Philip A, 1993. "The Effect of Taxation on Human Capital", Journal of Political Economy, University of Chicago Press, vol. 101(2), pages 327-350, April; Kleven, Henrik, Camille Landais, Mathilde Muñoz, and Stefanie Stantcheva (2020). "Taxation and Migration: Evidence and Policy Implications." Journal of Economic Perspectives, 34 (2): 119-42.

22 Bertola, G. (2016). "European Unemployment Revisited: Shocks, Institutions, Integration". CESifo, Munich, 2016 CESifo Working Paper No. 6170.

23 Andrés, J. Doménech, R. & Taguas, D. (1996). "Desempleo, ciclo económico y participación de las rentas del trabajo en la economía española". Working Paper D-96001, Directorate-General for Planning, Ministry of Economy and Finance, Madrid; Melguizo, A. (2007). "La incidencia económica de las cotizaciones sociales en España, 1964-2001". 14th Meeting of Public Economics: public policies and fiscal reforms, 2007.

depending on the model used. In terms of full-time equivalent jobs, this means a reduction of about 6,000 jobs in the first year and 33,000 jobs after three years (compared with the no-reform scenario). However, all of the measures approved to raise contributions have a greater impact once all of them are deployed, as the effective rate would rise by 2.7 points when the three measures are deployed. In addition, this impact is very heterogeneous by wage level at the end of the transitional period of implementation, as discussed below.

Specifically, it is estimated that, at the end of the transitional period, the effective rate will rise by 1.2 points for gross wages below €54,000 per year as a result of the Intergenerational Equity Mechanism (IEM). In contrast, the increase in rates is close to 10 points for gross incomes between €70,000 and €100,000 as these will be affected not only by the IEM, but also by the removal of the cap for the maximum contribution bases and the solidarity contribution. Thus, a wage income of €70,000 will have a gross tax increase of €7,500 per year while wages of €100,000 will have a tax increase of €9,700. The capping of the maximum contribution bases is the measure that largely explains this increase in rates, although the solidarity contribution will also result in an increase in the labour costs of the highest wages.

FIGURE RE_2.3. INCREASE IN TAXATION ON WORK DUE TO THE PENSION REFORM BY GROSS WAGE LEVEL (INCREASE IN EFFECTIVE RATES: INCREASES IN TAXATION BETWEEN GROSS WAGES)

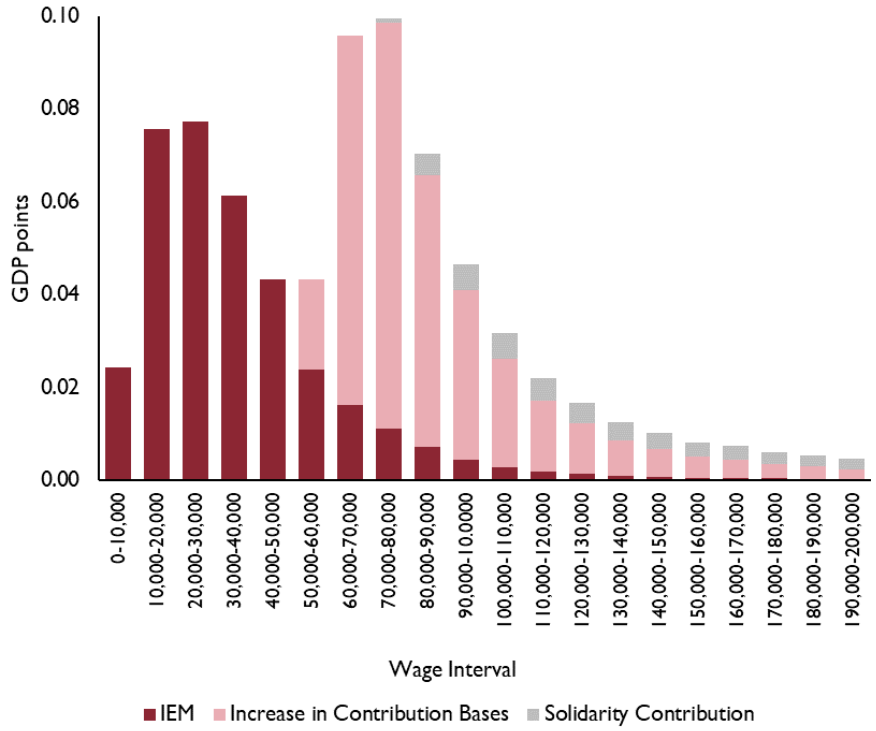
Source: AIReF based on administrative microdata of the AEAT-INE-IEF household panel

Note 1: does not incorporate the increase for brackets above €200,000.

Note 2: the figure shows the increase in the tax on work generated by the pension reform by gross salary levels. For example, gross wages of €70,000 per year will see an increase of 11 pp in their tax on work, amounting to an additional €7,700 per year.

The largest proportion of the tax increase will fall on wage income exceeding €54,000 (65% of the cost of the reform, that is, €7.8 billion of additional taxes with 2022 GDP data), mainly due to the increase in the maximum contribution bases. For their part, wages below €54,000 will bear 35% of the reform since, although they are only affected by the IEM, they are the most numerous group and the one in which most of the wages in Spain are concentrated.

FIGURE RE_2.4. DISTRIBUTION OF THE INCREASE IN TAXATION ON WORK DUE TO THE PENSION REFORM (TAXATION INCREASE EXPRESSED IN POINTS OF GDP, BY GROSS SALARY LEVEL)



Source: AIReF based on the AIReF joint contribution and PIT microsimulator and using the microdata of the AEAT-INE-IEF household panel

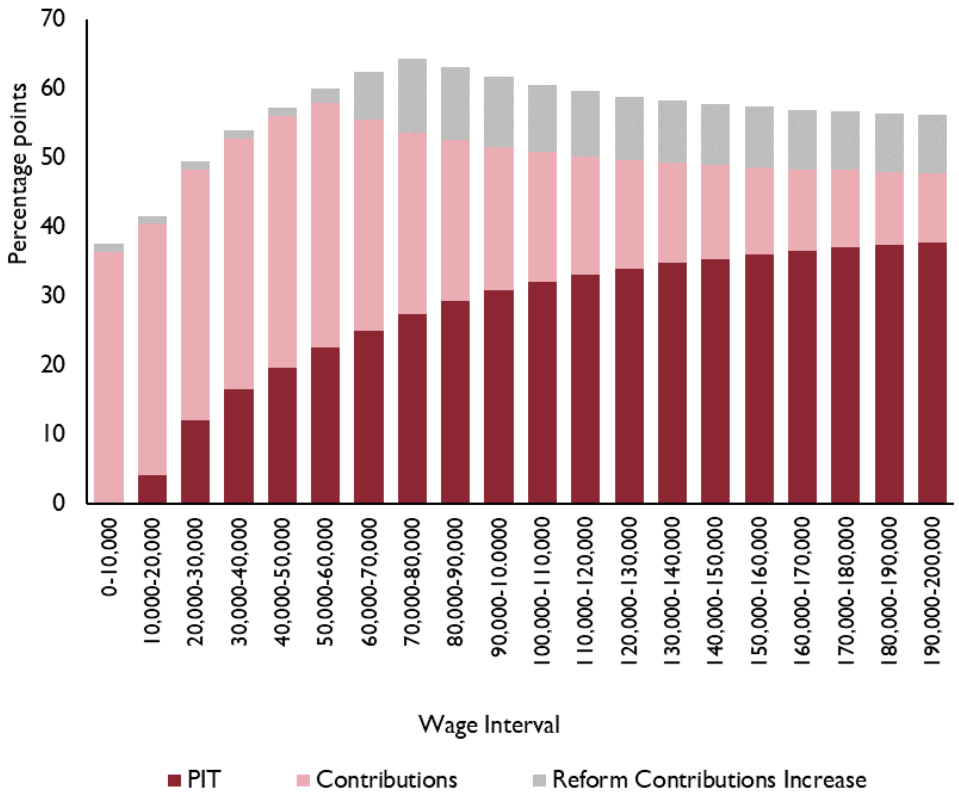
Note 1: the increase in taxation for brackets above €200,000, which would represent 0.07 points of GDP, has not been plotted.

Note 2: this figure shows the levels of wage income that bear the increase in the tax on work generated by the pension reform. For example, the value of 0.1 relative to wage bracket between €70,000 and €80,000 of gross work income means that that group would bear 0.1 points of GDP. Out of the 0.9 points of additional revenue generated by the reform, this represents 11% of the total.

Social security contributions are not the only tax on work income. Personal Income Tax, after deducting the social security contributions paid by the worker and applying a series of reductions, also taxes work income up to a maximum marginal rate of approximately 45%, with certain variations by Autonomous Region (AR). Using a joint microsimulator of social contributions and Personal Income Tax and using the public administrative data of the AEAT-IEF-INE household panel, we calculate the total effective rates (contributions + PIT) to which work income is subject in Spain before and after the pension reform.

Thus, for example, gross work income in Spain of €10,000 per year was previously subject to a tax rate of 36.25% as social contributions (€3,625) and paid almost no PIT as this income level falls within an interval that allows it to benefit from a series of reductions that make the amount of payable PIT zero. With the reform, this work income will pay 37.45% for social contributions (€3,745), due to the 1.2 pp added by the IEM, which means an increase of €120 per year. For its part, a wage income of €80,000 that until now was taxed at a rate of 52% (29% for PIT and 23% for social contributions), which meant €41,600 of taxes per year, will now be subject to a rate of PIT plus contributions of 63%, which represents an additional annual tax bill of €8,800.

FIGURE RE_2.5. TOTAL TAXATION ON WORK AFTER THE PENSION REFORM (EFFECTIVE RATES PIT + CONTRIBUTIONS AFTER THE REFORM)



Source: AIReF based on the AIReF joint contribution and PIT microsimulator and using the microdata of the AEAT-INE-IEF household panel

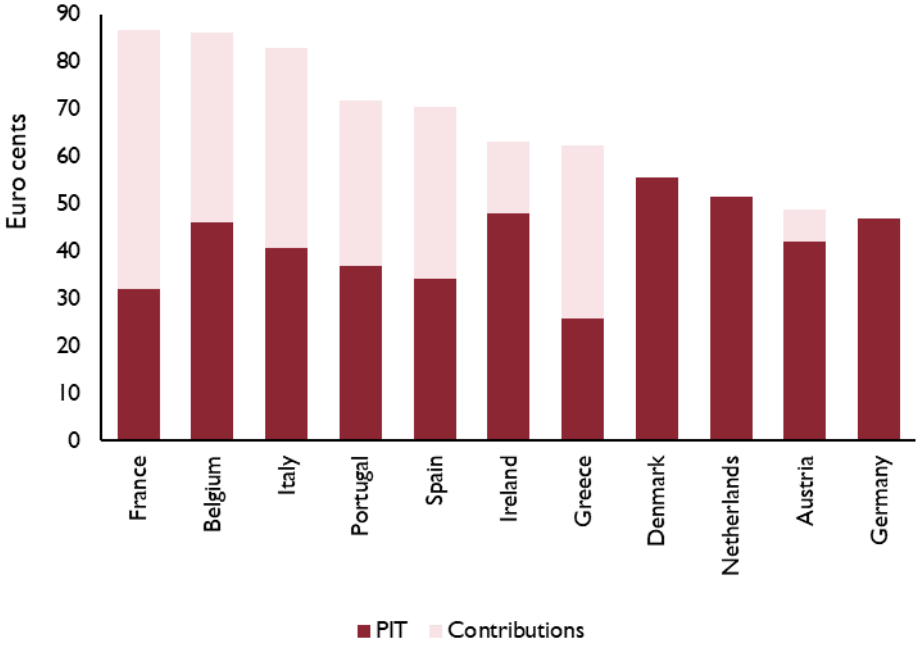
Note 1: due to the homogeneity of the intervals, the increase in taxation for brackets above €200,000 has not been plotted.

Note 2: this figure shows the effective rates of PIT and social contributions to which different income brackets would be taxed upon completion of the pension reform. Accordingly,

for example, a gross annual wage income of €80,000 that was taxed at a rate of 52% (PIT + social contributions) will change to 63%, which means €8,800 more in taxes on work per year.

Thus, taking into account this increase in rates and the information from the OECD database for taxes on work for other countries, which does not yet include the increase in rates generated by the reform described in this box, it can be seen that the recent pension reform will bring the taxes on work for high wages in Spain (wages equal to 167% of the average wage in the country) close to the highest rates in comparable countries.

FIGURE RE_2.6. TAXES ON WORK FOR EACH ADDITIONAL EURO OF INCOME (FOR WAGES EQUAL TO 167% OF THE AVERAGE INCOME IN THE COUNTRY)



Source: OECD

In summary, the macro-econometric simulations carried out show that an increase in contributions tends to reduce employment levels. The effects in the early years associated with recent increases at an aggregate level can be considered moderate. However, it should be noted that social contributions will increase on average by 2.7 pp by the end of the transitional periods and they may be subject to future changes as it is the IEM that will ultimately ensure compliance with the new pension expenditure rule. In addition, Spain has rigidities in the labour market and a productive specialisation in labour-intensive sectors that lead to the expectation of a higher impact of an increase in contributions than in other countries.

Once the gradual implementation periods are over, the reform will lead to an increase in labour costs with a very heterogeneous impact

by wage level. This will be particularly focused on gross annual work incomes exceeding €54,000.

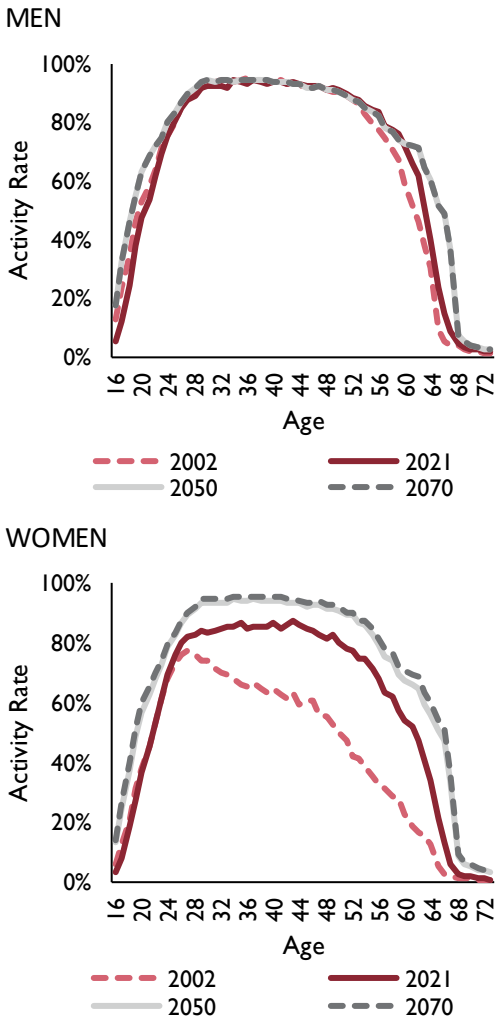
This is why the analysis of the impact of the current reform should be accompanied by an assessment not only of the accounting sustainability of pensions, but also of its effects on the labour market, taking into account the potential uneven effects on individuals and economic sectors.

2.2.2.3 Activity rates

The male activity rate has remained at around 70% since the start of the century, while the female activity rate has risen from 50% to 60%. The activity rate is defined as the active population aged between 15 and 74 over the total population of the same age. The historical data are obtained from the microdata of the LFS, which also allows breakdowns by sex and simple ages[24]. Disaggregating by age, it is found that the male activity rate has remained relatively stable over the past 20 years. At a more detailed level, it can be seen that the activity rate of young people in the base year remains at around 35%, far from the levels reached in the years prior to the financial crisis (52.7% in 2006) and the EU average (47%). In the case of older individuals, although their participation rate has risen slightly due to the pension reforms aimed at extending the effective retirement age, Spain remains noteworthy for having one of the lowest participation rates in the EU among those aged 65 and over (3.3%, compared with 6% in the EU). Finally, the female participation rate has undergone a significant convergence towards, albeit still below, the male rate.

24 The AIO variable is used, which defines the relationship with the activity of the interviewees, and includes employed people (values 3 and 4), unemployed people (values 5 and 6) and inactive people (values 7, 8 and 9).

FIGURE 21 ACTIVITY RATE OF MEN AND WOMEN. BASELINE SCENARIO



Source: INE and AIReF

Participation rates are projected to rise over the projection horizon. This is mainly due to an increase in the participation of women, whose participation rates will approach those of men over the projection horizon. The activity rate projections are calculated using a cohort simulation model, where the aggregate activity rate is obtained from the interaction between the age composition of the population calculated in the previous section and the projected sex and age participation curves. In this regard, it is assumed that women's activity rates will progressively converge towards those observed for man. This will reduce the gap, which currently stands on average at around ten points, to two points in 2050 and less than one point by 2070.

It also assumes an increase in male participation rates in younger and older

workers. In particular, it is estimated that the activity rate of young men will converge towards levels somewhat higher than those observed in the EU average (47%), albeit without reaching the rates recorded prior to the financial crisis (52%). Specifically, a participation rate of 50% is assumed.

In the case of older workers, the higher participation rates reflect the effects of the 2011 reform on the pension system, which, according to AIReF's estimates, translates into an increase of 0.9 years in the effective retirement age. The latest published data from the Continuous Sample of Working Lives confirm that the impact of the 2011 reform on the effective retirement age amounted to an average increase of 0.9 years, which is slightly higher for women.

In addition, AIReF considers that the reform approved in 2021 will raise the effective retirement age by one year by 2030. This implies a further increase in participation rates of almost 1.5 points in the projection period.

The assumptions on which these estimates are based are described in more detail in Section 3.2.1 Pensions. The increase in activity rates in the older age brackets (between 55 and 74 years old) will help it close the gap with other European economies, where participation rates of older people tend to be higher than in Spain.

Finally, the gradual increase in the participation of the immigrant population in the total population also contributes to raising participation rates over the projection horizon. This is because the foreign population has higher participation rates than the Spanish-born population, as most of them are of working age. In addition, one of the main reasons for immigration to Spain is to join the job market.

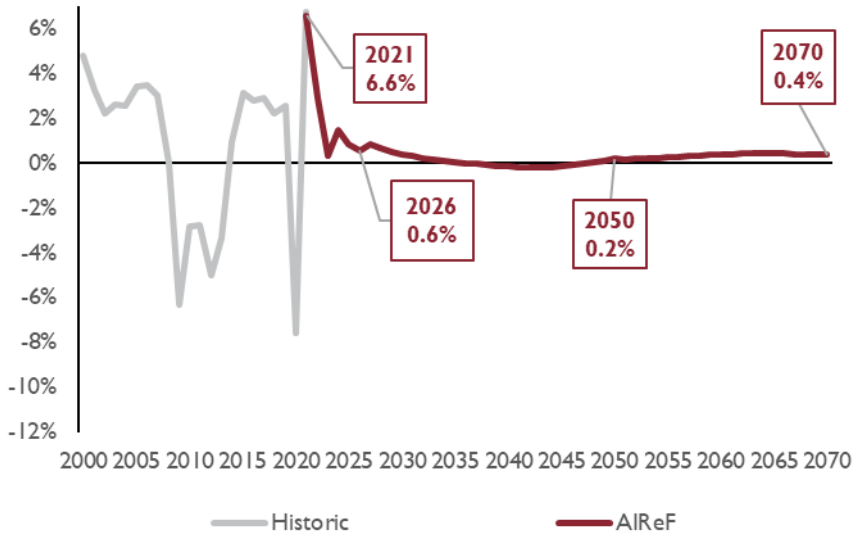
Overall, the scenarios show an increase in the activity rate from 65.3% in 2021 to almost 69% by 2050 and 71% by 2070. These rates are similar to those projected by the AR2021 for the Spanish economy.

2.2.2.4 Contribution of the labour factor to GDP

In its baseline scenario, AIReF considers an average contribution of the labour factor to GDP growth of 0.1 pp for the period 2027-2050, which recovers to an average of 0.3% between 2050 and 2070. The contribution of the labour factor to GDP growth is estimated by combining the assumptions about the working-age population, the activity rate and the unemployment rate. In the short term, this contribution is determined by the impact on employment of the energy crisis and the war in Ukraine, but in the long term the fundamental determining factor is the working-age population. AIReF's demographic projections set out a reduction in the working-age population. This is reflected in a gradual reduction in the contribution of the labour factor to GDP growth, which even becomes negative in the years when the baby boom generation leaves the market the most, as in the scenario set out in the AR2021. In fact, in the AR2021 the average contribution of the labour factor between 2019 and 2070 is equal to zero (the increase in employment of 0.2% is offset by the fall in the weight of the working-age population over the total population of 0.2%)[25].

[25] 2021 Ageing Report: Underlying Assumptions and Projection Methodology, page 72

FIGURE 22 LABOUR FACTOR (CONTRIBUTION TO GDP GROWTH)



Source: INE and AIReF

2.2.2.5 Other macroeconomic assumptions

AIReF considers that inflation and the GDP deflator will converge to 2% in 2027 and remain at that level thereafter. This rate corresponds to the ECB's target of keeping inflation rates close to 2% in the medium term. The AR2021 also assumes an inflation rate of 2%.

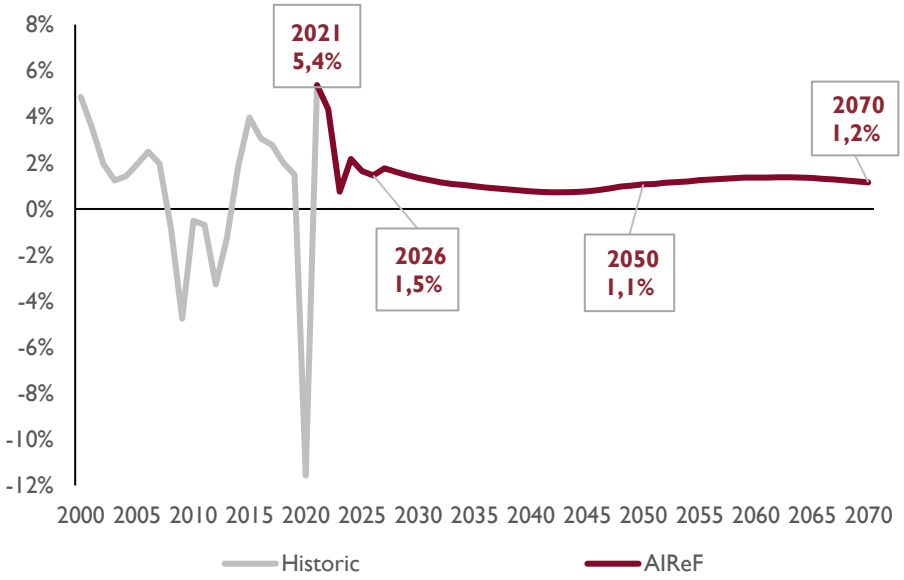
The average wage in the economy grows with productivity. This assumption is in line with standard microeconomic theory and implies that the weight of the wage bill in GDP is maintained. The historical data are taken from the INE's Annual Labour Cost Survey.

2.3. Results

AIReF estimates that the average annual growth of real GDP per capita amounts to 1% for the period 2027-2050, rising to 1.3% for the period 2051-2070 due to the recovery of the working-age population. The evolution of GDP per capita is estimated from the assumptions about the inputs of the production function. The average growth estimated by AIReF is somewhat lower than the 1.4% for the average for the period 2019-2070 estimated by the Ageing Working Group (AWG) for the AR2021. Although this report considers a higher contribution from productivity and a lower contribution from the labour factor compared with AIReF's estimates, it is necessary to bear in mind that the EC measures the labour factor and productivity

in terms of hours and not employed persons, and that it includes an additional contribution from capital to productivity per worker.

FIGURE 23. REAL GDP PER CAPITA. GROWTH RATE

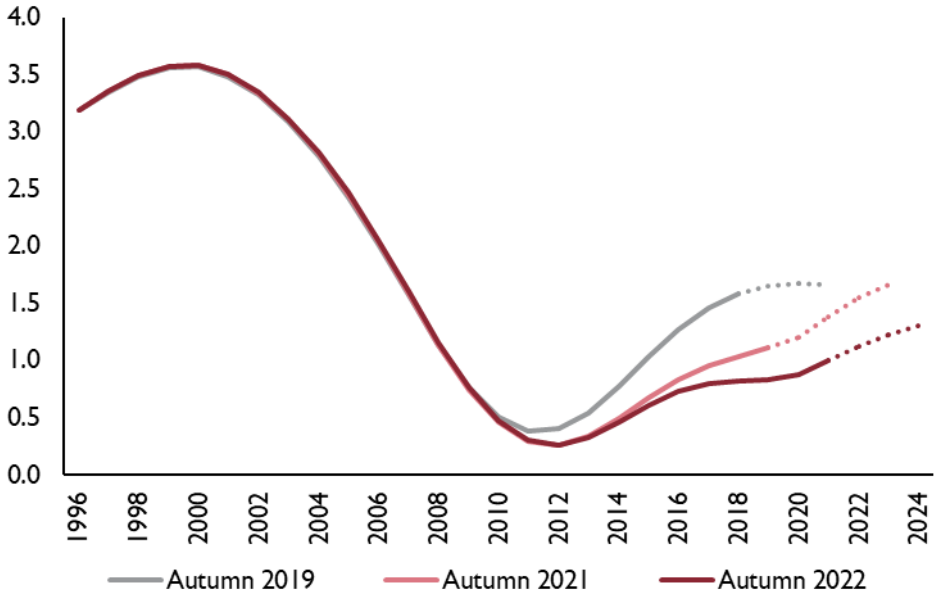


Source: INE and AIReF

2.3.1. Potential GDP growth

Potential GDP growth is revised down with respect to the 2019 Opinion on Sustainability, in line with the revisions carried out by other institutions in their projections of potential GDP in the long, medium and short term. For example, the European Commission's AR2018 projected average potential GDP growth for Spain of 1.5% during the period 2016-2070. However, in the 2021 version of this report, published in May 2021, following the impact of the COVID-19 pandemic, potential GDP growth during the period 2019-2070 was lowered to 1.4%. In medium-term projections, potential GDP growth has also been revised downwards after the pandemic. For example, in the 2018 *Fiscal Sustainability Report*, published in early 2019, the potential growth of the Spanish economy was estimated at 1.1% for the period 2018-2029. However, in the 2021 *Fiscal Sustainability Report*, published in early 2022, potential growth was revised to 1% for 2021-2032. Finally, with regard to short-term projections, the European Commission's potential GDP projections for 2021 and 2022 show a downward revision compared with 2019. In particular, potential GDP growth projected in November 2022 would be clearly below the growth trend of the November 2019 projections.

FIGURE 24. EUROPEAN COMMISSION ESTIMATES OF POTENTIAL GDP GROWTH IN SPAIN: TREND (%)



Source: AMECO

The impact of the disruption of COVID-19 and the energy crisis presents a great deal of uncertainty, especially over a long-term horizon. There are several channels through which these shocks could have long-term effects. Regarding the labour factor [26], the gap in the educational process produced by the lockdown in 2020 may lead to lower productivity in the long term. In the case of capital, both the pandemic and the energy crisis might lead to further capital depreciation as a result of delayed investment decisions in the context of uncertainty. Finally, depending on the persistence of these shocks, certain particularly affected sectors may need to be restructured, thereby also limiting potential growth.

A notable feature is that over the projection horizon the expected growth pattern differs from what was historically observed in the case of the Spanish economy. The growth of the Spanish economy has been determined by a high contribution of the labour factor, given the abundance of labour that has traditionally characterised

26 Martín Fuentes N & I Moder (2020), "The scarring effects of past crises on the global economy", Economic Bulletin Issue 8, ECB.

the Spanish economy, while the contribution of productivity has been more moderate, particularly in recent years. By contrast, growth over the projection horizon relies on a positive contribution from productivity, while the contribution from labour is comparatively moderate. This result highlights the importance that productivity growth acquires for sustaining the growth of the Spanish economy in the coming years in which, according to AIReF's projections, its traditional abundance of labour will begin to fade.

3. LONG-TERM BASELINE FISCAL SCENARIO

The baseline fiscal scenario is defined as a no-policy change scenario after the medium-term projections and the effect of the measures set out in the latest Stability Programme and the Budgetary Plan for 2023 have been exhausted. AIReF's forecasts up to 2026 of revenue and expenditure as set out in the Report on the Draft Budget and Main Budgetary Lines of the General Government 2023[27] are the starting point for the long-term baseline fiscal scenario. Therefore, as described in the above-mentioned report, the long-term projections start from a deficit situation for the GG as a whole of 3.3% in 2026. From 2026, revenue and expenditure evolve in the baseline scenario, on a no-policy change basis and with no further measures other than those included in the 2023 Budgetary Plan. This implies that revenue and expenditure only follow their own dynamics, mainly focused on demographic variables, according to the methodology and the assumptions of the demographic and macroeconomic scenarios described in the previous section. Therefore, this baseline scenario expressly excludes the adoption of discretionary measures aimed at reducing the structural deficit or compliance

27 Report on the Draft Budget and Main Budgetary Lines of the General Government 2023: ARs and LGs.

with fiscal rules, as well as structural measures to increase expenditure or reduce revenue.

