

IMPACT OF THE RECENT REFORM OF THE PORTUGUESE PUBLIC EMPLOYEES' PENSION SYSTEM*

Maria Manuel Campos**

Manuel Coutinho Pereira**

1. INTRODUCTION

The convergence of the public employees' pension system, the Caixa Geral de Aposentações (CGA), to the rules applicable to private sector employees started in 1993. It was then established that the pensions of the CGA contributors enrolled since September 1993 should be computed using to the formula that applies to the General Social Security System (GSSS). More recently, the convergence has been accelerated and was extended to public employees registered in the CGA before September 1993. In fact, the public employees' retirement requirements and pension formulas were subjected to a substantial revision, given the need to bring sustainable foundations to the social security system. The revision came into force in January 2006 (it was later complemented by subsequent legislation in 2007 and 2008).¹

The purpose of this study is to analyse the effects of the reform of the *Estatuto da Aposentação* (the Retirement Statute for CGA contributors) on the time-profile of retirements, initial old-age pensions, and CGA pension-related expenditure (from 2006 until the system closes, as it will, given that the enrolment of new public employees in the CGA ceased in December 2005). More specifically, the idea is to quantify the impact of three factors: the rise in the age and career-length required to qualify for a full pension; the change in the formulas used to calculate the initial pensions, including the introduction of a sustainability factor; and the revision or elimination of special regimes applicable to some CGA contributors.

In order to do so, it was used the «2005 Public Administration Human Resources Database», made available by the *Direcção Geral da Administração Pública* (DGAP). This dates from the specific point when the new legislation came into force (December 2005). On the basis of the information regarding age, years of service, and professional category, it is simulated for each public employee the retirement year, both under the current and the previous version of the *Estatuto da Aposentação*. Then the initial old-age pensions (including the applicable sustainability factor, based on average life expectancy in the retirement year) and the CGA pension-related expenditure are estimated. It was assumed that retirement only occurs when contributors qualify for receiving a full pension (or when they reach the age limit). Therefore, the more recent change in the *Estatuto da Aposentação* that reduced the minimum career-length required for retirement is not relevant for this exercise, since it implies receiving a partial pension.

* This article summarizes the research presented in Campos and Pereira (2008). See this reference for further details, in particular, concerning the database, retirement conditions, formulas for calculation of pensions, and results referring to the special CGA regimes. The opinions expressed in the article represent the views of the authors and do not necessarily reflect those of the Banco de Portugal

** Economics and Research Department, Banco de Portugal. The authors would like to thank the *Direcção-Geral da Administração Pública* for making available the «2005 Public Administration Human Resources Database», the *Caixa Geral de Aposentações*, in particular M. Carvalho, for several clarifications, M. Pinheiro and V. Cunha for making available the mortality rate projections, and N. Alves, C. Braz, M. Centeno, J. Cunha, A. Leal, and S. Moreira for comments.

(1) Law No. 60/2005 of December 29, Law No. 52/2007 of August 31, and Law No. 11/2008 of February 20.

This study does not aim to predict the profile of retirements of CGA contributors. In fact, in the past an important number of contributors retired before completing all the conditions required to be entitled to a full pension, or on the basis of other reasons, such as disability. Moreover, some CGA contributors are not public employees.² There is also no attempt to carry out a welfare exercise regarding the employees affected by the legislative reform.

The article is structured as follows. Section 2 briefly outlines the database and the modifications introduced to ensure its suitability for this study's purpose. Section 3 illustrates the methodology, highlighting the modifications to the retirement conditions and pension formulas introduced by the new legislation. It also describes the procedure used to calculate a career advancement profile for each professional category, based on the estimated relationship between service length and wage in December 2005. In section 4 the results of the simulation are discussed. Finally, section 5 presents the main conclusions.

2. THE 2005 PUBLIC ADMINISTRATION HUMAN RESOURCES DATABASE

This database comprises information dated from December 2005, including variables that allow to classify public employees in a variety of categories. In terms of central government, it does not include military personnel and data on judges are incomplete. Furthermore, it does not cover the regional government employees of the *Região Autónoma dos Açores* (RAA) and the information on local government workers is only partial.

In order to undertake the simulation exercise, an attempt was made to obtain a proxy to the unknown data (except for military personnel, which was excluded from this study). The "1999 Public Administration Human Resources Database" was used to obtain data on local government workers and judges³. The information for the RAA was obtained from the *Ficheiro Central de Pessoal do Governo Regional dos Açores* (also dated from December 2005), made available by the DGAP.

The information for the different sub-sectors (central, regional and local government) was put together into a single database and then was treated. In particular, observations assumed to be errors were eliminated. Moreover, it was detected the existence of employees occupying more than one position in the Public Administration and, by consequence, with more than one observation in the database. In these cases the observation corresponding to the longer career-length reported was selected.

It should be stressed that the reform of the *Estatuto da Aposentação* did not affect the workers who met the requirements for obtaining a full pension by 31 December 2005. These were not taken into account in the exercise. Additionally, as the simulation is only applicable to Public Administration employees enrolled in the CGA, it was necessary to separate them from those registered in the GSSS. Since there is no information in the database about which of the two entities the worker belongs to, it was considered, as an approximation, that the enrolment in the CGA corresponds to the labour relationships resulting from appointments, administrative fixed-term contracts and administrative fixed-term teaching contracts. The simulation exercise was implemented for this group, consisting of 612 thousand individuals.⁴

(2) Note also that although the database covers almost all CGA contributors working for general government entities, it does not exactly match it (see below).

(3) To determine which of these employees were still working in 2005 a preliminary exercise was undertaken in order to simulate the retirement year (starting in 2000), in terms of the legislation then in force. Information on the number of employees registered in the CGA between 2000 and 2005 was also taken into account.

