1 Introduction

Accession to Economic and Monetary Union (EMU) by the main European economies led to an acceleration of the rate at which structural reforms were adopted in many member states, including Spain. Nevertheless, after ten years of EMU membership, the Spanish economy continues to face a number of difficult medium and long-term challenges which call for new and ambitious economic policy measures. Beyond the immediate problems of the current crisis, two major challenges stand out, with direct repercussions for our living standards over the coming decades. The first is to complete the process of convergence towards our European neighbours’ levels of income and welfare. The second is the rapid ageing of Spain’s population – a trend that will make it increasingly difficult to finance certain essential public services.

Despite the many things that have changed for the better in the Spanish economy in recent decades, in terms of relative income per capita within the group of the most advanced countries, Spain is today in exactly the same position it was in back in 1975: i.e. twenty percentage points below the OECD average. The long period of expansion which, with its ups and downs, we have enjoyed since 1985, has done no more than enable us to recover the ground lost during the profound crisis between the two years just mentioned. The outlook for the immediate future is not good, and things are unlikely to improve until we make a decisive effort to tackle some of the structural problems weighing down our growth and competitiveness.

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1 This paper has been translated from Spanish by Ducan Gilson.
2 Alesina, Ardagna and Galasso (2008) present evidence on the adoption of structural reforms in the EMU countries. Their findings suggest that in goods and services markets these reforms have been significant, whereas adoption of the euro has scarcely had any impact on the adoption of reforms in the labour market.
The battle for convergence has to be waged on two fronts: productivity and employment. In the case of productivity, we have been slipping relative to our direct competitors for over twenty years. In the case of employment, our experience from the last few decades is more positive, but two crucial problems persist. Even in the best of times, Spain registers activity and employment rates lower than those in comparable countries. And as recent data show, there is a tendency for employment to collapse when conditions turn sour.

The other big challenge we face is demographic. The crisis of the seventies also marked the start of a process of ageing which, despite the temporary relief brought by the wave of immigration in recent years, looks hard to reverse. Under these circumstances, there is no alternative but to redesign our system of social protection (including healthcare, pensions and care for dependent persons) to ensure its long-term viability.

In both cases, the necessary therapy will be painful in the short term, and therefore, unpopular in certain circles. In order to tackle these issues with a reasonable chance of success, we need to start a process of reflection and debate so as to raise public awareness and build a consensus that should include the main political parties and social actors. This paper is intended as a contribution to this debate. To this end, we have set out to identify some of the main economic challenges facing Spanish society today and to make some recommendations about the policies that would be necessary in order to overcome these challenges. Some of the reforms we propose are important not only in the long term, to ensure Spain’s growth and welfare, but also in the short term, to ease the way out of the crisis in which we are immersed. From this perspective, some of these reforms are, perhaps, even more necessary within EMU than outside of it, given that membership of the euro has meant renouncing some of the instruments available in the past, such as the option of devaluing the currency.

This paper is organised as follows. Section 2 analyses the progress of the Spanish economy over the last half-century, and its current situation in relation to the group of most advanced economies. From this exercise we have extracted a list of the three main economic and social challenges our country needs to address over the next few decades: increasing the growth rate of productivity, improving the functioning of the labour market and ensuring the viability of the social protection system in the context of a rapidly ageing population. Sections 3 to 5 look in more depth at these three topics, each focusing on one aspect of the problem we consider to be crucial. Section 3 is devoted to the education system; section 4

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3 The analysis of the Spanish economy’s challenges and the need for structural reforms has been a recurrent topic over the last few years, as is highlighted, for example, in the Informe Económico del Presidente del Gobierno (Prime Minister’s Economic Report, 2007 and 2008), the Programa Nacional de Reformas (National reform programme 2005) and numerous recommendations from the OECD and the European Commission.
to the necessary labour market reforms; and, section 5 the implications of the ageing population for the viability of the pension system. Section 6 offers some conclusion.

2 The Spanish economy: a comparative perspective

This section undertakes a comparative analysis of the current situation of the Spanish economy and how it has developed over the last few decades in terms of some basic economic and demographic indicators. Our reference will be an aggregate which we shall call OECD-21, which comprises the main economies of the OECD. It excludes the most recent members of the organisation and some small economies for which it is sometimes difficult to obtain all the necessary data.  

This section is divided into five sub-sections. In the first of these we use a simple decomposition of relative per capita income into three factors linked to productivity, employment and demography to perform an initial diagnosis of the relative performance of the Spanish economy. In the following three sub-sections we look in more detail at each of these factors. The final sub-section summarises our main conclusions and presents the topics which will be covered in the rest of the paper.

2.1 The sources of the income differential with comparable countries

Chart 2.1.1 shows the variation over time of relative per capita income in Spain, the United States and the EU-14 (i.e. the EU-15 minus Luxembourg) between 1955 and 2007. This variable is defined as output per capita in each territory, corrected for purchasing power differences and expressed in logarithmic differences with the OECD-21 average.

The chart suggests that the period we are analysing can be broken down into three sub-periods according to the behaviour of Spanish per capita income: a rapid approach to the average (1955-75), a strong reversal of the trend (1975-85), and a third phase of more gradual convergence (1985-2007) at the end of which Spain was still 20 percentage points below the OECD-21 average, 7 points from the EU-14 average, and 39 points below the United States.

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4 Specifically, the members of this aggregate are the countries of the EU-15, with the exception of Luxembourg, plus the United States, Canada, Australia, New Zealand, Japan, Switzerland and Norway.

5 For more details of the construction and sources of the variables used in this section, see Annex 1.
In order to investigate what lies behind the process we have just described, we will start out with a simple breakdown of relative per capita income. The output per inhabitant of country $i$ ($PCI_i$) can be expressed in the following form:

$$PCI_i = \frac{GDP_i}{POP_i} = \frac{GDP_i}{	ext{HOURS}_i} \cdot \frac{\text{HOURS}_i}{P1564_i} \cdot \frac{P1564_i}{POP_i} = QH \cdot LMKT \cdot DEM_i$$  \[1\]

where $POP_i$ is the total population, $P1564$ the working age population and $\text{HOURS}_i$ the total number of hours worked. This breaks per capita output down into three components: a demographic component (DEM), which corresponds to the fraction of the population of working age, productivity per hour worked (QH), and a third component (LMKT) which incorporates factors linked to the behaviour of the labour market. Dividing all the variables by their averages in the OECD-21 group and taking logarithms of the resulting expression, we obtain:

$$pci_i = qh_i + dem_i + lmkt_i$$  \[2\]

where the terms on the right-hand side are the components of relative per capita income. Lower-case letters are used to indicate that all the variables are measured in logarithmic differences with the sample average (which is approximately equal to the percentage difference between these two quantities, provided that this difference is not too large).

Table 2.1.1 and Chart 2.1.2 summarise the results of the breakdown of Spanish relative income per capita into the factors just mentioned. Chart 2.1.2 shows the time course of the main components of this variable while Table 2.1.1 gives the values in a selection of years between 1960 and 2007.
The main source of the differential in income between Spain and the OECD is currently the low level of productivity per hour worked, followed by a below-average utilisation rate of human resources. The first of these factors contributes more than 13 percentage points to the income differential with respect to the OECD average, while the contribution of the second factor is 8 percentage points. The only mildly positive factor is demography, which reduces the gap in per capita income by six tenths of a point.

Looking back, things have changed significantly over the last half century. The demographic component of per capita income was negative until just a few years ago, and has followed a U-shaped curve, with a minimum value of −8.1 points in 1980. Also, the productivity differential fell by 29 points between 1960 and 2007, while the labour market component registered a slight deterioration between the start and the end of the period.

The last two components of relative income experienced significant fluctuations over the course of the last half century, moving in opposite directions for much of it. Between 1960 and 1985, Spain’s relative productivity improved spec-
tacularly (almost 47 points in 25 years), reaching a peak 4.5 points above the OECD-21 average in 1985. Since then, however, the trend has been reversed. Between 1985 and 2007 Spain lost almost 18 points in relative productivity per hour worked, thus returning to its 1977 position.

The behaviour of the labour market component of income per capita is very different. Between 1960 and 1975 there was a slight improvement (9.5 points), which put Spain slightly above the average. Between 1975 and 1985, however, the deterioration in the labour market subtracted 35 points from relative income. Two thirds of the ground lost during this dramatic fall was gradually recovered over the last two decades.

2.1.1 The challenge of real convergence

The data reviewed above point to two clear grounds for concern about the current state of the Spanish economy and its relative performance over the last half century. The first is the evolution of productivity. In 2007 output per hour worked in Spain was 13% below the OECD average and had fallen by almost 18 points over the two previous decades. The second is the poor functioning of Spain’s labour market. Despite the fact that in 2007 the Spanish economy was in the most favourable position it had been in for almost three decades in terms of employment, the labour market component of our relative income continued to be almost eight points below the average for the reference sample. Adding both factors together, the gap in per capita income between Spain and the OECD average slightly exceeded 20 percentage points in 2007, almost exactly the same value as registered in 1975, more than 30 years ago. The short-term prospects are, moreover, clearly negative and point towards the likelihood of Spain’s process of convergence with the group of comparable countries going into reverse.

The first long-term challenge the Spanish economy is facing is therefore that of breaking through this “glass ceiling” situated twenty points below the OECD average. This is a level which has so far represented an impassable barrier to our relative position within the group of the world’s wealthiest economies. In what follows we will try to look in more detail at some of the aspects of the diagnosis sketched out in this section and identify the type of measures that will be necessary to complete Spain’s transformation into an economy fully able to compete with the most advanced countries on an equal footing.

2.2 The labour market

The labour market component of relative per capita income can in turn be broken down into three factors linked to labour-force participation and employment rates (LFPR and ER), and the number of hours worked per employed person (HW), respectively:
where \( \text{LF}_i \) and \( \text{NEP}_i \) refer to the labour force (active population) and the number of employed persons, respectively. Taking logarithmic difference from the aggregate average, we obtain:

\[
\text{lmkt}_i = \text{lfpr}_i + \text{er}_i + \text{hw}_i
\]
A more detailed examination of the comparative progress of some of these indicators will allow us to identify some of the specific features of Spain’s experience. Even in the best of times, Spain registers labour-force participation and employment rates lower than the OECD averages. In times of crisis, moreover, both variables tend to drop more rapidly than in other economies. Both phenomena are illustrated in Charts 2.2.2 and 2.2.3, where Spain’s labour force participation and unemployment rates during the period 1960-2007 are compared with the average, maximum and minimum values in our sample. What stands out is that over an uninterrupted period since the mid-seventies, Spain has enjoyed the dubious honour of having both the highest unemployment rate in the OECD-21 and a below-average labour-force participation rate.

CHART 2.2.2 LABOUR-FORCE PARTICIPATION RATE

CHART 2.2.3 EMPLOYMENT RATE
(NUMBER OF EMPLOYED PERSONS/TOTAL LABOUR FORCE)
The first of the two problems we have just highlighted (low employment rates even in boom times) seems to be concentrated almost exclusively in the female population, which suggests that systematic barriers remain to the full incorporation of women to the labour market and that these barriers are higher in Spain than in other industrial countries. Using data from 2007, Charts 2.2.4 and 2.2.5 show the labour-force participation and unemployment rates broken down by sex and age group in Spain, along with the average for the EU-15. In the case of men, there is practically no difference between Spain and the EU (for this reason the European data are omitted). The labour-force participation and employment rates for Spanish women, however, are lower than the European figures for al-
most all age groups, and in turn, these are almost always lower than the figures for their male counterparts.

The difference in labour-force participation and employment rates in favour of men tends to widen with age, at least between the ages of 25 and 55 years. This phenomenon may partly reflect differences between cohorts in attitudes and social norms regarding women’s participation in the labour market. To control for this factor, Charts 2.2.6 and 2.2.7 summarise the same data as shown in the previous two charts, but in this case focusing only on Spain and the progress of one cohort over time. We also observe an increase in the differential in favour of men during fer-

CHART 2.2.6  EVOLUTION OF THE LABOUR-FORCE PARTICIPATION RATE OF A GIVEN COHORT (SPAIN)

CHART 2.2.7  EVOLUTION OF THE UNEMPLOYMENT RATE OF A GIVEN COHORT (SPAIN)

tile years, which tends to be inverted after the age of 35 or 40, however. This pattern suggests that the lower labour-force participation and employment rates among women that we observe in the data are fairly closely related to the difficulties existing in Spain for making family responsibilities compatible with work, and that the burden of these responsibilities falls disproportionately on women. Certain factors which may considerably aggravate the problem are the limited flexibility of labour contracts, the incompatibility between work and school hours and holidays, and the shortage of affordable child-care and care for the elderly.

The second peculiarity of Spain’s labour market is its tendency to adjust in terms of quantity rather than prices, which means jobs are destroyed rapidly during a crisis. In the decade following the first oil crisis in the seventies, the number of jobs per working age person fell by 23% in Spain, compared with a drop of 3% across the OECD-21, a fall of 8% in the EU-15 and a rise of 2% in the United States. During the recession in the early nineties the story was similar, although less dramatic. In the three years following the start of the crisis, the employment indicator fell by 6.4% in Spain, 3.5% in the EU-15, 2.3% in the United States, and 1.9% in the OECD.

The data from the last quarters of 2008 also point in the same direction. Chart 2.2.8 shows the increase in the employment rate recorded between the third quarter of 2007 and the third quarter of 2008. Spain is, by a wide margin, the EU country in which this indicator has been most adverse, with the unemployment rate rising by more than 2.5 points (from 8.7% to 11.4%), compared with an average of just a tenth of a point for the EU-15 as a whole (from 6.9% to 7%). According to the Spanish Labour Force Survey (Encuesta de Población...
Activa, EPA), the number of people out of work rose during the fourth quarter of 2008 by more than 600,000, adding 2.6 points to the unemployment rate in the third quarter. This has undoubtedly widened our differential with the European average even further.

### 2.3 The evolution of productivity

The productivity component of relative per capita income \((q_h)\) can be broken down into various factors using an aggregate production function. We shall assume that this is of the Cobb-Douglas type, with constant returns to scale in labour and capital for a given average level of training of the labour force. Under these assumptions, the production function can be expressed in intensive form, as a function relating output per hour worked to the stock of capital per hour worked \((k)\), average educational attainment \((\text{edu})\) and total factor productivity \((\text{tfp})\):

\[
q_h = \text{tfp} + \theta_k k + \theta_{\text{edu}} \text{edu}
\]

As before, all the variables are measured in relative terms, that is to say, in logarithmic deviations from the weighted sample average. The coefficients \(\theta_k\) and \(\theta_{\text{edu}}\) are the elasticities of output with respect to the various factors of production and measure the percentage increase in output that would be produced by an increase of 1\% in the stock of each factor considered, while keeping the other factors constant.

The data on capital we have used in order to apply equation [5] correspond to the stock of non-residential private capital, while the level of educational attainment is measured in terms of the adult population’s average number of years of schooling.\(^6\) The values assigned to the elasticities shown in equation [5] \((\theta_k = 0.345\) and \(\theta_{\text{edu}} = 0.394\) come from de la Fuente and Doménech (2002), who estimated an aggregate production function using OECD-21 data that are similar (but not identical) to those used here.

