Working life and retirement pensions in Spain: The simulated impact of a parametric reform

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Abstract This article aims to offer an ex ante evaluation of the impact of a parametric reform of the Spanish pension system that would involve increasing the reference period used to calculate benefits, an approach proposed many times by various actors in the socio-economic field. Such gradual change may be categorized as a non-structural reform of the pension system. This contrasts with reforms of a structural nature that have been very popular in Latin America and elsewhere, involving the creation of defined contribution individual account schemes. As regards the parametric reform proposed in this article, the main findings indicate that it would have a small but negative impact on pension income for pensioners and would reduce income distribution.

Keywords pension scheme, social security reform, social solidarity, Spain

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Introduction

Almost since the inception of public pension systems, warnings have been voiced about the challenges that may arise as regards meeting future obligations towards insured workers. Such misgivings have normally been associated with the process of demographic ageing resulting from increases in life expectancy and a fall in fertility rates, which tends to accompany economic development. If a date were to be assigned to the latest round of fears over the future of prevailing pension systems (mostly pay-as-you-go schemes in various forms), then 1994 would probably be the most appropriate, since it was then that the World Bank published its policy research report *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth* (World Bank, 1994). In this well-known work, the Bank established the basis for its recommendations on social security, which still apply today, albeit with significant changes. These guidelines for the reformulation of social security emphasize in particular that contributory pension schemes, which in both developed and middle-income countries are mostly run by the State, should be transformed into privately-managed defined contribution individual account schemes. The Bank model posited a three-pillar structure based on a first pillar oriented towards assistance-type benefits (to be financed, logically by the State), a second pillar of mandatory and private individual accounts and a third pillar, again based on individual accounts but of voluntary and private nature.

Inspired and mainly guided by the World Bank's recommendations, which were shared to a large degree by other institutions such as the International Monetary Fund, the Inter-American Development Bank and the Organisation for Economic Co-operation and Development, a large number of countries, mostly middle-income countries in Latin America and the Caribbean and Eastern Europe, introduced reforms. These reforms also looked to the Bank's principal role model: the pension system created by Chile's pioneering reform of 1981.

For Latin America and the Caribbean, the region that pioneered the adoption of defined contribution individual account schemes, the extensive literature analysing the impacts of, what Mesa-Lago has called, "structural" reforms (Mesa-Lago, 2004) on various aspects of the economy has emphasized various problems, many of which still await a solution.[1] First, mention must be given to the limited impact (or, in some cases, a total lack of impact) of such systemic changes on the coverage of the working population. Second, it should be stressed that the reforms, in both the short and medium term, require efforts of a fiscal nature that are far from negligible (involving both reductions in expenditure and increased taxes) to cover the so-called transition costs resulting from the need to pay pensions under the previous system and to recognize the contributions paid by workers prior to the

1. See, inter alia, Uthoff (2002), Mesa-Lago (2002 and 2004), Ochando (2004) and Antón (2006).

reform to the previous social security scheme. These limitations, combined with alternative policy choices adopted by several governments, have acted to slow the adoption of such reforms in some regions, including Latin America. For example, Brazil and Panama have chosen to introduce "parametric" reforms to their public defined benefit systems to enhance the link between contributions paid and the pensions actually received. According to the proponents of these refroms, such an approach helps rationalize public pension expenditure without incurring the costs of transition resulting from structural reform.[2]

Spain, which has a public pay-as-you-go scheme providing defined benefits, has opted for this alternative "parametric" path towards reform, involving gradual small-scale changes in benefits, and has also encouraged complementary but voluntary private schemes. In the mid-1980s and 1990s changes were introduced to contain expenditure on pensions by increasing the required number of years of contributions prior to retirement to be used to calculate the value of the old-age pension.

In recent years, various governments in Spain have studied the possibility of extending such mechanisms, with the aim of rationalizing the volume of resources needed to finance pensions. In this process, the constructive attitude of the trade unions towards the study of such adjustments is noteworthy (García and Serrano, 2004). This development has also seen the publication of the so-called "Toledo Pact", a consensus agreement between all the political powers represented in Parliament. The agreement expressed support for such gradual, small-scale changes as a means to guarantee the sustainability of the Spanish pension system where such changes sought to strengthen the relation between inputs and outputs in the social security system. The impact of the economic crisis of 2008 on the state budget has rekindled this debate.

This article seeks to analyse the implications of such reforms for pensioners. Unlike most previous works, which have assessed the capacity of reforms to contain pension expenditure, this article addresses not only the impact of such changes on the purchasing power of pensioners, but also seeks to describe the wide range of probable effects produced by such reform, and thereby to analyse the impact of such reforms in relation to individuals' income, gender and contribution group (a variable tied to occupational classification). This article also draws on a new administrative resource, the *Sample of Working Lives, 2005* (Secretariat of State of Social Security, 2005), which has been made available to researchers by the Ministry of Labour and Social Affairs. The findings of this survey, in our opinion, may offer

2. In the United States, in the debate on the advisability of privatizing "social security" that took place during President George. W. Bush's administration, moderate positions gained ground over time. For example, Diamond and Orszag (2004), postulated gradual reforms involving small reductions in expenditure and increases in income, which were championed as alternatives to more radical pension system reforms.

guidance to policy-makers in other countries that have not reformed their pension systems on the impact and advisability of such reforms.

Following this introduction, the remainder of the article is presented in three sections. The next section presents a literature review of the impact of pension reforms in Spain, and offers a basic framework to help understand how the social security system in Spain operates. This is followed by a detailed description of the database used for this article and of the empirical methodology used in the study. The main findings are presented and discussed. The final section summarizes the conclusions of the study.