3.1. Evolution of General Government Revenue

AIReF estimates that revenue, excluding the RTRP, will fall from 43.5% of GDP in 2021 to 42.5% in 2026. AIReF projects an acceleration of taxes on production once the energy measures have been phased out. Their growth will subsequently slow down as a result of both less dynamic VAT, linked to the evolution of national demand, and the deceleration of the growth of special taxes, in line with the evolution of real GDP. For their part, the weight of taxes on income over GDP is estimated to be higher than that prior to the pandemic, with an evolution that slows at the end of the period, following the trend of its underlying macroeconomic variables[28]. These taxes are affected by the temporary increase measures that will be implemented in 2023 and which will be phased out in 2025 – taxes on the energy and banking sectors, the Tax on Large Fortunes and the limitation of the offsetting of losses in Corporate Income Tax. The evolution of social contributions over the entire period is essentially determined by the dynamics of employment and wages. However, it accelerates in 2023 as a result of the entry in force of the IEM and the increase in the maximum contribution bases, which raise the weight over GDP by 0.2 points. Other revenue recovers its historical weight over GDP.

In its baseline scenario, AIReF projects that GG revenue will stand at 44.7% of GDP in 2050. This projection implies an increase in revenue of 2.2 points compared with 2026. Therefore, the weight of revenue over GDP will rise gradually with an average annual gain of approximately 0.09 points of GDP, similar to the average annual values observed between 1995 and 2019. The increases are mainly concentrated in direct taxation, while indirect taxation falls slightly and other revenue maintains a broadly constant share of GDP. This increase also includes the impact of pension reforms on revenue, such as the progressive increase in the IEM rate, which amounts to 0.4 points

28 Compensation of employees in relation to PIT and gross operating surplus in relation to Corporate Income Tax.

of GDP, the end of the transitional period of the self-employed contribution system, 0.5 points including the potential effect on the emergence of the underground economy, and the solidarity contribution, 0.1 points.

FIGURE 25 CURRENT REVENUE IN % OF GDP (WITHOUT NGEU)

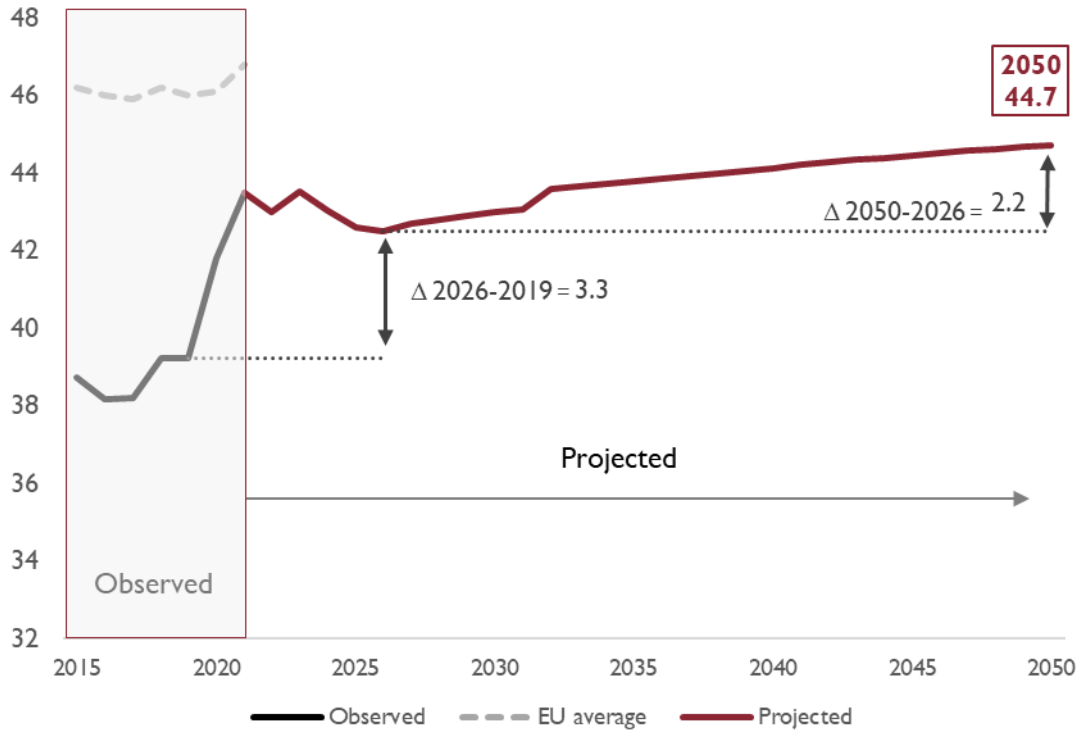


TABLE 2. CURRENT REVENUE AS % OF GDP (WITHOUT RTRP)

	2021	2026	2035	2050	Δ 2026-2021	Δ 2050-2026	Δ 2050-2021
Non-financial revenue	**43,5**	**42,5**	**43,8**	**44,7**	**-1,0**	**2,2**	**1,2**
Modelled	**36,0**	**36,0**	**37,3**	**38,2**	**0,0**	**2,2**	**2,2**
VAT and taxes on products	10,3	10,4	10,4	10,3	0,1	-0,1	0,0
PIT	8,8	9,5	10,1	10,9	0,6	1,4	2,0
Corporate Income Tax	2,7	2,4	2,5	2,8	-0,3	0,4	0,1
Social contributions	14,2	13,7	14,3	14,3	-0,5	0,6	0,1
Not modelled	**7,5**	**6,5**	**6,5**	**6,5**	**-1,0**	**0,0**	**-1,0**

The implied average elasticity of long-term revenue to GDP in the absence of measures would be 1.04 as a result of modelling the main sources of revenue separately. Making a long-term projection on a no-policy change basis is complicated since in many cases the discretionary action of the Government is aimed at softening

the fiscal drag of certain taxes, such as PIT, or to adjust the rates of others that may be outdated, such as special taxes. In general, elasticities higher than one are deduced for revenue from direct taxation, while elasticities slightly lower than one are deduced for indirect taxation (VAT and Special Taxes) and an elasticity of close to one for social contributions if the impact of the reform of the self-employed system is not taken into account. In addition, AIReF has conducted an analysis of the evolution of the main taxes between 2000 and 2019 if they are stripped of their regulatory changes, which shows a trend towards an increase in the weight of revenue over GDP that confirms elasticities slightly higher than unity. It also follows from this exercise that in the period under analysis the effects of contractionary and expansionary regulatory changes have tended to cancel each other out. The OECD also derives long-term revenue elasticities for Spain that are higher than unity[29], setting them at 1.12. Other empirical work also confirms the existence of elasticities greater than unity[30].

[29] (Dougherty, S., P. de Biase & L. Lorenzoni (2022), "Funding the future: The impact of population ageing on revenues across levels of government", OECD Working Papers on Fiscal Federalism, No. 39, OECD Publishing, Paris, OECD Working Papers on Fiscal Federalism)

30 For example, Dyck *et al*. (2014), Dudine & Jalles (2017) and Mourre & Princen (2015) estimate a long-term elasticity between 1.26/1.5 for Corporate Income Tax for a wide set of countries, while, for contributions, PIT and VAT, they estimate elasticities close to unity. Belinga, V., Benedek, D., Mooij,
R. A. & Norregaard, J. (2014). Tax Buoyancy in OECD Countries. IMF Working Papers, 14(110), 1. Tax buoyancy in OECD countries; Dudine, P. and Jalles, J. T. (2017). How Buoyant Is the Tax System? New Evidence from a Large Heterogeneous Panel. IMF Working Papers. How buoyant is the tax system? New evidence of a large heterogeneous panel; Mourre, G. and Princen, S. (2015). Tax Revenue Elasticities Corrected for Policy Changes in the EU. EC Discussion Paper 018. https://doi.org/10.2765/622532

TABLE 3. ELASTICITY OVER NOMINAL GDP EXEMPT FROM MEASURES: AVERAGE 2027-2050

		Elasticity over nominal GDP 2027-2050	Structure (%) (*)
Average elasticity of revenue		**1.04**	**100**
Modelled part			
D.211r+D.214r	VAT & STs	**0.99**	25
D.211r	Value-added taxes VAT	**1.10**	17
D.214r	Taxes on products, excluding VAT & import	**0.70**	8
D.51r	PIT	**1.18**	20
D.51r	CIT	**1.20**	5
D.61	Social contributions (**)	**1.00**	33
Non-modelled part (rest)			
Other		**1.00**	17

(*) 2019 weights

(**) Unit elasticity due to the underlying assumption of evolution of contribution bases, including maximums, at the same rate as wages

Source: AIReF

AIReF estimates that the weight of VAT and other taxes on products will remain practically stable, standing at 10.3% of GDP in 2050, 0.1 points less than in 2026. Taxes on production and imports account for a little under 30% of total revenue, of which VAT accounts for approximately 60% and other taxes on products, mainly Special Taxes, account for 30%[31]. In the long run, VAT evolves with nominal GDP with an elasticity slightly above unity. In a no-policy change context, this elasticity may be explained by changes in the composition of the goods consumed with different tax rates - general, reduced and super-reduced - associated with an increase in per capita income. The growth in the weight of VAT is offset by the fall in the weight of Special Taxes, the evolution of which depends on GDP in volume, which is less dynamic than nominal GDP. Although in the past the evolution has been partially offset by regulatory changes, these are excluded in this baseline scenario.

31 Weights calculated in national accounting terms for 2019 as it is considered a more representative year than the last observed years, 2020 and 2021, which were affected by the pandemic.

AIReF forecasts a progressive increase in the weight of PIT to reach 10.9% in 2050, 1.4 points higher than in 2026. The long-term evolution is determined by the changes in the different tax bases – wages, pensions, unemployment and other income – and the associated effective rates. Therefore, the projection also takes into account the effects of demographic change on revenue collection. Both the progressive nature of the effective rates and the structural changes in the population will result in an increase in the weight of revenue from PIT. On the one hand, the fiscal drag of PIT implies an increase in tax collection that is proportionally higher than the growth in wages. In this regard, if current policies were maintained, the elasticity of PIT over nominal GDP over the projected period would rise above 1.4. However, this fiscal drag is partially or totally corrected over time through the different reforms that moderate the growth of effective rates. For this reason, in the evolution of PIT, a correction of the growth of effective rates for the tax bases has been assumed. Smoothed rates have been established that reduce the average elasticity with respect to nominal GDP, with more realistic results than those derived from elasticity modelled in the absence of regulatory changes. On the other hand, although the effective rate of pensions is lower than that of wage income, as a result of the ageing of the population, pension growth is expected until 2050, which will raise the volume of collection for that taxation. This results in an average elasticity of 1.18 for projections up to 2050, which, however, would fall to 1.07 over the next 20 years, aligning more with the growth of the wage bill as the growth of pensions slows.

For Corporate Income Tax, AIReF also projects an increase in long-term collection, which will stand at 2.8% of GDP in 2050, 0.4 points above its weight in 2026. This tax, which is difficult to model both in the short and long term, has an asymmetric elasticity at different stages of the economic cycle. In addition, the existence of elements such as tax loss carryforwards also distort its relationship with the economic cycle. These features would lead to an estimate of sharp increases in collection in a long-term macroeconomic scenario that does not include economic cycles. To solve this problem, it has been decided to apply the average elasticity with respect to GDP over the last full cycle, which is equal to 1.2.

AIReF estimates that social contributions will stand at 14.3% in 2050, the result of an evolution in line with GDP, of the impact of the IEM, the new contribution system for self-employed workers once the transitional period

ends and the full implementation of the solidarity contribution. The long-term projection is based on the evolution of the bases and contribution rates separately for the employed and the unemployed. On the one hand, the contribution rates rise in accordance with the IEM, by 1.2 points in 2029, leading to an increase in collection of 0.4 points of GDP. Moreover, the maximum contribution bases grow annually in line with the CPI observed the previous year plus 1.2 points between 2024 and 2050. This evolution is similar to that of wages in AIReF's long-term scenario, which would determine a unitary elasticity with respect to GDP up to 2050. This heading also includes the social contributions charged for those falling under the civil servant scheme [32]. AIReF also includes the impact of the full roll-out of the reform of the self-employed contribution system once the transitional period is over. This estimate is based on the assumption that the full roll-out of the reform will lead to the self-employed workers who are currently registered raising their contribution rate for common contingencies to the same percentage as employees. It also includes the full implementation of the solidarity contribution.

AIReF maintains the weight of other revenue over GDP at 6.5% throughout the forecast horizon. This heading groups non-modelled tax revenue, as well as all non-tax revenue. It is assumed that this revenue will evolve at the same rate as nominal GDP and therefore its weight from 2026 will not change.

AIReF's projections would add an additional 0.9 points to total revenue from 2050 to 2070, placing it at 45.6% in the last year of the period. This represents average annual growth of 0.04 points of GDP, with a lower dynamic than expected until 2050. On the one hand, the lower growth is due to the lower elasticity of PIT over the last 20 years of the forecast horizon as a result of the slowdown in pension growth caused by demographic changes. On the other hand, from 2050, the maximum bases will grow annually in line with the CPI, so that collection will grow less than GDP (elasticity less than unity). This results in an average implied

[32] The social contributions assigned do not represent cash revenue, but are recorded as revenue in national accounting terms, amounting to 0.4 points of GDP in 2026. As no new contributors have been admitted to the system since 2008, the assigned social contributions are progressively reduced over the projected period until they are phased out in 2050.

elasticity for all revenue with respect to GDP of 1.03 from 2027 to 2017, compared with the figure of 1.04 estimated up to 2050.

3.2. Evolution of General Government expenditure

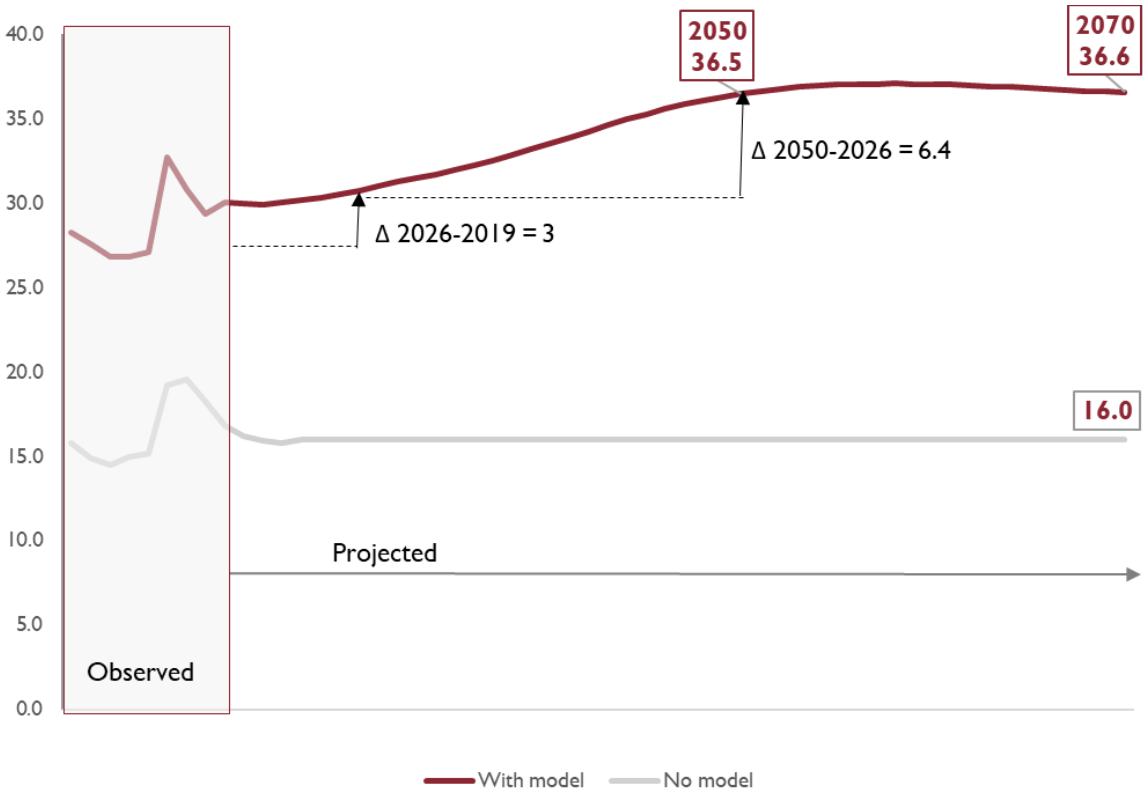
In the medium term, AIReF forecasts a downward trend in expenditure from 50.4% of GDP in 2021 to stabilise at 45.8% of GDP in 2026. The expected reduction of 4.6 points of GDP is driven by the withdrawal of the measures, first associated with COVID-19 and subsequently those associated with the energy crisis. However, the return to fiscal rules planned for 2024, as well as the easing of inflationary pressures will condition the evolution of expenditure. Inflation is transmitted directly, albeit with a one-year lag, to pension expenditure and, indirectly, to compensation of employees through the multi-year agreement with trade unions. In addition, it also puts upward pressure on the cost of goods and services purchased by the public sector and the cost of interest on debt. In the medium term, a fall in the weight of GDP is estimated for all expenditure headings, except interest expenditure.

AIREF projects a baseline scenario that would raise expenditure to 52.4% of GDP in 2050 to stabilise thereafter and reach 52.6% in 2070. In the absence of additional measures to those set out in the Budgetary Plan, AIReF projects spending according to the assumptions detailed above in its demographic and macroeconomic scenario. Most expenditure, around two-thirds, has been modelled to incorporate the effects of an ageing population. This expenditure includes spending on pensions, healthcare, education, long-term care, unemployment and interest. For the remaining third of expenditure, after an analysis of its historical evolution, it has been assumed that it evolves after 2026 at the same rate as nominal GDP in line with the no-policy change assumption. This assumption means maintaining the weight over GDP in 2026 of various expenditure headings, such as defence, R&D&I and the environment, for which there are agreements to increase them to a weight over GDP greater than the current one. In the section on risks and sensitivity, the impact of an increase or decrease in expenditure or revenue over the debt ratio is indicated.

The increase in expenditure between 2027 and 2070 in the baseline scenario is mainly explained by the ageing of the population and the increase in interest expenditure. Within primary expenditure, expenditure on public pensions would increase by 2.1 points of GDP until 2050, with a subsequent reduction of 2.3 points up to 2070. Also as a consequence of the ageing process, there would be an increase in healthcare spending of 1.3 points and long-term care spending of 0.9 points in 2050. The former will stabilise thereafter, while spending on long-term care will rise by a further 0.3 points over the rest of the period. For its part, spending on education would fall by 0.5 points until 2050 to almost recover its weight over GDP of 2027 in 2070. However, the largest increase in expenditure over the period would be on

interest, which would rise from 2.6% of GDP in 2027 to 6.9% in 2070 as a result of the process of debt accumulation and the normalisation of interest rates.

FIGURE 26. CURRENT EMPLOYMENT IN % GDP (WITHOUT RTRP)



Source: IGAE and AIReF

TABLE 4. EXPENDITURE AS % GDP (WITHOUT RTRP).

	2021	2026	2035	2050	2070	Δ 2026-2021	Δ 2050-2026	Δ 2070-2050	Δ 2070-2021
Non-financial expenditure	**50.4**	**45.8**	**47.9**	**52.4**	**52.6**	**-4.5**	**6.6**	**0.1**	**2.2**
Modelled	**30.8**	**30.1**	**32.0**	**36.5**	**36.6**	**-0.7**	**6.4**	**0.1**	**5.8**
Pensions	13.6	14.1	14.8	16.2	13.9	0.5	2.1	-2.3	0.3
Interest	2.2	2.5	3.5	5.1	6.9	0.3	2.6	1.8	4.7
Healthcare	7.4	7.1	7.6	8.4	8.4	-0.3	1.3	0.0	1.0
Long-term care	0.8	0.8	1.1	1.7	2.0	0.0	0.9	0.3	1.2
Education	4.6	4.3	3.8	3.8	4.2	-0.3	-0.5	0.4	-0.3
Unemployment	2.2	1.3	1.2	1.2	1.2	-1.0	-0.1	0.0	-1.0
Not modelled	**19.6**	**15.8**	**16.0**	**16.0**	**16.0**	**-3.8**	**0.2**	**0.0**	**-3.6**

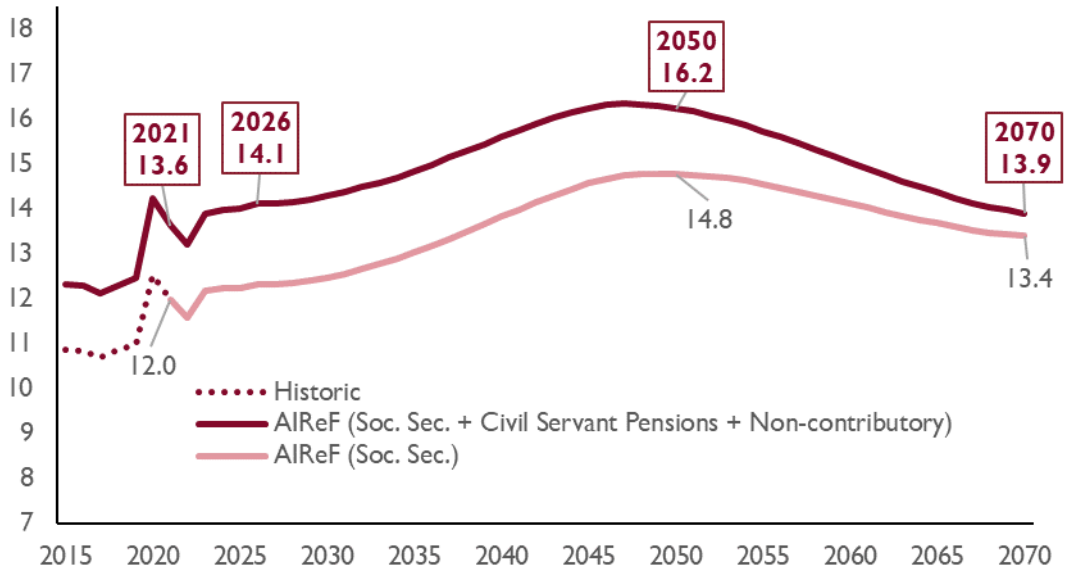
Source: IGAE and AIReF

3.2.1. Pensions

AIReF estimates that in the baseline scenario expenditure on pensions, including civil servant pensions, will amount to 16.2% of GDP in 2050 and will subsequently fall to 13.9% in 2070. These projections include pensions from the Social Security system and State civil servant pensions and non-contributory pensions. The system of State civil servant pensions is being phased out with no new contributors since 2011. This explains why these pensions go from accounting for 1.6% of GDP in 2026 to 1.2% in 2050 and only 0.3% of GDP in 2070. The new contributors from the Central State Administration, the Administration of Justice and the career military have been integrated into the Social Security system since 2011. Non-contributory pensions are assumed to maintain their weight at 0.2% of GDP.

The scope of the projections has been extended in the current revision. The projection includes State civil servant pensions and extends the projection period from 2050 to 2070. This means that the results will be comparable with those of the AR2021 (see Box 4 Comparison with AR2021).

FIGURE 27. PENSION EXPENDITURE OVER GDP (%)



Source: Social Security and AIReF

Pensions in the Social Security system would account for 14.8% of GDP in 2050 and 13.4% in 2070. Regarding the baseline scenario of AIReF's previous forecasts, which included the application of the sustainability factor and the increase in line with the CPI, published in September 2020[33], there is an increase in expenditure for 2050 of 0.6 points. The change in demographic and macroeconomic assumptions pushes spending up by 0.8 points, with the rise in prices responsible for half of this increase. In addition, AIReF includes the impact of eliminating the sustainability factor (0.8 points in 2050) in its projections, the modification of the calculation period for determining pensions from the 25 years prior to retirement to the 27 best years of the last 29 (neutral in 2050), the real reduction in the maximum pension (-0.4 points in 2050) and the reform of the incentives to delay retirement, which AIReF considers

33 Update of demographic and pension expenditure forecasts 2020

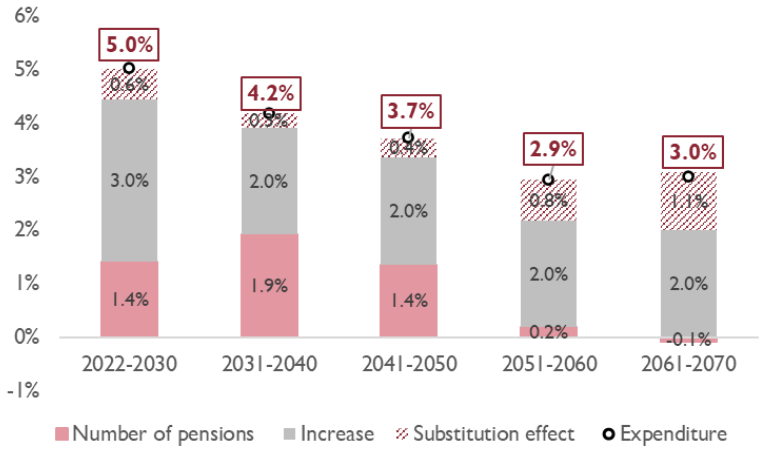
On this update, a change of assumption is made on the increase of pensions, which are raised in line with the CPI of the previous year instead of the CPI of the current year, in accordance with the new regulations.

The estimate of the average retirement pension implies an update of the contribution bases up to t-2 with the corresponding CPI. Therefore, it is considered that the impact of the CPI on the average retirement pension will have three lag periods. The average retirement pension will be updated with productivity plus the CPI of three periods ago instead of the CPI of the current year.

reduce spending in 2050 by 0.8 points. In its baseline scenario, AIReF considers that 30% of individuals will decide to delay their retirement for three years or until they reach 68. Under these assumptions, spending in 2050 will be 14.8 points of GDP. From 2050, once the baby boom retirements have ended, spending begins to moderate, with it estimated to stand at 13.4% in 2070, 1.4 points lower than in 2050, but 1.4 points higher than the spending in 2021 (see Box 2).

The growth in the number of pensions in the Social Security system will accelerate until reaching a peak in 2035 of 2%, to subsequently slow down, while the substitution effect will moderate its impact compared with its historical levels. The growth in pension expenditure is explained by the combination of the evolution of the number of pensions and the average pension, which in turn can be broken down into the effect of the year-on-year pension increase and the substitution effect. The growth in the number of pensions accelerates between 2021 and 2035, with a peak of 2% in that year, and then moderates until even reaching negative rates at the end of the 2050s. This path is explained by the retirement of the most numerous cohorts of the Spanish population of the so-called 'baby boom' generation, people born between 1960 and 1980. The increase in pensions in line with the CPI applies upward pressure on pension spending throughout the time horizon, with a peak in 2023 as a result of the upturn in inflation in 2022. Finally, the substitution effect also raises expenditure growth, because the pensions of new pensioners are higher than for those leaving the system, although its impact will be lower than historical values.

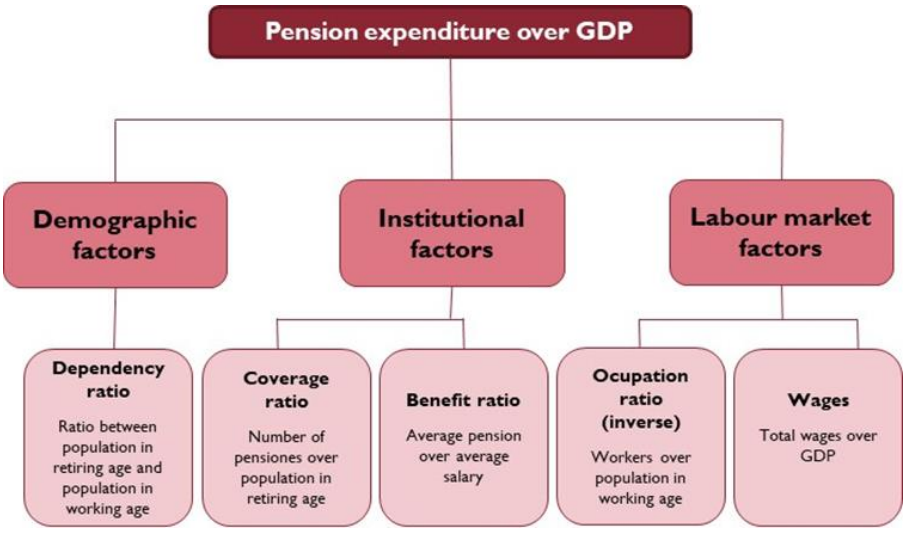
FIGURE 28. BREAKDOWN OF GROWTH IN SOCIAL SECURITY PENSION EXPENDITURE



Source: AIReF

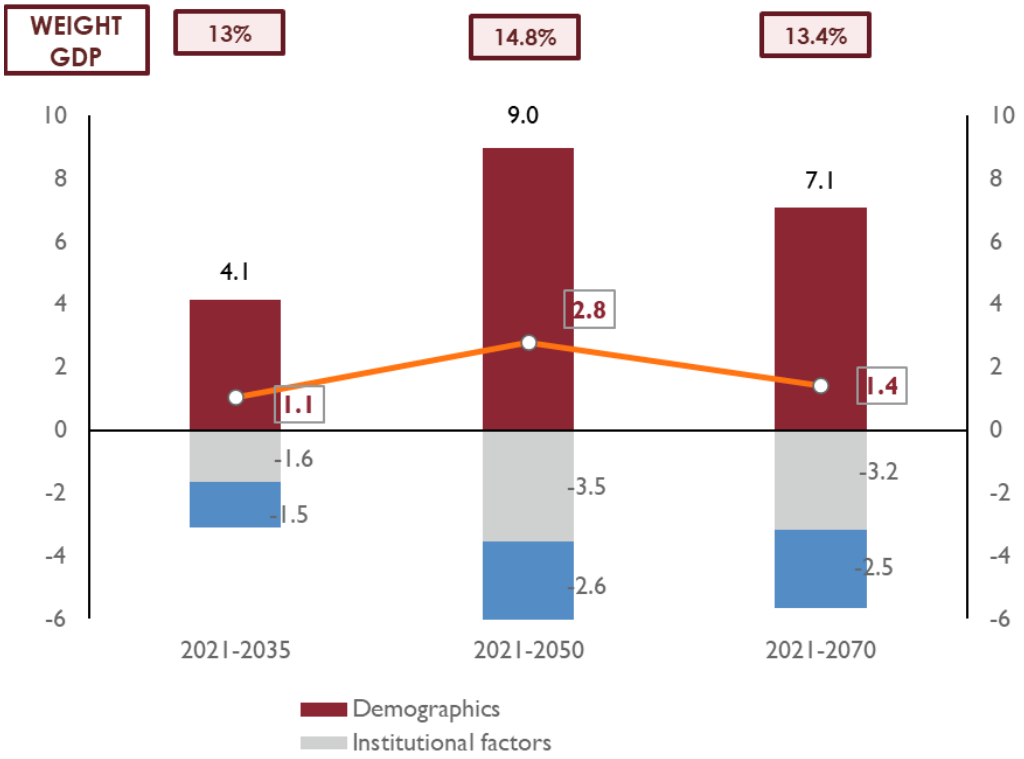
The increase in Social Security pension expenditure, 2.8 points of GDP between 2021 and 2050, can be alternatively broken down into demographic, institutional and labour market factors. The demographic factor is reflected in the evolution of the dependency ratio. Institutional factors are reflected in the eligibility ratio and the benefit ratio, defined as the ratio between the average pension and the average wage. For its part, the labour market is shown in the evolution of the inverse of the employment rate and labour participation.