Using equation [5] we can break down Spain’s relative productivity into the contributions of physical and human capital and total factor productivity. Table 2.3.1 and Chart 2.3.1 summarise the results.

One very surprising aspect of these results is that the estimated level of Spanish TFP is higher than the average for the OECD-21 throughout the period analysed. This indicator reached a peak of 25\% above the average (15\% above the United States) in the mid-eighties. This result is rather implausible, suggesting the possible existence of measurement problems that could be biasing the estimate of Spanish TFP upwards (it should be remembered that TFP is obtained as a residual, by subtracting the contributions of the various factors of production

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\(^6\) See Annex 1.
from relative productivity). One possible reason for this would be a systematic undervaluation of the average hours worked, as this would lead to an overvaluation of the relative productivity and the contribution of the capital stock (per hour). Another factor suggesting that these results should be interpreted with extreme caution is that the levels of TFP are sensitive to the sectoral structure of prices in the base year used to construct the real output series (Dabán, Doménech and Molinas, 1997).

It would therefore seem advisable to focus more on the way TFP varies over time than on its absolute values. From this viewpoint, the most noteworthy feature of Chart 2.3.1 is the rapid loss of relative efficiency suffered by the Spanish economy over the last two decades. Indeed, between 1990 and 2007 Spanish TFP declined in absolute as well as relative terms.

As for the remainder of the components of relative productivity, the contribution of human capital has been on an upward trend since 1970. At the end of the period, however, the level of qualifications of Spain’s population still contributed slightly more than 10 percentage points to the differential between Spain’s income and productivity and the average for the reference group of countries, thus
making it the main direct source of the productivity gap. A clear pattern of convergence to the mean is also observable in terms of the stock of physical capital. Convergence in this factor is stronger than that observed in the case of human capital and is concentrated in the first half of the sample period. It should be noted that the approach to the other countries’ average physical capital stock per unit of labour which took place during the period of crisis was largely due to the rapid loss of jobs. Moreover, the doubts and reservations already expressed about the “hours worked” data series lead to uncertainty over the validity of the level of this series which, according to our estimates, would point to a productivity gap between Spain and the OECD-21 of just 5 points in 2007.

2.4 Demography

The second big challenge the Spanish economy faces is the rapid ageing of the country’s population, and all this entails in terms of growing difficulties for funding some of the main social benefits. The problem is not readily apparent in the retrospective breakdown of income we have taken as a starting point, but it becomes obvious as soon as we start looking at how basic demographic indicators have evolved.

As we have already seen, the demographic component of Spain’s relative per capita income has developed favourably over the last three decades. This phenomenon, however, corresponds to the initial period of a process of ageing which began late in Spain, but has been very rapid. In its early stages, this process translated into an increase in the relative weight of the population of working age, in detriment of younger cohorts. As time goes by, however, the trend is for these two groups to shrink relative to the older population, causing the sign of demographic component to change. This could lead to serious problems for the sustainability of public finances. We will look at some of these issues in more detail below.

Charts 2.4.1 and 2.4.2 show how Spain’s relative situation has evolved in terms of the relative sizes of the various different population segments. Up until the nineties, Spain’s population was relatively young, with the share of the population of school age being above the OECD average and the share of the population aged over 65 below the OECD average. After the nineties, however, the situation reversed: the share of the population of retirement age moved above the average and the share of the youngest population segment became one of the lowest in the sample.

The immediate causes of this phenomenon are shown in Charts 2.4.3 and 2.4.4. These causes are the considerable increase in life expectancy registered during the period, and in particular, the sharp drop in the Spanish birth rate. This fell by more than 50% between the mid-seventies and mid-eighties leaving Spain with one of the lowest fertility rates in the world.
Charts 2.4.1, 2.4.2 and 2.4.4 show a slight trend towards an inversion of the ageing process of the Spanish population during the first few years of the present century. During this period the crude birth rate picked up slightly, while the school-age population as a share of the total stabilised and the population aged over 65 fell slightly. These three phenomena are the result of the rapid inflow of immigrants during the period, as newcomers were characterised by a lower average age and a higher fertility rate than the native population. The quantitative importance of this phenomenon can be seen clearly in Chart 2.4.5. The number of people of foreign origin in Spain rose from 0.6 million in 1998 (1.6% of the
total) to 5.3 million in 2008 (11.4%). Three quarters of the increase in Spain’s population during the last decade was as a result of immigration.

As we shall see below, the most reliable forecasts suggest that immigration can provide only temporary relief from the ageing process. The high levels of immigration seen in recent years would be difficult to sustain over the long term, and the forecasted flows are insufficient to offset the decline in the population of fertile age, which has already started, or the continuing increase in longevity expected over the coming decades. The demographic outlook, therefore, is for a continuation, and indeed an acceleration, of the process of ageing that has already begun.
Chart 2.4.6 presents some of the immediate causes of this phenomenon in visual form. The graph shows the distribution of the population resident in Spain according to its date of birth. The population curve clearly reveals the effects of the Civil War, the long baby-boom from 1955 to 1975 and the consequences of the fall in birth rates over the last three decades. The vertical lines on the graph divide the population according to three age segments. Shifting the window marking out the working age population towards the right gives us an idea of where we are heading. A large part of these baby-boom cohorts have now left their fertile years behind them and are approaching retirement,
while the cohorts joining the working age segment will soon be smaller than those leaving it.

2.5 Summary and plan of the following sections

Over the coming decades, Spanish society will face two big economic challenges: The first is to complete the process of real convergence with the countries of the OECD and, the second to adopt the reforms necessary to ensure the viability of the welfare state in an adverse demographic context. Both challenges have multiple dimensions and call for actions of various types. To get closer to income levels in the more advanced countries we need to speed up our productivity growth and improve the functioning of our labour market, both in boom times and in crises. The first goal requires that we invest more, and more efficiently, in various types of tangible and intangible assets, but also that we adopt complementary measures to eliminate unnecessary obstacles to economic activity and to increase competitiveness and improve the regulation of our goods and services markets. The second requires a diverse range of legal and institutional changes, together with specific actions to eliminate the obstacles that still remain to the full incorporation of women to the job market. Finally, the demographic challenge will demand changes in many aspects of the social protection system, including healthcare, pensions and assistance to dependent persons.

It would be impossible to address all these issues in a single paper. Given the limitations of space and time we face, we have decided to concentrate on three issues we feel are crucial to the country’s economic future: the education system, and the necessary labour market and pension system reforms. Each of the following sections focuses on one of these topics. Along with our comparative advantage in understanding some of them, this choice is also justified by the fact that other challenges facing the Spanish economy are highly dependent upon the challenges we examine here. For example, although increasing R&D investment is necessary in Spain in order to get closer to the leading OECD countries, such investment may be hampared by the lack of a sufficiently educated population or by the existence of distortions in markets for labour and goods that may reduce the incentives to invest in R&D. Something similar is also true of Spain’s international competitiveness, in that improving it would require flexible and competitive markets for labour as well as goods and services, and a bigger investment effort in human capital and R&D.

3 The educational challenge

One of the clearest implications of the preceding section is that improving productivity has to be among the basic priorities of Spain’s economic policy. Of the
many factors that could have an impact on this variable, in this paper we will focus on education. This is partly for reasons of space and comparative advantage, and partly because we are convinced that, as a growing body of empirical evidence suggests, education is a key long-term determinant of both productivity and employment in a world in which output is increasingly knowledge intensive.7

3.1 The current state of education in Spain

Over the last few decades Spanish society has made a big effort to raise its level of education. Whereas in 1960 10% of the adult population was illiterate and the majority barely had primary education, in 2001 the rate of illiteracy had fallen to below 3% and was concentrated in the elderly, while almost 60% of the population had completed secondary or university education. As a result of this process of accumulation of human capital, the average number of years of schooling among the adult population rose by approximately 70% between 1960 and 2000 (4.97 to 8.19 years), with the bulk of the improvement concentrated in the last two decades.

As can be seen in Chart 3.1.1, this effort has served to considerably narrow the educational divide between Spain and the group of comparison countries, but has

7 The literature on the topic is very extensive and this is not the place for anything more than a very brief summary. For an overview, see de la Fuente and Ciccone (2003), de la Fuente (2004) and Doménech (2008).
Spain and the euro. The first ten years

not eliminated it. Between 1960 and 2005 the distance from the EU-15 average (excluding Luxembourg and Spain) and from the United States in terms of average schooling shrank considerably, dropping from 36 to 19 and from 53 to 31 percentage points, respectively.

Although the improvement in relative average educational attainment in Spain has undoubtedly been considerable, at least three important problems remain. The first is that our average level of training is still a long way from the average in comparable countries. The second is that the educational structure of the population is still very imbalanced, with a bias towards the extremes. We have a relatively high proportion of university graduates, but also a large proportion of the population that has not managed to get beyond compulsory schooling. The third problem is the inadequate quality of our educational system, which is manifest, among other things, in the poor performance of Spain’s pupils in international standardised tests or the weak position of our universities in the international quality rankings.

The first of these problems appears to be on its way to being solved, at least partly, but not the second or the third. Chart 3.1.2 shows the breakdown of the

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8 To these three problems we could add a fourth, which we will not address in this paper. This is the existence of marked differences in education between regions, which do not appear to be diminishing of their own accord. On this topic, see de la Fuente and Doménech (2006b) and de la Fuente (2006a). Fuentes (2009) analyses in detail the situation of the education system in Spain in relation to other OECD countries and the reforms needed to improve its results.
Spanish population by educational attainment (low, medium and high) across different age groups. The share of the population at each level of educational attainment has been normalised using the OECD-21 average (excluding Japan, for which not all the necessary data are available) in order to highlight Spain’s relative position. The breakdown by age groups makes it possible to analyse how our relative situation has varied over time as we take the younger cohorts into account.

If we focus on the fraction of the population that has finished some form of tertiary education (that is to say, has obtained a university qualification or advanced professional training), the situation is not bad and has improved rapidly over time. Considering the working age population as a whole, Spain is currently only slightly below the OECD average and is above this reference if we consider only the youngest adult cohort (between 25 and 34 years of age).

In the case of the other two groups, the situation is much less satisfactory. The relative size of the least qualified population segment (i.e. persons completing no more than the first stage of secondary education) has remained almost constant in all the cohorts at a level higher than that observed in other advanced countries. The intermediate group (i.e. those who have completed upper secondary education or basic vocational training) is well below the average in terms of its relative size and, although progress can be seen when comparing the three older cohorts with one another, the situation appears to have stagnated in the last decade. As shown in Chart 3.1.3 the situation is similar when we compare ourselves with our EU neighbours in terms of school failure rates.

**CHART 3.1.3  PREMATURE SCHOOL-LEAVING RATE**

![Chart showing premature school-leaving rate in EU-15 and Spain from 1995 to 2007.](chart)

NOTE: Percentage of the population aged 18 to 24 that has not completed the first stage of secondary education and is not in school.

The first ten years

A worrying fraction of young Spaniards receive only the education that is legally compulsory. By contrast with what we see in the EU, moreover, this fraction does not show any clear downward trend over time, and has even tended to rise slightly in recent years.

To the quantitative deficits we have just highlighted we also need to add a significant and growing qualitative deficit which shows up, among other places, in the poor performance of our secondary school pupils on standardised international aptitude tests such as those carried out by the OECD through the PISA project. As can be seen in Chart 3.1.4, Spain has been well below the OECD average in the last two rounds of PISA, both in mathematics and reading comprehension. Moreover, it shows an extremely worrying backward trend on both scales, particularly the second, in both absolute and relative terms.

Although these indicators need to be interpreted with caution, another worrying sign of the unsatisfactory quality of our education (and research) system is the weak position of Spanish universities on international rankings. According to the most frequently cited rankings, namely those to the University of Shanghai and the Times World University Ranking, Spain’s top institution is below posi-

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NOTES: Observation 1 (obs 1) combines the results of the test of reading in 2000 with that of mathematics in 2003, while observation 2 combines the average results of both tests in 2006. All results are standardised using the sample average in each year (which reduces the two tests by 1.1% in the case of reading and 0.5% in the case of mathematics). The sample comprises all the OECD countries that took part in the relevant tests with the exception of Mexico.


Key: ES = Spain, Tu = Turkey, Gr = Greece, It = Italy, Po = Portugal, Sk = Slovakia, NZ = New Zealand, Can = Canada, Aus = Australia, Fin = Finland and Ko = Korea.

According to this latter source, of the world’s top 100 universities, 37 were in the US, 17 in Britain, 7 in Australia, 5 in Canada and 5 in China (including Hong Kong). Japan and the Netherlands each had 4 institutions in the group, Germany and Switzerland 3, France, South Korea, Singapore, Denmark and Sweden 2 and, Belgium, Finland, Israel, Ireland, and New Zealand each had 1. Finally, universities in Austria, Taiwan, India, Thailand, Mexico, Norway, South Africa and Russia are listed in the rankings above the first Spanish institution (the University of Barcelona).

### 3.2 What education policies? Some lessons from the literature

The economics literature suggests that the stock of human capital is an important determinant of income levels and a strategic competitiveness factor in an increasingly knowledge-based economy. Therefore, correcting the problems outlined above is a necessary condition for Spain’s desired convergence with the most advanced countries in terms of income and welfare.\(^{10}\)

As we have seen, there is considerable room for improvement in our stock of educational capital in both quantitative and qualitative terms. In relation to the first of these dimensions, there is a long way to go before our upper secondary enrollment ratios approach those seen in most industrialised countries. At some point, however, additional increases in the average number of years of schooling will inevitably lead to rapidly diminishing returns.\(^{11}\) In the long term, therefore, it seems clear that educational quality rather than quantity is the more relevant margin.

Designing policies which help improve student performance is, however, a complicated issue for which the aggregate comparative studies prevailing in the literature on education and growth provide little guidance in practice. There is, however, a considerable volume of micro-econometric research on the economics of education which gives us at least some general indications that may be helpful in setting policy priorities. The main implications can be summarised in two propositions. Firstly, offering the right incentives to all the participants in the educational process is likely to be more important than increasing the volume of resources, at least in advanced countries where expenditure on schooling is already very significant. And, secondly, higher returns from investments in education are associated with

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\(^{10}\) This section is based on de la Fuente (2006b). See also Círculo de Empresarios (2006) for another analysis along similar lines.

\(^{11}\) Econometric estimates of aggregate production functions do not suggest rapidly diminishing rates of return to increases in the average level of schooling around the observed levels of this variable. Even so, the return to education will drop if young people stay in the education system longer because their working lives will be shorter, thus reducing the period over which they enjoy the returns on the investment in their education. Moreover, the appearance of sharply diminishing returns is inevitable at some point. It does not seem likely, for example, that the whole population has the necessary ability to be able to benefit from higher education.
early interventions, particularly when these are focused on children from disadvantaged families.