The context: The Spanish pension system at a crossroads

Social security in Spain dates chiefly from the 1960s. It was during this period that the foundations were laid for the current contributory pension system, which is financed out of social security contributions paid by active workers. It was in the mid-1980s that the first fiscal incentives were introduced for complementary private pensions (Antón, 2007), and in 1990 the argument was advanced for some degree of universalization of social protection by the introduction of a tax-financed pension system to provide assistance-type benefits to those requiring support. The social security system is fragmented, with sectoral special schemes operating for mining, fishing, domestic work, self-employment and the public service. Nevertheless, the main subsystem was and remains the General Scheme, which covers most employees, and to which we will henceforth refer.

Until 1985, the contributory system was governed by the following formula for the calculation of benefits:

$$P_{65} = \alpha(n) \times BR(w) \qquad [1]$$

in which benefit P payable to an individual retiring at age 65 depended on the coefficient α, which was a non-linear function of the number of years of contributions n and of the regulatory base of the pension, BR, which was calculated as the average contributory wage (w) during the last two years in which contributions were paid. Workers who had paid a minimum of 10 years of contributions received 50 per cent of the regulatory base, which increased by 2 per cent for each additional year of contributions. Three other features should be noted that still apply. First, unemployed persons receiving unemployment benefits contribute to the pension system at the minimum rate; second, if during the reference period used as the basis for the calculation of the pension the individual did not pay contributions (as a result of inactivity; of unemployment, but not being eligible for unemployment benefits; or some other contingency), those months are not only excluded from the calculation of the pension, but are treated as if the

"earnings" during this period were equal to the minimum wage (which in general has been the same as the minimum interprofessional wage in Spain); third, there is a minimum pension subject to a means test, which in 2005 was set at just over €500 a month.

The first significant reform of the system was made in 1985. This consisted of an increase in the minimum number of years of contributions required to qualify for a pension (from 10 to 15 years) and, more significantly, in a modification of the average earnings used for the calculation of the regulatory base, which involved a change from the average of the last 112 months of contributions to that of the last 24. Under this reform, benefits were equal to 60 per cent the regulatory base for workers with a minimum of 15 years of contributions, but which increased by 2 per cent for each additional year of contributions.[3]

Finally, the more significant recent reform, which was preceded by a broad consensus between all political forces under what has come to be known as the "Toledo Pact", increased the reference period used in the regulatory base from 8 to 15 years and established that a minimum of 15 years of contributions would entitle the insured person to a pension equal to 50 per cent of the regulatory base, with an additional 3 per cent payable for each additional year of contributions from 16 to 25 years, and an additional 2 per cent payable for each additional year beyond 25 years (up to a maximum of 100 per cent of the regulatory base with a maximum of 35 years of contributions).[4]

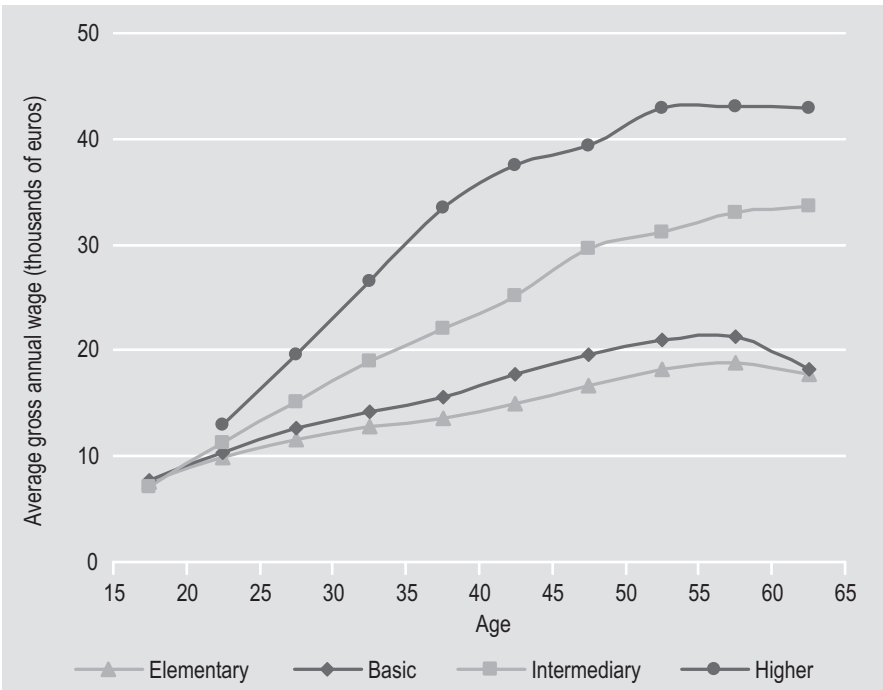
One element foreseen in this process of "permanent" reform (Rodríguez Cabrero, 2005) of the Spanish public pension system is to increase what has come to be termed the "contributivity" of the system, which means an increase in the ratio of inputs made to the system by contributors to the resulting pension. Two elements affect the degree of contributivity: the number of years of contributions, and the number of required years used to calculate the regulatory base.