TABLE 5. BREAKDOWN OF PENSION EXPENDITURE



The key factor in the rise in pension expenditure is demographics, while institutional and labour market factors moderate this growth over the entire forecast horizon. The downward push on spending exerted by institutional and labour market factors intensifies up to 2050 as a result of the full implementation of the 2011 reform, the delay in the retirement age driven by the 2021 reform and by the decrease in the maximum pension in real terms resulting from the 2022 reform. After 2050, the demographic pressure begins to ease, which moderates the contribution of this factor to the growth of pension expenditure over GDP.

FIGURE 29. FACTORS FOR CHANGE IN SOCIAL SECURITY PENSION EXPENDITURE OVER GDP



Source: Social Security and AIReF

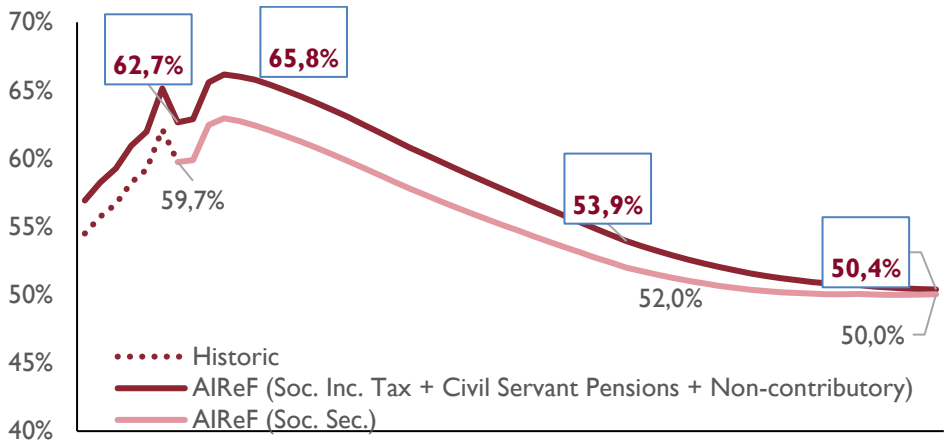
In terms of sufficiency, the benefit ratio of the contributory pension system [34]**, calculated as the average pension over the average wage, falls from 62.7% in 2021 to 53.9% in 2050.** Subsequently this ratio falls to 50.4% in 2070 due to lower average pension growth than the growth allocated to wages in the pension model[35]. In 2050, the ratio would be 52% if only Social Security pensions were taken into account. The erratic evolution in the early years is due to the fact that the increase in the average pension, linked to the CPI of the previous year,

34 This includes pensions from the Social Security system and the State civil servant pension system. Non-contributory pensions are excluded from this analysis because the comparison between the pension and the wage received is only relevant in contributory pensions.

35 Pensions grow with the CPI while wages grow with the deflator of GDP and productivity. In the initial period, the CPI is higher than the deflator plus productivity, while as of 2025 it is lower.

and that of wages, which evolve with the GDP deflator and productivity in the pension model, is not aligned. Subsequently, the reduction is mainly explained by the evolution of wages above pensions, which are increased in line with the CPI.

FIGURE 30. BENEFIT RATIO



Source: Social Security and AIReF

BOX 3. PENSION REFORM BETWEEN 2021 AND 2023

The reforms included in the baseline scenario correspond to those adopted to date. The pension reforms approved between 2021 and 2023[36] mean an increase in the deficit of 1.1 points of GDP in 2050 and 1 point in 2070 compared with a scenario without these reforms and with the PRI and the sustainability factor. This figure includes the increase in line with the CPI[37], which results in an increase in expenditure of 2.7 points compared with PRI in 2050 and 2.5 in 2070.

TABLE RE_3.1. IMPACT OF REFORMS APPROVED SINCE 2021 (PP OF GDP)

	2050	2070
Change in expenditure	**2,4**	**2,3**
Increase in pensions with the CPI (elimination of PRI)	2,7	2,5
Elimination of sustainability factor	0,8	1,4
Early retirement	0,0	0,0
Incentives for delayed retirement	-0,8	-1,1
Determination of years for calculating entry pension	0,0	-0,1
Evolution of maximum pension different from Maximum Contribution Bases	-0,4	-0,4
Change in revenue	**1,3**	**1,3**
Intergenerational Equity Mechanism	0,4	0,4
Reform of self-employed contributions	0,5	0,5
Evolution of Maximum Contribution Bases	0,4	0,4
Solidarity contribution	0,1	0,1
Impact on deficit	**1,1**	**1,0**

Source: AIReF

The increase **in pensions in line with the CPI** of the previous year means an increase in expenditure of 2.7 points of GDP and 9.4 points of the benefit ratio in 2050 compared with application of the PRI in the absence of additional

36 Law 21/2021 on guaranteeing the purchasing power of pensions and other measures to strengthen the financial and social sustainability of the public pension system

Royal Decree-Law 13/2022 establishing a new contribution system for self-employed workers and improving protection for cessation of activity

Royal Decree-Law 2/2023 on urgent measures to extend pensioners' rights, reduce the gender gap and establish a new sustainability framework for the public pension system

37 The increase in line with the CPI was already incorporated in AIReF's baseline scenario in previous publications. Therefore, the reforms represent a reduction in the deficit of 1.7 points of GDP with respect to the previous forecast in 2050 and 1.6 in 2070.

measures. In 2070, the impact would be 2.5 points in spending and 9.1 points in the coverage ratio. In this regard, it should be noted that AIReF already included in its baseline scenario of the previous forecasts the increase in line with the estimate of the CPI of the current year as is usual practice since the 2018 GSB. However, it has been Law 21/2021 that has formally repealed the Pension Revaluation Index (PRI) and established that the CPI of the previous year should be used as an index for increasing pensions. A difference with respect to the previous forecasts is the new revenue that has been contributed to the Social Security system by the Administration as compensation for "improper expenses" in application of the recommendations of the Toledo Pact, the increase in social contributions of 1.2 pp due to the IEM and the new solidarity contribution. This new funding structurally raises the financing of the system and would therefore affect the calculation of the PRI. In this scenario, the PRI would have ceased to be less than 0.25 by 2065.

The elimination of the **sustainability factor** results in an increase in expenditure in 2050 of 0.8 points of GDP and an increase in the coverage ratio of 2.9 points. In 2070, the elimination of the sustainability factor would mean an increase of 1.4 points in expenditure and 5.3 points in the coverage ratio. The sustainability factor introduced in the 2013 reform linked life expectancy to the amount of the initial pension and its entry into force had been postponed to 2023.

This mechanism has been replaced by the **Intergenerational Equity Mechanism**, a special-purpose social contribution of 1.2 pp (1 pp payable by the company and 0.2 pp payable by the worker), which will be accumulated in the Reserve Fund to compensate for mismatches between contributory revenue and expenditure. This new contribution will gradually rise from 0.6% in 2023 to 1.2% in 2029, after which it will remain at that level. The measure is recorded in AIReF's projections as an annual increase in the weight of social contributions of 0.4 points of GDP, irrespective of whether it is used to reduce the deficit or is accumulated in the Reserve Fund. In addition, apart from the schedule of financial contributions and disbursements to the Reserve Fund, it would result in lower debt for the GG as a whole of 11 points of GDP in 2050.

The new **incentives to raise the effective retirement age** include, among other measures, revising the coefficients applicable to early and delayed retirement and the possibility of replacing the increase in pension with a single payment at the time of delayed retirement.

The reform of the **early retirement system** generates a higher penalty than the previous system when individuals decide to bring forward retirement between 21 months and 24 months or between 3 months and 1 month, while these retirements become more favourable in the other cases. For contribution careers over 44 and a half years, there is only a disincentive for bringing forward the three months immediately before the normal retirement age. The coefficients applicable to early retirement are determined on the basis of the number of months (rather than the number of quarters) in which retirement is brought forward and the contribution career. If it were assumed as a simplification that the entire population decides to postpone their retirement for three months, the impact on expenditure would be a reduction in the rate of growth of pensions in the early years of between 0.1 and 0.2 points. This impact would fade in the long term due to the increase that this would cause in the average pension. Given the incentive structure of the Law, the estimate is considered an upper limit for the impact of this measure. Accordingly, the measure does not have a significant effect on long-term pension expenditure.

Following the reform, the coefficients applicable to **delayed retirement** are calculated on a full-year basis, as was the case before the reform. However, the same additional percentage is applied for each year of delayed retirement instead of this being calculated on the basis of the contribution period. This percentage rises to 4% per year of delay. In addition, the reform prohibits forced retirement through collective bargaining agreements at ages below 68. AIReF's baseline scenario assumes that 30% of workers decide to delay their retirement compared with 6% at present. In order to define this scenario, AIReF has taken into account the experience of previous increases in incentives and the information contained in the regulatory impact analysis report of Law 21/2021 based on a survey conducted by the Ministry of Inclusion, Social Security and Migration, which showed that only 25% of workers stated that they were freely able to postpone access to retirement. For the single payment option, this survey indicated that almost twice as many individuals would "certainly" or "very likely" decide to delay their retirement if offered a single payment instead of an increase in the average pension [38]. All of the above

38 The survey indicated that about 30% of people would certainly delay retirement to take up the single payment option and almost 20% would almost certainly delay. Considering a probability that 90% of those who answered that they would certainly delay comply with the answer and 25% for those who answered that they would almost certainly delay gives the 30% included in AIReF's baseline scenario.

would result in an increase in the average effective retirement age of approximately 1 year. Under these assumptions, the new incentives to delay retirement represent a saving of 0.8 points of GDP in 2050 and 1.1 in 2070. However, these results crucially depend on the assumptions about the change in the behaviour of workers and companies. As sensitivity analyses, alternative scenarios are defined based on different assumptions of agent behaviour in reaction to regulatory change. The impact of these expenditure simulations shows that in 2050, pension expenditure may fall by between 0.2 points in the case in which only 10% delay their retirement to just over 1.5 points of GDP in the case in which over 55% do so. In addition, it should be noted that the effect of doing so with an increase in the pension or a single payment is subsidiary.

With these measures, which aim to bring the effective age closer to the statutory age, influenced by labour market developments characterised by increased labour shortages, the average effective retirement age would rise by an additional 0.8 points between 2050 and 2070. This increase in the effective age is in addition to that caused by the 2011 reform, which modified the ordinary legal age. These changes not only directly affect pension expenditure, but also determine labour market participation rates, affecting GDP growth.

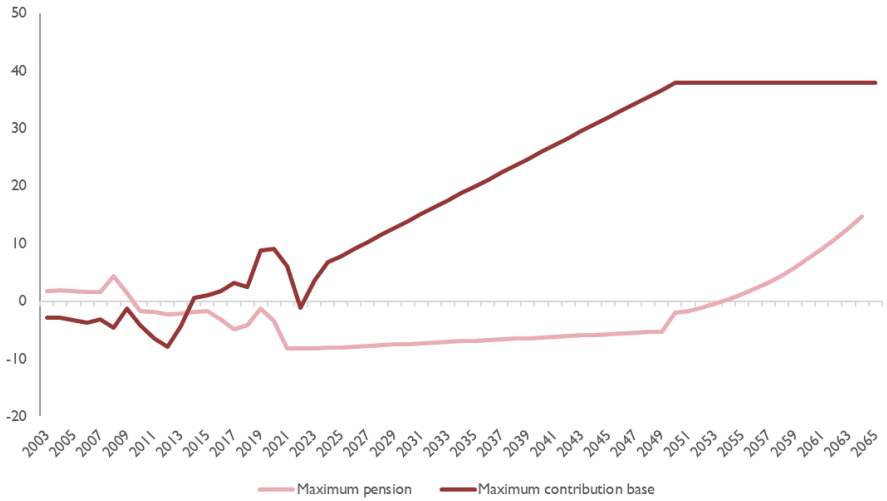
The reform of the **contribution system for self-employed workers** establishes a new contribution system on the basis of their real income, with a transitional system between 2023 and 2032. The amendments will be neutral as approved in the transitional regime, but would increase revenue by 0.5% of GDP after the end of the transitional period. The analysis of the measures adopted for the transitional period shows that the reform will keep revenue at a similar level to the current level. As the other stages of the transitional system are defined, AIReF will assess their possible short-term impact on the deficit. From 2032, once the transitional system ends, AIReF assumes that self-employed workers will contribute according to their declared income. This would result in an increase in structural revenue of 0.5 points of GDP with the current income structure and including the potential surfacing of the underground economy resulting from increased cross-checking of information between the Tax Agency and the Social Security system.

A **path of increases in the maximum contribution bases** between 2024 and 2050 is established based on the CPI plus an annual fixed amount of 1.2 pp, while the **initial maximum pension** will be increased on the basis of the CPI plus an additional increase of 0.0115 pp until 2050. The

evolution of the maximum contribution bases at a rate higher than the maximum pensions would lead to a reduction in expenditure of 0.4 points of GDP compared with the alternative of the maximum pension growing at the same rate as the maximum contribution bases. In this case, as wages rise at a higher rate than the maximum pension, the percentage of people receiving the maximum pension, and thus having their pension capped, increases. This increase results in a reduction in the average retirement pension, which is transferred to a lower average pension and a reduction in expenditure. In addition, the impact of increasing the maximum bases at the rate of the CPI plus 1.2 points compared with doing so only with the CPI would result in higher annual revenue amounting to 0.4% of GDP in 2050.

Between 2051 and 2065, the maximum pension will undergo further increases up to 20% in real terms, while the maximum contribution bases will grow with the CPI and, therefore, below wages[39]. On the one hand, the approved path of growth of the maximum pension is, on average, very similar to the growth in wages. Therefore, the impact on the average pension up to 2050 will remain almost unchanged in 2070. On the other hand, the weight of revenue from social contributions over GDP will fall as the number of workers with capped contributions due to the maximum contribution bases will increase.

FIGURE RE_3.2. EVOLUTION OF THE MAXIMUM PENSION AND THE MAXIMUM CONTRIBUTION BASE (CUMULATIVE INCREASE IN REAL TERMS, %)



39 In the macroeconomic scenario, an increase in wages equal to the CPI plus apparent labour productivity is assumed, which rises to 1.1% as from 2035. In addition, it is considered that there are no changes in the wage distribution.

The reform of the **calculation period for determining the initial pension** establishes that from 2043 the last 29 years of working life will be considered to calculate the regulatory base of the retirement pension, of which the worst 24 months will be excluded. Between 2026 and 2040, there will be a dual system in which new pensioners will have access to the most favourable regulatory base between the new system and the previous system, where the regulatory base was calculated on the last 25 years of working life. AIReF estimates that the impact of this increase in the **calculation period of the contribution careers** to 29 years to select the 27 best years in 2070 will stand at around 0.1 points. During the transitional period, the impact will be a slight increase in expenditure in 2040. In addition, the impact of filling women's gaps up to 100% for the whole period has been analysed and the impact is a very small change in the total average pension that does not result in a substantial increase in expenditure. The impact on the increase in minimum pensions above one level for 2027 will imply growth of around 5% per year in minimum pensions, a similar level to that set out in AIReF's baseline scenario. The impact on spending would therefore be limited

The 2023 reform also includes the so-called **"solidarity contribution"**, an additional contribution on income from work that exceeds the maximum contribution base. The contribution will be 5.5% on the part of the remuneration between the maximum contribution base and 10% above the maximum contribution base, 6% on the part of the remuneration between 10% and 50% above the maximum contribution base, and 7% on the remuneration more than 50% above the maximum contribution base. This additional contribution will gradually increase between 2025 and 2045. AIReF estimates that the measure would raise social contributions by 0.1% of GDP permanently once the transitional period has finished.

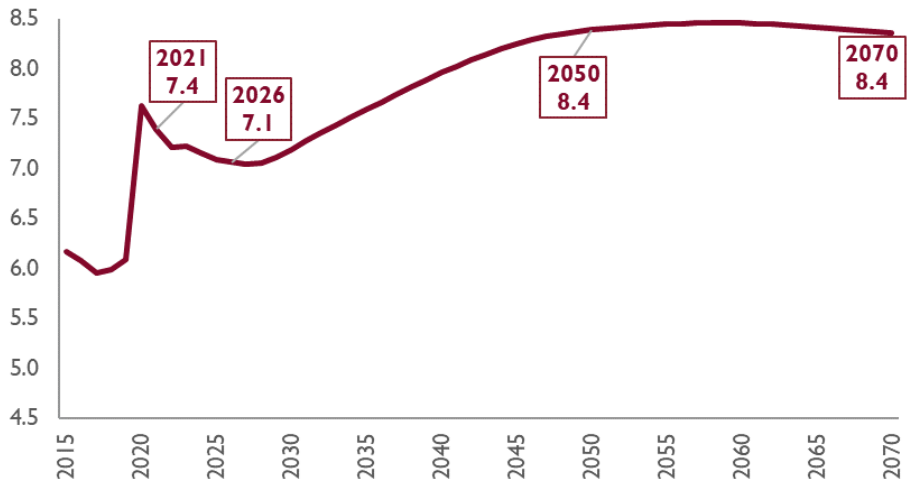
Finally, the reform establishes a **pension expenditure rule** that sets a limit on average pension expenditure at 15% of GDP between 2022 and 2050, offset by an average impact for the same period of the revenue measures from 2020 of 1.7% of GDP. If these limits are exceeded, the Government should take action and, if it does not, the IEM contributions would gradually increase to compensate for the deviation.

3.2.2. Healthcare

AIReF forecasts that healthcare expenditure will rise by 1.3 points of GDP between 2026 and 2050 and will remain unchanged until 2070. The evolution of healthcare expenditure over the long term

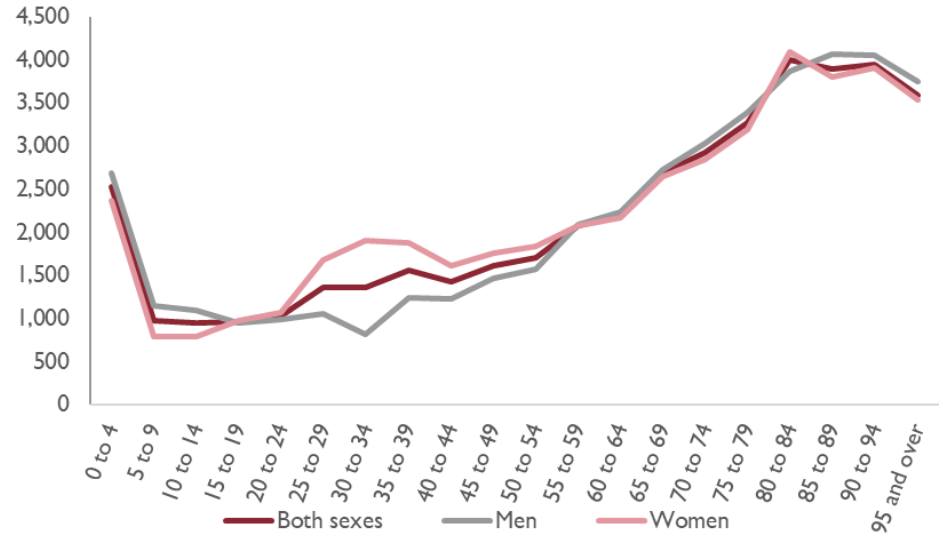
is based on a cohort model that projects the unit expenditure of each type of health expenditure (hospital, specialised, primary, pharmacy and other expenditure) by gender and age. The evolution of expenditure depends on the evolution of the population and the updating of unit expenditure. AIReF's model considers that unit expenditure rises with nominal GDP and introduces an income elasticity of 1.1. Until 2050, the increase in the age of the population due to the ageing of baby boomers raises the expected expenditure. However, as from 2050, spending begins to moderate, mainly due to the lower weight of the ageing population over the total. The evolution of expenditure is aligned with the estimate in AR2021 (see Box 4 Comparison with AR2021).

FIGURE 31. EVOLUTION OF HEALTHCARE EXPENDITURE (% GDP)



Source: IGAE and AIReF

FIGURE 32. HEALTHCARE EXPENDITURE BY AGE AND GENDER (€)



Source: Ministry of Health and AIReF.

Healthcare expenditure will be subject to additional tensions on top of the demographic ones that are being identified in the Healthcare Spending Reviews carried out by AIReF[40]**.** The need to incorporate new innovative medicines, the treatment of new pathologies, the expansion of the portfolio of services, the acquisition of new diagnostic equipment, the generational replacement of health workers, the strengthening of the professional career, new recruitment methods and remuneration aspects are, among others, important challenges that the public health system will have to address and that will have an impact, beyond demographics, on the evolution of health expenditure [41].

[40] See the complete set of findings and proposals in the field of pharmacy and healthcare capital equipment at: https://www.airef.es/wp-content/uploads/2020/10/HEALTH/PDF-WEB-Hospital-cost-of-SNS.pdf

41 In the same vein, analyses carried out by the OECD for a wide range of countries suggest that demographic factors play a comparatively minor role in explaining the increase in health expenditure. Noteworthy among these factors, on the demand side, is the possibility of healthcare improvements that enable health gains at older ages, but also the time until death – where a high proportion of expenditure is concentrated – particularly in the last year of life. From a supply perspective, it highlights the role of technological advances and the manner in which healthcare services are organised and delivered. See C. de la Maisonneuve, J. Oliveira Martins Public spending on health and long-term care: a

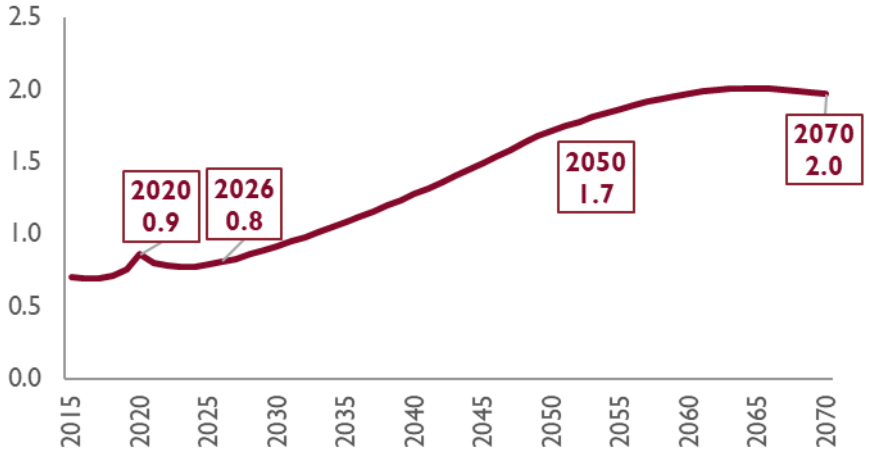
3.2.3. Long-term care

AIReF forecasts that expenditure on long-term care will rise by 0.9 points from 2026 to 2050 and increase by a further 0.3 points from 2050 to 2070. The evolution of long-term care expenditure depends on the evolution of the population, the updating of unit expenditure and the number of beneficiaries. AIReF estimates long-term care expenditure with a cohort model in which the unit expenditure profile - by gender and age - of the care beneficiaries is combined with the evolution of the probability of being a beneficiary of such services over time. The unit cost evolves with GDP and an income elasticity of 1.1 converges to unitary in 50 years. The probability of being a beneficiary converges to the level proposed in the approved plans. The probability of being a beneficiary is combined with AIReF's demographic projections to obtain a number of beneficiaries by age group and gender over time. This is used to project the estimated unit expenditure. In recent years, expenditure has started to moderate due to the relative rejuvenation of the population[42]. The change in expenditure is aligned with that estimated by the AR2021 (see Box 4 Comparison with the AR2021).

new set of projections. OECD Publishing, Paris (2013); Meijer, B. Wouterse, J. Polder, M. Koopmanschap. The effect of population aging on health expenditure growth: a critical review. European Journal of Ageing, 10 (4) (2013), pages 353-361

42 The increased participation of women in the labour market could push this expenditure even higher, as many women now take on this role on an unpaid basis.

FIGURE 33. EVOLUTION OF LONG-TERM CARE EXPENDITURE (% GDP)

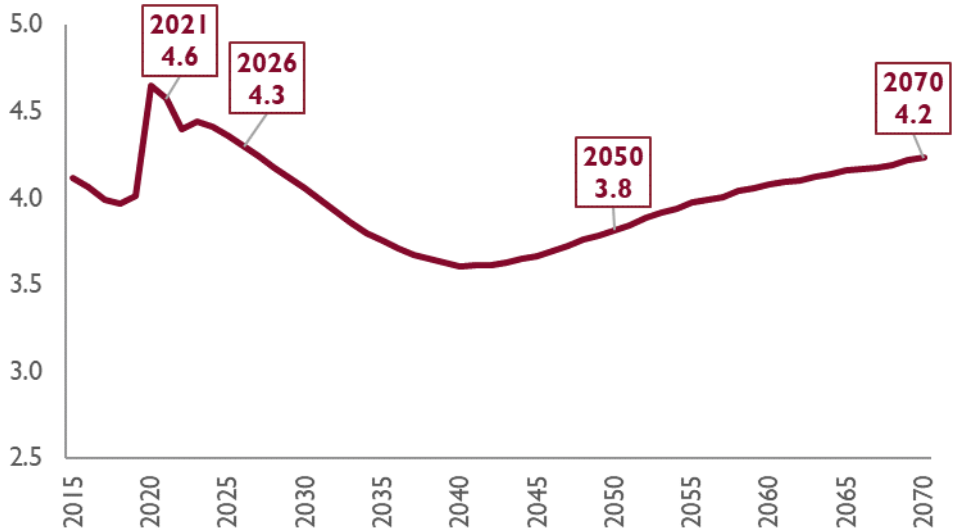


Source: IGAE and AIReF

3.2.4. Education

AIReF forecasts that spending on long-term education will fall by 0.5 points from 2026 to 2050 and then rise by 0.4 points from 2050 to 2070. The evolution of spending on education over the long-term is also estimated using a cohort model in which the unit expenditure is estimated in the base year for each level of education and the probability of enrolment, also for each level, for the projection period. These probabilities evolve in a manner consistent with the labour market participation rates included in the macroeconomic scenario, which is especially relevant for higher education. The number of students per educational level over time is obtained from the probabilities of enrolment and demographic projections, while unit expenditure by education level evolves with nominal GDP. AIReF's model includes an assumption of an increase in the enrolment rate for the 0-3 age group. The low birth rates of the demographic projection cause a reduction in education expenditure up to the end of the 2040s. From then on, the slight increase in the birth rate, together with the increase in school enrolment of children from 0 to 3 years of age, cause an upturn in expenditure in the last years. In this case, the evolution of education expenditure differs from that estimated by the AR2021 in the period 2050-2070 (see Box 4 Comparison with the AR2021).

FIGURE 34. EVOLUTION OF EXPENDITURE ON EDUCATION (% GDP)



Source: IGAE and AIReF

BOX 4. COMPARISON WITH THE AR2021

The AR2021 has a reference year of 2019, which does not include the impact of the pandemic on the structural expenditure of certain components of ageing, especially healthcare and education. Therefore, AIReF's estimates for expenditure on healthcare, long-term care and education will be compared with those of this report by measuring the increase determined by the AR2021 and AIReF with respect to 2025, the first year with data for after the pandemic that the AR2021 publishes. For pension expenditure, the level of expenditure in points of GDP will be compared.