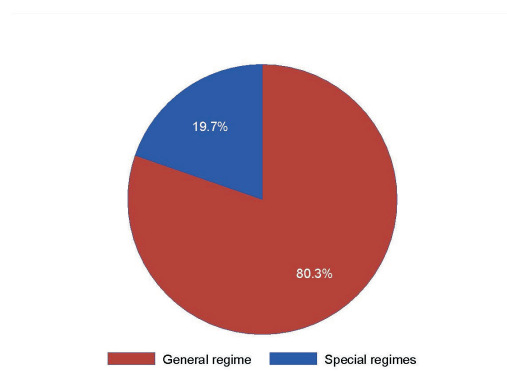
(4) This group, in addition to the individuals who already met the requirements for obtaining a full pension in 2005, adds up to roughly 617 thousand employees. The number of CGA contributors working in the Public Administration (including military personnel, not considered in this study) was approximately 660 thousand at the end of 2005.

Moreover, it is relevant to distinguish the individuals belonging to the so-called general CGA regime from the ones enrolled in the special regimes. The distinction was made by reference to the reported professional category (Chart 1). The special regimes considered in the exercise are those applicable to security force members (GNR and PSP)⁵, primary education and kindergarten teachers, and nurses. These cover the majority of the public employees enrolled in the CGA but not included in its general regime (see Chart 2 for the contributors' distribution by these professional categories).

Finally, it is also important to establish the contributors' enrolment date, specifically whether it occurred prior to September 1993, since this determines a different formula for pension calculation. The career-length reported by the majority of the individuals included in the simulation exercise (59 per cent) implies a registration date prior to September 1993.

Chart 1

PUBLIC EMPLOYEES ENROLLED IN THE GENERAL AND SPECIAL CGA REGIMES

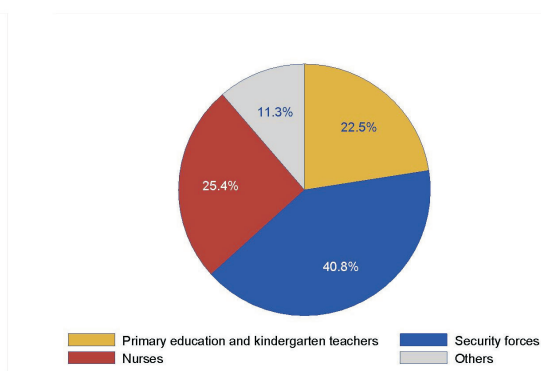


Source: Authors' calculations.

Chart 2

PUBLIC EMPLOYEES ENROLLED IN THE MAIN SPECIAL CGA REGIMES

Distribution by professional category



Source: Authors' calculations.

3. SIMULATION EXERCISE METHODOLOGY

3.1. Simulation of the annual number of retirements

Part of the effects of the revision of the *Estatuto da Aposentação* refers to the postponement of retirement. Hence, a first step was to simulate the annual number of retirements under the legislation in force until December 2005 and since January 2006.

Following the reform, for every CGA contributor, the minimum age required to retire with a penalty-free pension rises gradually from 60 to 65 years, at a 6 months per year rate, during a transitional period that goes from 2006 to 2015 (see Table 1.1.1, in Appendix 1).⁶ For the employees whose enrolment date is prior to September 1993, the number of years of service corresponding to a full contributory career also rises at a 6 month per year rate, from 36 to 40 years, between 2006 and 2013 (Table 1.1.2 in Appendix 1). Regarding the contributors enrolled since September 1993, a career-length of 40 years

(5) *Guarda Nacional Republicana* and *Polícia de Segurança Pública*, respectively.

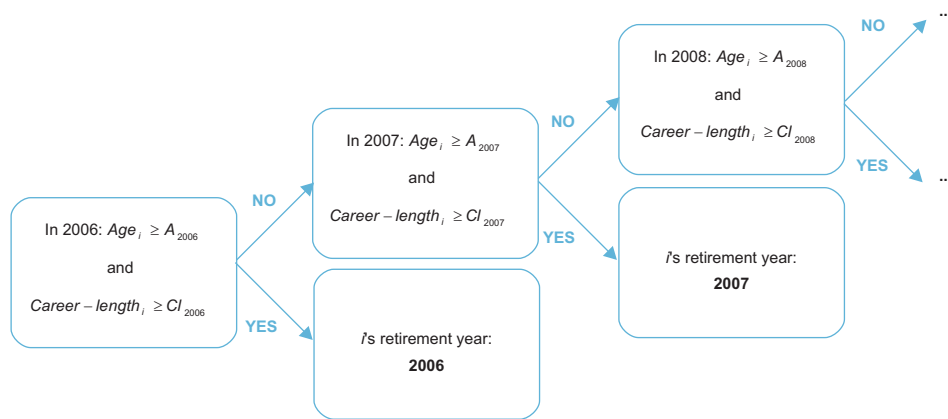
(6) There is the possibility of reducing this minimum age limit, benefiting contributors with a relatively longer length of service.

remains the minimum required to warrant a full pension, since the GSSS pension computing rules were already applicable to them before the legislative reform.

It should be stressed that individual preferences play an important role in the choice of the retirement moment within the legal framework. The factors influencing this choice are subjective, hence considering them in a simulation is difficult. In the performed exercise it is therefore assumed that public employees retire when they fulfil all the requirements to receive a full pension or reach the age limit (70 years, for general CGA regime contributors). As mentioned, there are public employees that belong to special regimes and may retire on the basis of different conditions than those applicable in the general CGA regime. For further details about these conditions, see section 4.2.

In order to simulate the profile of retirements, it was prepared an algorithm based on the legal retirement conditions for the general and the special CGA regimes. Diagram 1 exemplifies this algorithm.

Diagram 1



in which:

Age_i = age of individual i in a given year.

$Career-length_i$ = career-length of individual i in a given year.

A_t = Minimum age required to qualify for a penalty-free pension in year t .

Cl_t = Minimum career-length required to qualify for a full pension in year t .