The emphasis on increasing the contributivity of pensions addresses two constant concerns. First, in the reforms mentioned, the increase in the reference period largely addresses the aim of avoiding strategic behaviour by future pensioners who might "buy" their pensions. Given that before the 1985 reform only two years' contributions were needed to secure entitlement to a retirement pension, many employee groups agreed artificial wage increases over the last two years of their working life. The second wave of reforms (1997) is more closely tied to

3. For further details of pension reform in Spain since the 1980s, see Boldrin, Jiménez-Martín and Peracchi (2001).

4. At the same time, two very different reports were published: that by Herce and Pérez-Díaz (1995) on the reform of the public pension system, and the more optimistic report by the Ministry of Labour and Social Security (MTAS, 1996), which were both followed by the well-known *Barea Report* (Barea and González-Páramo, 1996) and the report financed by the Circle of Entrepreneurs and co-authored by José Piñera, the architect of the Chilean reform (Piñera and Weinstein, 1996).

Figure 1. *Average gross annual wage by age and educational level in Spain (2002)*



Source: Authors' calculations based on the *Wage Structure Survey database*. See http://www.ine.es/jaxi/menu.do?type=pcaxis&path=%2Ft22/p133&file=inebase&L=0.

demographic change in the Spanish population, due to increases in life expectancy to over 80 years, and the fall in fertility rates since the 1960s. These two phenomena have resulted in an increase in the old-age dependency ratio (persons aged 65 or older as a percentage of the potentially active population), resulting in a corresponding increase in the cost of pensions per potentially active person. In both cases, the ultimate aim of the reforms was to contain the growth of pension expenditure.

One of the main features of the Spanish contributory pension system is that the benefits received depend on the earnings received by the insured person over a certain number of years preceding retirement. Lindbeck and Persson (2003) observe that it is very common for public schemes, and Bismarckian-type general average premiums schemes, to calculate the pension as a proportion of the average earnings received from work over the last x years or during the y years with the highest income. According to the extensive review conducted by those two authors, such a policy may lead to inequities contrary to the interests of workers of lower educational levels (who often receive lower remuneration), since the wage profiles of more highly-skilled workers usually grow more than those with lower educational

Table 1. *Number of years included in the calculation of retirement benefits under various public pension systems*

Entire working life	Last (*x*) years	(*y*) Best years
Belgium	Argentina (10)	Austria (best 20 years,
Brazil (except the lowest 20%)	Colombia (10)	changing to 40)
Canada (except the lowest 15%)	Costa Rica (20)	Costa Rica (5)
Estonia	Czech Republic (last 10,	Ecuador (5)
Finland	changing to 30)	France (25)
Germany	Nicaragua (5)	Greece (best 5 of the last 10)
Hungary	Paraguay (3)	Guatemala (5)
Iceland	Peru (5)	Morocco (8)
Italy	**Spain (15)**	Norway (20)
Japan	Tunisia (10)	Panama (7)
Korea (Rep. of)	Uruguay (Last 10 or best 20)	Slovenia (best 18 consecutive years)
Latvia	Venezuela (Last 5 or best 5 years	United States (35)
Lithuania	of the last 10)	
Luxembourg		
Poland		
Portugal (maximum 40 years)		
Serbia		
Slovakia		
Sweden		
Switzerland		
Turkey		
United Kingdom		

Sources: Authors' calculations based on SSA and ISSA (2008a, 2008b, 2009a and 2009b).

levels, who also tend to receive smaller wage increases over time. Although offering a cross-section of data, Figure 1 shows how wage profiles in Spain correspond to those posited by Lindbeck and Persson (2003).

In principle, the existence of these different wage profiles suggests that by using a greater number of years of contributions to define the reference period used to calculate pensions — together with a reduction in average pensions for all educational levels (in so far as income from work tends to increase in the course of the working life for all skill levels), and in view of the fact that any reform of these features would have no uniform impact on retired persons — those with "steeper" wage profiles would be the ones with most to lose in their pension income. The main hypothesis that this study seeks to examine is precisely whether a reform of this kind would in fact have a redistributive effect. A second, no less important aim, which is highly relevant but often overlooked in academic research, is to quanitfy the concrete and specific impact of such changes.

However, this method of calculating pensions, as already stated, is not exclusive to Spain: while an increasing number of countries are indeed opting for an extension of the reference period used to calculate the regulatory base to cover the entire working career, others still retain formulas based on only part of the contributory career (see Table 1).

A review of the literature shows that, although far from numerous, there have been several analyses of the impact of such changes in rules on pensions and the distribution of pension income in Spain. These include studies by Monasterio and Suárez (1992), Monasterio, Sánchez and Blanco (1996) and Bandrés and Cuenca (1996) of the impact of the 1985 reform based on aggregate historical data, simulations by Durán (1995) and Gil and López-Casanovas (1997), and papers by Blanco (1997) and Bandrés and Cuenca (1998) on the impact of the 1997 reform. Chiefly, these studies highlight the fact that the reforms reduced the return to workers on their social security contributions. The present article nevertheless differs from those mentioned above in that it is based on a sample of microdata that are representative of the workers' career history from the very recent past. As already stated, unlike past literature, this study focuses on the impact of the reforms on insured workers, and not on macroeconomic aspects.

Data, methodology and results

The aim of this article is to study the impact of increasing the number of years included in the calculation of the regulatory base, which determines the pension amount payable in Spain. A comparison of the pension received under the current system — calculated on the basis of covered earnings in the 15 years prior to retirement — with the pension that would be received if the number of years of prior earnings were to be increased, will enable us to determine the impact of such parametric reform. For this purpose, in the sections that follow, the database used for this simulation is described, the methodology is explained and the findings are discussed.

Database

This study is based on the second edition of the *Sample of Working Lives, 2005* (MCVL), made available by the Secretariat of State of Social Security (2005), which reports on all individuals covered by social security in the year in question. This database was made available to researchers in 2007 and contains information on a number of socio-demographic features of the profiles of covered individuals (gender, age, date and place of birth, occupation, etc.), the relationship that individuals have with social security across the life course, and the contribution base of non-wage earners and self-employed persons. A concise and accessible description of this database may be found in Durán (2007).