3.2.1 Determinants of the quality of education

Economists tend to think about education as a standard production process in which various types of input (pupils’, parents’ and teachers’ time, school facilities, textbooks and other teaching materials, etc.) are combined to produce an educational output that we could identify with the acquisition of useful knowledge and skills. When we look at things in this way, it is tempting to think that any desired increase in students’ academic performance can be obtained by injecting sufficient resources into the education system. In fact, many discussions on education policy implicitly take this approach and focus on the need to increase expenditure in order to reduce the number of students per classroom, buy more computers, cut tuition fees or increase the number of scholarships.

Unfortunately, the problem is rather more complicated. A considerable number of papers in the recent literature suggest that increasing inputs does not necessarily yield better academic performance. Despite the sharp rise in spending per pupil and the continuous drop in the number of students per classroom, school performance does not appear to have been on an upward trend over the last few decades in most OECD countries and in fact has declined significantly in many of them (Hanushek, 2003, Hanushek and Woessmann, 2008 and Gundlach et al., 2001). Nor is there a clear cross-country correlation between spending levels and results on international standardized tests. Finally, micro-econometric estimates of educational production functions with very different samples of students yield rather inconclusive results in the best of cases, and a preponderance of non-significant coefficients or coefficients with the “wrong” sign (see Hanushek 2003 for a meta-analysis of these papers and Woessmann 2003 and 2005 for two thorough studies on the topic in which two broad international samples of individual data are used). Although the debate is far from over, as the probable endogeneity of the allocation of resources within and between schools makes it difficult to isolate the causal impact of classroom sizes and other input indicators on educational performance, Heckman (2000) maintains that, even if we accept the most optimistic estimates found in the literature on the effects of teacher/pupil ratios on the future income of the pupils,

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12 Hanushek (2003) and Hanushek and Kimko (H&K 2000) conclude that the usual indicators on the use of resources in the education system do not have a perceptible effect on the quality of education, measured by standard performance tests. Lee and Barro (2001), however, find a positive correlation between some of the expenditure variables and the results on these tests.

reducing the number of students per teacher would be an inefficient policy with negative expected returns.

Overall, therefore, it looks unlikely that indiscriminate increases in spending would contribute significantly to improving academic performance among pupils in Spain or in other European countries. Some of the leading experts in this field maintain that a more promising alternative would be to focus on providing appropriate incentives for students, teachers and school managers, broadening the possibilities of choice for parents and increasing competition between educational establishments. One measure that seems to have a substantial positive effect on the incentives of agents in the education system is the introduction of standardised curriculum-based tests as a requirement for obtaining educational credentials, together with the publication of average results and indicators of value added for each school. Bishop (1997) has found that centralised examinations have a significant positive effect on pupils’ academic performance both across countries and across Canadian provinces. Hanushek and Raymond (2003) also find positive results in relation to the introduction of accountability systems by schools in various states in the US. Wöessmann (2003) has confirmed these findings using a larger sample including data from 39 countries. This last author also concludes that greater school autonomy in certain areas (but not in others) has a positive effect on academic performance – particularly in countries where there are centralized examinations. According to these findings, greater autonomy regarding staff and internal organisation, together with greater freedom for teachers to choose their own teaching methods, contribute to improving school performance because they allow schools to use their direct knowledge of the circumstances and needs of their pupils. However, Wöessmann also concludes that control over budgetary issues and the curriculum should be kept relatively centralised in order to avoid possible opportunistic behaviours whereby individuals seek to reduce workloads or obtain financial gain.

Other measures that also seem to have positive effects, presumably through improved incentives, include introducing incentive schemes in teachers’ pay, the existence of competition from privately managed (although not necessarily privately financed) schools, and increased parental choice through school vouchers and other similar systems (see Hanushek 2003, Heckman, 2000, Wöessmann andSchütz, 2006, and the references given in these papers). On the other hand, some authors warn that it is not easy to design incentive sys-

14 A form of exception to this pattern in results is related to the quality of teachers. Hanushek (2003) and Wöessmann and Schütz (2006) review a number of empirical findings that suggest that this factor has an important effect on pupils’ academic performance. These same authors also observe that it is extraordinarily difficult to link teachers’ performance to ex ante observable characteristics, such as their level of education or experience.
tems correctly, and that the use of badly designed schemes can have adverse effects on performance (see Hanushek 2003 and Ladd and Walsh, 2002, for example).

3.2.2 Learning over the course of the life cycle

Acquiring knowledge and cognitive and non-cognitive skills is a continual process in which the competencies acquired at each stage are a crucial input to the next, enabling the individual to continue progressing. In a series of papers Heckman and various co-authors (see, among others, Cunha et al., 2005, and Heckman, 2000), develop a life-cycle model of competency acquisition which incorporates the available evidence from the literature in economics and other disciplines on the characteristics of the learning process and on the returns to investments in human capital during various stages of life for people in different socio-economic strata. These authors highlight that the learning process starts very early in life and is decisively influenced by family environment, that there are critical periods for the acquisition of certain basic skills and that some of them crystallise very early and are very difficult to improve later.

Heckman’s model, together with his review of the existing empirical evidence, provides some useful suggestions on the efficient assignment of resources to different age and income groups. One important prediction of the model that appears to be borne out by empirical studies is that the return on investment in human capital declines with age in a way that varies systematically across socio-economic strata. Returns fall with age in all cases because learning at an early age enables additional knowledge to be acquired and because the time during which the investment generates additional income flows grows shorter as the individual ages. Returns to investment at early stages tend to be highest for children from disadvantaged families, because intensive intervention can compensate, at least partly, for the effects of an adverse family environment at a critical age for the acquisition of very basic skills. In the absence of these interventions, however, the return to additional investments in disadvantaged individuals drops off rapidly with age as skill deficits accumulate, and tend to fall below the return on investment in individuals from higher income families at a relatively early age. There is consequently a clear trade-off between equity and efficiency at more advanced ages, but not for very young children.

Heckman and his co-authors build a convincing case in favour of a strategy of active intervention at early ages focusing on the more disadvantaged population groups as a way of promoting both efficiency and effective equality of

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15 There is substantial evidence that early and intensive interventions have substantial and long-lasting effects. In addition to Cunha and the references cited therein, see, for example Barnett (1990 and 1995) and Goodman and Sianesi (2005).
Ageing and real convergence: challenges and proposals

Ángel de la Fuente and Rafael Domènech

The evidence presented by these authors also suggests that attempts to remedy educational deficits at later ages are of limited effectiveness and very costly, and that these deficits, rather than the possible existence of financial constraints, are the main obstacle to many young people from low-income families obtaining advanced education.

This all suggests that an important goal of education policy must be to seek to integrate children from disadvantaged families early on an academically oriented preschool system in order to prevent from early skills deficits that may have long-lasting adverse consequences. By contrast, some of the measures frequently advocated as a means for facilitating lower income groups’ access to post-compulsory education, such as highly subsidised university fees, may have only a limited effect.

3.3 Some further reflections

A peculiar feature of Spanish society is the lack of a basic educational consensus. Different sectors of society and the political parties that represent them hold opposing views on important aspects of the educational model. To a large extent, the conflict has focused on the schools’ role in the transmission of values, as has been highlighted by the bitter disputes between left and right over subjects such as religious education and citizenship education, but it also extends to other areas and reveals important differences in views regarding the basic mission of the educational system and the philosophy that should inspire its design.

The result of this disagreement has been a high degree of legislative instability. Ever since the transition to democracy, each time the ruling party has changed, there has been a reform of the basic legislation on education. A major education reform approved by the socialist government in 1990 (the Organic Law on the Educational System or LOGSE) was followed by a counter-reform passed during the People’s Party second legislature (with the LOCE or Organic Law for the Quality of Education). A new socialist government suspended the application of this law immediately after winning the 2004 election, and replaced it two years later with a new law (the LOE or Organic Law for Education) which to a large extent marked the return to the LOGSE model.

Almost everyone agrees that such swings are not good for the educational system. Building on such a fragile foundation, it may be advisable to try to forge a

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16 Schuetz et al (2005) reach the same conclusion in an interesting study in which they built an index of (in)equality of opportunities for over 50 countries based on the estimated influence of family socio-economic status on students’ academic performance. The authors explore the determinants of this index and conclude that countries with high rates of participation in long stages of pre-school education tend to produce greater equality of opportunity. They also conclude that systems in which there is an early separation of students into different types of centre according to their performance have a negative impact on equality of opportunity.
minimum consensus that may give the system the stability it needs to function properly. To make progress in this direction, it may be necessary to leave out the more ideologically charged aspects of the problem (such as the status of religious education) in order to concentrate on the academic core of the problem. To be able to advance in this direction, we need to find ways to advance simultaneously in the pursuit of educational quality and equality of opportunity. While these objectives are in principle shared by everybody, in practice, the two sensitivities in dispute tend to focus on one of them almost to the point of excluding the other one.

Since LOGSE was passed, equality of opportunity has undoubtedly been the dominant goal of Spanish education policy. LOGSE raised the school leaving age from 14 to 16, and established a “comprehensive” school model with a single track for all pupils up to the end of the first cycle of secondary education. The law undoubtedly had a number of very positive aspects, such as making secondary education universal, thus bringing about a marked rise in the average level of education in Spain, and thereby contributing to social cohesion. However, the model it created did not manage to significantly reduce premature school-leaving and educational failure rates and has not prevented a gradual deterioration in the academic performance of Spanish students.

There is a wide variety of opinions regarding the cause of this problem. Many people who defend the LOGSE model attribute its disappointing performance to the failure to fully deploy the support measures envisaged in the law due to a lack of resources. Its detractors, however, point to the difficulties involved in keeping pupils with different levels of performance and motivation, and very different immediate aims, together in the same classroom up until the age of 16. Moreover, they maintain that the result has been to make the system less demanding so as to match the pace of the slower or less motivated pupils. Many people also criticise certain teaching approaches and curricular content, and complain of an excessive emphasis on equality at the expense of merit and effort.

The review of some of the aspects of the literature given above suggests that there may be some truth in both of these explanations. It therefore helps to clarify the terms of the trade-off between quality and equality and also suggests certain lines of action that would make it possible to advance in both directions at once. An important conclusion is that corrective measures aimed at reducing the risk of failure among disadvantaged pupils need to be concentrated in the early stages of education. The demand for more resources is no doubt justified if these resources are devoted to extending coverage and improving the quality of the preschool education system and to bolster primary education. At higher levels, however, these measures tend to be very expensive and rather ineffective. It also looks likely that it would be a good idea to abandon the single track through the final years of compulsory secondary education (ESO, in its Spanish initials). It is probably not
necessary to separate pupils by school, but it might make sense to put them in different classrooms at least part of the day. In this respect there is considerable room for adapting teaching to pupils’ needs, aptitudes and interests by adopting a more flexible curriculum that might include the option of studying a given subject at different levels of difficulty, as happens in some other countries (the “honors level” approach in the US, for example), as well as the establishment of different tracks with varying degrees of academic focus.

Finally, many of the measures that the literature has identified as being desirable could help raise the performance of all pupil groups and do not, therefore, come into conflict with equity goals. It is worth emphasising here that it is important to think in terms of incentives of all the participants in the system and not just the quantities of inputs. To this end, one possibility that should be added to those discussed above would be that of informing students about the excellent economic reasons that exist for continuing their education. The empirical evidence on the positive effects of education on wages and job opportunities is very strong, but many pupils, and even many parents, are unaware of it. It is therefore necessary to transmit the value of education to young people, convince them of the future benefits that making an effort and developing their talents can yield, and encourage them to recognise the incentives that exist to continue learning after they have completed their compulsory schooling.

Another reform that might be desirable, for both equity and incentive reasons would be a considerable increase in university fees, accompanied by an expanded offer of grants and other aid linked both to income and/or academic performance. This would give students greater incentives not to unnecessarily prolong their university studies and help mitigate the regressive nature of a funding system that transfers resources towards individuals with expected incomes that are well above those of the average taxpayer.

4 Labour market reform

As mentioned in the second section, two features of its labour market set Spain apart from other advanced economies. The first is a high unemployment rate, with significant volatility over the course of the economic cycle, which indicates that in both recessions and expansions the Spanish economy has a tendency to ad-

17 The paper by Jimeno (2008) highlights the main changes undergone by the Spanish labour market in recent decades in terms of labour supply and demand and social policies. The rising share of women in the labour force, better educated workers, the ageing of the labour force, immigration, greater international competition and globalisation are some of the changes observed in the Spanish labour market. Bentolila and Jimeno (2006) and the references in their paper are a good starting point for understanding how unemployment rates have varied over time in Spain.
just in terms of quantities rather than prices. The second characteristic, which is related to the first, is that the temporary employment rate (i.e. the numbers of employees on temporary contracts as a proportion of the total workforce) is much higher in Spain than in other European economies.

What explains the high unemployment rate? There is an abundant empirical evidence available suggesting that the institutions regulating the labour market have a highly significant impact on the level and persistence of employment rates and the extent of temporary work. Nickell, Nuzziata and Ochel (2005) show that 55 per cent of the increase in the structural unemployment rate in OECD countries between the sixties and the nineties may be explained primarily in terms of the changes in the labour market institutions that took place during that period. The variables which the authors find have a significant effect include job protection, taxes, the type of collective bargaining, the level and duration of unemployment benefits and increased union pressure. In a recent paper, Gianella et al (2008) mainly confirm these results, finding that the level of regulation in the goods and services market, the levels of unionisation, and employment benefits play an important role in explaining the changes in NAIRU in the majority of OECD countries, including Spain.

Of the set of variables that determine the performance of the job market, in this section we will focus on the characteristics of the Spanish economy that refer to collective bargaining, the two-tier labour market created by the difference in firing costs for temporary and permanent employees, and the regulation of goods and services markets. These are the areas that require the most urgent structural reforms to reduce the structural unemployment rate and the segmentation of the labour market.

4.1 Reforming collective bargaining

In terms of collective bargaining Spain has a series of characteristics which make it somewhat different from other OECD countries. Firstly, although the degree of unionisation is among the lowest among the countries listed in Table 4.1.1, the share of the labour force covered by agreements determined by collective bargaining is among the highest. Indeed, together with France and Greece, Spain has one of the biggest differences between the number of workers who participate actively in the bargaining process (through the unions they belong to) and those who are finally affected by the outcome of these negotiations.

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18 See, for example, Blanchard (2006), Nickell (2006), OECD (2006), Blanchard and Wolfers (2000), IMF (2003), and the bibliography they cite for an overview of the determinants of unemployment rates in the OECD countries.

19 An assessment of the effects of taxation on employment in Spain can be found in Boscá, Doménech and Ferri (2009), and the references they cite.
Along with the issue of how well the collective bargaining process represents workers, another problem is that, as Estrada and Melguizo (2008) argue, the collective bargaining agreements that have been put in place since 1997 have produced a situation in which in most cases wages are negotiated at the sector/province level rather than at the firm level. This is despite the various labour reforms that the Spanish economy has undergone since the mid-eighties and the recognition of some of the problems brought by extending the scope of collective bargaining agreements.