3.2. Simulation of the initial old-age pensions

3.2.1. Pension calculation

- Public employees enrolled until 31 August 1993

Prior to 31 December 2005 the pension computing formula applicable to employees enrolled before September 1993 was defined in the *Estatuto da Aposentação* then in force. The initial pension amount was given by the product of the wage received in the last position held, by the number of years of service (with an upper limit of 36 years) and a 2.5% implicit pension accrual rate (corresponding to the ratio between 90 per cent of the salary and 36 years).

The reform of the *Estatuto da Aposentação* set down a new formula. The initial pension amount corresponds now to the sum of two components, multiplied by a sustainability factor.⁷ The first component is given by the product of the monthly wage in the last position held, by a pension accrual rate that varies as a function of the career-length equivalent to a full contributory career (that rises gradually from 36 to 40 years), and the years of service completed up to 31 December 2005. The second component corresponds to the product of the years of service completed since 1 January 2006, up to the limit required to be entitled to a full pension, by the average wage over that period, and an accrual rate. This rate was 2% for the employees retired by 31 December 2007 and this rule is still in force for retirements taking place after that date, as long as the individuals have less than 20 years of contributions. Otherwise, the accrual rate is a function of the reference compensation. It varies between 2% and 2.3%, in line with a regressive bracket mechanism indexed to the mandatory minimum wage (or the IAS)⁸, as indicated in Table 1.3.1 in appendix.

- Public employees enrolled since 1 September 1993

For public employees registered since September 1993, pensions are computed, as previously, using the formulas applicable in the GSSS. These formulas were revised for the last time in 2007. For contributors whose enrolment took place between 1 September 1993 and 31 December 2001 and who retire by December 2016, the pension is the weighted average of two components.⁹ The first one corresponds to the product of the average wage over the best 10 out of the last 15 contributory years, by a 2% pension accrual rate, and the number of years of service, up to the limit of 40. The second component is given by the number of years of service, up to the limit of 40, multiplied by the average wage over the total contributory career and the applicable accrual rate (which is equal to 2% for the employees with 20 years of contributions or less; otherwise it is determined in line with the bracket mechanism described). The weights correspond to the proportion of the years of service completed until and since 31 December 2006 in the total.¹⁰

For contributors enrolled until 31 December 2001 but who retire from 1 January 2017 onwards, the formula is the same. However, in this case, the first weight refers to the service completed up to 31 December 2001 and the second to the subsequent contributory years.

Finally, for CGA members enrolled since 1 January 2002 initial pensions correspond to the product of the number of years of service (up to the limit of 40), by the average wage over the whole career, and an annual pension accrual rate determined as explained above. The sustainability factor is also applicable to this amount.

3.2.2. Computation of the reference compensation

In order to simulate the amount of the initial pensions, it is necessary to know all the variables in the formulas presented in the previous sub-section. The length of service and age required to be eligible for a full pension are determined by law, while the age and number of contributory years at retirement are an output of the simulation exercise. However, there is no information on the actual wages received throughout the contributory career, and thus it is not possible to compute directly the different values of

(7) The sustainability factor is applicable to the pensions paid from 2008 onwards and is given by the ratio between average life expectancy at 65 years in 2006 and average life expectancy at 65 in the year before the pension is paid for the first time.

(8) *Índice dos apoios sociais*.

(9) In the legal framework there are exceptions to this formula. However, since in the database there are no employees in such conditions, the respective formulas are not presented. For greater detail, see Decree-Law No. 187/2007 of May 10, or Campos and Pereira (2008).

(10) In the exercise, for the determination of the weights, it was considered a maximum length of service of 40 years. Hence, for employees with a full career-length, the second weight corresponds to 40 years minus the years of service completed up to 2006.

the reference compensation. As an alternative, the salary earned in each contributory year was estimated using regressions of the wage on the service length in December 2005, for the various professional categories¹¹. Given that in the initial and the final years of each career it is typically difficult to estimate an accurate profile, the first four years, as well as the ones beyond the 36th, were aggregated. Thus, the estimated coefficients capture the difference between the average earnings over the first four years and in each of the following years, until the end of the contributory career. Then the progression profile resulting from this estimation procedure was smoothed and, in addition, it was assumed that the salary remained constant upon reaching the respective maximum or, at the latest, by the 36th year (see Campos and Pereira (2008) for the results).

The wage progression profiles reflect the relationship between earnings and seniority that was observed in 2005, meaning that the pensions simulated are also at 2005 prices.¹² Note that, even in real terms, the relationship between wages and years of service estimated for 2005 is different from the relationships that prevailed in the past and will prevail in future, since real wages change frequently. This effect should be reinforced by the ongoing revision of the public administration pay schedule. However, it should be stressed that discrepancies vis-à-vis the 2005 wage level and/or progression profile have a similar impact on the simulated pensions, in terms of both the previous and the current legal frameworks. As the results presented always refer to the differential effect of the legislative reform, the procedure followed should provide a good approximation.

4. RESULTS

4.1. Impact on the profile of retirements and initial pension for the general CGA regime

4.1.1. Time-profile of retirements¹³

In the exercise performed, a first step was the comparison between the profile of retirements resulting from the legislation in force before and after December 2005 (Charts 3 and 4). The most obvious result is a shift to the right in the flows referring to the public employees enrolled before September 1993. Such an effect becomes progressively stronger during the transition to the new rules, and it stabilizes at the end of that period, in 2014-2015. While a rise in retirements is projected for the years subsequent to 2006 under both versions of legislation, this is less marked under the new one (Chart 4). Such rise in the number of new retirees reflects the large number of workers admitted to Public Administration entities in the period following the April 25, 1974, Revolution. In Chart 4, the increase in the flow spreads until about 2018, while in Chart 3 it ends in 2014.