In line with most studies of the Spanish pension system — except for highly specific ones — we shall focus our attention on the so-called "General Scheme", which provided more than two-thirds of all new retirement pensions in 2007.

The General Scheme is expected to cover an even greater share of retirees in the future, because of the gradual disappearance of "special schemes".[5]

Our reckoning of the impact on the amount of pension that would be payable as a consequence of a change in the number of years included in the calculation of the regulatory base uses a sample of retired persons aged 65; the early or delayed retirement of individuals involves non-actuarial advantages and penalties that are beyond the scope of this study to analyse. The process of extracting data from the sample is highly complex, since it involves the combining and merging of a volume of significant information from the various files included in the MCVL. On the whole, the process of selecting this subsample comprised four phases.

First, individuals were chosen who first received an old-age pension under the General Scheme in 2005 at age 65. Second, this file was merged with files providing personal details, employment relationships and contribution history.

At this stage, a database was built to include all individuals retiring under the General Scheme in 2005 at age 65, but excluding those with more than 30 different employment relationships since 1980. The information presented included personal details, the start and end dates of employment contracts, the sector and occupation concerned by each contract and the insured person's contribution base for each month of employment. The steps that followed consisted of a process of filtering, grouping and indexing.[6] The outcome was a sample that included 1,875 individuals. Before calculating the pensions, it was necessary to index the contribution bases in accordance with the rules described above. This involved the use of the monthly consumer price index (CPI), available from the National Statistical Institute of Spain (Instituto Nacional de Estadística de España — http://www.ine.es). In accordance with the rules in force, the minimum contribution base is used for periods in which the individual did not pay social security contributions, information that is available in the *Economic and Financial Report on Social Security in Spain* (Secretary of State for Social Security, 2008).

Finally, the values of the old-age pensions were calculated using the resulting database in accordance with the legislation in force at the time of retirement i.e. using a reference period of 15 years (180 months) for all individuals in the sample. After further filtering of the database, the pension amount resulting from this calculation was compared with the pension amount that, according to the benefits list, the individuals began to receive in the month following retirement. All cases

5. Of the remaining pensioners not covered by the General Scheme, 20 per cent belong to the Self-Employed Scheme and the Self-Employed Agricultural Scheme, which cover self-employed workers (a status that is declining in Spain), and the remaining 10 per cent to the residual schemes for miners, non wage-earners in agriculture, domestic workers and seafarers. The latter schemes are disappearing on account of the reduction in the numbers of such workers and as a consequence of political efforts to standardize retirement schemes.

6. Specific details of this process may be found in Muñoz de Bustillo (2008) or direct from the authors.

where there was a margin of error of more than 5 per cent between the simulated and the actual pension payable were eliminated.[7] The resulting sample, which we will call the "reduced" sample, contained 1,010 individuals. Correspondingly, pensions were also calculated for the "expanded" sample, comprising 1,875 individuals, which gave results very close to those for the "reduced" sample and which coincided with those obtained from studies within Spanish social security by Durán and García (2006). In the following discussion we will use only the "reduced" sample, which requires less demanding suppositions to fill gaps in the database.

In addition to the problems deriving from the complexity of our database — which is common when using administrative records with such details — a central problem that merits attention is that the available data on contributions paid date back only to 1980 and the information on employment relationships before that date is of poor quality due to basic omissions. There is also another problem: although in principle the contributions data are available back to 1980, the degree of error and omission in the period 1980-1985 makes it very difficult to offer any analysis using data prior to 1985. For this reason, our sample and this study are limited to income received from employment in the 20 years preceding retirement.

Empirical methodology

After the arduous task of organizing the database, the more complex part of the study is easier, and consists in determining and quantifying the effect of increasing the reference period (years) used in calculating the regulatory base through simulations using the database described above and Stata 10 software. We shall first consider the effect of increasing the reference period from 15 to 20 years. Then we shall simulate the effect of the changes from 2 to 8 years, and from 8 to 15 years, which represent the main changes of the social security reforms of 1985 and 1997.

The central element in the simulations is the calculation of the individual's regulatory base, which may be expressed as:

$$\begin{aligned} BR_a &= \frac{\sum_{k=1}^{12\times a} \frac{BC_k}{A_k}}{12\times a} \; where \; 2 \le a \le 20 \\ 1 &\le k \le 12\times a \\ A_k &= 0 \; if \; k \le 24 \\ A_k &= IPCk \; if \; k > 24 \end{aligned} \qquad [2]$$

7. Such errors are due to the fact that, in determining pensions, the Secretariat of State of Social Security may use information that, for various reasons, is not available in the database that has been made available to researchers.

where BR_a is the regulatory base for the last a years of working life; BC_k is the contribution base for the k-th month prior to retirement, (which is the same as the wage, except where the ceiling is exceeded or it is below the minimum threshold value), and IPC_k is the consumer price index, which makes it possible to update the contribution base from month k to the month in which the individual begins to receive a pension.