TABLE RE_4.1. COMPARISON OF PENSION EXPENDITURE

	2050		2070	
	AR 2021	AIReF	AR 2021	AIReF
PENSIONS				
AIReF Baseline Scenario. Pensions. CPI without SF	16.5	16.2	13.9	13.9
Pensions, PRI without SF	13.8	13.0	11.5	11.3
Pensions, CPI and SF	15.7	15.1	12.7	12.5
Pensions, PRI and SF	13.0	12.5	10.3	11.2

The AR2021 estimates that pension expenditure will reach 13% of GDP in 2050 and 10.3% in 2070. It should be noted, however, that the European exercise follows the constant legislation principle. Therefore, the baseline scenario of the forecasts for Spain assumes that pensions are increased in line with the PRI and application of the sustainability factor for new pensions as from 2023. Under these assumptions, AIReF considers expenditure of 12.5 in 2050, 0.5 points lower than that of the AR2021. This is because AIReF's scenario includes the impact of the reforms approved since the publication of the report. However, in 2070, AIReF estimates expenditure that is 0.9 points higher than the European exercise. The reason for this is that AIReF's exercise includes the compensation of improper expenses, and in the scenario in which both the PRI and the sustainability factor had been applied, the PRI would be positive from the end of the 1950s and pensions would begin to be increased above 0.25.

The AR2021 includes two alternative scenarios for Spain with the aim of reflecting the reality of the policies in force at the time of its publication. In the first of these scenarios, pensions are increased with the CPI, with expenditure over GDP reaching 15.7% in 2050 and 12.7% in 2070, 0.6 points higher than estimated by AIReF in both cases. In

the second scenario, the sustainability factor is not applied, resulting in expenditure of 13.8% of GDP in 2050, 0.8 points higher than estimated by AIReF and 11.5% in 2070[43], 0.2 points higher than estimated by AIReF.

If the impact of the two measures is considered additive, the AR2021 estimates that in the case of raising pensions in line with the CPI and not applying the sustainability factor, expenditure on pensions would be 16.5 in 2050 and 13.9 in 2070, 0.3 points higher than the AIReF baseline scenario in 2050 and similar in 2070. It is important to bear in mind that the AR2021 estimates did not take into account the price increase that occurred in 2022 or the measures approved since the publication of the report.

TABLE RE_4.2. COMPARISON OF EXPENDITURE ON HEALTHCARE, LONG-TERM CARE AND EDUCATION

	2050		2070	
	AR 2021	AIReF	AR 2021	AIReF
OTHER EXPENDITURE (*) (**)				
Healthcare	1.1	1.3	1.1	1.3
Long-term care	0.5	0.7	0.7	1.0
Education	-0.4	-0.5	-0.3	-0.1

(*) Comparison made in increases in the projection horizon

(**) The estimate of the series increases is made with respect to 2025

Source: AR2021 and AIReF

AIReF estimates health expenditure with a model similar to that of the AR2021, with the difference that the AR2021 includes in its baseline scenario an improvement in morbidity. It considers that the increases in life expectancy are associated with health improvements in older ages, although the empirical evidence is not entirely conclusive[44]. It is for this reason that the AR2021 considers an increase in health expenditure that is 0.2 points lower, both until 2050 and until 2070.

In the case of long-term care, the increase in expenditure estimated by the AR2021 is 0.2 points and 0.3 points lower in 2050 and 2070. The main difference in the starting assumptions is that AIReF considers

[43] Ageing Report 2021, Country Fiche for Spain

https://economy-finance.ec.europa.eu/document/download/a089d0b9-5dac-4a52-8e86-d3f6e473d008_en?filename=es_-_ar_2021_final_pension_fiche.pdf

[44] E.M. Crimmins, Y.S. Zhang, J. Ki Kim, M. Levine. Chapter 19 - Trends in morbidity, healthy life expectancy, and the compression of morbidity. Handbook of the Biology of Aging (Ninth Edition), 2021, Pages 405-414

that there will be an increase in beneficiaries in the baseline scenario. In addition, the fact that a major part of care for people with disabilities is not accounted for in official statistics, as it is mainly carried out informally by women within households, this poses an upside risk in this component. This is due to the fact that the projections incorporate a significant increase in women's participation in the labour market, although it is difficult to quantify.

Finally, in education expenditure both the AR2021 and AIReF estimate a reduction in spending in 2050 (by 0.4 points in the AR2021 and by 0.5 points for AIReF) and a certain upturn in spending between 2050 and 2070. However, AIReF considers that the increase will be larger as it includes a convergence of enrolment rates of children under 3 years of age and university students higher than that considered in the AR2021.

3.2.5. Interest

3.2.5.1 Recent evolution and dynamics of interest

Despite the high level of debt, interest expenditure has fallen in recent years due to favourable financing conditions. The evolution of interest expenditure is directly related to both the accumulation of debt and its financing conditions. In the last quarter century, three distinct periods can be distinguished in the dynamics of both factors, which have determined the evolution of the financial burden:

- In the 1990s to the mid-2000s, there was a period of stable debt together with a significant and continuous fall in interest rates. This led to a sharp fall in the financial burden, both in absolute terms and as a percentage of GDP and revenue. The financial burden went from 5% of GDP in 1996 to 1.6% in 2006, reducing the implicit rate of the debt from 8.7% to 4.1% in the same period.

FIGURE 35. PUBLIC DEBT AND INTEREST (€ BN)

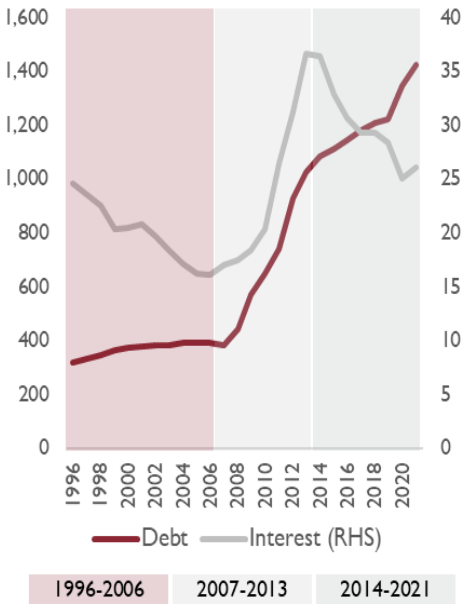
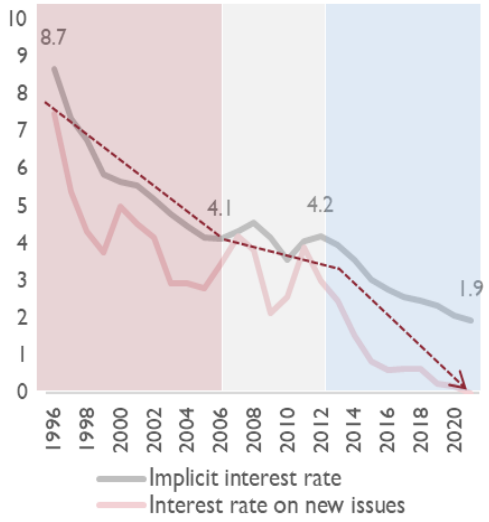


FIGURE 36 IMPLICIT INTEREST RATES AND NEW ISSUES (%)



Source: Refinitiv, Bank of Spain, IGAE, Treasury and AIReF

- Following the financial crisis of 2007 and the Great Recession of the following years, debt began a period of sharp growth with an upturn in yields that led to a considerable increase in interest expenditure to 3.6% of GDP in 2013. However, the implicit rate remained relatively stable at around 4% over this period.

- The European Central Bank's forceful action to support the euro in the wake of the sovereign debt crisis in 2012 marked the start of a period of sharp falls in yields and spreads on European sovereign debt to historic lows. This led to a reduction in the financial burden despite the fact that debt has continued to grow at a good pace. At the end of 2021, the average cost of new Treasury issues and the implicit rate on debt were at record lows of 0% and 1.9% respectively, helping to stabilise interest expenditure at 2.2% of GDP.

FIGURE 37. YIELD ON SPANISH PUBLIC DEBT (1, 10 AND 30 YEARS)

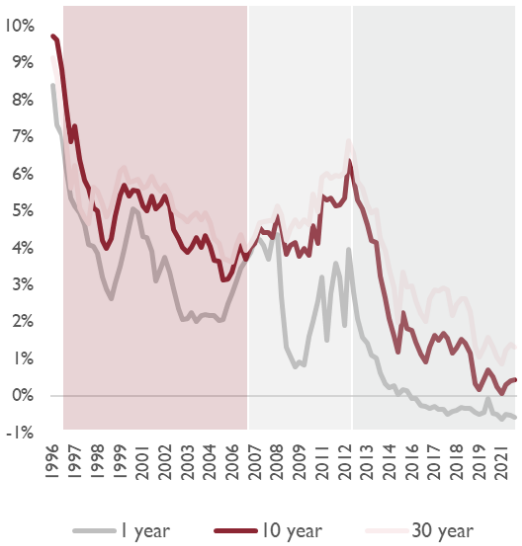
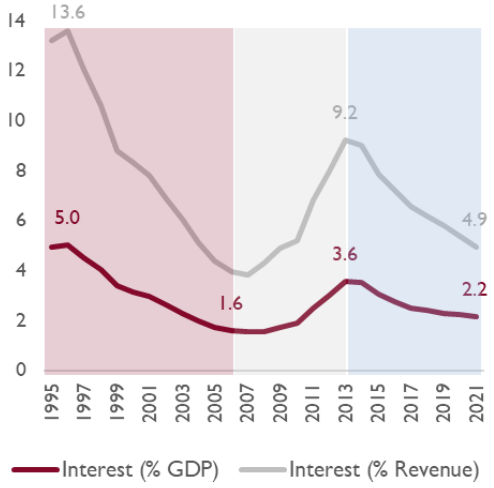


FIGURE 38. EVOLUTION OF THE FINANCIAL BURDEN (% OF GDP AND % OF REVENUE)



Source: Bank of Spain, IGAE, INE, AIReF

2022 has marked a turning point in the evolution of debt financing costs. The low interest environment of recent years turned sharply in 2022, when central banks around the world had to react with historic rate hikes in an attempt to curb much higher and more persistent inflation than initially expected. Debt markets have quickly incorporated this scenario with year-to-date rises of more than 250 basis points across all segments of the yield curve. This scenario of high inflation and a sharp increase in rates has passed through to market expectations for the coming years, with expected increases in interest rates there are more pronounced in the short term, resulting in a significant flattening of the curve.

3.2.5.1 Long-term projection

The sustainability of public finances will largely be determined by the evolving capacity to meet the financial burden of debt. In this regard, the starting point of this projection exercise places the financial burden in relation to GDP and revenue in a favourable situation, with historically low values (2.2% and 5% respectively) and not far from the minimum level prior to the financial crisis.

The average cost of debt will remain contained over the projection horizon despite some tightening of financial conditions in the short term. The gradual normalisation of monetary policy towards positive interest rates against a backdrop of intensifying inflationary pressures is leading to some deterioration in financing conditions, thus raising the cost of sovereign debt issuance. In the coming years, a relatively rapid return is expected from the low of 0% recorded in 2021 to average rates for new issues of 3%. In the medium and long term, the average cost of new issues is projected to gradually increase to 3.6% in 2070. This evolution in interest rates will generate a turning point in the average total cost of debt, which will begin an upward path from the low of 1.9% to approximately 3.8% in the long term[45].

FIGURE 39. PROJECTION AVERAGE ISSUE RATE AND IMPLICIT RATE

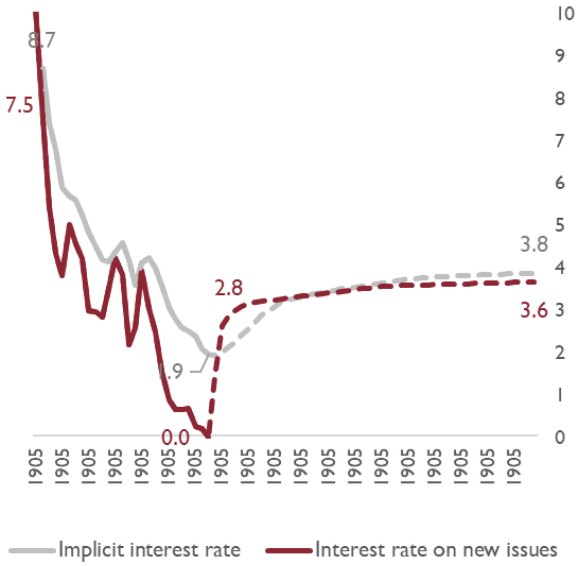
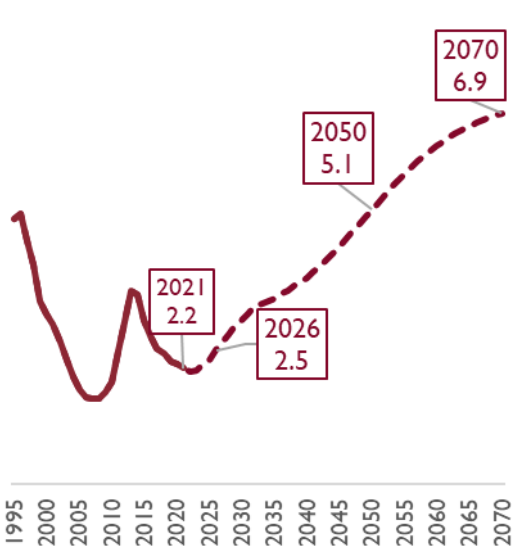


FIGURE 40. PROJECTION OF INTEREST EXPENDITURE (% GDP)



Source: AIReF

The high initial level of debt added to unbalanced public accounts will generate an unfavourable trend in the financial burden even in a scenario of containment of the cost of debt. Interest expenditure in relation to GDP will gradually and steadily rise from 2.2% of GDP to around 7% in the

45 See Box 3 for further details

long-term. AIReF forecasts an increase in interest of 2.6 points from 2026 to 2050 and a further 1.8 points from 2050 to 2070.

The future evolution of interest rates will have a major impact on the sustainability of public finances. Section 6 analyses the sensitivity of the interest burden and the debt ratio to different scenarios of changing financing conditions.

BOX 5. PROJECTED COST OF DEBT

The evolution of the cost of debt will depend on the following factors:

1) The average rate at which the debt to be repaid was issued

2) Net borrowing and the issuance strategy

3) The future evolution of the sovereign debt yield curve

Characterisation of the initial debt portfolio

In order to calculate the evolution of the cost of debt, it will be necessary to characterise the maturity profile of the initial portfolio and the interest rates at which the debt maturing at any given time was issued.

FIGURE RE_5.1. MATURITY PROFILE OF PUBLIC DEBT

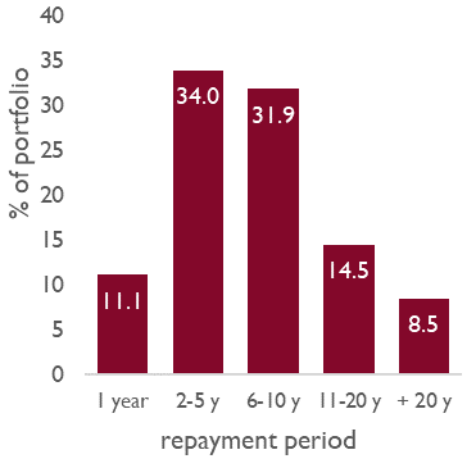
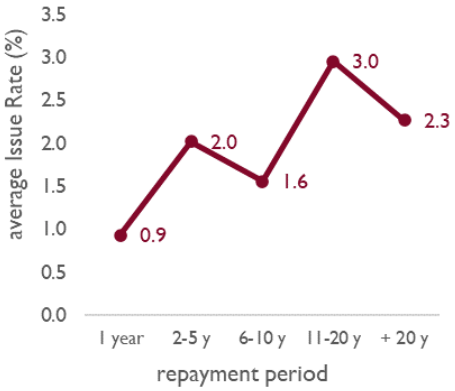


FIGURE RE_5.2. AVERAGE ISSUE RATE BY REPAYMENT PERIOD



Source: Public Treasury and AIReF

Net borrowing and issuance strategy

Net borrowing each year will be the sum of the maturities and net issuance (public deficit).

As for the issuance strategy, it is assumed that the new debt will be issued at different maturities replicating a similar term structure to the current one, with an average maturity of 7.5 years.

FIGURE RE_5.3. NET ISSUANCE: TOTAL BALANCE (% GDP)

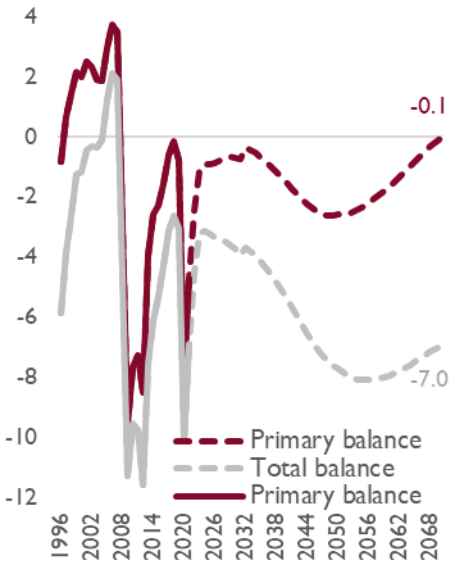
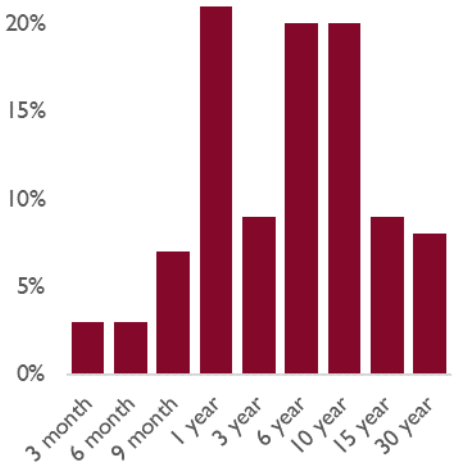


FIGURE RE_5.4. ISSUANCE STRATEGY (WEIGHT AT EACH MATURITY, %)



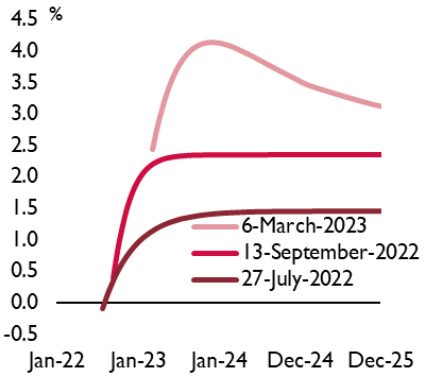
Source: Public Treasury and AIReF

Forecast of yield curves

The average interest rate of future issuance will depend on the evolution of

the rate curve, together with the issuance strategy. In the short term, the tightening of monetary policy is expected to continue with further rate hikes in response to high inflation, which will cause an upturn in the short segment of the curve in line with the expected rises in the ECB's official rates.

FIGURE RE_5.5. EXPECTED DEPOSIT FACILITY RATE OF THE ECB DISCOUNTED (*)

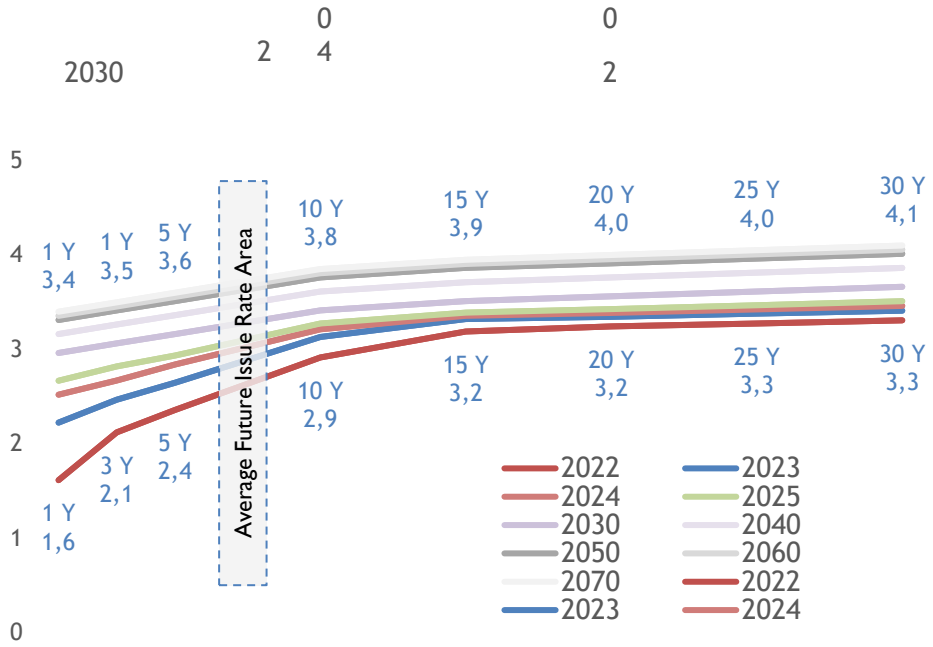


Source: Refinitiv and AIReF

(*) Through the instantaneous forward curve of the OIS

The scenario of high and persistent inflation coupled with a sharp increase in sovereign debt rates has passed through to market expectations for the coming years, with expected increases in more pronounced yields in the short term, resulting in a significant flattening of the curve. In the longer term, the curve is projected to rise slightly in parallel until it reaches a range from 3.4% to 4.1% in 2070 in the baseline scenario.

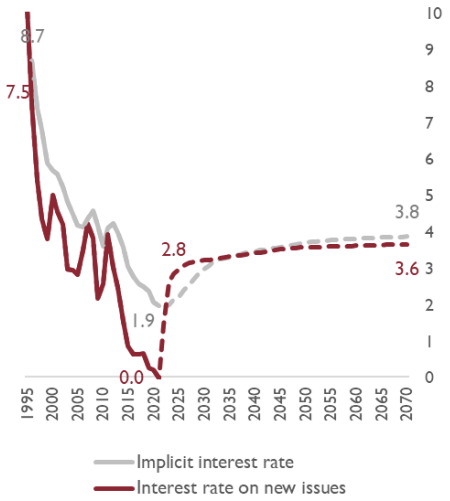
FIGURE RE_5.6. FIGURE RE_4.6. DEBT YIELD CURVE, CURRENT AND FUTURE PROJECTION TO 2070



Source: Refinitiv and AIReF

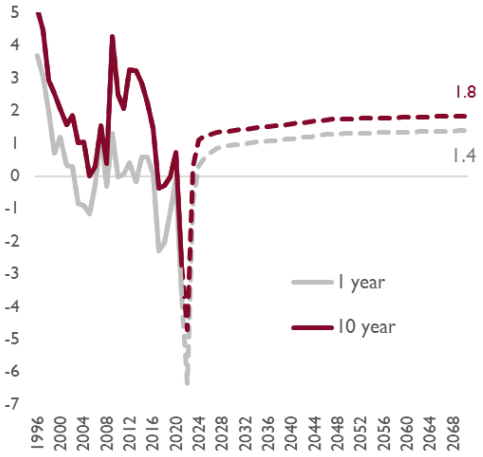
This evolution of the curve, following a 7.5-year issuance strategy, will give us an average issuance rate that will rise considerably from its minimum value of 0% in 2021 to 3% in the coming years and that will slowly converge to 3.6%, raising the implicit rate from 1.9% to 3.8% in the long term.

FIGURE RE_5.7. PROJECTION AVERAGE ISSUE RATE AND IMPLICIT RATE



Source: AIReF

FIGURE RE_5.8. PROJECTION OF THE REAL ON 1- AND 10-YEAR BOND YIELD



Source: AIReF

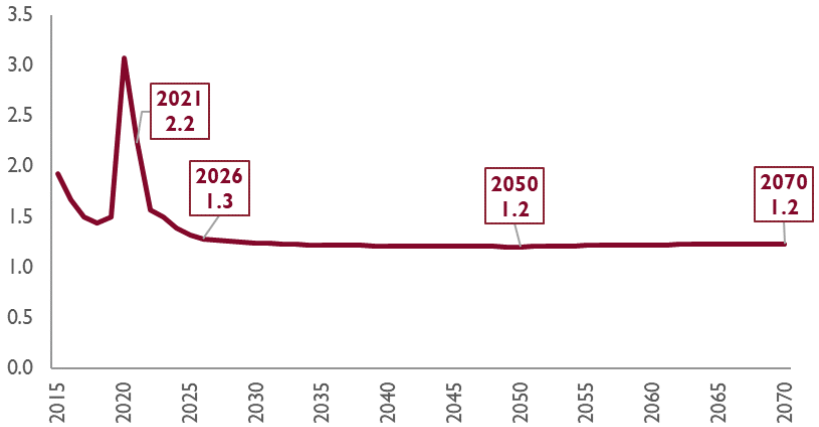
The issuance strategy will have a more limited impact over time as the slope of the yield curve decreases and the rates stabilise at their long-term values.

In real terms, interest rates are expected to continue rising to more "normal" levels as the ECB moves forward with the normalisation of monetary policy. The projected evolution of nominal interest rates together with inflation expectations stabilised at 2% will mean a return of real rates to positive territory, although at historically low values, placing the real yield at one and ten years at 0.7% and 1.3% in the middle of the decade, and at around 1.4% and 1.8% in the long term.

3.2.6. Unemployment

AIReF forecasts that unemployment expenditure will fall by 0.1 points of GDP from 2026 to 2050 and will remain unchanged from 2050 to 2070. In the long term, unemployment expenditure is projected using a model that takes into account both the increase in the average benefit through the evolution of the CPI, and the volume of benefits through the evolution of the unemployment rate. This model results in a slight decrease in its weight over GDP in the early years of the projection and a subsequent stabilisation. The absence of economic cycles in the projection results in a stable path of expenditure in this item that plays a very relevant role as an automatic stabiliser in the presence of cycles.

FIGURE 41. EVOLUTION OF UNEMPLOYMENT EXPENDITURE



Source: SEPE and AIReF

3.2.7. Other expenditure

AIReF's estimates of other expenditure are that they maintain their weight over GDP from 2027 at 16% throughout the projection. This group of expenditure items includes some such as defence and environmental expenditure on which a commitment to a progressive increase over time has been expressed at different times. However, as the timing and the specific measures that would support these increases are not specified, AIReF chooses to keep them with the same GDP weight. In order to be able to measure the impact that an increase in these expenditure items would have without compensating for it with the decrease in others or a similar increase in revenue, a sensitivity scenario of the impact on debt of a 1-GDP point increase in expenditure is added in Section 5.

3.3. General Government Balance

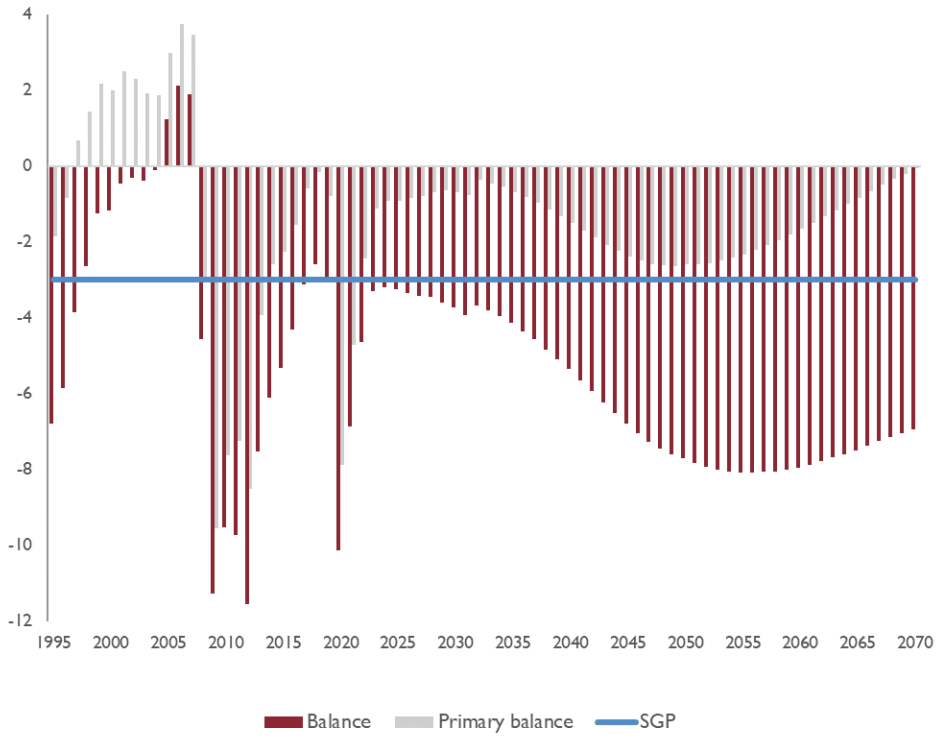
AIReF estimates a reduction in the public deficit to 3.3% of GDP in 2026. In the medium term, AIReF's forecasts included in the Report on the Main Budgetary Lines and Draft Budget of the General Government for 2023 represent a progressive reduction in the deficit from 6.9% of GDP recorded in 2021. Consequently, the medium-term forecasts, once the main economic effects of the pandemic and the energy crisis and the war in Ukraine have been overcome, would still end with a deficit of more than the 3% marked by the Stability and Growth Pact. This reduction in the deficit, to 3.2% in 2025, is mainly based on the phasing out of measures to mitigate the effects of successive crises. However, in 2026, the estimated deficit rises by 0.1 points due to the increase in interest expenditure.