As can be seen in Chart 4.1.1, the percentage of workers whose wages are negotiated at firm level has been on a downward trend since the early eight-

<table>
<thead>
<tr>
<th>Level of unionisation</th>
<th>Collective bargaining coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%-25%</td>
<td>USA, Japan, Lithuania</td>
</tr>
<tr>
<td>26%-50%</td>
<td>Estonia, Hungary, Poland</td>
</tr>
<tr>
<td>51%-75%</td>
<td>Germany</td>
</tr>
<tr>
<td>76%-100%</td>
<td>Spain, France, Greece</td>
</tr>
</tbody>
</table>

**TABLE 4.1.1 COLLECTIVE BARGAINING COVERAGE AGAINST LEVEL OF UNIONISATION, 2006**

**SOURCES:** Du Caju et al (2008) and SEE BBVA.

**SOURCES:** MTIN and SEE BBVA.
ies, reaching an average of just over 11 per cent in recent years. In common with Germany, the dominant wage bargaining level in Spain is the sector within each region, in contrast with other countries where wage negotiations are either national or firm level (particularly in the US and UK), as can be seen in Table 4.1.2.

These data suggest that Spain has an intermediate degree of centralisation of collective bargaining. Given that, according to Calmfors and Driffil’s (1998) theoretical results, there is a U-shaped relationship between the degree of centralisation and unemployment, the type of collective bargaining that predominates in Spain is less favourable in terms of job creation and unemployment than that in the Nordic countries (national) or Anglosaxon countries (where, with the exception of Ireland, the firm level predominates). Nevertheless, in empirical terms, using data for the OECD, Thomas (2002) finds that although wages are more sensitive to unemployment in countries with centralised collective bargaining, they are less sensitive to firm-specific factors (such as changes in relative prices and productivity) and this means unemployment rates end up being higher than in those countries where wages are negotiated at the firm level.

<table>
<thead>
<tr>
<th>Country</th>
<th>Level of Wage Negotiations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia</td>
<td>Firm</td>
</tr>
<tr>
<td>Hungary</td>
<td>Firm</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Firm</td>
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<tr>
<td>Luxembourg</td>
<td>Firm</td>
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<tr>
<td>Poland</td>
<td>Firm</td>
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<tr>
<td>Czech Republic</td>
<td>Firm</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Firm</td>
</tr>
<tr>
<td>USA</td>
<td>Firm</td>
</tr>
<tr>
<td>France</td>
<td>Sector/Firm</td>
</tr>
<tr>
<td>Austria</td>
<td>Sector-occupational</td>
</tr>
<tr>
<td>Sweden</td>
<td>Sector-occupational</td>
</tr>
<tr>
<td>Germany</td>
<td>Sector-regional</td>
</tr>
<tr>
<td>Spain</td>
<td>Sector-regional</td>
</tr>
<tr>
<td>Belgium</td>
<td>Sector</td>
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<tr>
<td>Denmark</td>
<td>Sector</td>
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<td>Netherlands</td>
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<td>Italy</td>
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<td>Norway</td>
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<td>Portugal</td>
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<td>Japan</td>
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<td>Slovenia</td>
<td>National</td>
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<td>Finland</td>
<td>National</td>
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<tr>
<td>Ireland</td>
<td>National</td>
</tr>
</tbody>
</table>

**SOURCES:** Du Caju *et al* (2008) and SEE BBVA.
One of the consequences of the fact that the dominant level for wage negotiations is not the firm is the smaller correlation between wage growth and productivity growth in Spain as compared with other countries where salaries are more responsive to firms’ production conditions. Using the results obtained by García (2009), a way of illustrating this implication of wage negotiations is to analyse the distribution of annual growth rates of wages and productivity in Spain, and compare them with those of other countries in which wages are mainly negotiated at company level (United Kingdom). Although, ideally, the best way of doing this exercise would be to have information for a sample of firms that is sufficiently representative of national output, the absence of uniform information across countries means it is only possible to perform this analysis with aggregate sector data. For this purpose data for the period 1996 to 2005 from the EU KLEMS database on 56 productive sectors has been used (see Ark, O’Mahony and Timmer, 2008).

Charts 4.1.2 and 4.1.3 show the estimated density functions for the real productivity growth rates and wage growth rates (560 observations, corresponding to the 56 sectors and 10 years covered by the sample used). As can be seen, the density function of annual wage growth in Spain is more closely concentrated around the mean (i.e. has a lower variance) than productivity growth. This finding contrasts with the evidence seen in the United Kingdom, where the two density functions are practically identical. In fact, when testing if both distributions are the same, the Kolmogorov-Smirnov test rejects the null hypothesis of equality in the case of Spain by a wide margin (the statistic is equal to 0.116 with a significance level close to zero), while for the United Kingdom it is accepted with a probability of 77.7 per cent (the statistic is 0.038).
These results suggest that when the dominant level of wage negotiations is not the firm, as is the case in Spain, there is greater salary compression, such that wage growth presents less variance and less of a correlation with productivity growth, thus confirming the findings of Pagán and Sánchez-Sánchez (2008), who, using the 2002 Structure of Earnings Survey (Encuesta de Estructuras Salariales) data, found that firm-level agreements are those with a higher correlation between productivity and salaries, in line with the evidence given by Card and de la Rica (2006).

According to Thomas's (2002) findings cited above, one of the implications of these results is that as wages are less sensitive to firm performance, employment is the adjustment variable. This evidence therefore suggests it is necessary to reform collective bargaining in Spain to bring it more in line with that in countries in which unemployment rates are lower and wage growth is more closely related to productivity growth. This reform does not imply renouncing collective bargaining on three levels (national, sector, and firm), but appropriately limiting the type of items to be negotiated on each of them.

At the national level it makes sense to agree those aspects which affect all workers and firms equally, regardless of the sector or market they operate in: e.g. agreements to improve the system for training workers, to reduce unemployment rates, avoid the two-tier structure of temporary and permanent workers, to improve and simplify labour legislation, to increase the efficiency of the tax system or to ensure the future sustainability of the pension system. At sector level only those issues that affect all the firms in an industry equally should be negotiated, such as health and safety, or working conditions in the
sector. Finally, salary and organisation issues (such as working hours, functional and geographical mobility), which have an impact on the efficiency and competitiveness of each individual firm, should be negotiated at the firm level.

Another important issue that should be taken into account in collective negotiations in Spain is avoiding the general applicability of collective agreements. This would prevent the application of agreements to firms and workers that are not formally represented at higher levels of collective bargaining, unless they voluntarily decide to opt-in to one of the supra-firm level agreements for a specific period. In line with this proposal, the OECD (2008) suggests the more widespread use of opt-out clauses at sub-national levels for negotiation. This would improve the extent to which workers are represented at lower levels and enhance the sensitivity of negotiated components to firm performance.

4.2 High rates of temporary employment

Another of the specific features of the Spanish labour market is that the share of temporary employment is much higher than in other European countries. As Jimeno (2008) argued, labour reforms in Spain (1984, 1992-93, 1994, 1997, 2001 and 2006) have not produced sufficient flexibility or contained the explosion in temporary contracts that began in the mid 1960s. As Table 4.2.1 shows, the rate of temporary employment in Spain in 2007 (31.9 per cent) was, by a wide margin, the highest among the OECD countries, more than doubling the OECD average (14.6 percent) or that of the 15 European Union countries (14.8 percent).

Apart from the problems of equity that this produces, the high rate of temporary employment that exists in Spain increases the sensitivity of unemployment to the economic cycle. In recessions such as the current one, the jobs that tend to be lost first are the temporary ones, making the temporary employment rate pro-cyclical. The prevalence of temporary contracts also has a negative impact on productivity (Dolado and Stucchi, 2008), as it affects firm’s decisions to provide ongoing training and workers’ decisions to accumulate physical and human capital, and even on women’s fertility rates (de la Rica and Iza, 2006).

As in many other economic spheres, this split between temporary and permanent employees is the result of the response to the incentives and restrictions existing in the Spanish labour market. These have made it difficult to reconcile the flexibility firms need to adapt to changing competitive and productive environments with the security that workers demand to ensure their continuity in their jobs. Balancing these opposing forces has given rise to an inefficient system, according to which, in the event of unfair dismissal (which in practice
covers virtually all redundancies), temporary workers are entitled to a severance pay of just 8 days per year worked, whereas employees on “employment promotion” contracts (a special scheme intended to convert temporary contracts into permanent ones) are entitled to 33 days’ pay and those on permanent contracts to 45 days’ pay per year worked (Chart 4.2.1).

To put an end to this two-tier labour market, the reform should bring all new jobs in a single type of contract, such that firing costs are linked to length of service without the current discontinuities. Instead of the intervals that currently exist, the new contract should produce a continuous relationship in which firing costs increase gradually with the time the employee has worked for the firm.20 One way of achieving this relationship between job duration and the cost of dismissal would be to set up a dismissal fund, such as that which exists in Austria, where the firm and the worker contribute part of their wages to a fund,
which is used in the case of dismissal, and which workers can take with them if they change job (see OECD, 2006).

4.3 Reforms in the goods and services market

As is well known, the rate of structural employment is simultaneously determined by the market power of workers in the labour market and the market power of firms in the goods and services market (see Andrés, 1993 and Layard, Nickell and Jackman, 2005). Recognising this characteristic of the labour market means that in order to reduce unemployment it will be necessary to undertake reforms in the goods and services markets as well as undertake a series of labour market reforms such as those described above.

Recent empirical evidence on the need to undertake reforms to promote employment growth is fairly conclusive. For example, Gianella et al (2008) confirm results previously reported in the literature (see, for example, the work of Blanchard and Giavazzi, 2003, Fonseca, et al, 2001, and the references in OECD, 2006), finding that the OECD indicator that approximates regulations restricting competition in seven sectors (gas, electricity, postal services, telecommunications, air transport, rail and road transport) has a statistically significant and economically important effect on structural unemployment rates in the OECD countries. Indeed, according to these authors the variable having greatest impact on the reduction of NAIRU in Spain over the period

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21 The construction of this indicator is described in the paper by Conway, De Rosa, Nicoletti and Steiner (2006).
1992-2003 is precisely the regulation of goods markets, where improvements over this period as a result of greater competition explain slightly more than 50 per cent of the reduction in the structural unemployment rate. Using an alternative method based on specifying and calibrating a general equilibrium model with unemployment and imperfect competition in the goods market, Ebel and Haefke (2008) find that deregulating goods markets can fully explain the drop in structural unemployment in the United States between the eighties and nineties.

Chart 4.3.1 illustrates the correlation that exists between the indicator for regulation in the goods market constructed by the OECD (referring to 2003) and the structural unemployment rate in 2005. As can be seen, those countries in which this indicator is highest (least competition in goods markets) have a higher structural unemployment rate (the correlation between the two variables is 0.57).

Chart 4.3.2 examines the correlation between the unemployment rate and the average of the standardised values of the World Bank’s Doing Business variables, which refer to how easy it is to start a business (number of procedures, time and cost), to handle permits and to conduct foreign trade. Again we observe that those countries which impose higher business start-up and running costs have

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22 The OECD has recently published the 2008 results for this indicator (see Wölfl et al., 2009), in which there is a clear relative improvement in Spain’s position between 2003 and 2008, above all in the domestic economic regulation index and, to a lesser extent, in that of administrative regulation. Despite this, Spain is still a long way behind the countries with the best regulatory environments. Given that no results are available for this indicator in 2008 for some of the countries in the sample, and as the effects of goods-market reforms on the labour market are not immediate, Chart 4.3.1 uses 2003 levels, which are more closely correlated to the structural unemployment rate in 2005.
higher rates of structural unemployment (the correlation between the two variables is 0.57).23

This evidence highlights the need to simultaneously reform the labour market and the goods and services market, by making progress towards market liberalisation, increasing competition and improving regulations to promote business activity and reduce administrative costs. The improvements in business efficiency and goods markets competition will therefore have an impact on reducing unemployment rates. In this regard, an ambitious implementation of the EU’s Services Directive would be a good opportunity to make decisive progress in this direction.

4.4 Other measures

The structural improvements the Spanish economy needs in order to raise employment rates undoubtedly do not end with the measures discussed in the preceding sections. With common regulations and institutions at national level, there is a high degree of heterogeneity in the employment rates across Spain’s regions and provinces. It therefore seems evident that it is necessary to eliminate the incentives that set up obstacles to workers’ geographical mobility, and which are preventing the differences in employment rates from disappearing. In this regard, as the empirical evidence shows, the relationship between housing policies, workers’ geographical mobility and how easy it is to rent a home is crucial. For example, Bassanini and Duval (2006) find that a third of the variance of the

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23 The correlation between the goods market regulation indicator constructed by the OECD and the Doing Business indicator is 0.74.
fixed effects estimated using a standard regression of the unemployment rate for a
panel of OECD countries between 1982 and 2003 seems to be explained by the
average percentage of homeownership (Spain has the second highest percentage
rate of home ownership in the OECD). Therefore, in order to increase the mo-
bility of the labour factor and reduce the huge disparities in unemployment rates
between provinces, it would seem timely to encourage rented property, not with
more tax incentives, but by strengthening the legal position of landlords, so as
to create genuine incentives for the large numbers of unoccupied properties that
currently exist to be offered on the rented property market.

Another aspect which is linked to regulations that hinder business activity (and also create a disincentive to foreign investment) is that of the administrative
costs they have to face due to the lack of a true internal market and the complex-
ity of the tangle of regulations, which differs from one Autonomous Community
to another. Re-establishing a genuine internal market does not require that the
Autonomous Communities renounce their competencies over trade, but does re-
quire that they coordinate them in a national commission bringing together all
the actors and institutions involved, in order to simplify the current dispersed
and heterogeneous legislation into a single, simplified regulatory framework.

5 The pensions system and the aging challenge

Pensions currently constitute one of the biggest public spending items in
most advanced countries. For obvious reasons, it is also one of the elements of
the welfare state that is most sensitive to ageing. The problem is particularly seri-
ous in those countries which, like Spain, have an unfunded system with defined
benefits, in which pensions are financed by current contributions from workers
(“pay-as-you-go”) and their levels are set in advance without reference to actuarial
sustainability criteria.

The topic has received considerable attention in Spain. Going back over a dec-
ade, a number of studies have approached the problem from different perspec-
tives. Practically all of them, however, agree on the seriousness of the challenge
and on the need for urgent reforms in the field.24

24 The literature on the sustainability of the Spanish pensions system is extensive. There was an ini-
tial wave of studies on the topic in the second half of the nineties, including among others, MTSS (1995),
Jimeno, Rojas and Puente (2008), MTIN (2008), Doménech and Melguizo (2008) and Moral-Arce et al
(2008).
Drawing upon this literature, this section will insist on the same message once again. After reviewing the evolution of pension spending over the last few decades, we project the future path of this variable over the next half century starting out from the most recent demographic scenarios and using a simple model of pension expenditure. Finally, this model is also used to obtain a tentative estimate of the possible impact of various reforms that will serve as the basis for our policy recommendations.