Finally, to calculate the benefit, a percentage is applied to the regulatory base corresponding to the number of years of contributions n, which may be summarized as follows:

$$a(n)=\begin{cases}0 & \textit{where } n<15\\ 0{,}50+(n-15)\times 0{,}03 & \textit{where } 15\le n\le 25\\ 0{,}80+(n-25)\times 0{,}02 & \textit{where } 25>n\le 35\end{cases} \qquad [3]$$

One limitation faced in this study is the fact that it is assumed that the changes in conditions do not affect the behaviour of individuals. Nevertheless, as suggested by Bourguignon and Spadaro (2006), simulations of the kind presented here make it possible to propose a reasonable approximation of the variation in individual welfare, especially in cases with imperfect labour markets. In Spain, the scope of this problem would seem to be limited in view of the relatively small size of the informal labour market (compared with Latin America and the Caribbean) and the low price elasticity of labour supply for non-wage earners, which is explained by the existence of such institutions as collective agreements (Labeaga, Oliver and Spadaro, 2008).

Results

The results show the pensions that individuals retiring in 2005 would have received if a greater number of years had been included in the calculation of the regulatory base than is currently the case; that is, we apply one of the reforms that the Government of Spain and the social partners are discussing at the moment.

According to the estimates given, increasing the reference period (years) included in the calculation of the regulatory base to 20 years results in a reduction in the average pension by 4.2 per cent in the "expanded" sample, and by 5.5 per cent in the "reduced" sample. This implies, on the whole, a reduction of one percentage point for each year added to the reference period. As stated above, the gaps in the MCVL data on contributions paid before 1985 made it unadvisable to stretch the estimates beyond a reference period of 20 years. Nonetheless, since this trend was also a feature of years before 1985, the result obtained for 20 years suggests that increasing the reference period in the calcualtion of the regulatory base beyond that limit, for example by taking the same number of years as that currently used to qualify

Table 2. *Average pension by income-bracket under different calculation scenarios (euros)*

Number of years	<500	500-750	750-1,000	1,000-1,250	1,250-1,500	1,500-1,750	> 1,750	Total
15	431.4	625.6	881.5	1,113.9	1,362.1	1,609.8	2,006.8	1,061.4
16	430.8	622.5	872.7	1,103.2	1,345.7	1,588.3	1,976.9	1,050.1
17	430.4	619.0	863.3	1,091.6	1,328.4	1,565.1	1,947.3	1,038.2
18	429.8	616.0	854.1	1,079.3	1,310.4	1,542.9	1,918.1	1,026.3
19	430.1	612.5	844.0	1,066.6	1,292.2	1,520.6	1,890.3	1,014.3
20	431.1	609.5	835.1	1,053.9	1,272.5	1,499.2	1,862.2	1,002.6

Source: Authors' calculation based on the MCVL.

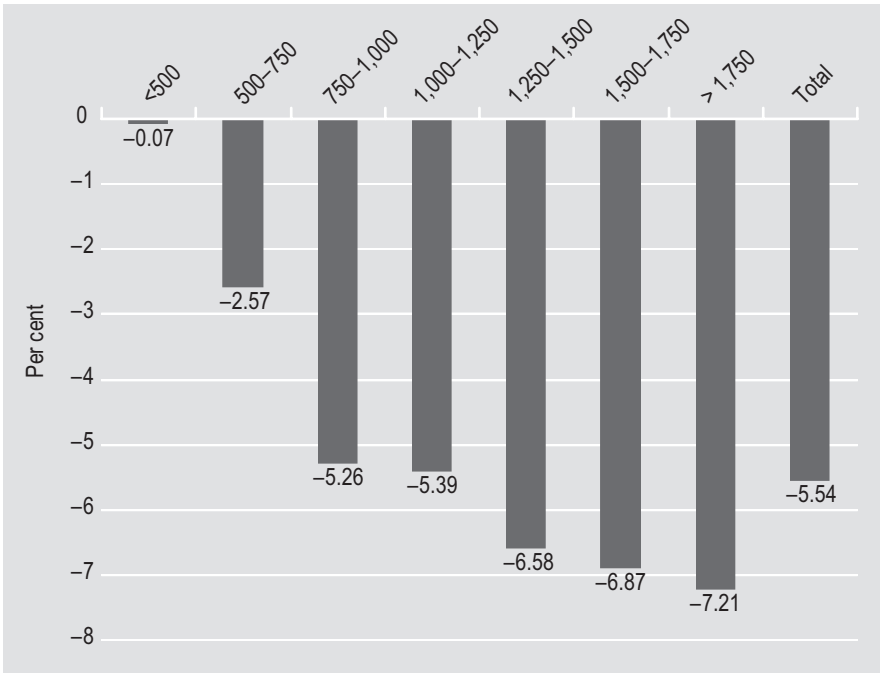
for 100 per cent of the regulatory base (35 years), would lead to a considerable reduction in the pension.

Table 2 shows the results obtained by using the procedure for the calculation of pensions with alternative scenarios, in order to show whether the perceived fall in pensions affects all pensioners equally or whether it affects some groups more than others. The income-brackets used correspond to the pension obtained with a reference period of 15 years' contributions. The result is clear: increasing the reference period has a bigger impact on larger pensions, which suggests a steeper career profile in terms of work/wages of groups who pay higher contributions.

Figure 2 shows the impact on the average pension, expressed as degrees of variation, of an increase in the reference period used in the calculation from 15 to 20 years. It shows that the highest pensions are those subject to the greatest percentage reduction. Apart from an individual's wage history, one plausible explanation of this feature is that people of lower educational level (who tend to receive lower contributory pensions) benefit more prominently from minimum pensions, which are not affected by this type of reform.

Following this analysis of the impact of increasing the reference period included in the calculation of average pensions, grouped according to income-bracket, Table 3 gives the results of the same exercise but grouped according to gender. This shows that the negative impact on pensions of an increase in the reference period used in the calculation of the regulatory base is slightly less marked for women than for men. This can be explained by the fact that women workers' total average contributions are smaller (some 25 per cent lower than for men, which on the whole reflects the gross gender wage gap in Spain). This is an interesting finding, since the structural reforms made in many countries in Latin

Figure 2. *Impact on pensions of increasing the reference period in the calculation for the regulatory base, by income-bracket (%)*



Source: Authors' calculation based on the MCVL.