The GG deficit would rise to reach a high of 8.1% of GDP in 2055 and then fall to 7% in 2070 in AIReF's baseline scenario. As a result of the baseline evolution of revenue and expenditure, the deficit would start to grow from the first year of the projection in the absence of additional measures. This growth would begin to accelerate from 2030 as a result of the intensification of the ageing of the Spanish population. The primary balance would be negative throughout the projection period, reaching a minimum of -2.6% of GDP in 2049 and subsequently starting an upward path to -0.1% in 2070. As economic cycles are not included in the long-term scenario, this deficit would be entirely structural.

This baseline scenario could only materialise in the absence of any budgetary constraints and a European and national fiscal framework. At this point, it is worth recalling the features of the baseline scenario on a no-policy change basis as it excludes discretionary measures that different governments may adopt year by year, both on the revenue and expenditure side, to mitigate the increase in the structural deficit. Moreover, this deficit path is incompatible with any fiscal framework. Although they are not known at this time, it is

foreseeable that, as has been observed in the past, governments will adapt their behaviour to the budgetary restriction and the fiscal framework that is in force at any given time.

FIGURE 42. EVOLUTION OF DEFICIT AND PRIMARY DEFICIT



Source: IGAE and AIReF

4. SUSTAINABILITY OF PUBLIC DEBT

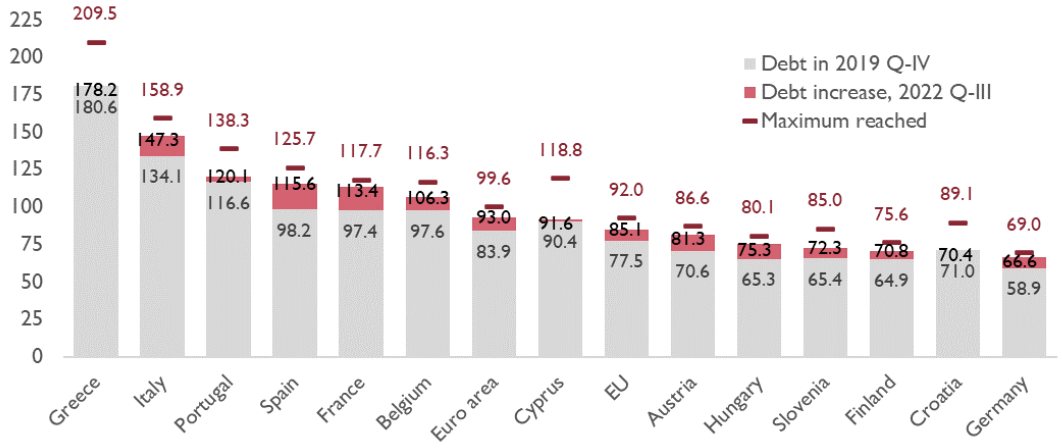
4.1. Historical evolution

The level of public debt in the Spanish economy has reached records not previously seen in peacetime. In just two decades, we have witnessed three extreme crises, first the financial crisis, then the health crisis, and just as economies were starting to live with the coronavirus, Russia's invasion of Ukraine caused a global energy crisis. This succession of shocks has left a deep scar on the public debt levels of advanced economies since 2009, which had already been on an upward path over recent decades. Thus, the international financial crisis led to an increase in debt of close to 30 pp on average in advanced economies and of 70 pp of GDP in the case of Spain; subsequently, the COVID-19 crisis led to an increase of close to 10 pp in the euro economies and 18 pp in the case of Spain. Finally, the energy crisis has had little impact on debt levels, having been accompanied by high inflation and strong nominal growth.

The notable increases in debt observed in periods of recession are accompanied by some hysteresis or downward resistance in periods of expansion. When viewed from a historical perspective, the distribution of the annual change in the debt of advanced economies shows a long tail to the right.

This warns that, just as some extreme shocks have caused intense increases in debt, shocks of the opposite sign compensating these movements should not be expected. The impact of these asymmetric shocks adds to an underlying upward trajectory in most advanced economies. Periods of debt containment have generally been few and short.

FIGURE 43. DEBT (% GDP) OF EUROPEAN UNION COUNTRIES WITH MORE THAN 60% (2022 QIII)



Source:
Eurostat

In Spain, these movements are even more intense than those observed in the EMU average. In the euro area, public debt stands at around 95% of GDP in 2022, compared with 66% in 2007. Within this area, the Spanish economy has recorded one of the largest increases in debt levels (only behind Greece). In only a few years, it has gone from being one of the economies with the lowest levels of debt in the EMU (36% in 2007) to one of the countries with the highest levels (115.6% in September 2022). This change has far-reaching implications for the functioning of the economy.

The increase in public debt in Spain and other advanced economies has gone hand-in-hand with profound changes in the underlying behaviour of the economy. Demographic trends, low productivity growth or excess savings in some economies became a "new normal" in the pre-pandemic period characterised by the persistence of low growth rates, low inflation and a downward path of real equilibrium interest rates down to historic lows.

FIGURE 44. EVOLUTION OF PUBLIC DEBT (% GDP)

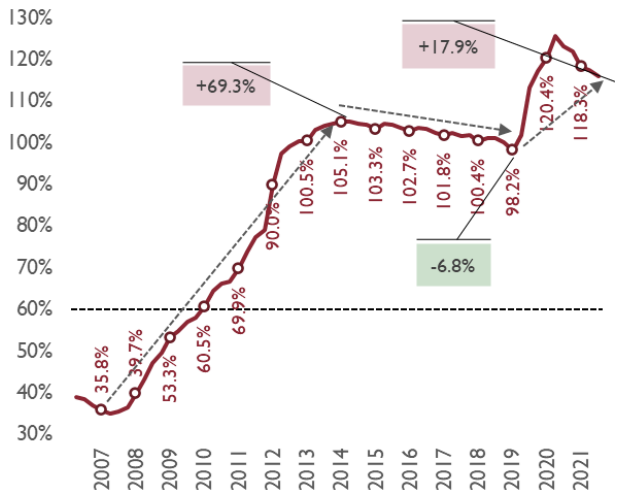
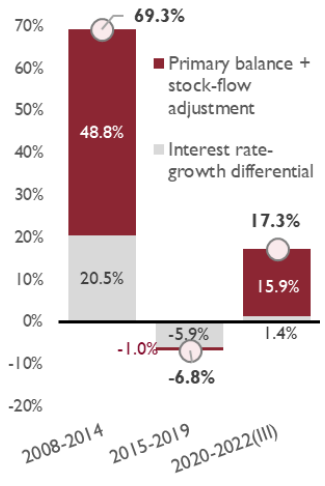
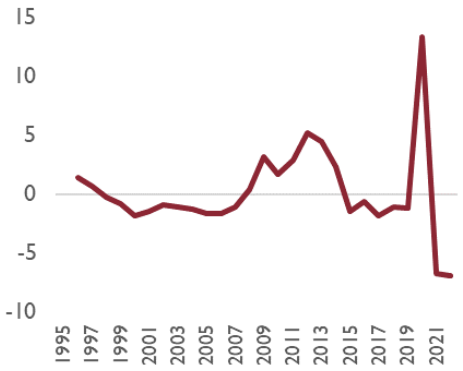


FIGURE 45. CONTRIBUTIONS



Source: Bank of Spain and AIReF

FIGURE 46. INTEREST-GROWTH DIFFERENTIAL, CONTRIBUTION TO THE CHANGE IN DEBT (GDP POINTS)



This scenario was reflected in market interest rates that came to stand at negative values in many economies. This was reflected in a favourable trend in the debt ratio through the negative differential between interest rates and economic growth. This led to questions as to whether the parameters by which debt sustainability was traditionally assessed were still valid in this new context, despite the high levels of accumulated indebtedness.

Source: AIReF

The new monetary cycle, with the rapid and intense tightening of financing conditions, together with the high level of existing debt, places the sustainability of public finances at a highly vulnerable starting point. The evolution of inflation, which is higher and more persistent than initially anticipated by central banks, has made it necessary to intensify the restrictive monetary policy stance. This has led to sharp upturns in global sovereign debt yields and in financing expectations for the coming years. This new interest rate environment implies a major vulnerability in the sustainability of public finances, given the increasing volume of debt that, according to AIReF's estimates, will have to be refinanced at significantly higher rates, as described in the following section.

4.2. Long-term projections

AIReF projects an unfavourable evolution of the debt-to-GDP ratio in the medium and long term. Based on growth projections, fiscal variables and interest rates, it is estimated that the debt ratio will reach 186% in the long term.

FIGURE 47. DEBT (% GDP)

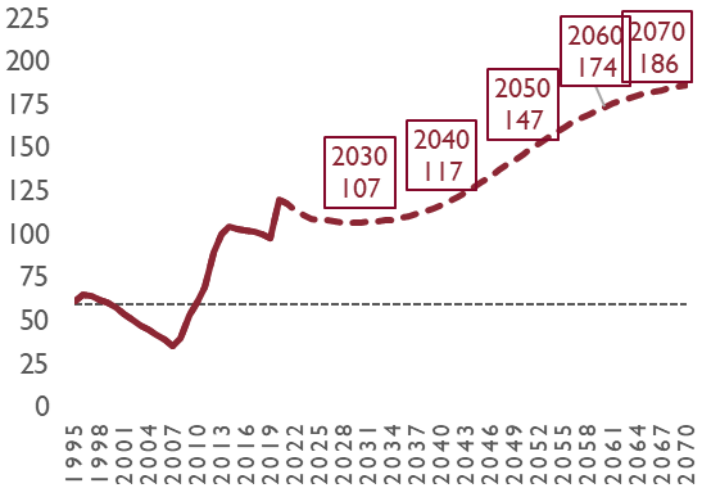


FIGURE 48. INTEREST (% GDP)

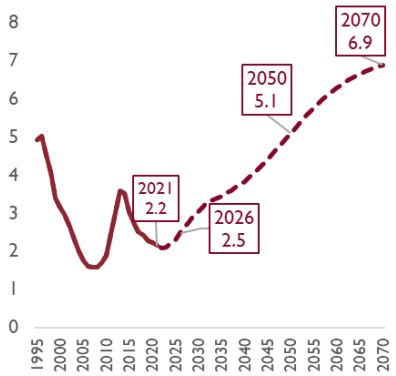
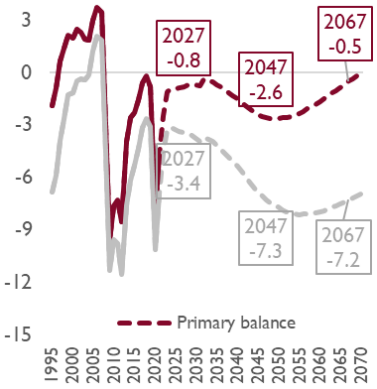


FIGURE 49. PUBLIC BALANCE (% GDP)



Source: AIReF

Throughout the present decade, debt dynamics are relatively favourable. After the sharp increase in debt as a result of the pandemic, it is projected to fall by around 13 points of GDP over the decade. This reduction will be supported by strong nominal growth with a very significant contribution from the deflator. It is estimated that the greatest pace of reduction will take place over the next three years, with a subsequent slowdown and stabilisation at around 108% of GDP. The ratio will reach its lowest value at the end of the decade (107.2% in 2029), 9 points higher than before the pandemic (98.2% in 2019) ten years later.

FIGURE 50. CONTRIBUTIONS TO THE CHANGE IN DEBT (GDP POINTS), BY YEAR AND DECADE

FIGURE 50. A. BY YEAR

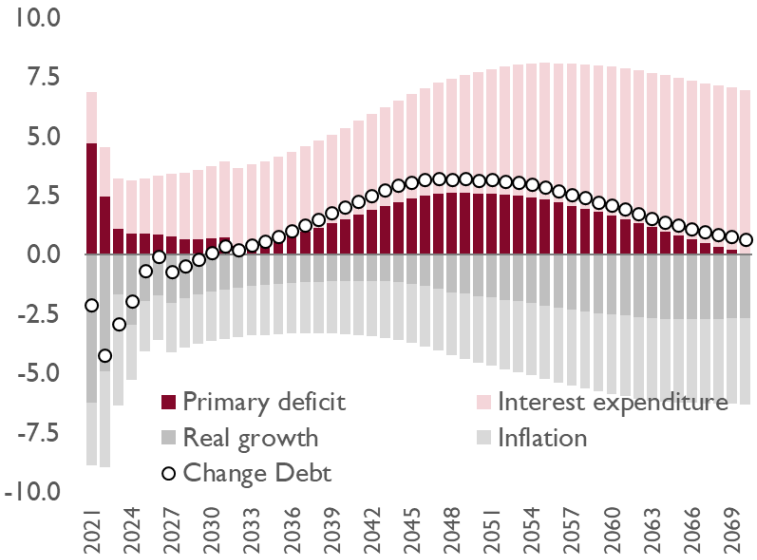
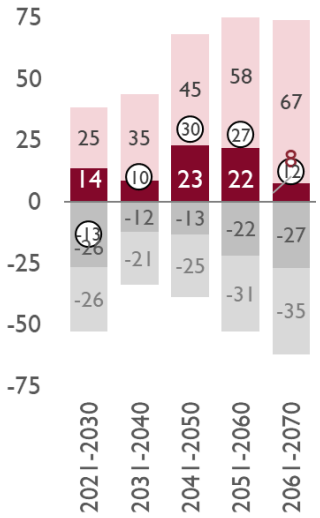


FIGURE 50. B. BY DECADE



Source: AIReF

The decade of the 2030s will mark a turning point in the evolution of the debt, returning to an upward path that will accelerate. The projected deterioration of the primary balance from 2030 onwards due to population ageing, together with stabilised nominal growth at 3% and a rising average debt interest rate, will result in a rapidly growing debt ratio that will accelerate over the following 15 years. The interest rate-growth differential ("snowball effect") will turn positive in 2034, thus exacerbating the dynamics of the ratio, which will require the generation of a primary surplus to stop its growth.

FIGURE 51. PROJECTION AVERAGE ISSUE RATE AND IMPLICIT RATE

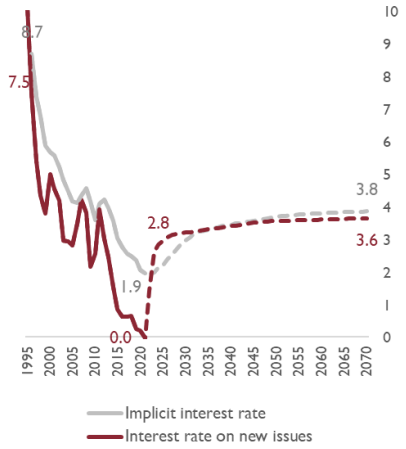
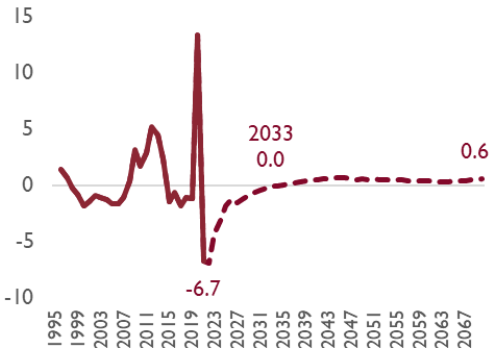


FIGURE 52. INTEREST-GROWTH DIFFERENTIAL, CONTRIBUTION TO THE CHANGE IN DEBT (POINTS OF GDP)



Source: AIReF

The largest increase in debt will take place in the 2040s. The high debt stock will represent an increasing financial burden even if the interest rates of new issues and the average rate of the portfolio stabilise at around 3.5%. As a result, interest expenditure as a percentage of GDP would rise from 3.8% in 2040 to 5.1% in 2050. This fact coupled with the deterioration of the primary deficit, that will reach its maximum by mid-century (2.6% in 2050), will generate an increase of 30 points in the ratio in ten years.

Despite the favourable evolution of the primary balance projected in the 2050s as a result of population dynamics, debt continues to accumulate at a high rate. The decline in expenditure associated with population dynamics fails to offset the increase in interest expenditure in the early years, with the total deficit peaking in the middle of the decade. The denominator effect will offset the worsening of the fiscal balance, and the net effect will be an increase in the ratio by 27 points.

At the end of the 2060s, the primary balance will be in balance, but still insufficient to halt the rise in the debt ratio. The high financial burden, which continues to rise to reach 6.9% of GDP, will contribute to the increase in the debt ratio, which starts to decelerate due to the improvement in the primary balance. In this decade, the ratio rises by 12 points, placing debt at 186% of GDP in 2070.

BOX 6. THE IMPACT OF CLIMATE CHANGE ON THE PUBLIC ACCOUNTS. THE ANALYSIS OF INDEPENDENT FISCAL INSTITUTIONS

Climate change is one of the main global challenges, which also applies to public accounts. European countries have committed to achieving net zero emissions by 2050, in addition to a series of intermediate targets. On the one hand, achieving the goal of net zero emissions requires a broad range of economic policies. These policies will lead to additional expenditure by the GG or a loss of revenue of sizes that are uncertain today. On the other hand, insufficient ambition on climate transition would entail significant macroeconomic and fiscal risks in the long run. So far, however, few institutions regularly assess the fiscal risks associated with climate transition.

Climate transition measures are defined as policies to reduce net greenhouse gas emissions. These measures can affect public finances through two channels: taxation and spending measures that can be used to achieve climate targets. The transitional measures have a direct, first-round impact associated with the budgetary impact of the revenue and expenditure measures adopted for the climate transition. In addition, these measures may entail a second-round impact through changes in the behaviour of companies and households, with a consequent additional impact on government revenue or expenditure. In this regard, regulatory measures with no apparent budgetary cost may also have a second-round effect on public finances insofar as they affect the behaviour of economic agents.

On the other hand, the physical risks associated with insufficient climate change mitigation can affect the economy through supply and demand shocks, such as infrastructure disruption, lower labour supply, lower consumption and investment and alterations in global trade flows. These shocks would end up affecting the public accounts, through greater pressure on public spending, lower tax collection and greater uncertainty in financial markets.

According to the Network of Independent Fiscal Institutions (IFIs)[46], despite growing concern about the impact of climate change on public finances, most national fiscal institutions have not conducted a quantitative analysis due to a variety of reasons including a shortage of expert staff, lack of access to reliable data and the absence of solid economic models.

Noteworthy amongst the most advanced IFIs in this field is the work of the British Office for Budget Responsibility (OBR). In its 2021 Fiscal Risks Report, the OBR included both physical and transition risks presented by climate change for the UK public finances, including a series of scenarios[47]. In an early action scenario, where net-zero emissions are reached by 2050 and where the threshold of a 1.5ºC temperature increase by the end of the century would not be exceeded, the climate transition could lead to an increase in net debt of 20 pp of GDP in the 2050-51 fiscal year. To this figure, an additional 23 pp of debt would have to be added in the event of later action. Finally, in an unmitigated warming scenario, temperatures would rise by 4ºC and the debt would soar to reach 289% of GDP by the end of the century. In the 2022 Fiscal Risks and Sustainability Report[48], climate change is analysed as a source of long-term fiscal pressure. In particular, given the target of reducing net greenhouse gas emissions to zero, the revenue projections include a reduction in tax collection associated with taxes that try to encourage the decarbonisation of the economy and, especially, fuel and vehicle excise duties. One way to reach the goal of reducing greenhouse gases is the electrification of the car fleet by 2050, so these sources of revenue will be reduced to zero by then.

The IFIs of Ireland, Denmark and Slovenia also publish regular reports on the fiscal impact of climate change that unanimously point to a not inconsiderable negative impact on public finances of policies aimed at ensuring the climate transition, but also of the long-term costs of postponing adaptation.

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46 Network of the EU Independent Fiscal Institutions (2022). Assessing the fiscal policy impact of the Climate Transition

47 Fiscal risks report – July 2021 - Office for Budget Responsibility (obr.uk)

48 Fiscal risks and sustainability – July 2022 - Office for Budget Responsibility (obr.uk)

Special mention should be made of the work of the Danish Economic Council, which analyses environmental policies in its annual reports entitled *Economy and Environment* with a microeconomic approach [49]. In 2022, they included an analysis of road transport regulation, green tax reform, climate accounting in agriculture, achievement of the 2030 targets and labour market adjustment costs arising from the green transition, as well as policy measures that can be taken to address these costs.

In addition to the periodic reports, several IFIs have published specific studies analysing specific environmental policies. For example, following its tradition of analysing the fiscal cost of legislative proposals and election programmes, the Dutch IFI (CPB), together with the Netherlands Environmental Assessment Agency (PBL), assessed in 2019 the ex-ante effects of the Dutch Climate Agreement on public revenue and expenditure, as well as its impact on GDP[50].

As for international institutions, studies on climate change are also increasingly frequent, with the aim of raising awareness of the fiscal risks involved. Particularly noteworthy is the role of the European Commission, which in 2019 added climate change as a risk in its debt sustainability report [51], with a descriptive analysis of the channels that could affect public borrowing. Over the period 1980-2020, total economic losses from extreme weather and climate events are estimated at around 3% of GDP on average in EU countries. By the end of the century, this figure is expected to triple in a scenario of an increase in temperatures of 1.5ºC. Scenarios of higher temperature increases represent an exponential increase in losses, which would multiply by 7.9 in the event of an increase in temperatures of 2ºC and by 14.9 in a scenario in which temperatures rise by 3ºC. In the latest report[52], the EC focuses on physical risks, stress-testing

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49 Danish Economic Council (2022). Economy and environment. Summary and recommendations

50 CPB (2019). Evaluation of the Climate Agreement (cpb.nl)

51 European Commission (January 2020). Debt Sustainability Monitor 2019, Institutional Paper No 120

52 European Commission (April 2022). Fiscal sustainability report 2021, Institutional Paper No 171

extreme weather and climate events, which have a significant and ongoing negative impact on debt projections and which are exacerbated in scenarios of increased warming. The economic losses due to global warming are estimated for Spain at 4.5% of GDP in a scenario of a 1.5ºC rise in temperatures and 5.3% of GDP in a scenario of temperatures rising by 2ºC in 2024.

Other institutions focus on the budgetary cost of mitigation or adaptation policies. In relation to mitigation measures, the European Central Bank published *Fiscal policies to mitigate climate change in the euro area*[53], where it provides an overview of fiscal policy measures to accelerate the green transition in the euro area. In terms of revenue, energy taxes in the euro area reached 4.8% of total public revenue in 2019 and taxes on transport represented on average around 1.2%. With regard to expenditure, climate-related public investment currently accounts for around 1% of GDP in the euro area. According to their estimates, in order to carry out the green transition, an annual investment of 3.7% of GDP will be required during the period 2021-30.

More recently, the IMF published *Macro-Fiscal Implications of Adaptation to Climate Change*[54]. On the one hand, short-term estimates are presented with different scenarios that reflect the impacts of natural disasters. In addition, long-term analyses are included with scenarios that take into account the cumulative effects of climate change, using adaptive general equilibrium models to analyse the effects on growth and debt. A rise in temperatures between 1.5ºC and 2.5ºC could result in an average loss of world GDP of 1.5% of GDP per year in 2100. This loss could rise to 3.3% on average if the increase in temperatures were between 2.9ºC and 4.3ºC. To avoid this, adaptation measures are needed, whose cost is estimated at around 0.25% of annual global GDP in 2030.

53 ECB Economic Bulletin, Issue 6 / 2022 – Article Fiscal policies to mitigate climate change in the euro area

54 Aligishiev, Zamid, Matthieu Bellon & Emanuele Massetti, 2022. "MacroFiscal Implications of Adaptation to Climate Change." IMF Staff Climate Note 2022/002, International Monetary Fund, Washington, DC.

At a national level, the Bank of Spain's 2022 Annual Report includes a chapter on the climate challenge reviewing the main threats expressed by the Intergovernmental Panel on Climate Change (IPCC) and presenting its own CATS model (*Carbon Tax Sectorial model*), which enables medium-term climate stress scenarios to be generated. This model estimates that an increase in the price of CO2 emissions together with an extension of the coverage of the EU Emissions Trading Scheme (ETS) would lower activity in energy-intensive sectors, leading to a cumulative 1.3% reduction in GDP over three years.

In addition to the quantification effort carried out, new techniques are being developed to align climate targets with countries' budgetary practices. The OECD is developing a compendium of green budgeting standards to examine the consistency of budget priorities with climate targets. Following this line, the European Commission labels different budget items in two categories; green and brown, due to their low and high climate impact, respectively[55]. Brown-labelled items include items such as tax reductions for industrial fossil fuels and air transport infrastructure development. In this regard, the OECD foresees a more extensive role for IFIs as an independent provider of inputs on the economic and fiscal impact of budgetary measures with climate targets and as a guarantor of compliance with green budgeting techniques [56].

In short, there is a cross-cutting effort by various institutions to try to assess the impact of climate change on public finances, where they predict a substantial effect in the short, medium and long term. Overall, assessments of the fiscal impact of climate transition measures are still very preliminary and would benefit from the independent expertise of specialist agencies. Regular and ongoing assessment of the impact of the climate transition on public finances can contribute to enhanced design of the policy package, enabling the right balance between reducing greenhouse gas emissions, public finances and other impacts. It is important that climate transition measures are timely,

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[55] OECD (2021) Green Budgeting Towards Common Principles. General Publications

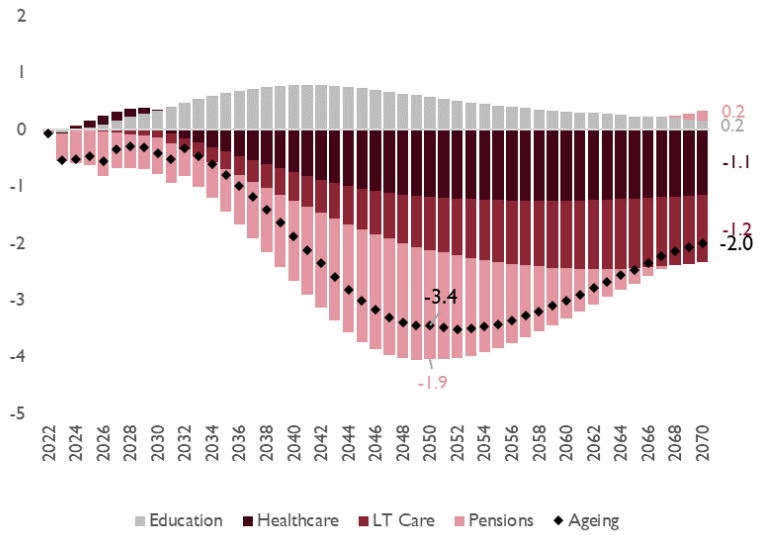
[56] Cameron, S., M. Lelong & L. von Trap (2022), "More than words: Potential roles for independent fiscal institutions (IFIs) in green budgeting", OECD Journal on Budgeting

targeted and efficient since late or disorderly action might increase the total cost of the climate transition and produce negative effects with far-reaching repercussions on the economy and other countries.

4.3. Impact on fiscal variables of expenditure associated with the ageing population

The evolution of demographics will condition the development of fiscal variables in the coming decades, and ultimately the long-term sustainability of public finances. AIReF's baseline scenario presented in this Opinion sets out the evolution of the macro-fiscal variables taking into account population dynamics. In order to analyse the impact of ageing on these variables, an alternative scenario is developed for the evolution of the public balance [57] that excludes the increase in expenditure related to pensions, healthcare, long-term care and education.

FIGURE 53. CONTRIBUTIONS TO THE CHANGE IN THE PRIMARY BALANCE OF THE COMPONENTS OF AGEING



57 The scenario assigns as an ageing factor the change in expenditure relative to the 2022 level of the healthcare, long-term care, education and pension components. In the case of pensions, the evolution of social contributions is taken into account.

AIReF's projections show that there is a significant deterioration of the primary balance as a result of the ageing of the population. The effect of demographics on public spending will begin to be more significant by the middle of the next decade, with an increase that will exceed 1 point of GDP (on the scenario that excludes ageing-associated spending) in 2036. It will then reach a peak towards the middle of the century, with an increase of 3.5 points. Population dynamics show an improvement in the primary deficit from 2050.

A higher primary deficit leads to a more unfavourable evolution of the debt ratio (+44 points in 2050 and +106 points in 2070), reaching 186% of GDP, with interest expenditure of 6.9% and a total deficit of 7%. An evolution of the primary balance that does not take into account demographic pressures would lead to a debt path that stabilises at 100% of GDP until the middle of the century, with interest expenditure and total deficit contained at around 3% and 1%, respectively.

The rise in pension expenditure is the largest contributor to the increase in debt associated with ageing until the middle of the century, adding 34 of the 44 points. The increase in expenditure on healthcare and long-term care will contribute, respectively, 14 and 11 points in 2050, although their contribution will accelerate to 40 and 35 points in 2070. This increase in expenditure and debt will be partly offset by the projected decrease in expenditure on education with 15 points in 2050 and 23 points in 2070.