Another consequence of the revision of the *Estatuto da Aposentação* is the elimination of the break in the number of new retirees between 2029 and 2033 that would have happened if there had not been a reform (Chart 3). This break would have resulted from the existence of different career-length requirements in the previous legislation, depending on registration date. Indeed, in terms of the legislation in

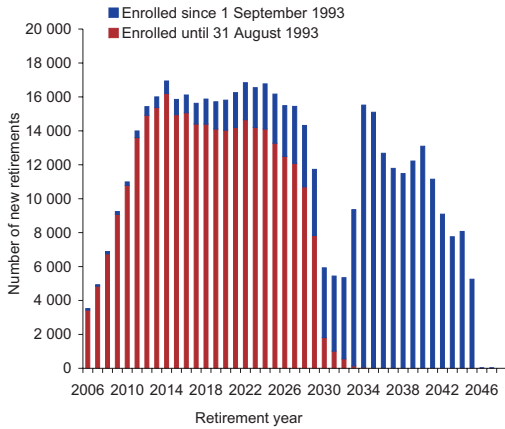
(11) The following categories were considered: administrative staff, administrative court staff, auxiliary staff, craft workers, doctors, judges, medical support staff, nurses, other court staff, professionals, other professionals, prison guards, security forces – higher ranks, security forces – lower ranks, teachers, technical staff, university teachers, others – with university degree, and others – without university degree.

(12) Every financial variable in this exercise is expressed at 2005 prices. In particular, the annual wages used to calculate the reference compensation were not updated in line with retirement year's prices (as foreseen in the legislation).

(13) The CGA has made available the figures referring to retirements in 2006 and 2007. As mentioned, the population of CGA members is broader than the one considered in this study and there is a substantial number of early and disability-based retirements. Even correcting for these factors, the simulation underestimates (by about 25 per cent) the actual flows for the two-year period. Presumably this stems from the fact that the service length reported in the database by some employees may fall short of the relevant years of service (because it does not comprise, for instance, military service or the time served in entities later incorporated into Public Administration). This phenomenon does not jeopardize an evaluation of the effects of the legislative reform.

Chart 3

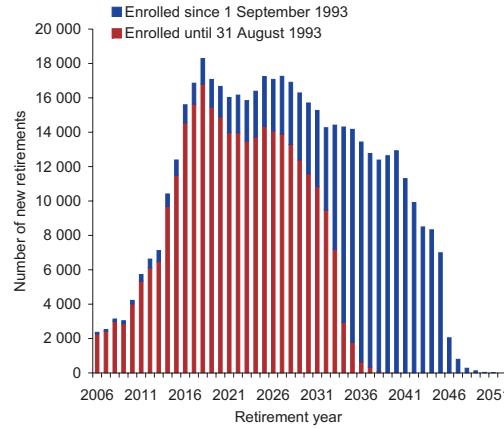
PROFILE OF RETIREMENTS – LEGISLATION IN FORCE UNTIL DECEMBER 2005
CGA general regime



Source: Authors' calculations.

Chart 4

PROFILE OF RETIREMENTS – LEGISLATION IN FORCE SINCE JANUARY 2006
CGA general regime



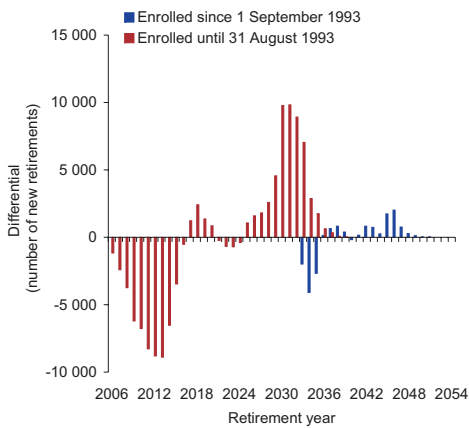
Source: Authors' calculations.

force until 2005, the CGA contributors enrolled since September 1993 needed 40 years of service to qualify for a full pension, rather than 36. Hence, in the projection performed under the previous legislation most of the employees registered before September 1993 would already have retired by 2029, while those registered afterwards would not have fulfilled 40 years of service before 2033.¹⁴

Chart 5 shows the difference between the flows of retirements, before and after the revision of the *Estatuto da Aposentação* (computed from the preceding charts). It is noticeable that the shift to the

Chart 5

PROFILE OF RETIREMENTS – IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*
CGA general regime



Source: Authors' calculations.

(14) The number of public employees enrolled since September 1993 who retire before 2033 is quite small and refers, with no exception, to individuals who reach the age limit.

right in the profile of retirements for employees enrolled before September 1993 generates a non-negligible decrease in the number of new retirees in the 10 years following the introduction of the new legislation. This decrease is then offset in the decade subsequent to 2025. Finally, for the individuals registered in the CGA since September 1993, the legislative reform consists only in a rise in the minimum age required for receiving a penalty-free pension, from 60 to 65 years. Therefore, although there is a similar change in the profile of retirements, its magnitude is much smaller.

4.1.2. Retirement moment and initial pensions¹⁵

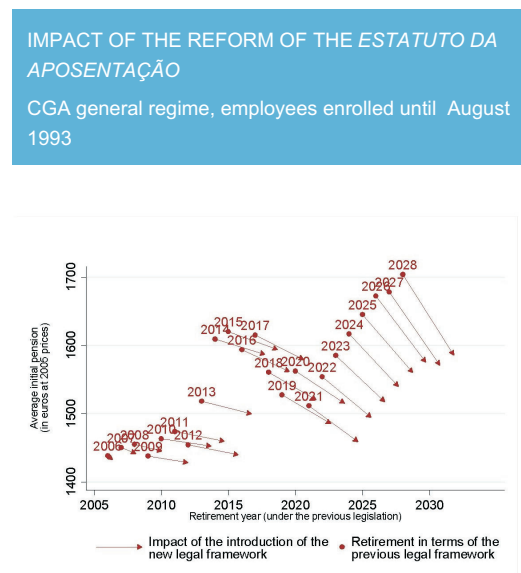
- Public employees enrolled until 31 August 1993

Chart 6 shows the average delay in the retirement year and variation in the pension amount as a consequence of the revision of the *Estatuto da Aposentação*, for employees whose registration date is prior to September 1993. The retirees are grouped by retirement year in terms of the previous legislation.