5.1. Evolution of the revenues and expenditures of the contributory pension system, 1981-2007

This section analyses the evolution of the revenues and expenditures of Spain’s public pension system over the last three decades. The data we have used correspond to spending on contributory Social Security pensions. We have obtained data on the number of pensions paid each month between 1981 and 2007 and on their average amount from the Ministry of Labour (MITIN, 2008a) website. These data are broken down by pension type (retirement, disability, and survivors’ pensions). For 1998-2007 they come from the Labour Statistics Bulletin (Boletín de Estadísticas Laborales, MITIN, 2008b), while for previous years average amounts are taken from the 2000 and 2007 editions of the INSS Statistics Report (Informe Estadístico, various years).

Total pension expenditure is estimated by multiplying the average number of pensions due each year by their average value (obtained by multiplying the monthly amount by fourteen). The calculation is performed separately for each type of pension and the results aggregated. We also checked that the total obtained in this way approximately matches the figure given in the General State Budget for this item.

In Spain, ordinary social-security contributions cover a series of contingencies apart from retirement, making it theoretically impossible to isolate a specific contribution to the pension system. Based on an internal report by the Spanish government cited by Doménech and Melguizo (2008), we estimate that 95% of social-security contributions are allocated to the pension system. In recent years, social security contributions have been supplemented by a growing contribution by the State, which has gradually taken on the financing of the so-called “minimum complements”, which bring the lowest contributory pensions up to

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25 The total number of current pensions is greater than the number of pensioner because a given individual may receive more than one pension. Pension payments are doubled in the months of July and December.

26 According to the report cited by Doménech and Melguizo (2008), income from social-security contributions paid in to the pension system came to 8.6% of GDP in 2006. We have calculated the ratio between this amount and the total social-security contributions for ordinary risks (including those corresponding to the unemployed), which in this year came to 8.98% of GDP.
the legally established minimum. Our data on the system’s income are drawn from the Economic and financial report included in the Social Security system’s general budget (Informe Económico-Financiero de los Presupuestos Generales de la Seguridad Social) for the 2009 financial year and from the Annex to that document (MITIN, 2008d).

Data on GDP, employment and population disaggregated by age are taken from the INE website (2008b and 2008d). The INE provides two series of National Accounts data, one for 1995-2007 with 2000 as the base year, and another for 1980-95, with 1986 as the base year.27 We have spliced the two series by extending the more recent one back in time and using the growth rates of the older series.

Chart 5.1.1 shows how Spain’s spending on contributory pensions has progressed as a share of GDP, together with the income the pension system is estimated to receive on current criteria, including 95% of contributions for ordinary risks and the state’s contribution to finance minimum pension complements. The expenditure series shows a growing trend up to 1996, when a peak of 8.51% of GDP was reached. From this year on a gentle reduction has been observed, falling to 7.43% in 2007. The income series does not show a clear trend, although there have been considerable variations.

The chart should be interpreted with caution as the State has gradually been taking on the financing of important benefits which previously, at least in part, were paid for by the Social Security system (including part of health-

27 In the most recent series, the employment variable corresponds to full-time equivalent work. In the 1980-95 series this is not clear, but the series seems to refer to “gross” employment rather than full-time equivalent employment.
care and non-contributory pensions). Strictly speaking, therefore, the vertical distance between the two series can only be interpreted as the surplus or deficit of the public pension system in very recent years. However, in any case, it gives us an idea of the way in which its financial situation has evolved. In the mid-nineties the system was approximately in equilibrium. In recent years, however, a reduction in spending has made it possible to build up a reserve fund which had accumulated 45,716 million euros (4.35% of GDP) by the end of 2007.

5.1.1 The evolution of spending

In order to analyse the dynamics of pension spending as a share of GDP, it is useful to break this indicator down into a series of factors that capture the influence of demographics, employment and the generosity of the pension system.  

Let \( P_\text{EXP} \) be total pension expenditure. The ratio between this variable and GDP can be expressed in the following way:

\[
\frac{P_\text{EXP}}{GDP} = \frac{NPENS}{L} \frac{P_\text{EXP}}{NPENS} \frac{NPENS}{GDP} \frac{AVPENS}{Q} = NPENSEP \times GEN
\]

where \( NPENS \) is the number of pensions being drawn and \( L \) is total employment. Therefore, pension expenditure as a share of GDP is equal to the product of the number of pensions per employed person (NPENSEP) and an indicator (GEN) of the “generosity” of average labour pension, measured by the ratio between this variable (AVPENS) and average labour productivity (Q). It is convenient to rewrite the first term of the decomposition as follows:

\[
NPENSEP = \frac{NPENS}{L} = \frac{NPENS}{N65+} \frac{N65+}{N1864} \frac{N1864}{L} = COV \times DEP \times EMP
\]

where \( N65+ \) and \( N1864 \) refer to the population aged over 64 and the population between 18 and 64 respectively. Therefore, the number of pensioners per worker can be expressed as the product of these three factors: the pension coverage ratio (COV = number of pensions per person of retirement age), old age dependency ratio (DEP = number of people over 64 for each person of working

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28 This type of decomposition has often been used in the literature. See, for example, Jimeno, Rojas and Puente (2008) and Doménech and Melguizo (2008).
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age) and the inverse of the employment rate among the working-age population (EMP).\(^{29}\) Finally, combining [6] and [7], we obtain

\[
\frac{\text{PEXP}}{\text{GDP}} = \text{DEP} \cdot \text{EMP} \cdot \text{COV} \cdot \text{GEN}
\]  

Chart 5.1.2 breaks down the pension expenditure indicator (PEXP/GDP) into its two main components: the number of pensions per person in employment and the average pension expressed as a fraction of output per worker, both normalised by their initial values. The first of these components is in turn disaggregated into various factors in Chart 5.1.3.

The charts show that pension spending over the last few decades has been dominated by two main factors: adverse demography and the generally favourable performance of the labour market. The demographic effect, which is captured by the dependency ratio (DEP), was negative except in the final years of the sample, when the strong migratory influx Spain experienced during this period translated into a gentle decline in the dependency ratio, temporarily inverting this variable’s clear upward trend. Also, the employment rate among the working age population showed an upward trend throughout most of the period, thus generating a positive effect on employment (EMP), which softened the negative effect of the demographic factor. In the last third of the sample period, rapid employment creation, combined with strong immigration, even

\(^{29}\) In turn, EMP can be broken down into two new factors reflecting the inverse of the labour force participation rate and the inverse of the labour force employment rate.

\[
\text{EMP} = \frac{N_{1864}}{L} = \frac{N_{1864}}{LF} \cdot \frac{LF}{L}
\]
allowed a noticeable reduction in expenditure as a share of GDP. As we shall see, however, all the signs suggest that this was just a short-lived respite within a continuing upward trend in expenditure which will be irreversible unless significant changes are made to the design of the pension system.

As regards the rest of the components of pension expenditure, we see a gentle increase in the indicator of the generosity of average pensions (GEN), while the coverage ratio (COV) has tended to remain fairly constant, with no clear trend or large oscillations.

5.2 Demographic and employment scenarios for 2007-60

The data we have just reviewed suggest that population ageing is already having a substantial effect on pension expenditure and that the acceleration of this process over the coming decades could jeopardise the viability of the system.

In order to try to get an idea of the potential magnitude of the problem which we are likely to have to face in the future, we will forecast pension spending over the period 2008-2060 under the assumption that there are no significant changes to the system’s current structure. As our starting point, in this section we will construct a variety of scenarios for the demographic and employment components of pension expenditure. In each case we will prepare three forecasts: a baseline scenario, an “optimistic” (minimum expenditure) scenario and a “pessimistic” scenario.

5.2.1 Demographic scenarios

Our starting point in this analysis is the demographic scenario recently constructed by Eurostat for Spain (Europop, 2008). Eurostat’s baseline scenario for
Spain envisages a gradual decline in net immigration (down from more than 600,000 people a year in 2008 to less than 150,000 from 2040), a slight recovery in the fertility rate (from 1.39 children per woman in 2008 to 1.56 in 2060) and a rapid increase in life expectancy (by 7.5 years for men and 5.7 years for women over the same period). The result is a rapid process of ageing. On this hypothesis, the old age dependency ratio (defined as the ratio of the population aged 65+ to the population aged 18-64) will increase rapidly over the next five decades, from 0.25 in 2008 to 0.62 in 2060.

In addition to Eurostat’s central scenario, we will also consider two alternative scenarios with a view to delimiting the range of possibilities. The first (without immigration or pessimistic), also prepared by Eurostat, is identical to the baseline scenario except that here it is assumed that the flow of immigrants is zero throughout the period. The result is a sharp acceleration in the ageing process, with an additional increase of 15 percentage points in the estimated dependency ratio at the end of the period, which reaches a value of 0.77 in 2060.

The third (optimistic) scenario modifies two of the hypotheses of Eurostat’s baseline scenario in the opposite direction to the second scenario. Firstly, the net flow of immigrants is increased by 50% in each of the years in the sample, assuming that the new entrants are uniformly distributed over the 20 to 29 year age range. Secondly, we have increased the gross fertility rate implicit in the baseline scenario by 10%. With these changes the dependency ratio in 2060 would be 0.54.31

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30 The construction of this scenario is described in more detail in Annex 2, section 1.
31 INE has recently published (January 2009) a projection of the Spanish population over the next ten years. This scenario is similar to Eurostat’s baseline scenario, although somewhat more pessimistic regarding the future evolution of immigration.
Charts 5.2.1 and 5.2.2 show the expected variation in the total Spanish population and the old-age dependency ratio (population aged 65+/18-64) in each of the three scenarios, with the second variable normalised using its value in 2008 (0.252). The baseline scenario implies the virtual stagnation of Spain’s population after 2020, whereas a complete halt to immigration would imply that this variable would start to decline immediately. As we have seen, the dependency ratio would be doubled in the best case and could be tripled over the next half century.

5.2.2 Employment scenarios

The share of GDP taken up by pension expenditure is also very sensitive to variations in the employment rate. In this section we project the value of this variable over the period of interest, starting from the (full-time equivalent) employment series given above, which have been constructed by linking the two CNE series. We will therefore work with the employment rate of the working-age population defined as the ratio of total equivalent employment to the population aged 18-64.

Employment is a more difficult variable to predict than population as it does not have the latter’s inertia. Therefore, the exercise undertaken here is much riskier than the one in the previous section. Given our aims, however, it is not essential that the employment forecast be very precise. Basically, we will settle for a reasonable bound on the degree to which favourable developments on employment front can mitigate the adverse effects of ageing on the public pension system. Our basic hypothesis will therefore be rather optimistic: we will assume that the aggregate employment rate continues on the positive trend it has displayed over the last two decades and tends to gradually converge on the male employment rate in 2007 (a good year) in Spain or
some other country with more favourable ratios than ours. We will also try, however, to take into account the possible effects of the current crisis on the coming years.

We will therefore start out with the employment rate observed in 2007 (65.16%) and project it in to the future using the procedure described below.

The employment rate forecasts for the population in the 18-64 age range for 2008-10 have been obtained by combining the employment forecasts in the recently updated Stability Plan (Plan de Estabilidad para España; MEH, 2009) with the baseline demographic scenario. That is to say, the employment rate in each year is obtained by dividing the employment envisaged in MEH (2009) by the 18-64 population envisaged in Eurostat’s central demographic scenario. The value of the employment rate estimated in this way is used in the three employment scenarios for the years 2008-10. (What changes from one scenario to the next, once they have been combined with the corresponding demographic scenario, is the change in population, so that by maintaining the employment rate constant, we will be varying the total volume of employment).

For 2011 onwards, we have proceeded as follows: On the baseline scenario the employment rate recovers its 2007 level in 5 years (in 2015) with uniform annual increments. After 2015 the employment rate converges at an annual rate of 4% towards the employment rate for Spanish males aged between 16 and 64 in 2007 (which was 77.4%), a similar level to that currently seen in the population as a whole in Japan, the Nordic countries, Canada and the US.

To this central scenario we have added an “optimistic” and a “pessimistic” scenario. In the first case, we assume that the recovery in employment in the wake of the current crisis takes four years (rather than five) and that, starting in 2014, the employment rate converges on its long-term level at a rate of 4% a year, but now

![Chart 5.2.3: Employment Rate Projections](chart.png)
taking the employment rate among Dutch males in 2007 (82.3%), the highest in the EU that year, as the reference. Finally, in the pessimistic scenario, we assume that after an initial drop, the employment rate remains constant in 2011 (at the 2010 level) and that the recovery of the 2007 level now takes six years from 2011. In this case, the long-term reference is again the employment rate for Spanish males, but the rate of convergence is reduced by half (to 2% a year).

Chart 5.2.3 summarises the results of the exercise. On the baseline scenario, the employment rate increases by 16% between 2007 and 2060. This increase shrinks to 11% in the more pessimistic scenario and rises to 22% in the most optimistic scenario.

5.2.3 The combined effects of demography and employment

By combining the results of the preceding two sections, it is possible to construct a sort of confidence interval for the number of people of retirement age per employed person. Firstly, we have combined both baseline scenarios. To construct the interval around this central projection we have combined the two pessimistic scenarios in one case and the two optimistic ones in the other.

Chart 5.2.4 shows the results. Combining the demographic and employment factors (but keeping the unit cost or generosity element constant), our baseline forecast suggests that pension expenditure as a share of GDP will more than double between 2007 and 2060. In the most optimistic scenario, the increase in this expenditure item will fall to 74%, while in the most pessimistic scenario pension expenditure will almost triple.

Table 5.2.3 summarises the results of the last three sections. On the baseline scenario, *ceteris paribus*, the ageing of the population will translate into an increase in pension spending as a share of GDP of 146.3% between 2007 and
2060. Moreover, the forecast increase in employment will subtract 15.7 points from this amount, leaving the envisaged increase in spending at 112.9%. In the more optimistic scenario, the increase in spending will be reduced by as much as 74.6%, while in the most pessimistic case it will be increased by 174.8%.

5.2.4 The evolution of total employment

Another interesting piece of data that can be obtained by combining the demographic and employment scenarios is the total volume of (full-time equivalent) employment. As we shall see below, the rate of growth of this aggregate is crucial for the sustainability of the pension system.

<table>
<thead>
<tr>
<th>TABLE 5.2.3 DEMOGRAPHIC AND EMPLOYMENT COMPONENTS OF PENSION EXPENDITURE (OBSERVED VALUES IN 2007 AND EXPECTED VALUES IN 2060, 2007 = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs 2007</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Old-age dependency ratio</td>
</tr>
<tr>
<td>Employment rate (population 18-64)</td>
</tr>
<tr>
<td>Old people per employed person</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 5.2.4 ENVISAGED EMPLOYMENT GROWTH (OBSERVED VALUES IN 2007 AND EXPECTED VALUES IN 2060, 2007 = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs 2007</td>
</tr>
<tr>
<td>Total employment</td>
</tr>
<tr>
<td>Average annual growth rate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHART 5.2.5 PROJECTION OF TOTAL EMPLOYMENT</th>
</tr>
</thead>
</table>

![Chart showing the projection of total employment from 2007 to 2057.](chart5.2.5.png)
Chart 5.2.5 shows the envisaged course of employment between 2007 and 2060 in each of the scenarios. Table 5.2.4 summarises the initial and final values and also shows the average rate of growth of equivalent employment in each case for the period as a whole.