FIGURE 54. PRIMARY BALANCE (% GDP)

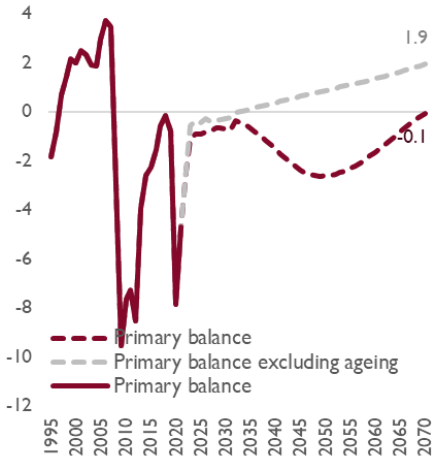


FIGURE 55. INTEREST (% GDP)

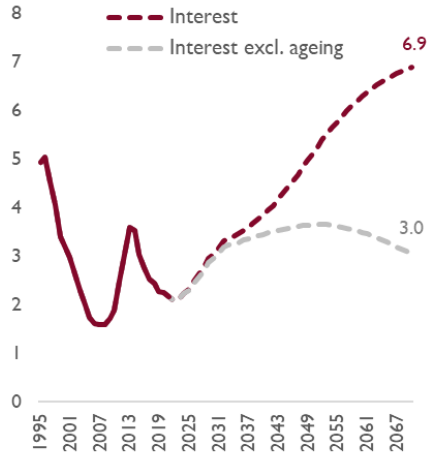


FIGURE 56. TOTAL BALANCE (% GDP)

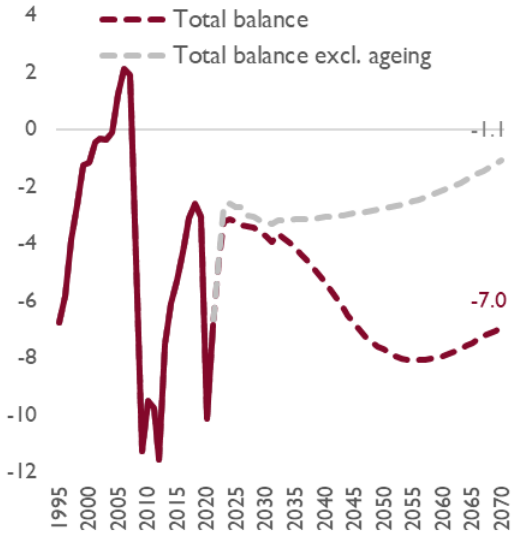
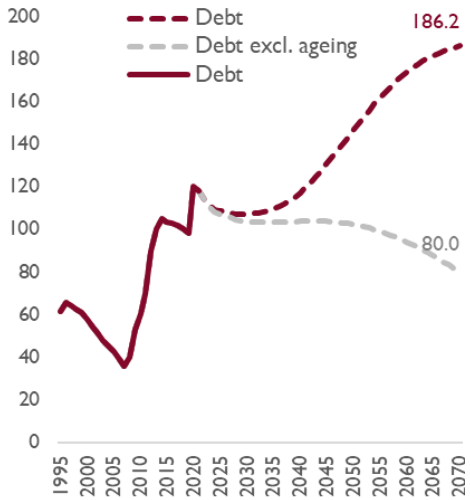
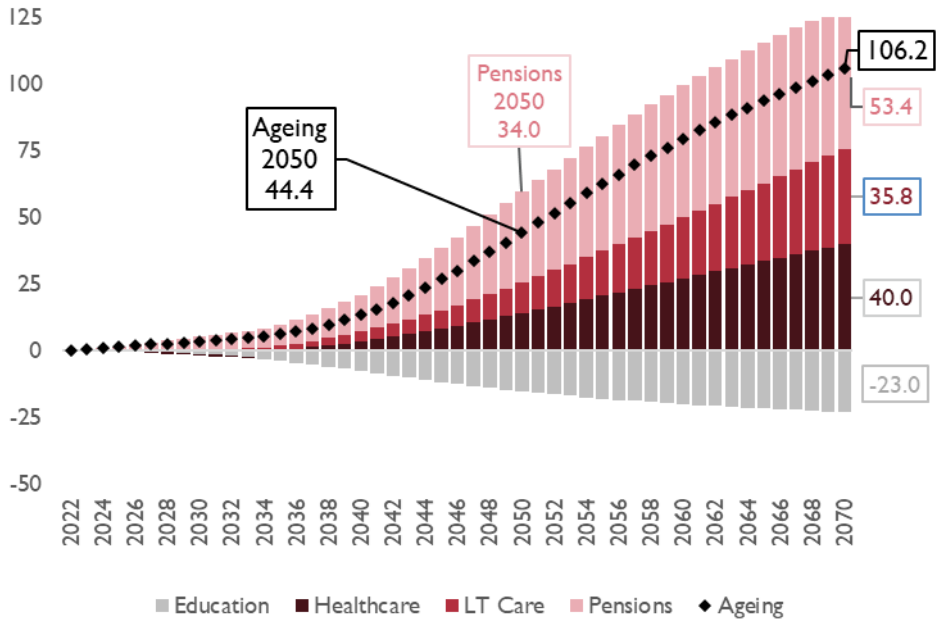


FIGURE 57. DEBT (% GDP)



Source: AIReF

FIGURE 58. CONTRIBUTIONS TO THE CHANGE IN THE DEBT OF THE COMPONENTS OF AGEING



Source: AIReF

5. ALTERNATIVE SCENARIOS

The actual evolution of the fiscal scenario will depend on the framework of fiscal rules, the budgetary decisions of each government and the reforms that are implemented. The baseline scenario is unrealistic insofar as it is the governments themselves which, through democratic budgetary decision-making processes, will largely determine the fiscal scenario that materialises. Therefore, the fiscal scenario will be influenced by the economic and demographic situation that eventually materialises as well as the aggregation of the decisions of the different governments. These actions by the GG authorities are conditioned to a large extent by the framework of fiscal rules in force at any given time. In addition, the implementation of the RTRP and other reforms will have an impact on the potential growth of the economy, which may also have an impact on the sustainability of the GG.

AIReF presents three alternative scenarios below. The objective of these scenarios is to illustrate the potential effects on debt sustainability of structural reforms that raise the potential growth of the economy, of an autonomous decision by the authorities to reduce or increase the structural deficit, and of the implementation of a framework of fiscal rules in line with the EC proposal.

5.1. Scenario of higher potential growth

Structural reforms aimed at increasing the long-term growth of the economy play a crucial role in fostering an improvement in the underlying position of public finances. Numerous reforms and investments associated with the RTRP are currently being rolled out which, if properly implemented, could have an impact on growth. In addition to the RTRP, additional efforts to remove the rigidities of the Spanish labour market, improve the skills of human capital and the capacity of companies to innovate and incorporate technological advances could also have an impact on the economy's productivity.

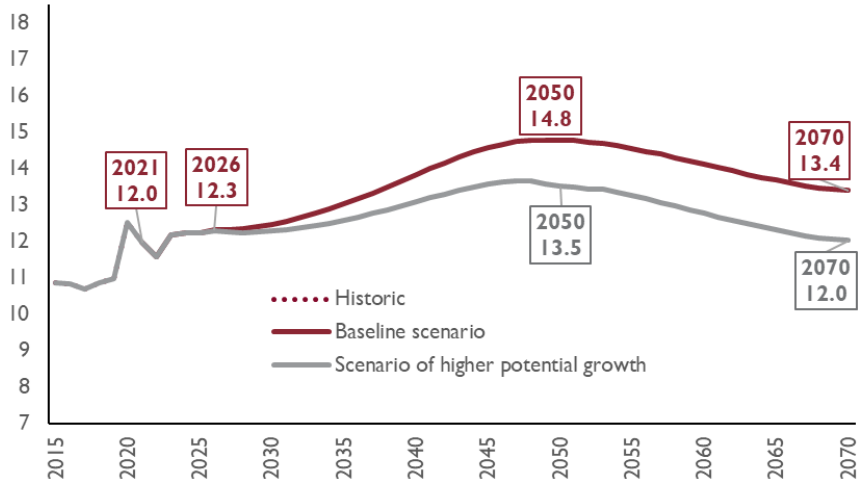
AIReF carries out a theoretical exercise that aims to illustrate how implementation of structural reforms that contribute to economic growth will have an impact on the sustainability of public finances. In this scenario, an increase in GDP growth over the projection horizon of 0.3 per year is considered. This impact is similar to the long-term impact that the EC estimates would result from a scenario of structural reforms aimed at increasing productivity[58]. AIReF assumes that the increase in potential growth flows through the labour market, productivity and migration. In particular, the reforms are expected to lead to a convergence of productivity in 2035 to 1.2; they will reduce the unemployment rate to 5.5% in 2050; increase the participation rate by 1 point in 2050 and lead to an increase in migration of 15% compared with the baseline scenario from 2024.

If this hypothetical scenario materialises, Social Security pension expenditure would reach 13.5% of GDP in 2050, 1.3 points lower than the baseline scenario. In 2070, the weight of pension expenditure would moderate to 12% of GDP. The main factor in this case would be the higher level of GDP associated with the scenario, which increases the denominator of the ratio. Conversely, the increase in migration also translates into higher expenditure on pensions at the end of the period.

[58] The potential growth impact of structural reforms in the EU. A benchmarking exercise (europa.eu)

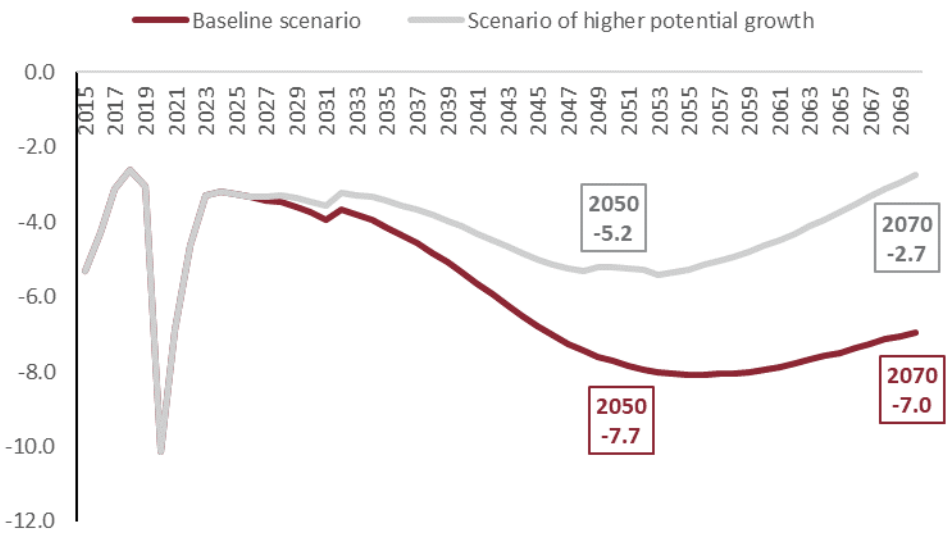
In this scenario, debt would peak at 126% in 2060 and subsequently fall to 117% in 2070. The public deficit would moderate from the baseline scenario to a peak of 5.4% in 2053 and fall to 2.7% in 2070. This evolution would be explained by the lower weight of pension expenditure and lower interest expenditure associated with a lower level of debt. As for other expenditure, higher nominal GDP growth also results in higher expenditure growth and therefore its weight over GDP does not change. However, it should also be noted that further economic growth could facilitate eventual consolidation, as the historical evidence shows. On the revenue side, higher economic growth translates into higher growth due to greater elasticity, nuanced by the effect of the population structure on the collection of PIT.

FIGURE 59. EVOLUTION OF SOCIAL SECURITY PENSION EXPENDITURE. BASELINE SCENARIO VS SCENARIO OF HIGHER POTENTIAL GROWTH



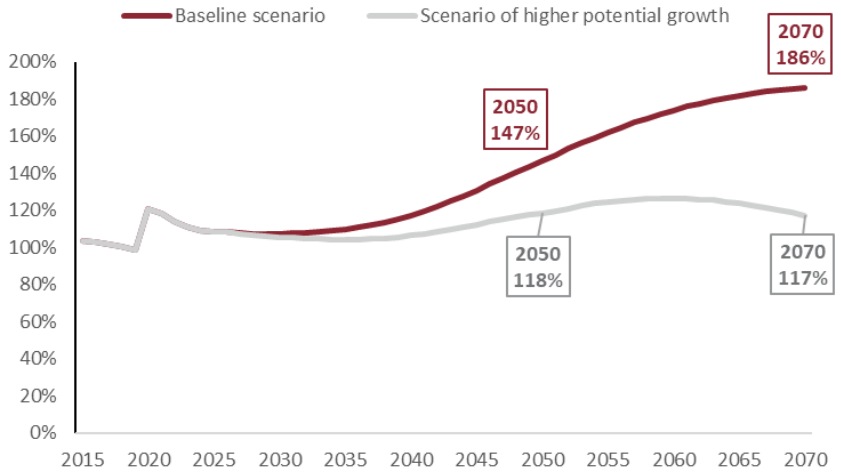
Source: Social Security and AIReF

FIGURE 60. EVOLUTION OF THE DEFICIT. BASELINE SCENARIO VS SCENARIO OF HIGHER POTENTIAL GROWTH



Source: IGAE and AIReF

FIGURE 61. EVOLUTION OF THE DEBT. BASELINE SCENARIO VS SCENARIO OF HIGHER POTENTIAL GROWTH



Source: IGAE and AIReF

5.2. Discretionary changes in revenue and expenses

Beyond the trends described in the baseline scenario, the evolution of revenue and expenditure is subject to the set of discretionary decisions adopted by governments to develop public policies.

Governments in the development of public policies continuously make decisions that affect GG revenue and expenditure in the short and long term. In the medium and long term, governments also take on different commitments on the evolution of revenue and expenditure, such as reaching a certain level of expenditure for a specific policy. Annually, these decisions and commitments are reflected in the budget laws of each authority. However, these commitments and policy decisions are not always accompanied by specific information on how they will be financed, whether by higher revenue or lower expenditure elsewhere or, alternatively, by higher deficits. Specifically, the RTRP contains a high number of such commitments in one sense or another.

The RTRP will have an impact on the underlying position of public finances beyond the effects it has on long-term growth. Some of the reforms under the RTRP directly affect public sector revenue and expenditure. In addition, a portion of the investments will become structural expenditure or will require an increase in structural expenditure to be operational. Although the RTRP does not identify or quantify its budgetary impact, it is no less relevant in terms of sustainability.

The aims of the RTRP include the reform of the tax system for inclusive and sustainable growth that will increase the efficiency and collection potential of the system. In this regard, Component 27 of the RTRP includes a series of measures and actions to prevent and combat tax fraud, while Component 28 includes measures to adapt the tax system to the reality of the 21st Century, aimed at ensuring equity, tax justice and tax collection efficiency, designing green taxation, broadening tax bases, advancing in the incorporation of new taxes adapted to technological changes and new emerging activities, and strengthening international coordination and cooperation. It also establishes that a Group of Experts be set up to conduct a diagnosis of the tax system, which has materialised in the White Paper on Tax Reform, published on March 4th, 2022.

In addition, the RTRP addresses the reduction of structural expenditure through the modernisation of the GG and application of the reforms, although the investments may entail a structural increase in current expenditure. The components of the RTRP include some elements that might lead to a

reduction in structural expenditure. A commitment is also made to the evaluation of public expenditure through the Spending Reviews, which may generate fiscal spaces. Conversely, the maintenance of investments might lead to increases in structural expenditure to ensure though they are continued and maintained over time. Consequently, even if they are not properly identified or incorporated in a medium-term fiscal strategy, the RTRP may lead to increases or reductions in the structural deficit.

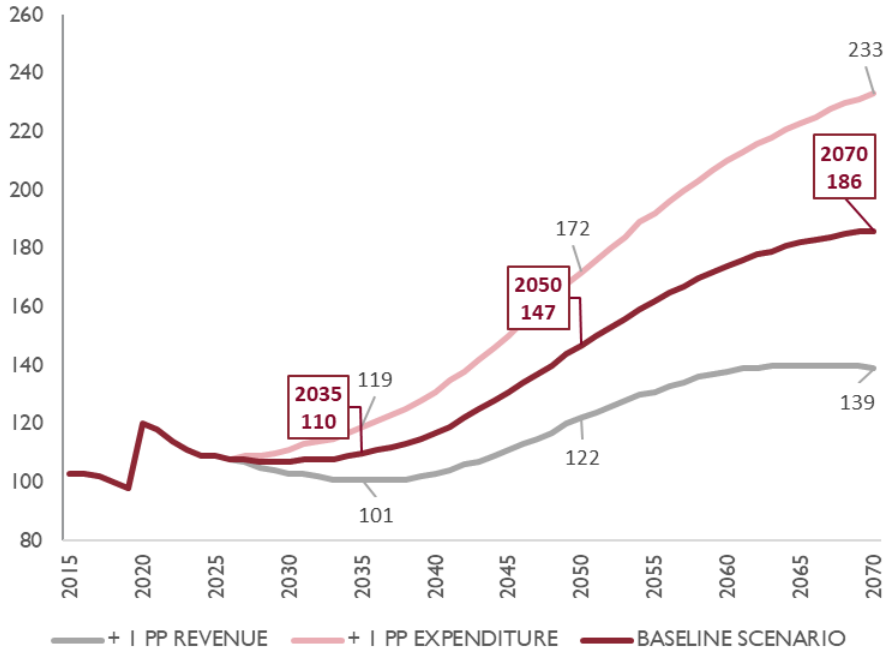
Apart from the RTRP, there are commitments by governments to raise revenue for certain policies, such as defence and the environment, as well as to reduce certain taxes. If not permanently funded, these decisions will have a direct impact on the deficit and long-term forecasts. These include the commitment to raise defence spending to 2% of GDP, the costs of the digital and green transition, investment in R&D&I to the 1.25% of GDP included in the Law on Science and the increase in expenditure on education to 5% of GDP included in the last education reform, among many others. These commitments are usually set out in strategic documents or even legislation without the corresponding budgetary support and are usually conditional on compliance with the principles of budgetary stability. Similarly, governments also make commitments regarding the reduction of taxes that affect the structural deficit. Although it is not uncommon for these commitments to eventually fail to materialise, they represent additional pressure on the public accounts.

A structural reduction in the deficit, via revenue or expenditure, of one additional point from 2027 would mean a reduction of 25 points of GDP of debt in 2050 and 47 points in 2070. If revenue was increased or expenditure reduced in the medium term to the point that the deficit from 2027 is one GDP point lower than in the baseline scenario, there would be a progressive reduction in debt in relation to the baseline scenario, which would place it at 122% of GDP in 2050 and 139% in 2070. This reduction in the primary deficit would be increased by a reduction in interest expenditure, which would lead to a reduction in the nominal deficit of 2.7% of GDP in 2070. Each year of delay in reducing the deficit would mean around one additional point of debt. Therefore, if revenue increases by one point of GDP from 2037, the debt would stand at 132% in 2050 and 150% in 2070.

In the opposite direction, a structural increase in the deficit, via revenue or expenditure, of one additional point from 2027 would result in an increase of 25 GDP points of debt in 2050 and 47 points in 2070. If revenue was reduced or expenditure increased in the medium term to the point that the deficit from 2027

is one GDP point higher than forecast in the baseline scenario, there would be a progressive increase in debt in relation to the baseline scenario, which would place it at 172% of GDP in 2050 and 233% in 2070. The increase in the primary deficit would be boosted by an increase in interest expenditure.

FIGURE 62. EVOLUTION OF DEBT: EFFECT OF REVENUE INCREASE/REDUCTION OF EXPENDITURE OF 1 PP FROM 2027



Source: IGAE and AIReF

FIGURE 63. ANNUAL DEFICIT REDUCTION (% GDP)

FIGURE 63.A. INCREASE IN REVENUE

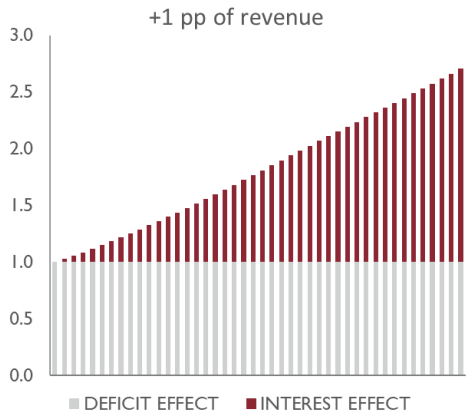


FIGURE 63.B. INCREASE IN EXPENDITURE

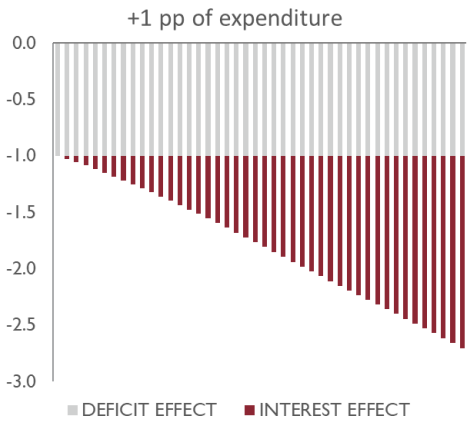


TABLE 6. CHANGE IN DEBT DUE TO THE EFFECT OF DEFICIT REDUCTION

	Debt reduction (% of GDP)		
	in 2035	in 2050	in 2070
-1 pp from 2027	**-9**	**-25**	**-47**
-1 pp from 2028	-8	-24	-46
-1 pp from 2029	-7	-23	-45
-1 pp from 2032	-4	-20	-41
-1 pp from 2037	0	-14	-36

Source: AIReF

5.3. Compliance with fiscal rules

The scenarios in this Opinion unanimously suggest that debt will remain at very high levels in the coming decades. As set out in the previous sections, public debt represents a vulnerability for the Spanish economy. This is not only due to the current high level, but also because, in the absence of economic policy measures, the ageing of the population will lead to additional increases in public debt in the future. Even in a scenario of reforms that have a permanent impact on the potential growth of the economy (0.3 pp per year), debt remains at levels above 100% of GDP in the coming decades.

In this context, it is important to design a medium- and long-term fiscal policy strategy that can contain debt dynamics, place it on a downward path and generate room for manoeuvre to deal with future challenges and shocks. This is even more important in a monetary union since unsustainable dynamics in one member country may have implications for the financial stability of the Union.

The European and national fiscal framework can make a crucial contribution to this strategy. Fiscal frameworks establish benchmarks that fiscal policy must fulfil with two fundamental objectives: to ensure the long-term sustainability of public debt and to allow the implementation of countercyclical fiscal policies in both expansionary and recessionary phases. However, the current framework at the supranational level has not been sufficient to design stable and predictable fiscal policies, despite the huge web of rules and procedures it contains. Neither have national frameworks contributed to this task. In general terms, national fiscal policies have been pro-cyclical in nature and have not prevented the gradual increase in government debt ratios[59].

Aware of these weaknesses, the European Commission initiated a review process of the fiscal framework in February 2020 and presented a reform proposal in November 2022, which is currently pending completion. AIReF has participated in this debate and presented a technical paper with an operational proposal that seeks to improve the way in which the fiscal policy recommendations are formulated in Spain[60]. Ensuring that fiscal targets are set with greater internal consistency, transparency and adequacy to the present and future situation of public finances is a necessary condition for achieving a more efficient fiscal framework that facilitates compliance with the commitments acquired.

59 See, for example, European Commission (2020) "Commission staff working document on the Economic Governance Review".

60 In the context of the debate on the reform of economic and fiscal governance in the EU, AIReF has published two papers. The first reflects AIReF's contribution to the public consultation launched by the European Commission in October 2021 https://www.airef.es/wp-content/uploads/2022/02/CONTRIBUCION-DE-LA-AIReF-A-LA-CONSULTA-PUBLICA-DE-LA-COMISION-EUROPEA-SOBRE-LA-REFORMA-DEL-MARCO-FISCAL-EUROPEO.pdf. The second, recently published, is a technical paper that contains a concrete proposal for the reform of the fiscal framework, applied to the Spanish economy https://www.airef.es/wp-content/uploads/2022/10/DT_REGLLAS_FISCALES/221021-DT-Fiscal-Regulations-2.pdf

AIReF's proposal puts forward specific fiscal targets for each country to be set by each government for the whole of the legislature, in order to increase the medium-term orientation of fiscal policy. With regard to the timing aspects, in AIReF's opinion, the framework must combine, on the one hand, the flexibility necessary to respond to shocks that have become much more frequent in recent years than previously thought and, on the other hand, a medium-term orientation of fiscal policy that makes it possible to internalise the implications that current decisions have for future debt sustainability. In this regard, the paper puts forward the possibility that, at the start of each legislature, the incoming government should propose a fiscal path that is binding for the entire legislature. This path must respect common guidelines for all Member States and be approved by the European Council to become the binding fiscal policy benchmark in the next four years.

With regard to material aspects, the technical paper proposes a methodology for setting a specific debt anchor for Spain that will generate a feasible path of reduction. When establishing this anchor, the country's information regarding the level of starting (present) debt, the historical evolution of the ratio (past) and the trend projections of public revenue and expenditure (future) are taken into account so as to consider the implications of the fiscal policy commitments acquired and the implications of ageing on public finances.

The disaggregated projections of public revenue and expenditure presented in this Opinion constitute an essential ingredient for deriving the trend path of public debt and assessing its medium- and long-term sustainability, incorporating future spending pressures and possible risks. According to AIReF's proposal, the sustainability diagnosis will result in the calibration of an alternative and more prudent path to the trend path, with a ten-year debt anchor that guarantees with sufficient probability that the debt ratio will fall in the long term. Once the debt anchor has being calibrated, its implications for fiscal policy in the short and medium term are reflected through a path of primary spending in levels, net of new revenue measures. This operates as a multi-year spending ceiling for budgetary policy. The fiscal authorities will be accountable for compliance with this spending ceiling over which they have a high degree of control, which facilitates the monitoring of compliance. Incorporating the revenue and expenditure projections of this Opinion into the methodology proposed in AIReF's Technical Paper, the fiscal adjustment that would be necessary in ten years (2023-

2032) to achieve a reduction in the debt path with a probability of over 80% is shown below.

FIGURE 64. CALIBRATION OF AIREF'S FISCAL RULE PROPOSAL

FIGURE 64 A. DEBT CALIBRATION (% GDP)

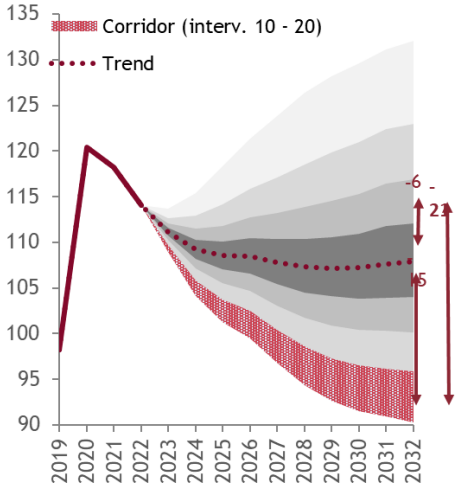


FIGURE 64. B. MEASURES

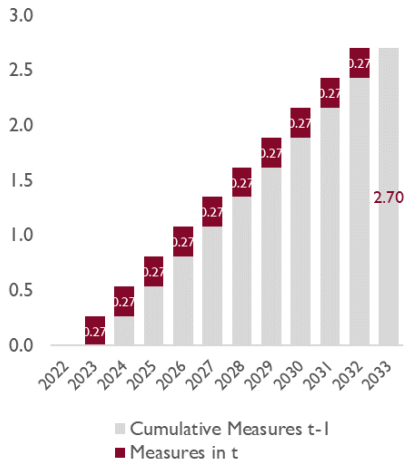


FIGURE 64 C. PRIMARY BALANCE (% GDP)

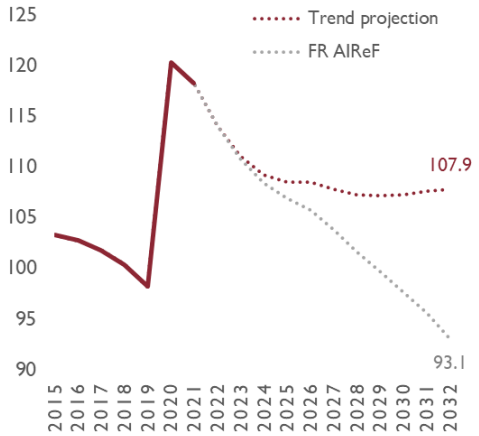
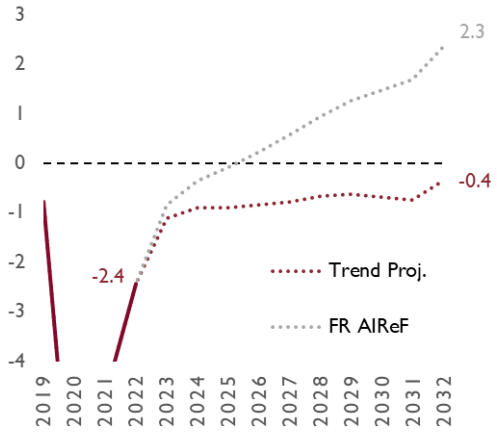


FIGURE 64. D. DEBT (% GDP)



Source: AIReF.

According to this scenario, a gradual and sustained adjustment of 0.27 points over ten years would have a very favourable effect on debt dynamics in the medium and long term, preventing the associated financial burden from rising dramatically. The adjustment can be calculated either through a constant effort over the time horizon or with sharper adjustments at the beginning or at the end of the period. This simulation involves achieving the target path by calibrating a constant annual adjustment of the primary balance (as a percentage of GDP). The magnitude of measures to reduce the deficit that need to be implemented compared with the trend scenario amounts to 0.27 points of GDP per year. As can be seen in the previous figures, a gradual and sustained adjustment of 0.27 points for ten years would have a cumulative effect that would have a very favourable impact on debt dynamics in the long term and the associated interest rates. Consequently, the fiscal rule would require the design of a medium-term scenario that implies a cumulative improvement in the primary balance of 1.08 points compared with the trend scenario over a four-year legislative period.