Chart 6 demonstrates that the reform of the *Estatuto da Aposentação* results, in general, in the postponement of retirement for the general CGA regime employees enrolled until August 1993. On average, the delay corresponds to 3.5 years and increases gradually during the transitional period, stabilizing around 4 years from 2015 on. No employees retire earlier than they would have under the previous legislation and most of them (87 per cent) serve more time in Public Administration. Most of those work 4 or 5 more years in order to fulfil the new requirements (Chart 7). The remaining employees retire when reaching the age limit; hence, for them the retirement year remains unchanged.

As far as the pension amount is concerned, the simulation leads to the conclusion that the average initial pension for contributors enrolled until 31 August 1993 tends to be lower when calculated under the

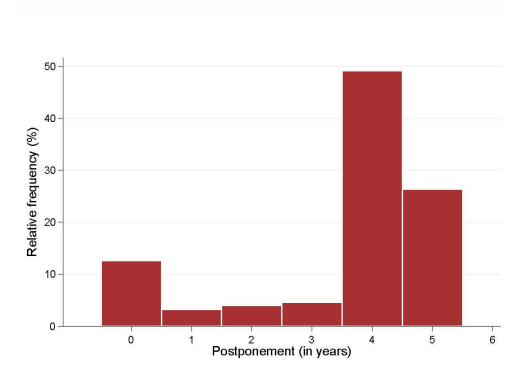
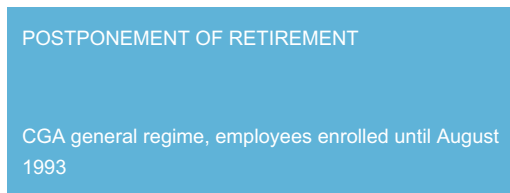
Chart 6



Source: Authors' calculations.
 Note: The horizontal shift represents the average postponement of the retirement moment, whilst the vertical one measures the variation in the average initial pension.

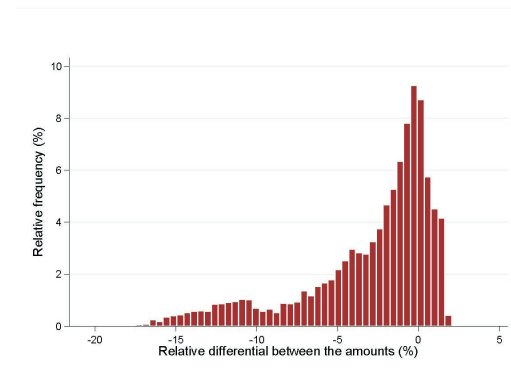
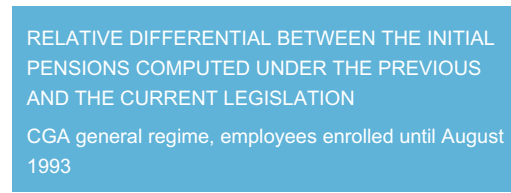
(15) This section does not take into account the sustainability factor. The impact of its introduction will be analysed later, in Section 4.3.

Chart 7



Source: Authors' calculations.

Chart 8



Source: Authors' calculations.

revised legislation. The average decrease becomes more noticeable the further from 2005 the retirement takes place. This happens because the weight of the second component in total pension increases over time, and a comparatively larger proportion of the pension is based on the average earnings of the whole career. Nonetheless, the effects of the reform of the *Estatuto da Aposentação* are relatively heterogeneous. Indeed, even though initial pensions in general decrease, this does not happen for approximately 20 per cent of the employees. Such an effect is not shown in Chart 6, but is clearly seen in Chart 8.

In order to explain how the legislative reform influences the initial pension, a breakdown of its variation in terms of the contribution of the relevant variables was undertaken.¹⁶ The formula applicable before the legislative reform was rewritten as the sum of two components, following the rationale underlying the new rules. The first component concerns the length of service up to December 2005, whilst the second refers to the subsequent service. The annual pension accrual rates are equal to 2.5% and the reference compensations correspond to the monthly wage in the last position held, in both components.

The difference between the initial pension computed in terms of the previous and current legislation (P^P and P^N , respectively) can be presented as:

$$d_P = P^N - P^P = \underbrace{(P_1^N - P_1^P)}_{d_{P_1}} + \underbrace{(P_2^N - P_2^P)}_{d_{P_2}} = \underbrace{(P_1^N - P_1^P)}_{d_{P_1}} + \underbrace{(P_2^N - P_2^P)}_{d_{r_2} + d_{RC_2} + d_{C_2}}$$

where:

P_1^i and P_2^i ($i=P,N$) refer to the two components of the initial pension, corresponding to the years of service until and since December 2005;

⁽¹⁶⁾ The breakdowns mentioned in this and in next sub-sections are presented with greater detail in Appendix 2. They rely on the assumption that the individuals retire with a full pension, thus excluding the ones who retire when they reach the age limit.

d_{P_1} represents the differential explained by the first component, due to the difference between the implicit pension accrual rates (the other elements do not change);

d_{P_2} is the differential explained by the second component, which can be split into:

d_{r_2} , referring to the impact of the change in the accrual rate applicable;

d_{RC_2} , corresponding to the effect of the change in the reference compensation;

d_{C_2} , reflecting the impact of the change in the length of service corresponding to a full contributory career.

Chart 9 presents this breakdown (with the individuals grouped by the retirement year under the previous framework).