Table 3. *Impact on pension income of increasing the reference period used in calculating the regulatory base, by gender*

Number of years	**Men**		**Women**	
	Average pension (€)	Variation (%)	Average pension (€)	Variation (%)
15	1,146.7	—	868.8	—
16	1,134.0	–1.11	860.5	–0.96
17	1,121.1	–2.23	851.0	–2.05
18	1,108.1	–3.37	841.5	–3.14
19	1,095.1	–4.50	831.9	–4.25
20	1,082.4	–5.61	822.2	–5.36

Source: Authors' calculation based on the MCVL.

Table 4. *Average pension by contribution group under different scenarios for calculating the regulatory base (euros)*

Contribution group	Number of years					
	15	16	17	18	19	20
Engineers and graduates	1,667.5	1,647.4	1,624.6	1,601.6	1,578.9	1,557.1
Technical engineers and assistants	1,648.0	1,634.0	1,614.8	1,589.9	1,564.5	1,542.0
Administrative managers	1,416.0	1,397.3	1,375.1	1,357.1	1,340.4	1,322.9
Non-graduate assistants	1,476.7	1,456.0	1,436.2	1,418.1	1,400.7	1,383.0
Administrative officials	1,099.8	1,084.4	1,069.6	1,054.1	1,038.8	1,024.4
Subordinate employees	954.2	945.6	936.1	926.9	916.8	907.5
Administrative assistants	902.0	892.1	881.2	870.6	860.1	848.8
First- and second-degree officials	995.1	984.4	973.6	962.9	952.0	941.2
Manual workers and similar (a)	931.6	924.7	918.7	911.8	904.9	897.6
Manual workers and similar (b)	754.6	749.2	742.7	737.0	730.0	724.6

Source: Authors' calculation based on the MCVL.

America, for example, have had a predominantly negative impact on women in general (Mesa-Lago, 2004).

Finally, Table 4 and Figure 3 show the impact of increasing the reference period by contribution groups. It may be noted that the negative effect is more pronounced for contribution groups associated with higher wages and occupational categories.

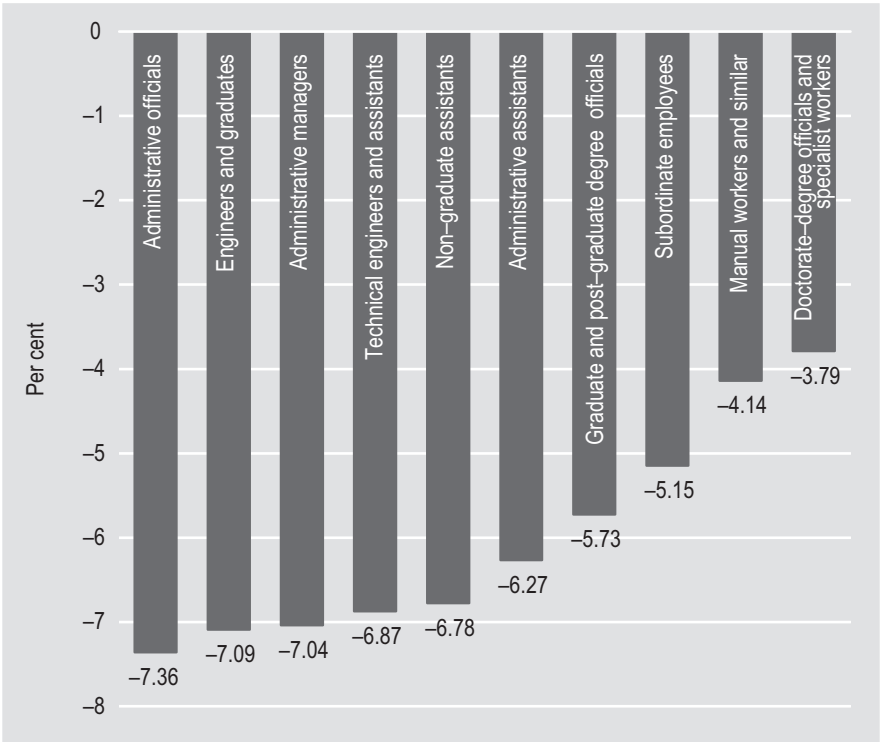
In summary, according to our analysis of the sample described above, increasing the reference period used in calculating the regulatory base for retirement pensions provided under the General Social Security Scheme from 15 to 20 years, which implies a 30 per cent increase in the number of years, would have the result of reducing the pension by between 4 and 5 per cent. This reduction is greater for those with higher pensions and in higher occupational groups, but there are no appreciable differences deriving from the gender of the worker.