**5.3 A simple model of pension spending**

Section 2 of Annex 2 sketches a simple accounting model of pension spending in an economy in which salary growth is exogenous. The model uses highly simplified assumptions, including lifetimes with non-stochastic durations and constant rates of employment and productivity growth, it ignores agents’ heterogeneity and the endogeneity of decisions to enter or exit the labour market and does not take into account some important characteristics of the Spanish system, including the existence of ceilings and floors on the base for pension contributions. It is not, therefore, a detailed or realistic model that tries to capture all the relevant variables when projecting pension spending or analysing the impact of possible reforms of the system. Nevertheless, we believe that it is a useful complement to the aggregate accounting model that we are using because it introduces a degree of discipline when projecting into the future the generosity component of pension expenditure (i.e. the ratio between the average pension and labour productivity). Used with care, the model can also be used to construct a first estimate of the impact of various possible reforms on the long-term sustainability of the system.

The model assumes that the pension calculation period (N), the number of years over which contributions are paid (C) and the period during which a retirement or surviving spouse’s pension is drawn (X and X2) remain constant over time. It also assumes constant rates of employment and population growth (n) and average wage growth (g), a wage premium for experience that grows exponentially with the number of years worked (also at a constant rate, v) and a constant rate of contributions (τ). For the given values of these parameters, and applying the rules for pension calculations defined in the current Spanish legislation (see section 3 of Annex 2), the model enables us to calculate the ratio between the average pension and average wages, the IRR (internal rate of return) of the contributory pension system, the total income and expenses of the system, and therefore its financial balance. Finally, the model offers a simple characterisation of the financial sustainability of the pension system: it is sustainable in the long term if and only if its IRR does not exceed the rate of growth of aggregate wages (g+n).

**5.3.1 Parameterising the model**

When applying this model in combination with our demographic and employment scenarios, we have to take into account the fact that it is basically a
steady-state model and is unable to reflect the dynamics induced by changes in the values of these parameters. Consequently, what we will do is set the values of the parameters of the model by taking as a reference the average values of the variables of interest during the period 2007-60 in each of the scenarios we are considering and over the period 1981-2007.

Table 5.3.1 summarises the main data. For 1980-2007, g and n are set equal to the average rates of productivity growth per (full-time equivalent) employed person and total employment, according to the CNE data referred to above. Both rates have been calculated by regressing the logarithm of the corresponding variable on a linear trend. In the case of productivity, our base assumption for 2007-60 is that the average rate of growth observed from 1980-2007 will remain constant into the future. The value of g in the optimistic and pessimistic scenario is set equal to the average rate of productivity growth (calculated by the same procedure) over the periods from 1980-95 and 1995-2007, respectively. In the case of employment, the value of n for 2007-60 in each scenario s is set equal to the average growth rate of employment envisaged in it. This variable is not estimated, rather it is calculated directly from current employment and that envisaged at the end of the period, using

\[ n^s = \frac{\ln L^s_{2060} - \ln L^s_{2007}}{53} \]

where \( L^s_t \) is the employment forecast in period t under scenario s.

The average number of years over which pensioners have paid contributions is estimated as the product of the average employment rate among the population aged 18-64 in the relevant scenario (calculated as the average of their annual values) and the theoretical maximum duration of the individual’s working life,
65 – 18 = 47 years. The period during which a pension is drawn is calculated as the difference between the average life expectancy of the population as a whole (taking its average value during the relevant period) and the retirement age (which is set to be equal to the legal retirement age of 65 years). The period during which a surviving spouse’s pension is drawn is estimated as being the difference between the life expectancy of women and the population as a whole, incremented by 2.75 years, which is the average difference in age between men and women at the time of marriage according to the INE’s marriage statistics (2008c). For the period 1980-2007, the average value of life expectancy at birth between 1975 and 2005 has been taken. For the period 2007-60 we have taken the average of the values of this variable for 2005 and 2060. The latter is estimated by adding to the value observed in 2005 the increase in life expectancy forecast by Eurostat in its population scenario (which is our baseline scenario). The probability (\( \pi \)) that a retiree is survived by a spouse entitled to a survivor’s pension is set at \( \frac{1}{2} \).

The experience premium (\( \nu = 1.26\% \)) is set so that the model reproduces the ratio between the initial retirement pension (under the general social security system) and the average salary observed in 2007. The average salary is taken from the EES (Encuesta de Estructura Salarial) for 2006 and increased by 5% to take it to 2007. Finally, the social security contribution rate is assumed to be equal to 95% of the contribution rate for ordinary contingencies under the general social security system, calculated as the sum of the rates applicable to the company (23.6%) and the worker (4.7%).

### 5.4 Projection of total pension expenditure as a share of GDP

In the model sketched out in the previous section and in Annex 2 the ratio between the average pension (retirement and survivors) and aggregate average wages is given by

\[
\gamma(t) = \frac{P(t)}{W(t)} = \phi(C)b(N)e^{vC} \frac{n - \nu}{g + n - \omega} \frac{1 - e^{-nC}}{1 - e^{-(n-\nu)C}} \frac{1 - (1-\pi)\phi(C)e^{-(g+n-\omega)X} - \pi \phi(C)e^{-(g+n-\omega)(X+X2)}}{1 - (1-\pi)e^{-nX} - \pi e^{-n(X+X2)}}
\]

where

\[
b(N) = \frac{1 - e^{-C(N+\nu)N}}{(N+\nu)N}
\]

is the base for the pension calculation (expressed as a fraction of the worker’s salary at the time of retirement), \( \phi(C) \) is the percentage of the base which will correspond to a pensioner who has paid contributions for \( C \) years and \( \nu \) is the rate at which pensions grow in real terms once their initial amount has been set (which will be zero in the case of Spain, as they are updated in line with the CPI).
Using this expression and the values of the parameters that appear in Table 5.3.1.1 we have calculated the steady-state values of the ratio \( P/W \) predicted by the model (see Table 5.4.1). The value of the ratio \( P/W \) observed in 2007 for retirement pensions (under the general regime) is 0.51, well below the model’s prediction. If the model is correct, this would indicate that we are still a long way from the steady state and that the upward tendency of \( P/W \) we have observed during recent decades will persist into the future, even if all the parameters of the system keep the values observed in the period 1980-2007 indefinitely. Moreover, the value of the ratio \( P/W \) predicted by the model is higher for the period 2007-13 than for 1980-2007 in all three scenarios. As explained in Annex 2, this seems to be due to the increase in the average number of years during which contributions will be paid that we are expecting to see over the coming decades, under our relatively optimistic assumptions about the evolution of the employment rate.

In an attempt to be conservative, we will not use the model’s prediction directly for the steady state of the ratio \( P/W \). Instead, we will assume that this ratio will increase gradually between 2007 and 2060 by the same proportion as the model’s prediction for 2007-60 increases in relation to the prediction for 1980-2007. That is to say, in each scenario, the value of \( P/W \) in 2060 has been estimated by multiplying the value of the ratio observed in 2007 by the index which appears in the second column of Table 5.4.1. We will also assume that this increment takes place at a uniform rate over the period. Finally, we will assume that wages remain constant over time as a share of national income. We therefore arrive at the projection of the ratio between the average pension and the output per employed person that is shown in Chart 5.4.1.

Combining this projection with the relevant demographic and employment scenarios, and assuming that the system’s coverage ratio (number of pensions per person of retirement age) remains constant, we finally obtain the projection of total pension expenditure as a fraction of GDP shown in Chart 5.4.2. As previously, all the optimistic and pessimistic scenarios are combined to construct the “confidence interval” around the baseline scenario.

Chart 5.4.2 also shows the system’s expected income, which we hold constant over time at the value observed in 2007 (8.81% of GDP). With this assump-

<table>
<thead>
<tr>
<th>Table 5.4.1</th>
<th>Estimated Stationary Values of Ratio P/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-2007</td>
<td>0.704</td>
</tr>
<tr>
<td>2007-2060, baseline</td>
<td>0.829</td>
</tr>
<tr>
<td>2007-2060, optimistic</td>
<td>0.787</td>
</tr>
<tr>
<td>2007-2060, pessimistic</td>
<td>0.902</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated value</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.704</td>
<td>100.0</td>
</tr>
<tr>
<td>0.829</td>
<td>117.7</td>
</tr>
<tr>
<td>0.787</td>
<td>111.9</td>
</tr>
<tr>
<td>0.902</td>
<td>128.2</td>
</tr>
</tbody>
</table>
tion, the system would go into deficit in 2023 in the baseline scenario, 2031 in the optimistic scenario and in 2014 in the pessimistic scenario. If we assume that the system’s surplus during the initial years of the period is devoted to the reserve fund and that this fund generates a 2% real return, the accumulated resources in

<table>
<thead>
<tr>
<th>Obs 2007</th>
<th>Pessimistic</th>
<th>Baseline</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure/GDP</td>
<td>7.43%</td>
<td>26.17%</td>
<td>18.62%</td>
</tr>
<tr>
<td>Index, 2007=100</td>
<td>100.0</td>
<td>352.3</td>
<td>250.7</td>
</tr>
</tbody>
</table>
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The fund would cover the current deficit of the system up until 2032 in the baseline scenario, 2044 in the optimistic scenario and 2024 in the pessimistic scenario. These results are similar to those obtained by Doménech and Melguizo (2008). Once the reserve fund has been exhausted, the system's debt (also accruing at a rate of 2% a year in real terms) would skyrocket, to reach 234% of GDP in 2060 in the baseline scenario (74% in the optimistic scenario and 585% in the pessimistic scenario), as Chart 5.4.3 shows.

**5.4.1 Comparison with the results of other studies**

In general terms, our results are consistent with those of previous studies. Table 5.4.1 compares our projections of pension spending for 2050 with those of other authors, and insofar as it is possible, it identifies the source of the differences between baseline scenarios in terms of the main components of the expenditure indicator.

All the studies foresee a substantial increase in pension spending over the next few decades, primarily as a result of the sharp increase in the dependency rate predicted by the INE and Eurostat's demographic scenarios, which all authors take as their starting point. The employment scenarios are also fairly similar, and point towards an increase in employment rates (from initial values around 62) which, however, will be unable to compensate for the effects of ageing. The biggest discrepancies have to do with the behaviour of the ratio of the average pension to output per employee. Whereas some studies estimate that this ratio will remain constant or even fall slightly over the coming decades, others predict an increase of as much as 100%. The origin of these differences is not easy to ascertain. In some cases this component of spending is projected only approximately. However, there does not seem to be a consensus on this issue even among the studies that
use more detailed data on employment histories and transitions, in order to incorporate the heterogeneity of the population and the peculiarities of the pension calculation in a realistic way when forecasting this expense component.

5.5 Reforms necessary to ensure the viability of the pension system: a first approximation

In this section we will use the pensions model sketched out above to analyse the impact of possible reforms of the pension system on its sustainability over the next half century. Our approach is similar to that taken in the previous section: taking the average values of the relevant variables in 1980-2007 and 2007-60 (for each of the scenarios) as a reference for setting the values of the parameters of the model, we will analyse the long-term sustainability of the current system and the impact possible reforms might have on it.

As indicated in Annex 2, the model tells us that the pensions system will be in financial equilibrium (income = expenses) provided the following condition is met:

$$\tau \left( \frac{e^{(g-n)\pi}}{n} - 1 \right) = \rho(C,N) \frac{1 - (1-\pi\phi)e^{-(g+n-\omega)X} - \pi\phi e^{-(g+n-\omega)(X+X2)}}{g+n-\omega} \quad [11]$$

where \(\rho(C,N) = \phi(C)B(N)\) is the system’s initial replacement rate, defined as the ratio between the initial pension and salary at the time of retirement. If we take

\[
\begin{array}{|c|c|c|c|c|c|}
\hline
& & & \text{Expenditure/GDP} & \text{Values on baseline scenario} \\
& & & \text{Baseline} & \text{Min} & \text{Max} & \text{Employment rate} & \text{Dependency ratio} & \text{Average pension/productivity} \\
\hline
\text{This study} & 18.1 & 13.1 & 26.1 & 71.4 & 59.1 & 19.6 \\
\hline
\text{Jimeno} (2000) & 19 & 26.6 & 71.4 & 30 \\
\hline
\text{EPC} (2006) & 15.7 & 71.3 & 65.4 & 17.1 \\
\hline
\text{MITIN} (2008) & 15.3 \\
\hline
\text{Gil et al} (2007) & 15 & 12 & 24 & 75.1 & 54 & 21 \\
\hline
\text{Balmaseda, Melguizo and Taguas} (2006) & 18.7 & 13.5 & 24 & 75.1 & 54 & 21 \\
\hline
\hline
\hline
\text{Average} & 18.2 & 13.8 & 23.2 & 71.4 & 60.5 & 22.6 \\
\hline
\end{array}
\]
as given the rate of contribution to the social security system, $\tau$, we can use this condition to calculate the sustainable initial replacement rate, $\tilde{p}$, (i.e. the rate that would balance income and expenditure in the steady state). Alternatively, taking as given the initial replacement rate produced by the system, we can calculate the sustainable contribution rate, $\tilde{\tau}$. Finally, the model also tells us that the system is in long-term equilibrium if and only if its IRR is not greater than the sum of the rates of growth of employment and productivity, $g+n$.

Table 5.5.1 shows the three sustainability indicators just mentioned. The current system would be sustainable over the long term with the demographic and growth parameters observed on average from 1980-2007. Under these circumstances, it might even be possible to reduce the contribution rate slightly or increase the replacement rate by almost two points without jeopardising the long-term equilibrium between income and expenditure. Given our demographic and employment scenarios, however, the situation going forward is very different. The current system will not be sustainable even on most optimistic scenario of the three we have considered.

The problem is basically demographic. All the forecasts suggest a very much reduced rate of growth of the working age population, accompanied by a significant lengthening of life expectancy. Even on the basis of highly favourable assumptions about labour market performance, the rate of growth of the system’s income will slow markedly, thus reducing its sustainable IRR, while the lengthening of the period over which pensions are drawn tends to raise their real IRR. In order to re-establish the balance, it would be necessary to increase contribution rates significantly (by between 16 and 54 percentage points), which would be highly unwise, or reduce the replacement rate by between 30 and 56 points.

As we shall see, a third option is to delay retirement. Before examining this possibility, let us consider the effects on the sustainability of the system of three reforms that have often been suggested: extending the pension calculation pe-
period, increasing the number of years needed to be entitled to a “full pension” (i.e. to 100% of the pension base) and updating pensions at less than the rate of inflation.