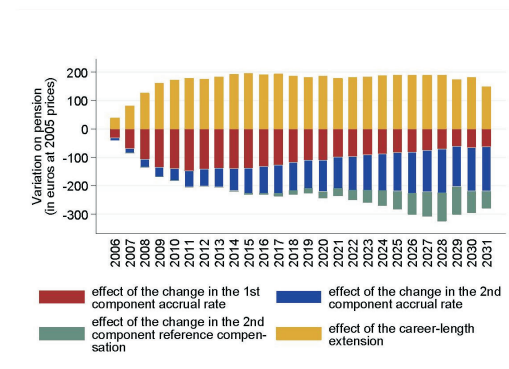
The changes in the calculation of the reference compensation tend to result in a lower pension. Indeed, since 1 January 2006, there are two reference compensations, one for each of the pension's components. For the first component, the wage received in the last position held remains relevant and it does not change.¹⁷ For the second, it is relevant the average wage over the best years subsequent to 2005 (considering the service length necessary to build up a full contributory career). This average wage tends to be lower than the last salary received, which was the reference under the formula previously in force.

As for the impact of the changes in the pension accrual rates, this is always negative. In fact, the applicable rate under the previous legislation was 2.5%, whilst the ones introduced by the revision of the *Estatuto da Aposentação* are lower.¹⁸

It is worth noting that the impacts related to the first component become less relevant as the retirement year moves away from 2005, as they affect a smaller proportion of the overall pension. The opposite

Chart 9

BREAKDOWN OF THE AVERAGE CHANGE IN INITIAL PENSIONS
CGA general regime, employees enrolled until August 1993



Source: Authors' calculations.

(17) Since it was assumed that from the 36th year of the contributory career onwards wages remained constant, the wage in the last position held is the same, both in terms of the current and the previous legislation.

(18) The first component accrual rate corresponds to the ratio between 0.9 and the years of service equivalent to a full career, which rise from 36 to 40 (Table 1.1.2, in Appendix 1). The second component rate varies between 2% and 2.3%.

holds for the impacts related to the second component. This phenomenon explains why the difference between the pensions computed in line with the current and the previous legislation increases as retirement draws further from 2005 (as suggested in Chart 6).

Finally, the variation in the career-length has a positive influence on pension amounts. As previously shown in Chart 7, most public employees will extend their service period to fulfil the new requirements. For most of them, the impact of such an extension is more than offset by that of the other factors working in the opposite direction, and the pension diminishes when computed in terms of the new formula. Nevertheless, in some cases, the career-length extension, combined with the new annual rates, may result in global accrual rates that are higher than the previous maximum.¹⁹ When this happens, the pension computed under the new version of the *Estatuto da Aposentação* may be higher than the amount resulting from the previous formula, even though the reference compensation and the annual pension accrual rates decrease. These conditions are observed for about 20 per cent of CGA contributors whose enrolment took place until 31 August 1993.

- Public employees enrolled since 1 September 1993

In Chart 10 it is noticeable that the revision of the *Estatuto da Aposentação* has a more limited effect for the public employees enrolled in the general CGA regime since September 1993. In this case, the only modification was the rise in the minimum age for penalty-free retirement, from 60 to 65 years. This rise in the age requirement tends to imply the extension of the contributory career and a consequential delay in retirement. However, it was observed that such a delay amounts to less than 6 months on average, whilst the minimum age goes up by 5 years. This discrepancy is justified by the existence of a large number of contributors who would retire with more than 60 years of age, even under the previous

Chart 10

IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*

CGA general regime, employees enrolled since September 1993



Source: Authors' calculations.

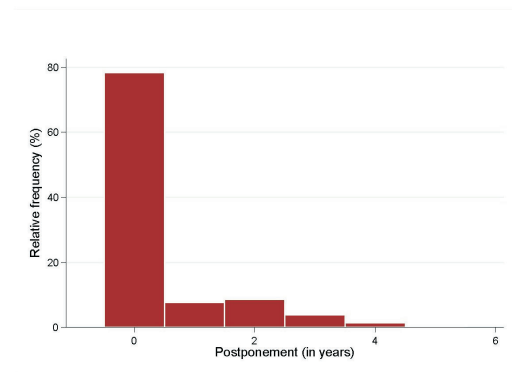
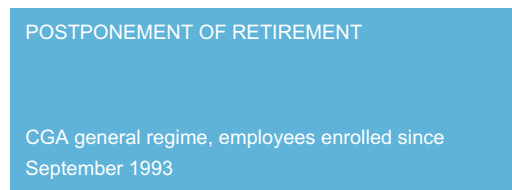
Note: The horizontal shift represents the average postponement of the retirement moment, whilst the vertical one measures the variation in the average initial pension.

(19) The global accrual rate is the product between the annual pension accrual rate and the relevant number of years of service. In the previous legislation it was equal to 90 per cent (2.5% multiplied by 36). In the new legal framework, it is determined by the sum of the product between the first component rate and the career-length up to December 2005 and the product between the second component rate and the subsequent years of service.

legal framework, in order to fulfil the 40-year career-length requirement. Therefore, for these employees, the postponement of the retirement moment is not very significant.

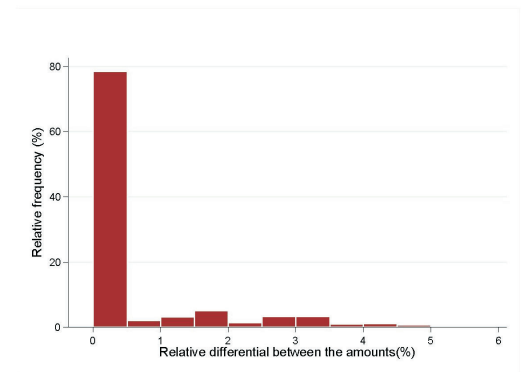
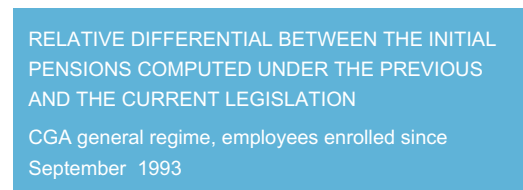
Additionally, since the formula for computing initial pensions has remained unchanged, the impact on pensions is minor (notice, however, that it is now positive due to the increase in the reference remuneration, as it will be seen). Indeed, for about 80 per cent of the contributors enrolled since September 1993, the introduction of the new legislation has a nil or almost nil effect on career-length and pension amounts. For the others, there is an observable extension of the career-length and an increase in the old-age pensions (Charts 11 and 12).