Using these figures, it is a simple task to calculate the elasticity of the pension in relation to changes in the reference period used to calculate the regulatory base, by means of the following formula:

$$\varepsilon = \frac{\Delta P}{\Delta a}\frac{a}{P} \qquad [4]$$

Figure 4 gives a value for elasticity for each of the new calculation formulas (16 to 20 years), as well as their average value (0.127). This means that if this ratio is

Figure 3. *Impact on pensions of increasing the reference period in the calculation for the regulatory base, by contribution group (%)*

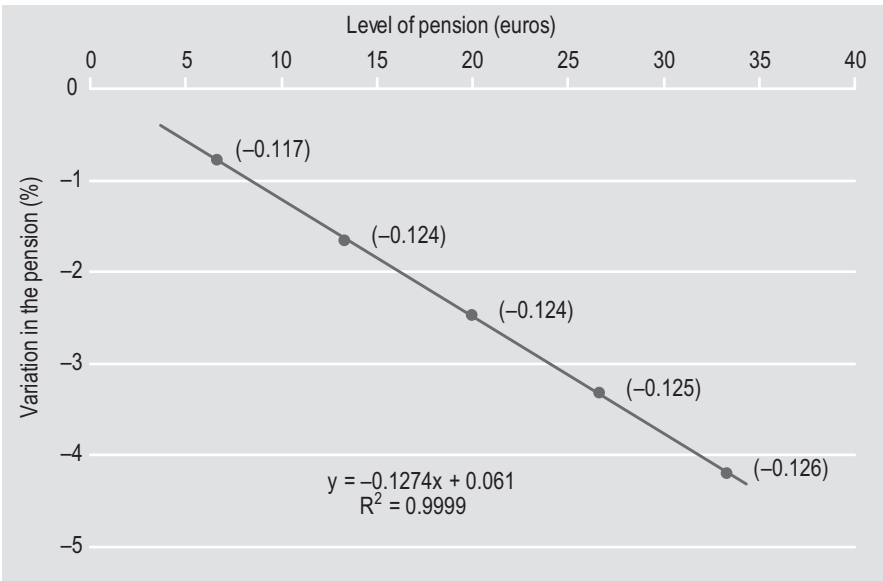


Source: Authors' calculation based on the MCVL.

maintained for increases in the regulatory base up to 35 years (a 133 per cent increase on the current situation), then the average pension would fall by 17 per cent. Since it is reasonable to consider that as we move closer to the beginning of workers' contribution histories the contribution base will fall faster than in the middle period of the working life (which is what is involved in moving from 15 to 20 years), it is highly probable that the figure of 17 per cent lies at the lower end of the range of values for such reductions, and even greater reductions may be expected in other cases.

To complement this, the same process has been used to calulate the average pension that workers retiring in 2005 would have received if the calculation for the regulatory base applicable prior to the 1997 reform (8 years) and that prior to the 1985 reform (2 years) had been applied. Table 5 gives the results, showing a significant increase in pensions, of 10 per cent with the

Figure 4. *Percentage variation in pension income in relation to the percentage variation in the number of years used to calulate the pension (elasticity in income-brackets)*



Source: Authors' calculation based on the MCVL.

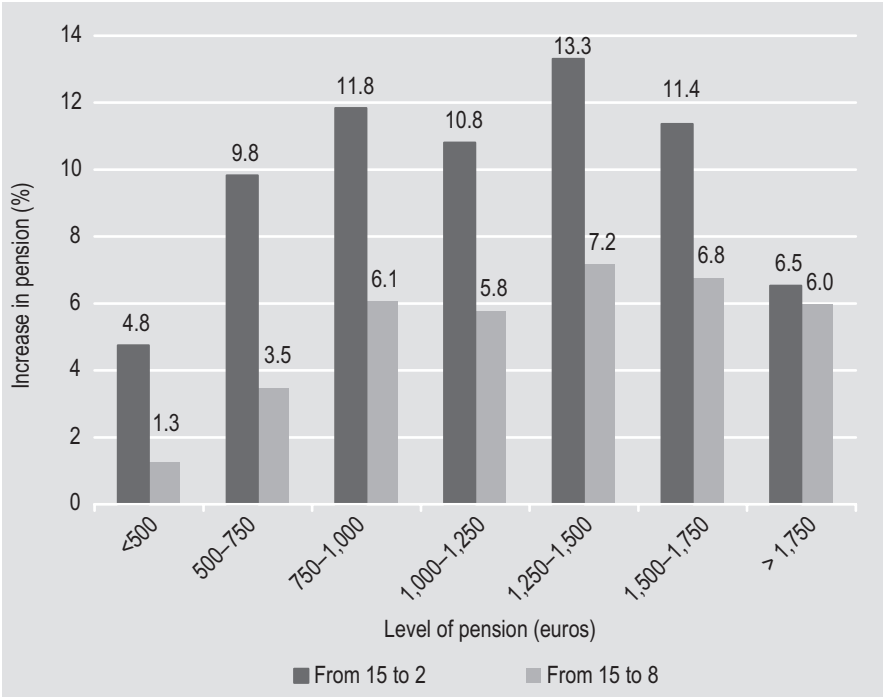
Table 5. *Impact on pension income of reducing the reference period used in calculating the regulatory base, by gender*

Number of years	Men		Women		Total	
	Average pension (€)	Variation (%)	Average pension (€)	Variation (%)	Average pension (€)	Variation (%)
15	868.8	—	1,146.7	—	1,061.4	—
2	947.6	9.07	1,267.9	10.57	1,169.6	10.19
8	911.9	4.96	1,215.4	5.99	1,122.3	5.74

Source: Authors' calculation based on the MCVL.

change from 15 to 2 years, and of around 6 per cent with a change from 15 to 8 years. Whereas the increase in the reference period used in the calculation for the regulatory base described above brought no significant differences in the results grouped by gender, in this case there is a greater impact on men than on women.