Chart 5.5.1 shows the impact of increasing the number of years of a worker’s wage history that are used to calculate his pension on the system’s initial replacement rate under the parameters of our baseline scenario for 2007-60. Starting out from the current situation, extending the calculation period would reduce the replacement rate on an approximately linear basis but at a relatively modest rate. Making the calculation period equal to the number of years of contributions by the representative pensioner (33 in the baseline scenario) would reduce the replacement rate by just 14 points, leaving it still 28 points above its sustainable value.32

The second option we explore is extending the period necessary to obtain a “full pension.” In order to parameterise this reform appropriately, we first assume that a “linear system” is adopted, with a constant accrual rate for pension calculations – that is to say, a system in which the pension entitlement, measured as a % of the “full pension”, increases linearly with time at a rate of 1/A points per year, where A is the number of years necessary to reach 100% of the pension base. Chart 5.5.2 shows the sensitivity of the replacement rate to A, starting out from the current replacement rate for the average pensioner.33 As in the previous case, the effect of the measure is significant but insufficient to

32 And assuming that the measure does not translate into an increase in early retirement, a danger pointed out by Díaz Giménez and Díaz Saavedra (2008).

33 That is to say, we take as our starting point the value of A (= 34.4) which would give the same ϕ as the current system to our hypothetical representative pensioner (on the baseline scenario).
Spain and the euro. The first ten years

Increasing the period required to reach 100% of the pension base to 50 years would reduce the replacement rate by 25 points, leaving it 18 points above its sustainable value.

A third possibility would be to update pensions, once granted, at a rate below the CPI. Chart 5.5.3 illustrates the consequences of indexing pensions at a rate equal to CPI – \(\chi\), where the variable \(\chi\) is shown on the horizontal axis. In this case, the system’s initial replacement rate does not change, as the initial pension would continue to be calculated in the same way as at present, but the lower expenditure growth rate would translate into an increase in the initial sustainable replacement rate. The graph shows that the impact of this measure would
be very modest: updating pensions two points below inflation would only buy an increase in the sustainable replacement rate of 8.7 points.

The combination of the three measures just considered would still not be sufficient to ensure sustainability under the baseline scenario, although it would just do the trick under the most optimistic scenario. Table 5.5.2 summarises the incidence of each of these measures and various combinations of them on the system’s IRR and initial replacement rate34 in each of our scenarios. Adopting all three proposed measures simultaneously would still leave us half a point above the sustainable IRR of the system (and 5.5 points above the sustainable replacement rate) in the base scenario. It should be kept in mind that the figures in the table will tend to overestimate the impact of both reforms in the short term. What the model shows are long-term or steady-state effects, but these will take time to become fully effective because the introduction of the measures envisaged (with the exception of the change in the pension indexing rate) will only affect new pensioners and not existing ones. It is also foreseeable that measures of this type will be introduced only gradually, which would lengthen the transition period yet further. As a result, it seems reasonable to conclude that changes in the way in which pensions are calculated do not, by themselves, provide a sufficient margin for action to ensure the sustainability of the system.

Looked at from a different angle, the results we have just summarised imply that the switch to a defined contribution system, with benefits based on actuarial criteria to guarantee the sustainability of the system, would result in a drastic cut in pensions from their current levels. This all points towards raising the retire-

---

34 It should be borne in mind that modifying the index used to update pensions does not affect the initial replacement rate but does affect the sustainable value of this indicator. In this case, therefore, only the effect on IRR is shown.
ment age as the most effective alternative and, no doubt, the most desirable way of ensuring the sustainability of the system while minimising the necessary cut in the value of pensions.

5.5.1 Implications of delaying retirement

Analysing the effects of raising the retirement age is more complex than analysing those of the previous measures because a reform of this kind would also affect many of the parameters of the model, including the average number of years of contributions, the evolution of employment and the length of time over which pensions are drawn. This in turn affects the IRR and the initial replacement rate of the system and its sustainable values.

Firstly, therefore, it is necessary to rerun our employment scenarios in the light of the new policy and re-parameterise the model. Let us assume that, starting in 2008 the retirement age is raised by two months a year until it reaches 70 years, and that the employment rate among individuals who have to postpone their retirement remains the same as seen in 2007 for the population aged 60 to 64, according to the EPA (33%). Using these assumptions, we have recalculated the variation in total employment, the employment rate, the average contribution period and the average number of years during which a pension is drawn with the results summarised in Table 5.5.1 and Chart 5.5.1 This exercise has been carried out using both the baseline and the optimistic scenarios. In order to calculate the average period during which the pension is drawn, we have subtracted an average retirement age of 68.6 years from the average life expectancy over the period.

Table 5.5.2 shows the long-term effects of delaying the average retirement to 68.6 years, maintaining other features of the current system unchanged. In the

<table>
<thead>
<tr>
<th>PARAMETERISATION OF THE MODEL ON DIFFERENT SCENARIOS (2007-60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output growth per worker (g)</td>
</tr>
<tr>
<td>Baseline [Retirement 65 Delayed retirement]</td>
</tr>
<tr>
<td>Optimistic [Retirement 65 Delayed retirement]</td>
</tr>
<tr>
<td>1.13% 1.13%</td>
</tr>
<tr>
<td>1.70% 1.70%</td>
</tr>
<tr>
<td>Total employment growth (n)</td>
</tr>
<tr>
<td>0.12% 0.21%</td>
</tr>
<tr>
<td>0.76% 0.85%</td>
</tr>
<tr>
<td>Average employment rate 18-64</td>
</tr>
<tr>
<td>70.33% 73.21%</td>
</tr>
<tr>
<td>72.87% 75.49%</td>
</tr>
<tr>
<td>Average years of contributions (C)</td>
</tr>
<tr>
<td>33.05 34.41</td>
</tr>
<tr>
<td>34.25 35.48</td>
</tr>
<tr>
<td>Life expectancy</td>
</tr>
<tr>
<td>Population as a whole</td>
</tr>
<tr>
<td>85.9 85.9</td>
</tr>
<tr>
<td>85.9 85.9</td>
</tr>
<tr>
<td>Men</td>
</tr>
<tr>
<td>83.5 83.5</td>
</tr>
<tr>
<td>83.5 83.5</td>
</tr>
<tr>
<td>Women</td>
</tr>
<tr>
<td>88.3 88.3</td>
</tr>
<tr>
<td>88.3 88.3</td>
</tr>
<tr>
<td>X = years drawing retirement pension</td>
</tr>
<tr>
<td>20.90 17.27</td>
</tr>
<tr>
<td>20.90 17.27</td>
</tr>
<tr>
<td>X2 = additional years surviving spouse’s pension</td>
</tr>
<tr>
<td>5.15 5.15</td>
</tr>
<tr>
<td>5.15 5.15</td>
</tr>
<tr>
<td>Retirement age (average)</td>
</tr>
<tr>
<td>65 68.63</td>
</tr>
<tr>
<td>65 68.63</td>
</tr>
</tbody>
</table>
baseline scenario the change increases the sustainable replacement rate by 9 points and the observed replacement rate by 2.25 points, reducing the viability gap expressed in terms of this indicator by almost 7 points. It also reduces the system’s IRR by 52 basis points and increases the sustainable IRR by 9 basis points, thereby reducing the viability gap in terms of IRR by 0.61 percent. In the present case, moreover, the long-term calculation made by the model underestimates the effects of the policy change, as there is a transition effect that the model does not capture. This effect is positive and may be significant: by raising the retirement age the average period during which individuals contribute to the system is gradually extended and the average period over which they draw a pension is shortened. Until both factors stabilise, this will tend to raise the revenue growth rate and to reduce expenditure.35

However, our results suggest that raising the retirement age by a reasonable amount would be insufficient by itself to ensure the long-term viability of the

system in the baseline scenario. In order to achieve this it would also be necessary to modify the procedure for calculating pensions in line with the suggestions made above. Table 5.5.3 shows the additional effects that the adoption of these measures would have in combination with raising the retirement age. On the baseline scenario, adopting the first two reforms proposed in the previous section would situate us precisely on the threshold of viability (extending the pension calculation period and the number of years necessary to reach 100% of the pension base). In the case of the optimistic scenario, it would be sufficient to adopt either of these two measures to achieve the same objective.

### 5.6 Conclusion and recommendations

On current demographic forecasts the Spanish contributory pension system is unsustainable over the long term, even if we make optimistic assumptions about the future evolution of employment rates, productivity growth and immigration. If the recovery from the current crisis is reasonably quick, productivity grows at a rate above 1%, the female employment rate approaches the male employment rate, and immigration falls only gradually, it is possible that the system will take as long as a decade to go into deficit and that the reserve fund accumulated during the period will allow us to continue paying pensions without problems for eight or nine more years. However, once we have reached this point, the debt necessary to maintain the current system will explode, rising to levels above 100% of GDP in just a few years. Given the system’s huge inertia, the only way to avoid reaching an unsustainable situation would be to start adopting a series of measures immediately. These should go beyond the minor tinkering that has been considered until now within the Pacto de Toledo – the framework agreement on pensions reached by the main political parties and social actors in the mid-nineties.
Given that it does not seem reasonable to embark on a spiral of rapidly increasing taxes and/or social security contributions which would end up suffocating the economy, the only feasible option is to reduce the generosity and/or duration of pensions to sustainable levels, extending the period over which pensions are calculated, increasing the number of years needed to reach 100% of the pension base and gradually raising the retirement age, as other OECD countries have done. The necessary cut in the replacement rate may be made by means of a formal change to a defined contribution system in which pensions are not set in advance but calculated on the basis of actuarial criteria at the time of retirement, or by modifying the parameters of the existing system to obtain an equivalent result. In any event, our calculations suggest that it would be necessary to start to act immediately. Some of the measures we have examined may have adverse effects on lower income individuals’ retirement decisions and other important transition effects that our model does not capture. Both factors could modify our results somewhat and require adjustments to the details of some of our recommendations, but they are unlikely to change the essence of the diagnosis or the general lines of the necessary treatment. In the demographic circumstances envisaged over the coming decades, the level of income that we will be able to guarantee our old people is, in relative terms, significantly less than at present, especially if we are not willing to accept a delay of a few years in the retirement age.

6 Concluding remarks

The central thesis of this chapter is that Spain urgently needs to undertake a series of profound structural reforms. In particular, these need to include:

- Reaching a minimum consensus among the various political parties to give the educational system the stability it needs to function properly.
- Stepping up corrective measures to reduce the risk of educational failure among least favoured pupils, concentrating efforts in this regard on the early stages of education. Eliminating the single track through the last stage of compulsory secondary education, or at least relaxing it so as

36 Over the last decade a large number of OECD member countries have reformed their public pension systems. Many of them have extended the period over which pensions are calculated so as to bring them closer to the individual’s total working life. Some of them have also raised retirement ages to over 65, linking the retirement age in some case to variations in life expectancy and/or introducing various mechanisms to allow the value of pensions to be adapted to demographic circumstances. The most ambitious reforms have been undertaken in Italy, Portugal and Sweden. For more details, see Alonso and Conde (2007) and OECD (2007b).
to allow for the introduction of more flexible curricula. Strengthening the incentives to promote academic excellence so that students continue their education and training after they have finished their compulsory schooling.

– Reforming collective bargaining by defining the type of elements that should be set in each of the three spheres of negotiation (national, sector-specific and corporate) and establishing more flexible opt-out clauses, with the aim that wage negotiations adequately reflect the economic conditions in each firm and reduce the current system’s tendency to make adjustments almost exclusively through employment levels.

– Creation of a single type of job contract with severance pay linked to length of service, without any type of discontinuities relating to contract duration, so that the cost of dismissal for new employees rises gradually with their length of service.

– Speeding up the adoption of reforms to intensify competition in goods and services markets, to bring down administrative costs and to make it easier to start up new businesses (in terms of the number of administrative steps, time and cost).

– Setting up a national commission bringing together all the regional institutions and other actors involved to simplify and unify legislation on the domestic market in a common regulatory framework.

– Improving the geographical mobility of the labour force by increasing the supply of rental housing by strengthening landlords’ legal position rather than by creating additional tax incentives.

– Reducing the generosity and/or duration of pensions to sustainable levels, by extending the pension calculation period and the number of years it takes to reach a 100% pension and gradually raising the retirement age, as has been happening in other European countries.

As readers will have noticed, neither our recommendations nor the analysis on which they are based are particularly new. In recent years the academic community, international organisations and other private commentators and have produced a huge amount of work on the challenges faced by the Spanish economy and the policies that would be necessary in order to overcome them. To a large extent, our work has limited itself to summarising and reiterating what numerous experts have been saying for a long time about these issues in the hope that repetition will help the message sink in.

The Spanish government is fully aware of the problems we have discussed here. The National Reform Programme (Programa Nacional de Reformas de España, PNR) adopted in 2005, as part of the European effort to re-launch the Lisbon Strategy, is subtitled “convergence and employment.” The document begins
with an analysis of the evolution of the Spanish economy and its structural weaknesses, which has a lot in common with that in section 2 of this paper, and which identifies two of the objectives we proposed above as the priorities for Spanish economic policy: full income convergence with our European neighbours and raising the employment rate, while also emphasising the challenge the current process of ageing represents.

In order to achieve these objectives, the PNR establishes a series of axes of action, which include investment in human capital (axis 3), improving the labour market (axis 6) and adopting measures that guarantee the future equilibrium of the pension system (included in axes 1 and 6). Within these axes of action, the PNR sets out a host of concrete measures, including in particular the following. On the subject of pensions (p. 62) it proposes advancing towards a “greater match between the contributions and benefits when determining retirement pensions” and establishing “new limitations on the recognition of minimum pensions,” although it also proposes increasing these at a rate above inflation. On the subject of education (pp. 79-81), one of the priorities is to bolster pre-primary schooling by expanding the number of public slots for children aged 0 to 3 years at a rate of 2% a year until demand is met, and to guarantee free schooling for all children in the second stage of this phase (3 to 6 years). It also proposes bolstering the support measures for pupils with difficulties in primary and secondary education, placing the emphasis on early detection and correction of learning difficulties and encouraging the integration of pupils from immigrant families. Finally, as regards the labour market (pp. 126-31) establishing or enhancing incentives for hiring women and young people on permanent contracts, modernising public employment services and reviewing the contractual basis of temporary work and the cost of temporary and permanent hiring and maintaining the main lines of the interconfederation agreement on collective bargaining (Acuerdo Interconfederal para la Negociación colectiva), which is perceived as a useful instrument in maintaining salary moderation.

The progress made towards implementing the measures put forward in the PNR is described in the 2006-2008 annual reports on the plan’s progress (MP, various years). On the subject of pensions, the reports emphasize the successive contributions to the reserve fund (which had accumulated a total of 56,000 million euros by 2008), the extension to fifteen years of the effective minimum contribution period required for access to a contributory pension (as compared with 12.6 years previously), and the generalisation of incentives to voluntarily extend working life beyond 65 years by establishing pension top-ups for each additional year worked. In relation to the labour market, partial waivers on employer contributions and other incentives for permanent contracts have been extended. As regards education, significant progress has been made in schooling rates for children under three. Another highlight is the passing and gradual implementation of
the new Organic Law on Education (Ley Orgánica de Educación, LOE), which is accompanied by an additional budgetary allocation of several billion euros which will basically be devoted to measures designed to lower school failure rates and bolster equal opportunity. The law also includes some significant steps forward, such as the introduction of diagnostic evaluations of basic competencies in the fourth year of primary education and the second year of secondary education.