On November 9th, 2022, the European Commission published a Communication setting out guidelines for a reformed EU economic governance framework. This Communication is the starting point for the debate which will culminate in a reform proposal expected in 2023. The proposal shares important elements with AIReF's Technical Paper. In both cases, a greater medium-term orientation of fiscal policy is proposed on the basis of primary expenditure net of revenue measures as an operational variable. In the Commission proposal, the expenditure path is also calibrated on the basis of stochastic debt projections. However, the adjustment horizon may be four or seven years depending on whether the Member State accompanies the medium-term fiscal plan with a series of reforms and investments. The path of expenditure net of revenue measures will be considered appropriate according to the Commission proposal if, once the adjustment period has ended, it can be guaranteed with a sufficient degree of plausibility that in the following ten years and on a no-policy change basis (i) the debt will remain on a downward path and (ii) the deficit will remain below 3%.

Many of the elements that will be contained in the Commission proposal are yet to be defined. To cite a few examples, it has not been specified publicly and in sufficient detail how the debt reduction plausibility criteria will be defined, how the deterministic scenarios referred to in the Commission Communication will be combined with the stochastic analysis and how the no-policy change projections beyond the adjustment period will be made. The following are preliminary results of what the Commission's proposal would entail, as interpreted by AIReF. For this purpose, and in the absence of the details indicated, projections and a parameterisation similar to that of the

previous simulations, i.e. using AIReF's stochastic analysis, are used.

FIGURE 65. CALIBRATION OF THE EUROPEAN COMMISSION'S FISCAL RULE FOR A FOUR-YEAR ADJUSTMENT

FIGURE 65 A. DEBT CALIBRATION (% GDP)

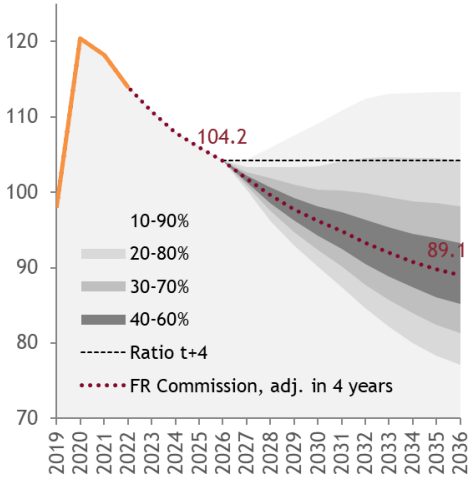


FIGURE 65. B. MEASURES

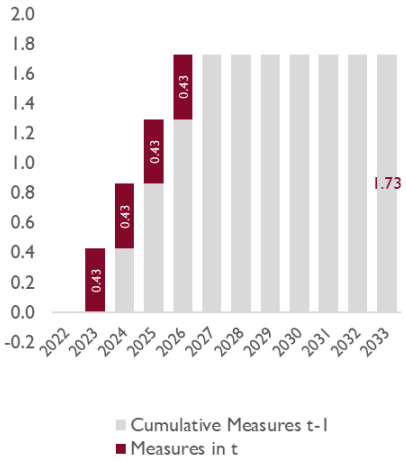


FIGURE 65. PRIMARY BALANCE (% GDP)

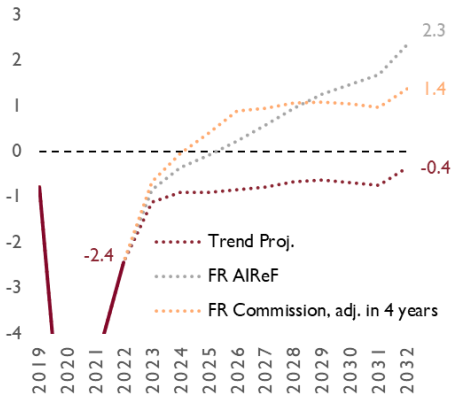
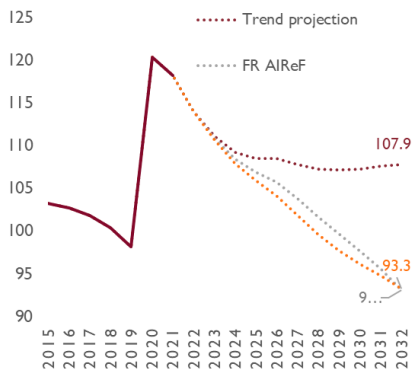


FIGURE 65. D. DEBT (% GDP)



Source: AIReF.

According to AIReF's current projections, the adjustment that would be necessary over the next four years to guarantee with an 80% probability that debt remains on a downward path over the next decade would amount to 0.43 pp per year. In contrast, if the adjustment period were extended to seven years because it was accompanied by reforms and investments, the measures that would have to be taken each year would amount to 0.32 pp. In addition, different calibrations of the probability threshold with which the debt must be guaranteed to remain on a downward path also give rise to different results in terms of the required

adjustment. For example, the adjustment would be 0.28 pp per year if calibrated at 75% probability and 0.24 pp if calibrated at 70%.

FIGURE 66. CALIBRATION OF EUROPEAN COMMISSION'S FISCAL RULE FOR A SEVEN-YEAR ADJUSTMENT

FIGURE 66 A. DEBT CALIBRATION (% GDP)

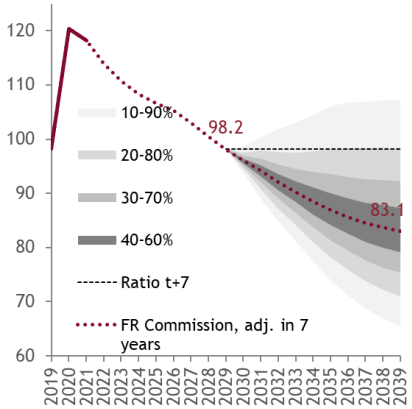


FIGURE 66. B. MEASURES (% GDP)

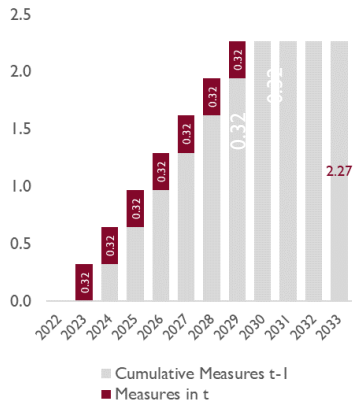


FIGURE 66 C. PRIMARY BALANCE (% GDP)

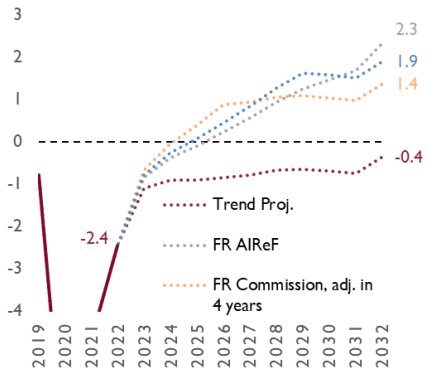
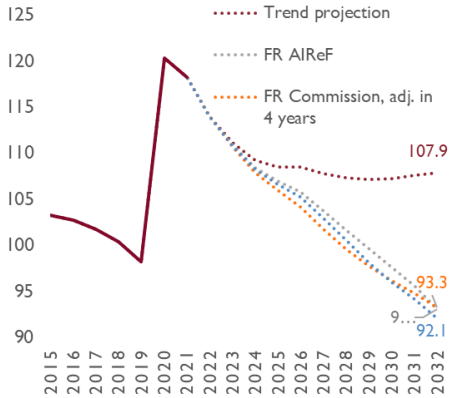


FIGURE 66. D. DEBT (% GDP)



Source: AIReF.

In short, AIReF's calibration proposal involves a more gradual but sustained adjustment over time, as opposed to the European Commission's early (4-year) or intermediate (7-year) adjustment proposal. It should be noted that these calculations do not take into account the possible impacts of the different alternatives on growth.

FIGURE 67. COMPARISON OF THE DIFFERENT CALIBRATIONS OF THE FISCAL RULE

FIGURE 67 A. TOTAL BALANCE (% GDP)

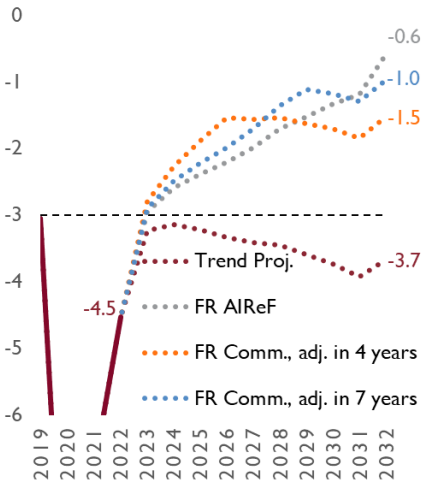
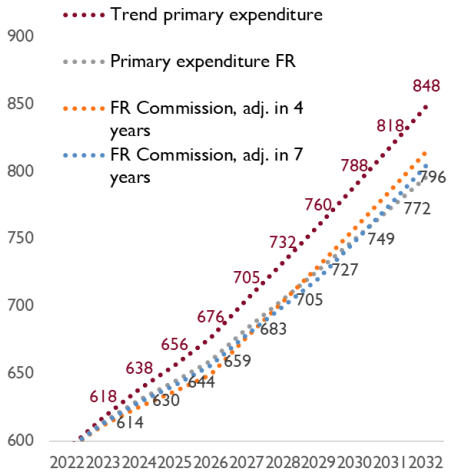


FIGURE 67 B. PRIMARY EXPENDITURE (€bn)



Source: AIReF.

The simulations show that implementation of an early fiscal strategy to contain debt dynamics and the increase in the interest burden will avoid further medium- and long-term adjustments. Regardless of the time profile of the adjustment over the next decade, the above simulations show that with a fiscal adjustment of between 0.3 and 0.45 pp sustained over ten or 4-7 years respectively, debt in ten years would be at a more moderate level and with a clearly downward trend. This is essential for coping with the spending pressures associated with the ageing of the population that will materialise in the following decade. Conversely, if the adjustments are not addressed in the next few years, containing the debt dynamics in the 2030s would require much higher adjustments. This is because they will need, on the one hand, to compensate for the growing dynamics of public debt caused by the additional ageing-related spending and, on the other hand, to generate an improvement in the primary balance to place the debt on a downward path.

FIGURE 68. PUBLIC DEBT PATH (% GDP) IN THE VERY LONG TERM WITH FISCAL ADJUSTMENT

FIGURE 68 A. TOTAL BALANCE (% GDP)

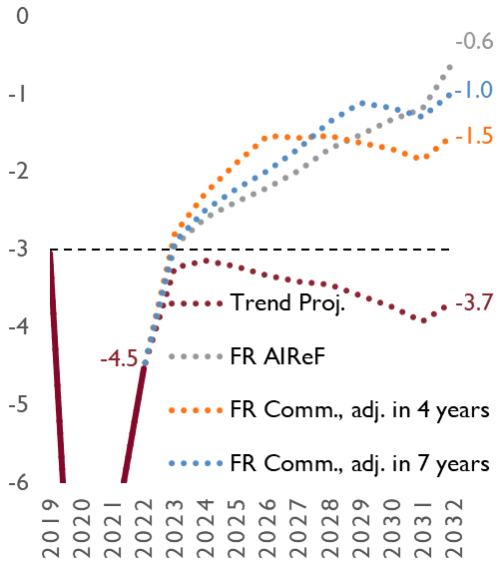
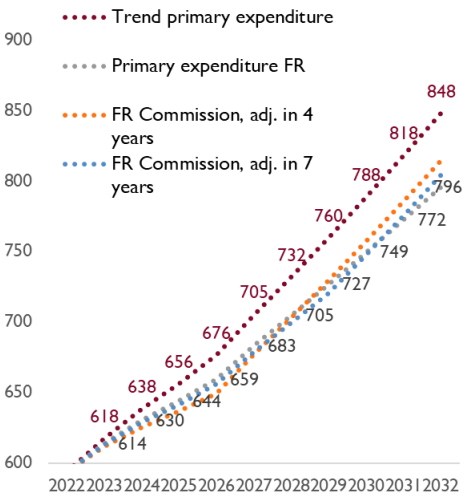


FIGURE 68 B. DEBT (% GDP)



Source: AIReF.

BOX 7. PENSION EXPENDITURE RULE

The Second Additional Provision of Royal Decree-Law 2/2023 introduces a specific fiscal rule that sets a limit of pension expenditure at 15% of GDP, as long as the revenue measures approved since 2020 have an impact of at least 1.7% of GDP, in both cases on average from 2022 to 2050. Both limits are joint, so that a deviation in one can be compensated with the other component, that is, if the measures have a greater impact, the rule allows higher expenditure, and if, on the contrary, they do not reach the set weight, spending must be moderated.

Supervision of the rule is established every three years, starting in 2025, and would be conducted with an asymmetrical distribution of functions by the Government, the European Commission and AIReF. The European Commission and the Government would draw up, without AIReF's participation, the expenditure forecasts that would be reflected in the Ageing Report. AIReF would estimate the impact of the revenue measures, although it would be required to use the assumptions agreed by the European Commission and the Government in the latest Ageing Report.

In the event of deviation, the rule also provides for activation of a correction mechanism. This correction mechanism would consist of the adoption of pension expenditure or revenue measures to offset the deviation identified. In the event that the measures proposed by the Government are not approved, the Government would have to increase the social contributions of the IEM annually by 20% of the deviation.

The first question would be to know the starting point for compliance with this expenditure rule. Although this cannot yet be done exactly, it is feasible to make an approximation. On the one hand, AIReF estimates, under the assumptions of this Opinion rather than those of the Ageing Report, that the average impact of revenue measures is 1% of GDP. Therefore, average expenditure must be less than 14.3% to comply with the expenditure rule.

On the other hand, the latest Ageing Report, published in 2021 (AR2021), sets average pension expenditure of 12.8% of GDP, including the PRI and the sustainability factor. It also calculated the impact of eliminating both elements, incorporating an alternative scenario with average expenditure of 15%. Therefore, the reforms adopted, as well as the changes in the assumptions introduced by the new

Ageing Report should entail an average expenditure reduction of 0.7% of GDP in order to comply with the expenditure rule. In this regard, it should be pointed out that AIReF estimates an average saving of the measures on the expenditure side of 0.6% of GDP, which would be insufficient to comply with the expenditure rule. However, if we take as an approximate reference the figures provided by the Government in the Toledo Pact, the expenditure rule would be met.

Finally, AIReF's total pension expenditure forecasts in the central scenario imply average expenditure between 2022 and 2050 of 15.1%. This is above the limit for complying with the expenditure rule. However, if the higher potential growth scenario is applied, the average would be 14.5% of GDP, which is still slightly above the expenditure rule, but with a smaller deviation.

In short, the result of the expenditure rule is highly sensitive to the assumptions and methodology used for its calculation. This makes the asymmetry in the distribution of the oversight function and the restrictions imposed on the oversight capacity of AIReF more striking.

EVALUATION OF THE PENSION EXPENDITURE RULE

	Pension expenditure 2022 – 2050	Impact of revenue measures 2022 – 2050	Does it comply with the expenditure rule?	Deviation from the expenditure rule limit
AR2021 + AIReF estimate of expenditure measures	14.4	1	No	0.1
Government	?	1	Yes	
AIReF – Baseline Scenario	15.1	1	No	0.8
AIReF – Higher potential growth	14.5	1	No	0.2

Source: AR2021, Government and AIReF

6. RISK ANALYSIS

The uncertainty surrounding any of the assumptions that condition the baseline scenario means that a sensitivity scenario should be presented. Firstly, projections of migration flows, which are a fundamental constraint on when the working-age population will begin its descending path, are subject to a great deal of uncertainty. The assumptions made about the evolution of the long-term unemployment rate, participation rates and productivity are also uncertain. In addition, there is a lot of uncertainty about the equilibrium interest rates of the economy.

AIReF sets out different scenarios in which some of the initial assumptions are modified and their impact on the demographic, macroeconomic and fiscal projections is shown. Specifically, it analyses the impact of changes in the growth path of the economy, a different intensity of migration flows, changes in the elasticity of revenue over GDP and changes in interest rate forecasts. Finally, the impact of modifications to each one of the fundamental variables is added as a sensitivity analysis.

6.1. Economic growth

AIReF considers two alternative potential GDP growth scenarios, depending on whether it is higher or lower than the baseline scenario. AIReF

considers two alternative potential GDP growth scenarios, one of lower growth compared with the baseline scenario in which the labour market and productivity are less buoyant, and another in which these components advance at a higher rate than in the baseline scenario. The scenarios presented entail average potential GDP growth for the period 2027-2050 that is 0.3 points lower and 0.3 points higher, respectively, than the baseline scenario.

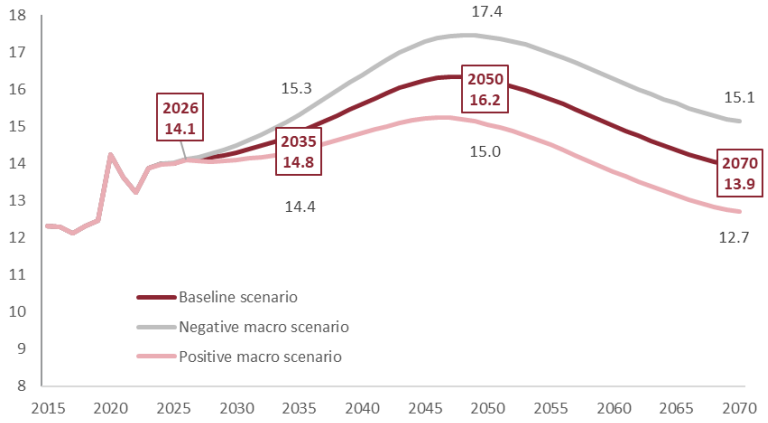
TABLE 7. COMPARISON OF MACROECONOMIC ASSUMPTIONS (VALUE IN 2050)

	Lower growth	Baseline	Higher growth
Productivity	0.9%	1.1%	1.3%
Unemployment rate	9%	7%	5%
Participation rate	67%	68%	70%

Source: AIReF

AIReF estimates that the change in macroeconomic assumptions will have an impact on pension expenditure in 2050 of 1 point and 0.2 points of GDP in the two scenarios. A more positive macroeconomic situation implies a reduction in pension expenditure of 1.2 points of GDP, whereas, if the economy grows at a higher rate than expected in the baseline scenario, expenditure would rise to the same extent.

FIGURE 69. EVOLUTION OF TOTAL EXPENDITURE ON PENSIONS ACCORDING TO THE MACROECONOMIC SCENARIO (% GDP)



Source: Social Security and AIReF

AIReF estimates that the proposed macroeconomic changes could increase or decrease the deficit by almost two and a half points and the accumulated debt in 2050 by around 30 points of GDP. The impact of macroeconomic changes is not limited to pension expenditure, but also affects other expenditure and revenue, and through them, the deficit and accumulated debt. Regarding the deficit, in 2070 the differences are about 4 points of GDP in each direction and more than 60 points in the case of debt.

TABLE 8. EVOLUTION OF DEFICIT AND DEBT ACCORDING TO THE DIFFERENT MACROECONOMIC SCENARIOS (% GDP)

	Negative macro scenario			Baseline scenario			Positive macro scenario		
(as % of GDP)	2035	2050	2070	2035	2050	2070	2035	2050	2070
Deficit	**-4.9**	**-10.1**	**-11.2**	**-4.1**	**-7.7**	**-7.0**	**-3.4**	**-5.4**	**-3.0**
Revenue	43.8	44.7	45.4	43.8	44.7	45.6	43.8	44.8	45.9
Expenditure	48.6	54.7	56.6	47.9	52.4	52.6	47.2	50.2	48.9
Debt	**115**	**176**	**258**	**110**	**147**	**186**	**104**	**119**	**121**

Source: IGAE and AIReF

6.2. Immigration

Migration is the most historically variable demographic phenomenon. This makes it the component that is most uncertain to predict. Therefore, two alternative scenarios to the baseline scenario are presented: one in which the net migration flow

is at the 80th percentile of the distribution with respect to the baseline scenario and another one in which the migration is at the 20th percentile, which implies approximately 15% higher or lower net flows respectively.

The scenarios proposed translate into average potential GDP growth for the period 2027-2050 0.1 points lower in the case of the low migration scenario, and 0.1 points higher in the case of high migration. The change in GDP in this case comes directly from the reduction or increase in the working-age population. In the low migration scenario, this population is reduced by an additional 0.75 million, while in the high migration scenario it rises by a similar number. The high migration scenario considers a reduction in the working-age population of 2.25 million compared with 2021, while the low migration scenario reduces it by 3.72 million.

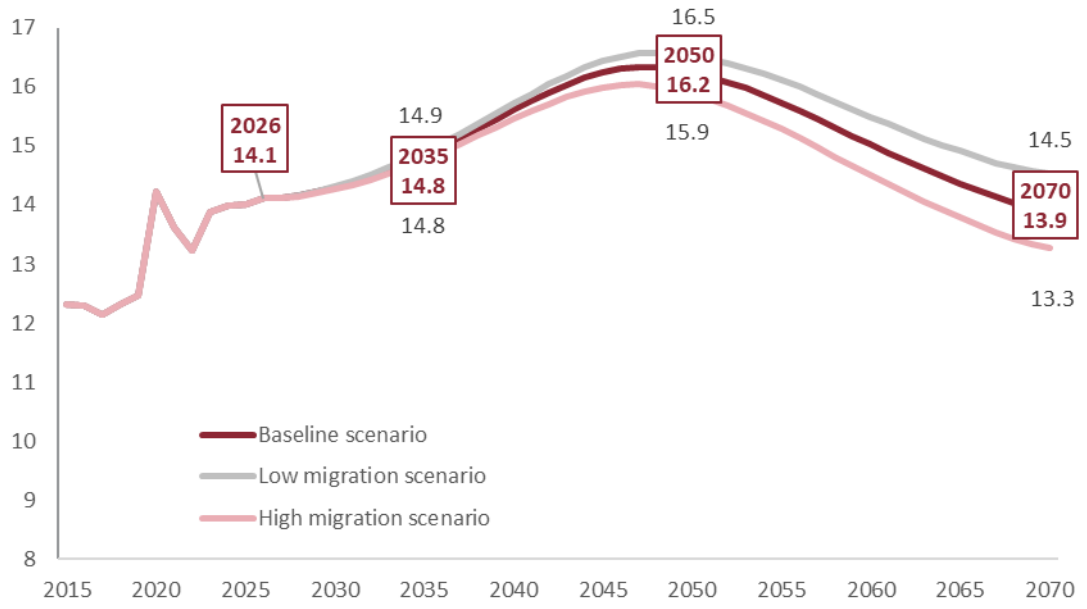
TABLE 9. INTERNATIONAL COMPARISON OF DEMOGRAPHIC ASSUMPTIONS

	Low migration	Baseline	High migration
Net migration flow 2022-2050 (thousand people)	206	239	271
Working-age population in 2050 (million people)	28,08	28,82	29,55
WAP reduction compared with 2021 (million people)	-3,72	-2,99	-2,25

Source: AIReF

Lower migration flows imply an increase in pension expenditure in 2050 of 0.3 points of GDP compared with the baseline scenario, while higher migration flows reduce expenditure by the same amount. The change in the working-age population affects the dependency ratio of the economy and GDP and, therefore, pension expenditure. In 2070, the differences would be 0.6 points in each direction.

FIGURE 70. TOTAL PENSION EXPENDITURE ACCORDING TO EVOLUTION OF MIGRATION (% GDP)



Source: Social Security and AIReF

AIReF estimates that in the scenario of low migration flows, debt could rise by around 7 points of GDP in 2050 and by 28 points in 2070, while falling symmetrically in the scenario of high migration flows. The impact of changes in migration flows, as in the case of macroeconomic variables, is not limited to pension expenditure, but also affects other expenditure and revenue, and through them, the deficit and accumulated debt. In the case of lower migration, the deficit in 2070 rises by almost 2 points, while in the case of higher migration, it would fall by a similar amount.

TABLE 10. EVOLUTION OF THE DEFICIT AND THE DEBT ACCORDING TO THE DIFFERENT MACROECONOMIC SCENARIOS

	Low migration scenario			Baseline scenario			High migration scenario		
(as % of GDP)	2035	2050	2070	2035	2050	2070	2035	2050	2070
Deficit	**-4.2**	**-8.3**	**-8.8**	**-4.1**	**-7.7**	**-7.0**	**-4.0**	**-7.1**	**-5.2**
Revenue	43.8	44.7	45.5	43.8	44.7	45.6	43.8	44.7	45.7
Expenditure	48.0	53.0	54.3	47.9	52.4	52.6	47.8	51.8	50.9
Debt	**111**	**153**	**214**	**110**	**147**	**186**	**109**	**140**	**159**

Source: IGAE and AIReF

6.3. Lower revenue-to-GDP elasticity

If revenue maintains a constant weight over GDP, the debt level will be 34 points of GDP higher in 2050. The evolution of revenue could be less dynamic than that resulting from the modelling of the main revenue headings, resulting in an implied average elasticity of 1.04 over the entire projection horizon, excluding measures. Given the impact of this evolution on the deficit, the alternative assumption is that revenue growth is equal to GDP growth. Under this alternative scenario of unitary elasticity with respect to GDP, the projections are more pessimistic than those of the baseline scenario, with a worsening of the deficit of about 6 points and an additional 85 points of debt in 2070.

TABLE 11. EVOLUTION OF DEFICIT AND DEBT ACCORDING TO THE DIFFERENT REVENUE ELASTICITIES CONSIDERED

	Scenario of revenue elasticity = 1			Baseline scenario (revenue elasticity >1)		
(as % of GDP)	2035	2050	2070	2035	2050	2070
Deficit	**-5.6**	**-10.9**	**-12.8**	**-4.1**	**-7.7**	**-7.0**
Revenue	42.5	42.5	42.5	43.8	44.7	45.6
Expenditure	48.1	53.4	55.3	47.9	52.4	52.6
Debt	**116**	**181**	**271**	**110**	**147**	**186**

Source: IGAE and AIReF

BOX 8. AGEING AND PUBLIC REVENUE

The projections made in this Opinion take into account the effects on public revenue and expenditure resulting from changes in the population's age structure and changes in the composition of their income in relation to the receipt of wages and pensions.

However, demographics can influence public revenue and expenditure through other channels as both the composition of individuals' income associated with wealth accumulation and their saving and consumption patterns change over the life cycle. This results in a certain heterogeneity in effective tax rates by age.

With regard to income taxes, the fall in the working-age population is reflected in a lower share of wages in national income. Given everything else, this translates into a lower collection of social contributions and a lower contribution from the progressivity of income tax since older taxpayers earn less income in relation to workers and generally bear lower effective tax rates, as shown in the attached graphs. However, these effects can be offset by two channels: on the one hand, older individuals tend to have higher accumulated assets, both real estate and financial, which will be associated with an increase in collection, although the tax rates on income from these assets are lower than those on wages (see Figure RE_6.3). In addition, the fall in the working-age population could drive up wage levels in the economy.