Chart 11



Source: Authors' calculations.

Chart 12



Source: Authors' calculations.

In order to analyse these results, a breakdown of the change in pensions was undertaken. This is similar to the one previously mentioned for the contributors registered until August 1993. In this case, as some individuals extend their career-length, the wages taken into account to compute the reference compensations may differ, as well as the second component accrual rate. For the employees enrolled between September 1993 and December 2001, the difference between the initial pension computed in terms of the previous and the current legal framework (P^P and P^N , respectively) can be represented as follows (see Appendix 2):

$$d_P = P^N - P^P = \underbrace{(P_1^N - P_1^P)}_{d_{P_1}} + \underbrace{(P_2^N - P_2^P)}_{\substack{d_{r_2} + d_{RC_2} \\ d_{P_2}}}$$

where:

P_1^i and P_2^i ($i=P,N$) refer to the two components of the initial pension, corresponding to the years of service until and since December 2001;²⁰

d_{P_1} is the differential explained by the first component, due to the change in the reference compensation;

(20) Since retirement with a full pension is assumed, the breakdown is not applicable to contributors who retire by December 2016. Thus, the years of service up to December 2001 are the relevant ones for the first component.

d_{P_2} is the differential explained by the second component, which can be split into:

d_{r_2} , referring to the change in the applicable pension accrual rate;

d_{RC_2} , corresponding to the change in the reference compensation.

For the employees whose registration occurred since January 2002, the computing formula has also remained unchanged. However, the reform of the *Estatuto da Aposentação* may as well result in variations in the reference compensation and, by consequence, in the annual accrual rate. In this case:

$$d_p = P^N - P^P = d_r + d_{RC}$$

in which:

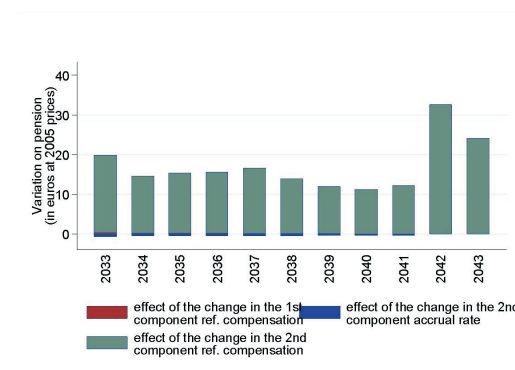
d_r is the impact of the change in the pension accrual rate;

d_{RC} is the impact of the change in the reference compensation.

Charts 13 and 14 show that, for employees enrolled since September 1993, the difference between the pensions computed under the revised legislation and the previous one is almost exclusively explained by the change in the reference compensation. Given that employees extend their career in order to fulfil the age requirement (as shown in Chart 11), the average wage over the best 10 out of the last 15 years and the average wage over the whole career tend to be higher. This outcome has a positive impact on the pension amount. In its turn, such variation in the reference compensation tends to bring down the accrual rates for the second component (for those enrolled until December 2001) and the overall pension (for those registered afterwards). This effect is nonetheless small relative to that of the increase in reference compensation.

Chart 13

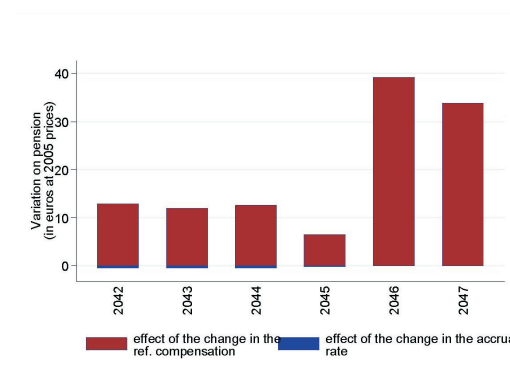
BREAKDOWN OF THE AVERAGE CHANGE IN INITIAL PENSIONS
CGA general regime, employees enrolled between September 1993 and December 2001



Source: Authors' calculations.

Chart 14

BREAKDOWN OF THE AVERAGE CHANGE IN INITIAL PENSIONS
CGA general regime, employees enrolled since January 2002



Source: Authors' calculations.

4.2. Impact on the time-profile of retirements and the initial pension for employees of the CGA special regimes²¹

This section presents the impact of the change in the retirement conditions and pension formulas for the employees belonging to the most representative CGA special regimes: primary education and kindergarten teachers, nurses, and security force employees. For the primary education and kindergarten teachers, the career-length and minimum age required to warrant a full pension rise progressively from 30 to 40 years (with the resulting gradual elimination of the implicit bonus)²² and from 55 to 65 years, respectively. Moreover, it was also stipulated an alternative that will remain in force until 2010, allowing retirement with full pension at 52 years of age and 32 years of career-length (as long as the contributor had 13 years of teaching service in October 1989). In 2005 the maximum age until which these employees can remain in service was also raised from 65 to 70 years. For nurses, revision of the retirement conditions consisted in a gradual rise in the minimum age, from 57 to 65 years, and in the career-length required for a full pension, from 35 to 40 years. Finally, for security force personnel (GNR and PSP) the legislative changes were the increase in the years of service required for receiving a full pension, from 36 to 40, and the reduction in the bonus applied in career-length computation, from 25 to 15 per cent of the actual period of service. Additionally, access to the pre-retirement situation²³ is now possible only upon reaching 55 years of age – besides 36 years of service.