While most of these measures point in the right direction, they do not go far enough. They are, by and large, minor modifications which do not alter the basic structure of education or pension systems or the model of labour relations. For example, there is no mention whatsoever, of changes to the retirement age or of reforms to the collective bargaining process. Moreover, the government has made an explicit commitment not to undertake any reform of the pension system or of the labour market without the explicit support of the social agents. To some extent, this may be reasonable, given that the cooperation of the trade unions and employers is virtually a *sine qua non* for any reform in this area to be feasible. However, the government and the main political parties cannot abdicate their responsibilities: they must openly recognize the existence of problems, offer solutions for them, even if they are painful for certain groups in the short term, and actively seek the support necessary to implement them. The long-term benefits for Spanish society as a whole undoubtedly more than compensate the effort we need to make today.
Annex 1: Definitions and sources of the data used in section 2

- **GDP** at purchasing power parity. In some countries it has been necessary to re-scale GDP slightly to enable relative per capita income comparisons with data available in Eurostat in August 2008.
  
  Sources: Economic Outlook, OECD, and National Accounts, OECD, various years. PWT 6.2 for the period 1950-59, growth rates used for backward extrapolation.

- **Population**, working age population, labour force and unemployment rate.
  
  Sources: Economic Outlook, OECD, and National Accounts and Employment Outlook, OECD, various years. PWT 6.2 for the period 1950-59, growth rates used for backward extrapolation. The working age population refers to the population between 15-64 years and 16-64 for Norway, Spain, Sweden, the United Kingdom and the United States. The employed population is consistent with national accounts, so may not be the same as that stated in the OECD Labour Force Survey.

- **Hours worked**: Number of hours worked per employee per year across the economy as a whole.
  
  Sources: Economic Outlook, OECD, 2008(1). Austria 2004-2007, Employment Outlook, OECD, 2008. The data for Greece in 2007 refer to 2006. For years previous to those available from the OECD, the hours estimated by Groningen Growth and Development Centre, having been extrapolated backward using their growth rates.

- **Private productive capital stock**: The same methodology as for the permanent inventory method in de la Fuente and Doménech (2006a) has been used to calculate the initial capital stock in 1950, but distinguishing between the private productive capital series, and residential investment and public capital. The depreciation rates are those published by Kamps (2006).
  
  Sources: Economic Outlook, OECD, and National Accounts, OECD, various years. PWT 6.2 for the period 1950-59, growth rates used for backward extrapolation.

- **Years of schooling** among the population aged over 25 years.
  
  Source: de la Fuente and Domenech (2006). Data for the most recent years have been estimated by applying growth rates from Cohen and Soto (2007), available up to 2010.

- **R&D expenditure** as a percentage of GDP.
  
  Source: Main Science and Technology Indicators, OECD.

- **Cost of regulations** affecting economic activity. Corresponds to the average of the standardised values for the 21 OECD countries in 2006 of the cost of setting up and closing down a company, red tape, regulations on hiring
employees, the cost of registering ownership and accessing credit, investor protection and contract protection (both variables with a negative sign), the tax burden and ease of foreign trade (also with a negative sign).

- *Inflation.* Rate of growth of the private consumption deflator.
  *Source:* Economic Outlook, OECD.

- *Structural unemployment rate.* NAIRU estimated by the OECD.
  *Source:* Economic Outlook, OECD.

- *Public Deficit.* Source: Economic Outlook, OECD.

- Index of *macroeconomic instability.* Average of the standardised inflation series, structural unemployment rate and public deficit.

Annex 2

1 Construction of the third (“optimistic”) demographic scenario

Let $P_t^e$ be the population of age $e$ on 1 January of year $t$ according to the baseline scenario. First of all, we calculate the gross survival rate for each age group between years $t-1$ and $t$, and the “gross fertility” of the population between 20 and 40 years, defined as:

$$s_t^e = \frac{P_t^e}{P_{t-1}^e} \quad \text{and} \quad f_t^e = \frac{P_t^{0-40}}{P_{t-1}^{20-40}}$$

The projected population under the new scenario $\hat{P}_t^e$ is constructed recursively from the population in 2008 on the baseline scenario, applying the survival rates from the baseline scenario defined above for each age group, incrementing the gross fertility rate by 10% and adding the additional influx of immigrants ($I$), such that:

$$\hat{P}_t^e = s_t^e \hat{P}_{t-1}^e + f_t^e \hat{P}_{t-1}^{20-40}$$

for $t > 0$ and

$$\hat{P}_t^{0-40} = 1.1 \times f_t \hat{P}_{t-1}^{20-40}$$

It should be noted that for the purposes of the calculations the population aged 80+ has been added as a single group (unlike other ages, which are broken down year by year). In this case we obtain:

$$s_t^{80+} = \frac{P_t^{80+}}{P_{t-1}^{79+}} \quad \text{and} \quad \hat{P}_t^{80+} = s_t^{80+} \hat{P}_{t-1}^{79+}$$

Note that in this approach we take the average birth-rate and mortality assumptions from the baseline scenario, at least approximately, and we also apply them to the new entrants, with the relevant modifications. Given that the gross survival rate we have calculated also takes immigration into account, we are implicitly increasing the rate of immigration by somewhat more than the initial 50%.

2 A simple model of pension expenditure

This section briefly summarises the pension expenditure model developed in de la Fuente (2009).
2.1 Demography and wage growth

Let us suppose that the number of births increases over time at a constant rate, \( n \), such that the number of individuals born at time \( s \) is given by:

\[
L(s) = e^{ns}
\]

An individual born at time \( s \) joins the labour market (and starts to work immediately) at time \( s+E \), retires at \( s+J \), dies at \( s+Z \), and has a probability \( \pi \) of being survived by a widowed spouse who survives until \( s+Z_2 \).

Let us suppose that wages are exogenous and increase over time and with the individual’s experience. In particular, the real salary at time \( t \in [s+E, s+J] \) of an individual born at time \( s \) is given by:

\[
W(s, t) = A_t e^{v(t-(s+E))} = A_0 e^{gt} e^{v(t-s-E)}
\]

where \( A_t \) reflects the effects of technical progress and the accumulation of capital on aggregate wage levels and the term \( e^{v(t-s-E)} \) is the premium on the individual’s experience. To simplify the calculations, we have assumed that the experience premium grows at a constant rate, \( v \), and that it does not present the hump-shape that is normally found in the data.

2.1.1 Calculating the pension

The model reflects, in simplified form, the approach used in Spain to calculate the value of contributory pensions. The initial pension an individual born at time \( s \) receives on retirement at \( s+J \) is calculated as:

\[
P(s, s+J, C, N) = \phi(C) B(s, s+J, N)
\]

where \( \phi() \) is a percentage dependent on the number of years of contributions, and

\[
C = J-E
\]

as specified in the current legislation (see section 3 of this Annex) and \( B() \) is the pension base, defined as the worker’s average wages over the last \( N \) years prior to retirement. We refer to \( N \) as the calculation period for the pension.

In order to work out the pension base, wages from previous years are updated using the CPI (except for those in the last two years, which we ignore in order to simplify the calculations). Given that we are working directly with real wages, the updating is implicit, and we obtain:
The pension base is, therefore, a fraction of the worker’s wages at the time of retirement. It is easy to confirm that this fraction is a decreasing function of the length of the period over which the pension is calculated (N) and the growth rate of the individual’s wages (g+μ).

The initial pension can therefore be written as follows:

\[ P(s, s+J, C, N) = \phi(C)b(N)W(s, s+J) = \rho(C, N)W(s, s+J) \]  

where \( \rho() = \phi()b() \) is the ratio of the salary at the time of retirement to the initial pension. We will refer to this variable as the individual’s initial replacement rate.

The model allows pensions to be updated using an index other than the CPI. If we call the real pension growth rate \( \omega \), the pension (P), in real terms, a pensioner retiring in year \( s+J \) would receive in year \( t \) is given by:

\[ P(s, t, C, N) = P(s, s + J, C, N)e^{\omega[t-(s+J)]= \rho(C, N)W(s, s+J)e^{\omega t}e^{-\omega (s+J)}} \text{ for } t \in [s+J, s+Z] \]  

When the worker dies, if he or she leaves a spouse, this spouse will draw a surviving spouse’s pension (PV) for the rest of his or her life, the value of which, in constant prices, will be equal to:

\[ PV(s, t, C, N) = \phi_v P(s, t, C, N) = \phi_v \rho(C, N)W(s, s+J)e^{\omega t}e^{-\omega (s+J)}} \text{ for } t \in [s+Z, s+Z2] \]  

where \( \phi_v = 0.52 \) in the general case.

### 2.1.2 The IRR of the pension system

From the worker’s point of view, the public contributory pension system can be considered an investment vehicle allowing him or her to ensure a life-long income after retirement in exchange for a flow of contributions during his or her working life. It can be shown that the internal rate of return (IRR) on this investment is the value of \( r \) which solves the following equation:

\[ \frac{\phi_v}{r} - g - v = \rho(C, N) \frac{1 - (1-\pi\phi_v)e^{-(r-\omega)X} - \pi\phi_v e^{-(r-\omega)(X+X2)}}{r-\omega} \]

where

\[ X = Z - J \]
is the length of time over which the retirement pension is drawn.

\[ X_2 = Z_2 - Z \]

is the length of time over which the surviving spouse’s pension is drawn (which is paid out with a probability of \( \pi \)) and \( \tau \) is the rate of social security contributions related to the pension system (including both the employee and employer contributions).

### 2.1.3 Aggregate magnitudes

By integrating over the date of birth, \( s \), it is straightforward to calculate the income and expenses of the pension system at any moment in time and for a given average salary and pension. As shown in de la Fuente (2009), the ratio between the average pension and average salary is given by

\[
\gamma(t) = \frac{\overline{P(t)}}{\overline{W(t)}} = \rho(C,N)e^{\nu C} \frac{n - \nu}{g + n - \omega} \frac{1 - e^{-nC}}{1 - e^{-(n-\nu)C}} \frac{1 - (1 - \pi \phi) e^{-(g+n-\omega)X} - \pi \phi e^{-(g+n-\omega)(X+X^2)}}{1 - (1 - \pi) e^{-nX - \pi e^{-(X+X^2)}}} \quad [12]
\]

Moreover, it can be checked that the expenditure of the system each year will be less than its revenues provided that the following inequality is fulfilled

\[
\tau \left( \frac{e^{(n-\nu)C}}{n-\nu} \right) \geq \rho(C,N) \frac{1 - (1 - \pi \phi) e^{-(g+n-\omega)X} - \pi \phi e^{-(g+n-\omega)(X+X^2)}}{g+n-\omega} \quad [13]
\]

Working with this expression as an equality, the sustainable replacement rate can be calculated for a given contribution rate \( \tau \) which is the contribution rate necessary to maintain the financial equilibrium of the system given the values of its parameters. Finally, it is possible to show that the condition for sustainability given in [13] is fulfilled if and only if the IRR of the system is not greater than the rate of growth of aggregate wages, i.e., if and only if

\[
\tau \leq g+n \quad [14]
\]

### 2.1.4 What does the ratio \( P/W \) depend on?

Charts A2.2.1 and A2.2.2 show the sensitivity of the steady-state value of the ratio \( P/W \) to increments in the rate of growth of productivity and total employment and to increases in the contribution period and length of time for which pensions are drawn. The starting point is a typical pensioner in the period 1980-2007.
The steady-state value of the ratio of average pensions to average wages is negatively affected by the average productivity growth rate, $g$, but much less than proportionally, and increases with the average number of years of contributions, $C$. This ratio is relatively insensitive to the employment growth rate, $n$, and life expectancy after retirement, $X$.

This result is counterintuitive and is due to the existence of widows and widowers pensions. If we consider only retirement pensions, when we extend life expectancy a little, the marginal pensioner, who formerly exited from the sample and now lives more years, has a pension below the average. Therefore, by increasing $X$ the average pension should drop. And, given that average wages do not vary, the $P/W$ ratio should also decrease. However, given that we include widows...
and widowers in the average pension calculation, the marginal pensioner could be close to the total average pension and his or her remaining in the sample will have a minimal effect on the average.

3 Determining contributory and survivor pensions in Spain

This section briefly describes the current rules on determining the initial value of the contributory and survivor pensions provided by the social security system in Spain and how this varies over the long term. It looks at the general case, ignoring the special regimes that exist.

In order to be entitled to a contributory pension it is necessary to have contributed to the social security system for at least 15 years, and with a few exceptions we will come on to later, have reached the age of 65. The initial amount of the pension is determined as a percentage ($\phi$) of the pension base.

\[ \text{Initial pension} = \phi \times \text{pension base} \]

The pension base is an average of the gross salary received by the worker over the last 15 years of contributions.$^{37}$

In order to calculate this average, salaries are updated with the consumer price index up to two years before the retirement date. Those corresponding to the last two years are not updated but calculated at their nominal value. The value of the percentage $\phi$ is proportional to the years of contributions accrued by the worker. Those who have contributed over the required minimum of 15 years will be entitled to 50% of the pension base. This percentage rises by 3 points per year of contributions up to 25 years and by 2 points for each year between 25 and 35 years, thus reaching 100% of the pension base after 35 years of contributions.

As we have said, the legal retirement age is 65. In some cases, however, this age is lowered in view of the special demands of certain occupations. The possibility of early retirement also exists, but with severe restrictions. The main exception in this regard affects workers aged 61 or over who have lost their jobs involuntarily and it implies a reduction in the pension of between 7 and 8% (depending on the number of years of contributions accrued) for each year by which retirement is brought forward. Moreover, retirement at 65 is not compulsory.

$^{37}$ The calculation is performed in monthly terms, using the last 180 months of contributions. The amount discounted from monthly salaries over this period is divided by 210 in order to calculate the monthly pension base. However, pensioners receive 14 annual payments (including the two extra payments), so the above operation compensates for the extra payments and therefore is equivalent to making the payment in annual terms.
Workers who continue working beyond this age are exempt from social security payments and continue increasing their pension. Workers who have accumulated 35 years of contributions can increase the percentage of their pension base above 100% at a rate of 2 percentage points per extra year worked, until they reach the maximum pension set by law.

Survivor pensions are set, in the general case, at 52% of the calculation basis of the deceased spouse, updated according to the revaluations applied to survivor pensions as of the date on which the original pension arose. Given that both survivor pensions and retirement pensions are updated in line with the CPI, this is equivalent to linking survivor pensions to the pension received by the deceased spouse at the time of death, with the possible exception of maximum and minimum pensions, which the model in the previous section does not take into account.

Once the initial value has been set, pensions are generally updated in line with the CPI. The annual pension increase is set based on the inflation forecast. If actual inflation is higher than that forecast, pensioners receive a compensating payment in the last month of the year, which is consolidated for future increments.

The system is financed out of social security contributions, which represent a fixed percentage of workers’ gross income between a floor and a ceiling. The contribution rate for “ordinary risks” is 23.6% for the employer and 4.7% for the employee. As mentioned in the text, this income also finances other benefits as well as pensions, so it is necessary to consider what share is allocated to pensions in order to estimate the system’s income.
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