FIGURE RE_8.1. DISTRIBUTION OF GROSS INCOME BY AGE GROUP

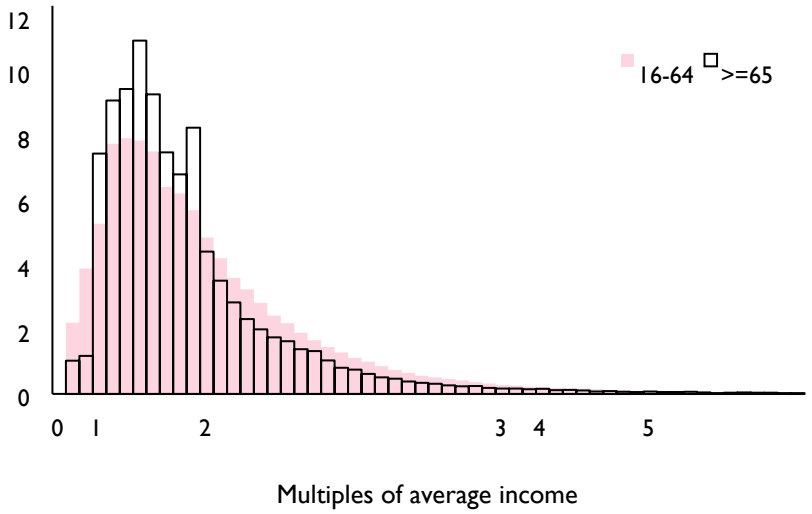


FIGURE RE_8.2. EFFECTIVE TYPES OF PIT BY AGE

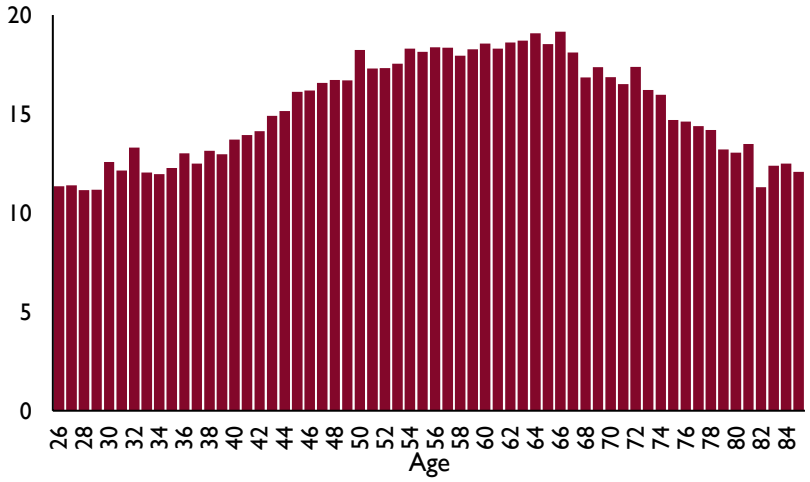
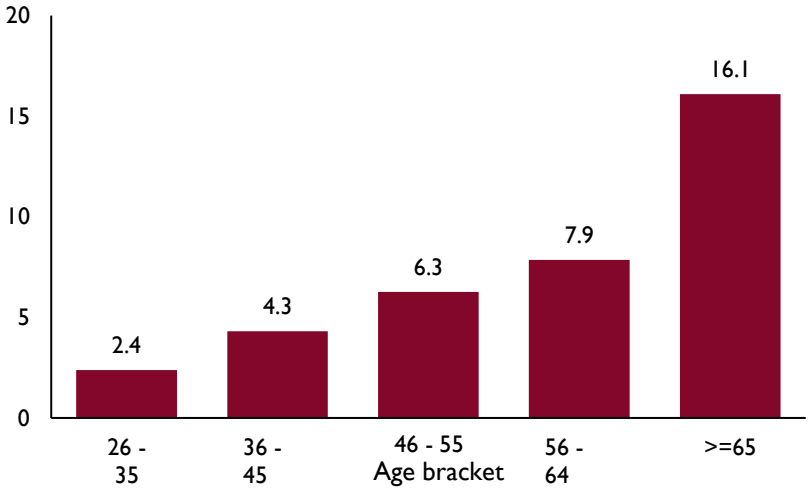


FIGURE RE_8.3. PERCENTAGE OF CAPITAL INCOME OVER TOTAL INCOME BY AGE GROUP



Source: Prepared by the authors based on the 2019 panel of personal income tax filers (AEAT-IEF_INE)

The collection of indirect taxes, particularly VAT, depends on the composition of individuals' consumption basket. In this regard, the evidence suggests that the older population consumes relatively more goods and services subject to lower rates (health services and food, for example) and less goods subject to higher rates or special taxes (fuels). Consequently, population ageing may lead to a lower collection of this type of tax.

At any event, the empirical evidence around the effects of ageing on collection is scant and not conclusive. Some studies conducted in Germany, the United States and Japan find that tax revenue falls as populations

age. However, most of these studies apply microsimulators and expected population changes to simulate tax revenue without taking into account possible changes in wages or other sources of income brought about by demographic ageing itself [61]. In contrast, a recent study for Austria suggests that, assuming rising real wages and pensions, an ageing population could lead to an increase in social security contributions per person[62].

6.4. Interest rates

The future evolution of interest rates will have a major impact on the sustainability of public finances, where a difference of 100 bp in financing conditions can represent almost 4 points of GDP in the long-term financial burden. Due to the large impact of the assumptions relating to the evolution of interest rates on the financial burden, especially over a 50-year time horizon, two alternative scenarios have been developed. The first, more pessimistic scenario foresees a more negative rate of evolution as from 2026 with a gradual and cumulative increase to 50 bp in 2030. A more optimistic scenario is also developed with an inverse evolution (reduction of 50 bp) of interest rates. The range between the two scenarios will mean almost 4 GDP points in the financial burden in 2070, from 5.2% to 9%. This would imply a range of 55 GDP points for debt – from 161% of GDP in the low-interest-rate scenario to 216% of GDP in the high-interest-rate scenario.

61 Borrallo, F., S. Párraga & J. Perez. Taxation challenges of population ageing: comparative evidence from the European Union, the United States and Japan, 2021. Bank of Spain; L. Calahorrano, L. Rebeggiani, S. Stöwhase & M. Teuber (2019) Demographic change and income tax revenues – results from a large microsimulation model for Germany, Journal of Economic Policy Reform, 22:4, 399-419, DOI: 10.1080/17487870.2018.1469984; M. Beznoska, T. Hentze, Demographic change and income tax revenue in Germany: a microsimulation approach, https://doi.org.10.3326/pse.41.1.8; H. Yashio & K. Hachisuka, Impact of Population Aging on the Personal Income Tax Base in Japan, Simulation Analysis of Taxation on Pension Benefits Using Micro Data, Policy Research Institute, Ministry of Finance, Japan, Public Policy Review, Vol.10, No.3, 2014

62 Prammer, D. (2019). How does population ageing impact on personal income taxes and social security contributions? *The journal of the Economics of Ageing*, *14*, 100186.

FIGURE 71. SCENARIOS FOR AVERAGE EMISSION RATES

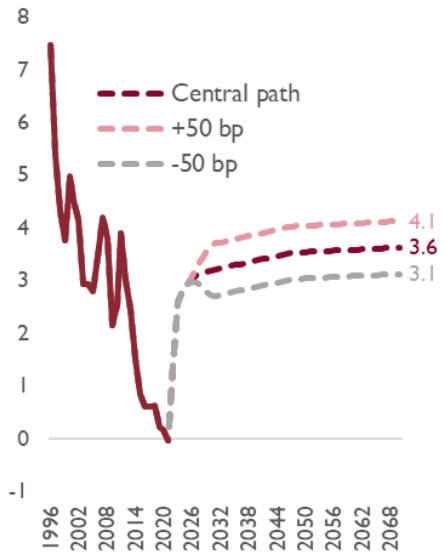


FIGURE 72. INTEREST EXPENDITURE (% GDP) ASSOCIATED WITH RATE SCENARIOS

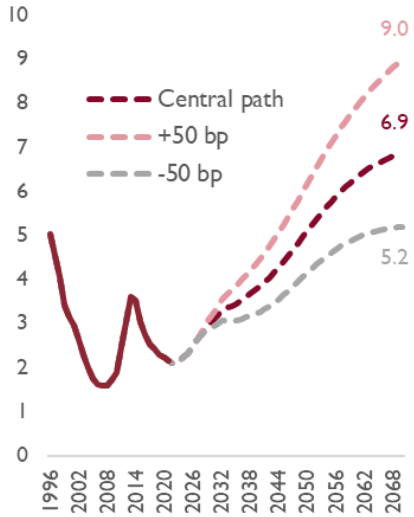
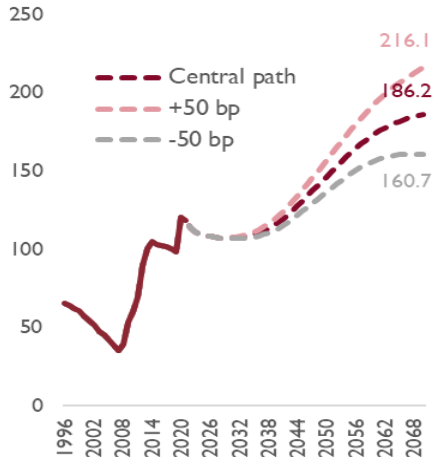


FIGURE 73. DEBT (% GDP) ASSOCIATED WITH RATE SCENARIOS



Source: Prepared by AIReF.

6.5. Sensitivity analysis

AIReF performs a detailed analysis of the impact of changes in assumptions on the variables that determine the demographic and macroeconomic scenario. Within the demographic scenario, the impact of changes in life expectancy, fertility and migration flows is analysed. Within the macroeconomic scenario, a sensitivity analysis is conducted on the participation rate, productivity and two unemployment scenarios, one with a rate slightly higher than the baseline scenario, and another with a convergence to the value of historical unemployment.

Pension expenditure is particularly sensitive to changes in migration and the level of unemployment. A more positive evolution of economic variables reduces pension expenditure, while a more adverse scenario increases it. Regarding the demographic scenario, higher fertility or migration flows drive expenditure down, while lower life expectancy also reduces pension expenditure, via the reduction in the total number of pensions.

TABLE 12. PENSION EXPENDITURE. DIFFERENCES FROM BASELINE (% GDP)

	Scenario Description	2035	2050	2070
High fertility	*Higher convergence value*	0,0	-0,1	-0,3
Low fertility	*No convergence value*	0,0	0,0	0,2
High life expectancy	*No convergence value (+1.2 years)*	0,1	0,3	0,5
Low life expectancy	*INE estimate*	-0,1	-0,3	-0,4
High migration	*80th percentile distribution (15% higher)*	-0,1	-0,4	-0,6
Low migration	*20th percentile distribution (15% lower)*	0,1	0,3	0,6
High productivity	*Convergence to 1.3*	-0,1	-0,4	-0,4
High participation rate	*+2 points in 2050*	-0,3	-0,6	-0,7
High unemployment	*Convergence at 10%*	0,2	0,4	0,3
Historic unemployment	*Convergence at 16.2%*	0,6	1,6	1,2

Source: AIReF

The evolution of pension expenditure is one of the main determinants of the evolution of debt. In adverse scenarios, debt levels could lead to an upward revision of the average interest rate, which would make the effect even larger than that presented.

TABLE 13. DEBT. DIFFERENCES FROM BASELINE (% GDP)

	Scenario Description	2035	2050	2070
High fertility	*Higher convergence value*	0,5%	0,0%	-8,3%
Low fertility	*No convergence value*	0,5%	0,4%	5,6%
High life expectancy	*No convergence value (+1.2 years)*	0,7%	2,9%	8,2%
Low life expectancy	*INE estimate*	0,3%	-1,8%	-8,7%
High migration	*80th percentile distribution (15% higher)*	-0,5%	-6,4%	-26,8%
Low migration	*20th percentile distribution (15% lower)*	1,7%	12,1%	27,9%
High productivity	*Convergence to 1.3*	-1,2%	-11,0%	-32,9%
High participation rate	*+2 points in 2050*	-2,6%	-11,7%	-25,6%
High unemployment	*Convergence at 10%*	3,2%	12,9%	24,0%
Historic unemployment	*Convergence at 16.2%*	8,9%	42,1%	82,5%

Source: AIReF

7. CONCLUSIONS

The public sector in Spain is vulnerable due to the persistence of the structural deficit and the high level of debt inherited from successive crises. After the Great Recession, public debt levels remained high, while the deficit only fell below the limit of 3% in 2019. Subsequently, the COVID-19 crisis dented economic growth and raised the level of debt. In addition, the energy crisis and higher inflation are delaying the reduction in the deficit, although the level of debt has begun a downward path thanks to the nominal growth of the economy. However, the medium-term outlook shows that the margin for reducing the deficit is exhausted without adopting additional measures, stabilising a little above the limit of 3% of GDP in 2026.

The ageing process imposes a great deal of pressure on public finances, which would place debt in a baseline scenario without measures at 186% of GDP in 2070. Based on the medium-term scenario, the Opinion makes forecasts of long-term expenditure and revenue and their impact in terms of debt. The ageing process results in a fall in the working-age population, partially mitigated by migration flows, which has an impact on economic growth. This, together with the arrival at retirement age of the most numerous baby boom cohorts, means an increase in expenditure on pensions, healthcare and long-term care. In the absence of further measures, the primary deficit would rise to peak levels around 2050, feeding through to the level of public debt. Even after overcoming the greatest pressures resulting from ageing, the debt would continue to grow until 2070, when it would reach 186% of GDP.

The sustainability of public finances will require a medium-term fiscal consolidation process. The high levels of public debt mean that the Spanish economy is highly vulnerable, especially in the event of adverse shocks, such as those recently seen, which, by definition, are not incorporated into the

baseline scenario. Both the starting point and the medium- and long-term forecasts unequivocally show that the public sector will have to make progress in the future in reducing the structural deficit in order to place debt on a downward path. This reduction should be reflected, as AIReF has repeatedly recommended, in a realistic and credible medium-term fiscal strategy.

The scenario with higher potential growth shows that economic growth is one of the pillars of the financial sustainability of the General Government. If structural reforms were implemented that increased long-term potential growth, by around 0.3 points in the alternative situation, the public finances situation would improve significantly compared with the baseline scenario. However, this scenario would continue to yield high deficit and debt figures - debt would peak at 126% in 2060 and subsequently fall to 117% in 2070.

Therefore, the medium- and long-term fiscal strategy must make economic growth compatible with the reduction of the structural deficit. Economic growth facilitates the processes of reducing the structural deficit. Therefore, the fiscal strategy must ensure that growth can be preserved. Consolidation processes in recessive contexts are often more difficult to implement and costly in social terms. For this same reason, the fiscal strategy must also have the appropriate flexibility to adapt to the economic situation and any adverse shocks that may materialise. In addition, the implementation of the RTRP offers a unique opportunity to reduce the nationally financed structural deficit, without this implying a shift to a contractionary fiscal policy that could harm growth.

The framework of fiscal rules - European and national - is the main tool to guarantee the sustainability of public finances. This fiscal strategy will be conditioned by the fiscal framework that emerges following the reform process at a European and national level. The gradual nature of the adjustment will be determined by the final result of the fiscal rules which, according to AIReF's simulations, could range between 0.27 and 0.52 points per year depending on the different parameters of the fiscal rules. In this regard, it is important to point out that the European Commission's proposal takes the starting point for defining a long-term scenario as that defined in this Opinion. In addition, the impact of the RTRP on growth would also make it possible to reduce the adjustment necessary to ensure sustainability.

8. PROPOSALS

Medium- and long-term fiscal strategy

The conclusions of the Opinion on the Sustainability of the General Government highlight the challenge posed by population ageing for the position of public finances. This is compounded by an already unfavourable situation due to the legacy of the shocks suffered in recent years and the absence of a consolidation process during the previous economic upswing.

A delay in addressing the challenges posed by ageing for the public accounts may raise public debt levels to records that could trigger the "snowball effect" at its peak. This would make it necessary to devote an increasing proportion of revenue to meeting the interest burden and diverting it from other uses that word have a greater impact on economic growth and the welfare of society.

In this context, it becomes necessary to open a process of reflection, both across society as a whole and internally in each authority on how to meet the challenges of the sustainability of the GG. The holding of different elections over the course of this year should not be an obstacle to this process, quite the opposite. As this constitutes one of the main challenges facing the Spanish economy in the coming years, it may be appropriate for the different parties to present their approaches to the public to start building the social consensus necessary to address it. After the election cycle

at all tiers of government, a new legislature will be opened and with it a window of opportunity to begin to implement less short-term approaches. This will lead to a healthier public accounts position, which will reduce vulnerability to possible changes in the perception of debt markets.

On this occasion, the Spanish economy has important levers on which to base this consolidation process. On the one hand, the boost to growth and structural transformation of the economy that might be provided by the RTRP if properly implemented. On the other hand, the reform of the European fiscal framework places the sustainability of public debt at the heart of the debate and the need for countries with higher debt levels to commit to a medium-term fiscal path that takes into account the challenges associated with ageing and that is sufficient to lower such debt levels to values that are less harmful to economic growth. National fiscal frameworks will need to carry over these commitments.

We are therefore at an ideal time to see where we stand and, on the basis of the analysis, to shape the solutions into a medium- and long-term fiscal strategy with the participation of all tiers of government. AIReF has repeatedly recommended that the Government should develop a medium-term strategy that will act as fiscal guidance and will realistically and credibly ensure the financial sustainability of the GG. This is in line with the obligation established by the Law on Budgetary Stability and Financial Sustainability to present a rebalancing plan. This recommendation would also be extended to all governments, regional and local, within the specific scope of their powers.

The current situation requires the capacity to adapt economic policy to the possible materialisation of risks arising from, *inter alia*, the war in Ukraine, inflation, the pandemic, climate change and the tightening of financing conditions. At the same time, a roadmap is required for reducing the structural deficit without hampering economic growth and allowing public debt to be brought to levels that mitigate the vulnerability of the Spanish economy to future crises.

For all these reasons, AIReF proposes that governments should:

1. **Structure a national medium- and long-term fiscal strategy with the participation of all tiers of government that includes a comprehensive reform of the national fiscal framework to ensure the sustainability of the GG. This requires:**

- **Considering the fiscal realities in terms of revenue and powers of each authority, to ensure adequate coordination and co-responsibility.**
- **Specifying the fiscal targets and milestone schedules.**
- **Including a sufficiently long time horizon to place debt on a path that will reduce its level of vulnerability.**
- **Integrating the macroeconomic and fiscal implications of the investments and reforms set out in the RTRP.**
- **Basing the strategy on realistic macroeconomic and fiscal forecasts.**
- **Including measures for contingency scenarios.**

Evaluating the evolution of the pension system

The demographic transition in which the Spanish economy is already immersed is generating a great deal of pressure on pension expenditure that will increase over the coming decades as the most numerous generations born during the so-called 'baby boom' retire. According to the analysis presented in this Opinion, the recent reforms result in an increase in the deficit as a percentage of GDP of 1.1 points until 2050 with respect to a scenario with PRI and the sustainability factor and without the reforms undertaken since 2021.

The Opinion also highlights the sensitivity of the evolution of pension expenditure to other factors such as economic growth, migration flows, life expectancy, price levels and wage evolution. In addition, there is a wide margin of uncertainty about the future evolution of the impact of reforms and other factors. A clear example would be the effects of incentives to delay retirement, which depend, as indicated in the Opinion, on changes in the behaviour of all agents.

Consequently, there is a need for ongoing monitoring and regular updating of the evolution of pension expenditure, in general, and of the impact of reforms, in particular. In addition to analysing the impact of all of these aspects in terms of future pension expenditure, their effects should be analysed from a broader perspective that incorporates other dimensions such as their impact in terms of sufficiency, contributory pensions and, particularly, intergenerational equity.

For all these reasons, AIReF makes the following recommendations to the Government:

2. **Monitor and evaluate the impact of pension reforms and the future evolution of pension expenditure, both in terms of expenditure and sufficiency, the contributory nature and, particularly, intergenerational equity as part of the design of the medium- and long-term fiscal strategy.**

Pension expenditure rule

The Second Additional Provision of Royal Decree-Law 2/2023 introduces a pension expenditure mechanism or rule and grants AIReF limited powers in the supervision and activation of corrective mechanisms. This expenditure rule sets a limit on the average weight of pension expenditure over GDP during the period 2022-2050 depending on the average impact of the revenue measures included in the reforms from 2020 onwards. In the event that it foresees a breach of these limits, the rule provides for the activation of mechanisms to compensate for the expected deviations.

Although such a rule contributes to the sustainability of public finances, its approach and design contain some weaknesses. Firstly, the setting of the limits of 15% of GDP for expenditure and 1.7% for revenue measures does not in itself represent a guarantee of sustainability without justification for setting these levels and not others. If these figures are obtained from current forecasts by the Ministry, the Commission or other types of analysis, both the forecasts as a whole and the assumptions and methodology on which they are based should be explicitly stated and published. It should include identification of the effects of this threshold, not only in terms of sustainability, but also of efficiency, equity and contributory nature, which are principles that characterise pay-as-you-go pension systems.

Secondly, this new fiscal rule would enter into force outside the reform of the European and national fiscal framework. There are therefore doubts about how it will fit in with the new framework. In this regard, it is essential that the future design of the national fiscal framework ensures consistency between all fiscal rules. The consistency of this new rule with the general expenditure rule, which is emerging as the main instrument of the new framework, is particularly relevant. In this regard, there are multiple options for the fit or hierarchy between the two.

Thirdly, AIReF's independent oversight capacity is undermined by the rule in relation to the case with other fiscal rules. The rule indicates that AIReF will use the forecasts and assumptions of the Ageing Report instead of AIReF's own forecasts as is the case with the

other fiscal rules. When monitoring the deficit target, debt target or expenditure rule, AIReF relies exclusively on its own analyses. In this case, it would be required to use a report prepared by the European Commission with the participation of the Member States, which substantially reduces the exercise of AIReF's independence.

Apart from these limitations, AIReF will independently fulfil its mandate as guarantor of the sustainability of public finances through the tools provided for in the Organic Law establishing the institution. In this regard, AIReF considers that this Opinion is a more complete and adequate approach to the sustainability of the Social Security system and of the General Government as a whole. For this reason, AIReF will, in the future, align the Evaluation Report provided for in paragraph 1 of the Second Additional Provision with the publication of the updated Opinion on the Sustainability of the GG. This will offer the Government, social stakeholders and society as a whole with an independent and detailed analysis of pension expenditure and the state of public finances as an objective element for decision-making.

In addition, it is necessary to adopt measures to solve or mitigate the weaknesses identified, so **AIReF proposes that the Government should**:

3. **Ensure coherence and consistency between all fiscal rules, including that developed in the Second Additional Provision of Royal Decree–Law 2/2023, in the reform of the national fiscal framework.**

4. **Facilitate the attendance of AIReF representatives at meetings of the Working Group on Ageing as observers and provide all information on assumptions, methodology, results and models used for the forecasts of the ageing report.**

5. **Establish an agreement to regulate the necessary exchanges of information and relations between AIReF and the Government for the proper implementation of the Second Additional Provision.**

6. **Publish the forecasts, assumptions and methodology used to determine the levels of expenditure and impact of measures included in the Second Additional Provision.**

Continuity in the evaluation of public health expenditure to strengthen knowledge of the factors determining its evolution and the efficiency of the spending.

The long-term evolution of healthcare expenditure in this Opinion is based on cohort models that project unit expenditure and

mainly depend on changes in the demographic structure. Until 2050, the increase in the age of the population due to the ageing of baby boomers will increase the expected expenditure to 8% of GDP. However, as from 2050, spending begins to moderate, mainly due to the lower weight of the ageing population over the total.

AIReF's evaluations of public expenditure on healthcare are an element that helps to better characterise the territorial determinants and specific features of healthcare spending. Thus, aspects such as the incorporation of new innovative medicines, the treatment of new pathologies, the expansion of the portfolio of services, the acquisition of new diagnostic equipment, the generational replacement of health personnel, the strengthening of the professional career, new recruitment methods and remuneration aspects are, in addition to demographic factors, other determinants that will condition the future evolution of healthcare expenditure.

In addition, these evaluations are making it possible to identify findings and proposals to strengthen the efficiency and sustainability of healthcare spending. For the time being, and within the scope of the Spending Review 2018-2020 commissioned by the Central Government, AIReF has proposed actions to strengthen efficiency in the pharmaceutical and capital goods area, such as establishing transparent criteria for the incorporation of new medicines into the covered portfolio, promoting the use of biosimilars, integrating pharmacy services into clinical units, centralising purchases around large hospitals and strengthening units for the rational use of medicines and pharmacists within primary care centres.

The continuity of these evaluations in other areas such as human resources, which already account for 43% of total spending, will make it possible to better determine the future dynamics of healthcare expenditure, as well as to identify findings and proposals that strengthen efficiency and contribute to the sustainability of the public accounts. Aspects such as the size and distribution of the workforce, personnel planning and organisation, remuneration and recruitment models, career and professional training and the appraisal of professional performance are areas whose evaluation should be carried out in order to provide solid and proven evidence to help public decision-makers in the coming years.

The Spending Review 2022-2026 does not envisage the continuation of the healthcare expenditure evaluation currently being undertaken by AIReF on the basis of specific commissions from certain Autonomous Regions. However, conducting simultaneous studies in all the Autonomous Regions in an area as complex and relevant as healthcare would have clear benefits in terms of scope, comparability and use of human and material resources.

In this regard, AIReF proposes that the Government should:

7. **Evaluate the public personnel spending and human resources policy in the National Health System (NHS), specifically in the following areas:**

    - **Planning, organisation and management of human resources.** Specifically, it would be advisable to evaluate the overall and operational strategic planning tools and the extent to which they are in line with established objectives, the size of the workforce and its territorial distribution between levels of care and centres, the instruments for managing personnel and the systems for recruiting, attracting and retaining talent, as well as the mechanisms for selecting professionals and filling posts. It is also particularly important to study the methods of hiring, as well as the evolution of temporary contracts and the turnover of professionals.

    - **Professional development and performance strategies**. It would be of interest to evaluate, in particular, career and professional development models and systems for defining and accrediting professional skills, as well as models for evaluating professional performance and associated financial incentives.

    - **Training plans.** Specific consideration should be given to defining and implementing plans and strategies for the ongoing training of professionals and health training of specialists in health sciences.

    - **Remuneration system and policy.** It would be of interest to study its coherence and congruence with the values, strategic objectives and needs of the NHS, and specifically to analyse the level of internal equity and external competitiveness of remuneration.

Evaluation of the impact of the RTRP on the growth and sustainability of public finances

The scenario with higher potential growth identifies that economic growth is one of the pillars of the sustainability of public finances. AIReF believes that the reforms and investments being implemented under the RTRP could boost productivity with

the consequent positive impact on the potential growth of the economy in the long term and, therefore, on the sustainability of public finances. In addition, some of the reforms under the RTRP will directly affect public sector revenue and expenditure and a portion of the investments will become structural expenditure or will require an increase in structural expenditure to be operational.

However, the lack of information makes the analysis of the impact of the RTRP very complicated. The details of many of the proposed reforms still pending approval or implementation are unknown. The budgetary impact of the investments and the reforms in force is not identified or quantified. The impact on the potential growth of the economy is not clearly detailed.

Given the scale of the funds received and the size of the proposed investments and reforms, it is necessary to establish a comprehensive framework for evaluating the RTRP with full information on the details of the reforms and investments and to analyse the degree of execution of the funds, assess the effectiveness and efficiency of the reforms and investments implemented and estimate their impact on the economy. With this comprehensive evaluation framework, an adequate estimation of the impact of the RTRP on the growth and sustainability of public finances could be made.

Moreover, the European Commission's proposal to reform the European fiscal governance framework will give fundamental weight to reforms and investments, placing growth as one of the pillars of sustainability. In their medium-term fiscal-structural plans, countries will have to set out the investments and reforms they intend to implement and their impact on public finances and growth. Therefore, evaluation will also be essential in this new framework of rules.

Although no specific evaluation of the RTRP is planned at a national level, evaluation is planned at a regional level as part of the necessary accountability to Parliament and the Council. In 2024, for example, an evaluation is planned on the implementation of the plans to analyse the extent to which the objectives have been achieved, efficiency in the use of resources and the relevance of the actions and objectives set. An overall *ex-post* evaluation including a long-term impact analysis is also planned for 2028.

Finally, it should be pointed out that evaluation is not only a European, but also an international, requirement. The IMF, in Article IV to Spain in 2022, stresses the importance of evaluation to improve the efficiency of

public spending and notes that improvements in spending efficiency should be guided by the spending reviews conducted by the newly established permanent division within the fiscal responsibility authority.

For all these reasons, and in the absence of an *ex ante* evaluation scheme at the start of the plan, **AIReF proposes** that the Government should:

8. **Design a RTRP evaluation governance model for the coming years. In this regard, and following the scheme proposed in the study on the institutionalisation of evaluation prepared by AIReF with the assistance of the OECD, governance based on three levels is proposed:**
    - **An internal institution of the Government that is aware of the specific features of the evaluation to carry out the planning and coordination of this evaluation and guarantee, in addition, the consideration by governments of the findings and proposals resulting from the evaluation.**
    - **Each management centre affected by the specific chapters of the RTRP should conduct a continuous follow-up by means of a map of indicators that addresses the degree of implementation and results. In addition, this map of indicators will serve to systematise, in part, the information needed to carry out the *ex-post* evaluation.**
    - **Independent and external agents should carry out more comprehensive evaluations that will determine the *ex-post* impact in terms of efficiency and effectiveness. This is particularly the case for those chapters on reforms and investments in the plan that may have greater importance in the future growth dynamics of the Spanish economy and on the composition of revenue and expenditure. This evaluation should include, in addition to rigorous impact and efficiency analyses, studies on the problems of the design and implementation of the plan that may have limited its potential scope.**

Preparation of a Report on Fiscal Risks

The existence of significant risks in the current context of major uncertainty makes it necessary for governments to identify the main fiscal risks and have strategies in place to mitigate the impact should they materialise. Therefore, in line with the proposal already formulated in the Opinion on Fiscal Transparency in the General Government in Spain published on April 15th, 2021, AIReF proposes that the Government should:

9. **Prepare a report on specific fiscal risks setting out the possible risks that may affect the fiscal projections. It should**

include information on the risks arising from the financial sector, the level of debt of public companies, natural disasters (including public health disasters), public-private partnerships, guarantee programmes, loans and judgments, asset and liability management and environmental risks.

- **Once the fiscal risks have been identified and analysed, it is important to assign probabilities to their materialisation and to quantify their impact.**
- **The risk mitigation strategy should be made explicit, either for the risks as a whole or for individual risks.**
- **The Central Government and Autonomous Regions should each develop strategies to manage the fiscal risks generated by possible natural, health and environmental disasters that may have a budgetary impact. These strategies should be public and reviewed at regular intervals. This measure would make the budgetary planning process more sophisticated, preparing it for natural and environmental contingencies, such as the impact of climate change. The strategies should consider the particular risks (pandemics, floods, droughts, fires or other catastrophes) to which each authority is subject. They should then quantify, on the basis of historical experience and taking into account projections of future contingencies, their potential budgetary impact, in order to take these risks into account in the budgetary planning of each public authority.**

The President of AIReF

Cristina Herrero Sánchez