Figure 5. *Impact on pension income of reducing the reference period used in calculating the regulatory base from 15 to 8 years, and from 15 to 2 years, by income-bracket*



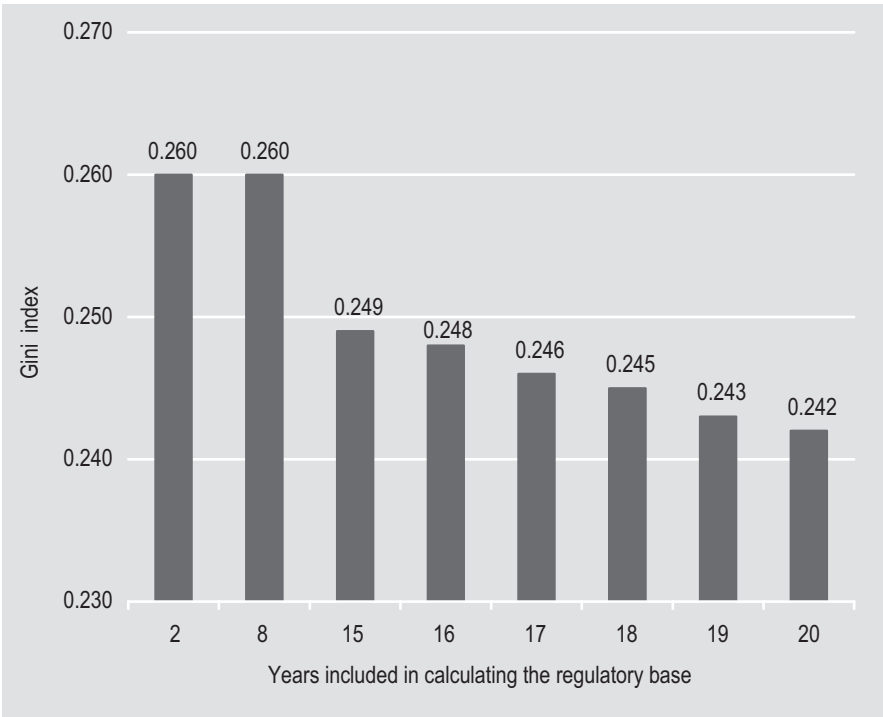
Source: Authors' calculation based on the MCVL.

Figure 5 shows the results of such changes by the amount of pension received, according to income-bracket, and illustrates the higher degree of impact on mid-range pensions.

On aggregate, an increase in the reference period used in calculating the regulatory base results in a reduction in the average pension, with a bigger impact on larger pensions, since the impact on lower-level pensions is offset by the existence of a minimum contribution base. This explains why the impact of increasing the reference period used in calculating the regulatory base, as can be seen in Figure 6, is a reduction in inequality.[8]

8. According to Muñoz de Bustillo and Antón (2007), citing the *Survey of Living Conditions* (see http://www.ine.es/jaxi/menu.do?type=pcaxis&path=/t25/p453&file=inebase), this is based on values that can be regarded in themselves as relatively low if account is taken of the fact that, in 2005, the Gini index of wage inequality was 0.31. This finding confirms that reached by Jimeno (2003), using a different methodology based on the construction of virtual and fictitious working careers.

Figure 6. *Gini index for old-age pensions using different calculation bases*



Source: Authors' calculation based on the MCVL.

Conclusions

Pension reform has aroused lively interest (and concerns) among politicians and academics both in Europe and in Latin America, as well as strong resistance and fears about the possible effects of changes in social security schemes. Over the past few decades many countries in Eastern Europe, Latin America and the Caribbean have introduced major structural reforms to their social security systems. This trend has slowed somewhat recently, since several countries have decided to postpone their reforms, have made parametric adjustments (Brazil, Ecuador, Nicaragua and Panama) or have radically changed the basis of their schemes (Venezuela) (Ochando, 2010), or have even reversed previous reforms and "renationalized" the system (Argentina). The effect of these reforms on the distribution of income by pensions has, in general, received little attention and in many cases has been the subject of only cursory examination through simulations for two or three profiles of representative individuals. Authors such as Carmelo Mesa-Lago have highlighted the possible adverse effects of reform in terms of distribution and gender equity (Mesa-Lago, 2004), and these questions are now being taken up more seriously in

social policy debates. It is also relevant to point out that, in the context of the current crisis, reforms that imply a significant budgetary cost (as in the case of structural reforms, which have major transitional costs) will have only a limited possibility of being implemented, for obvious reasons of political economy.

The aim of this study has been to examine, with reference to Spain — where such changes are and have been frequent over the last two decades — the impact on the amount of pensions received of increasing the length of the individual's working career (reference period) that is taken into account in calculating retirement pensions. There are three main findings:

- For each additional year that the length of the reference period is increased, the value of pensions is reduced by around 1 per cent on average.
- This effect is more pronounced with larger pensions (which are found among individuals who, in many cases, have access to private occupational or personal pensions). In the case of Spain, reform of these features leads to a reduction in income distribution through pensions.
- According to this study, the gap between men and women in pensions income would not be increased by the parametric reform in question, rather it would reduce slightly.

Taken together, this means that a parametric reform along the lines set out in this study would result in a reduction in pensions of an asymmetric nature, in that it would have a greater impact on larger pensions. If the reason for the reform is to reduce the future cost of pensions so as to cope more sucessfully with the process of demographic change, then this option would meet the desired objective. However, it should be noted that the weakening of the pension system resulting from a reduction in the amount payable might lead to perceptions that the contributory pillar is ultimately reduced to an assistance role, thus endangering the role of the system as a means of insurance, which could undermine any support it might enjoy among the middle classes for the retention of such systems. Equally, it does not seem appropriate to phrase this type of reform in purely accountancy terms, which would seem to be the case with the current state of the debate in Spain, unless some thought is first given to the philosophy of retirement schemes and the implications for economic and social justice of taking different periods of working life into account in calculating pensions (Esteve Mora, 2009).

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