Note that for the employees of the special regimes enrolled since September 1993 pensions were already computed using the formula stipulated for the GSSS. Nonetheless, the legislation did not specify how that rule would be implemented in detail. In the exercise a career-length requirement of 40 years was assumed, but proportionately reduced in line with the bonus that the legislation implicitly or explicitly foresaw for each professional group.

For the majority of the employees enrolled in the special regimes, the reform of the retirement conditions generates a greater postponement in retirement than for the general CGA regime. Indeed, there was a reduction or extinction of the bonuses applied in the career-length computation, besides the rise in the minimum years of service and/or age. On average, depending on whether the enrolment occurred respectively before and after 1 September 1993, the time served is extended by 7.3 and 7.1 years for primary education and kindergarten teachers, 5.5 and 1.7 years for nurses, and 3.8 and 1.8 years for security force personnel (note that the corresponding values for the general CGA regime are 3.5 and 0.4 years). The public employees whose retirement moment remains unchanged, despite the legislative reform, are basically primary education and kindergarten teachers covered by the mentioned alternative in force until 2010, security force employees that fulfilled the requirements to access pre-retirement by 2005, and contributors who retire upon reaching the age limit (when the latter has not changed by the reform).

In order to explain the variation in the initial pensions, breakdowns following the same rationale as for the general CGA regime were undertaken. For more than half of the employees enrolled until August 1993, initial pensions increase (being that proportion higher than for the members of the general CGA regime). In fact, in the special regimes, besides the direct positive effect of the career-length extension

(21) For further details, see Appendix 1 and Campos and Pereira (2008).

(22) In the legislation in force prior to 2005 that defined the retirement conditions for primary education and kindergarten teachers and nurses there was no explicit reference to a bonus in the determination of the length of service. However, there was an implicit one, since those employees could retire with a full pension without having 36 years of service, as required for the contributors of the general CGA regime. This also applies to the transitional periods instituted by Decree-Law No. 229/2005 of December 29.

(23) Pre-retirement is a situation similar to being in the reserves, in which employees are not on active duty. Retirement with a full pension is guaranteed for the individuals who spend 5 years in pre-retirement.

(including via de reduction of the bonus) on the pension amount, there may also occur an indirect effect. It results from the increase in the relevant number of years of service that may raise the reference compensation associated to the last wage. This effect is particularly relevant for higher ranks of the security forces, for which the estimated wage progression profile shows salary gains at the end of the contributory career. For the individuals whose pension decreases when computed in terms of the new legislation, the predominant effects arise from the reduction in the accrual rates and the reference compensation corresponding to the years of service since 2005.

The impacts on the initial pensions for the individuals enrolled since September 1993 are also heterogeneous. However, for most of them the pension amount increases. This effect is explained by the extension of the period of service, brought about by the rise in the minimum age for retirement and the reduction or extinction of the bonuses. Indeed, with the increase in the actual years of service, the wages taken into account to compute reference compensations are typically higher. Finally for a small percentage of the employees registered since September 1993, the pension amount is lower when calculated in terms of the more recent legislation. In particular, these are individuals who retire when reaching the age limit, thus in the same year in both versions of legislation. For the employees in these conditions, the actual career-length and the other relevant variables do not change. Nevertheless, pension decreases, given the revision in the bonuses applied to the years they served.

4.3. The impact of the introduction of a sustainability factor on the initial pension

Since January 2008 pensions awarded to CGA contributors are given by the statutory pension (resulting from the formulas already presented) multiplied by a sustainability factor. The factor is equal to the ratio between average life expectancy at age of 65 in 2006 and in the year before the one in which the pension is paid for the first time. It should be stressed that the legislation allows contributors to play down the impact of the sustainability factor²⁴, but this option is disregarded in the simulation exercise. As before, it is assumed that individuals retire as soon as they fulfil the requirements to warrant a full pension, therefore accepting the penalty imposed by the sustainability factor.

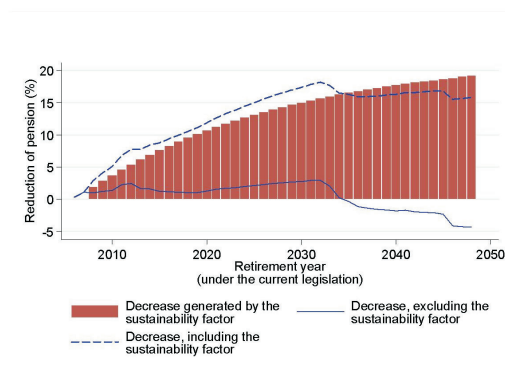
The figures for the average life expectancy at the age of 65 were taken from the mortality tables underlying the exercise presented in Pinheiro and Cunha (2007). They allow the computation of the sustainability factor applicable to the amount of the statutory pension for each year, from 2008 onwards. It is noticeable that the factor's relevance increases as the retirement year gets further from 2008, since, according to the projections, life expectancy rises over time.

Chart 15 presents the reduction in the pensions awarded each year (the retirees are grouped by retirement year under the current legislation), as a consequence of the introduction of the sustainability factor. From now on, all public employees registered in the CGA are analysed as a whole, whatever the enrolment date or the applicable regime. A decrease in the average initial pension, approximately until 2034, results from the implementation of the new legislation, when the sustainability factor is not considered. From that year on, the opposite occurs, as the pensions awarded to employees registered since September 1993 - which tend to be higher under the new legal framework - become predominant as shown in Chart 10.

As expected, the introduction of the sustainability factor has a negative impact on the initial pension of all CGA members that becomes more marked as life expectancy increases over time. This impact converges to about 20 per cent, and clearly surpasses the one arising from the other legislative changes in

(24) Specifically, by means of the extension of the professional life beyond the minimum requirements for receiving a full pension or the voluntary contribution to a public or private capitalization scheme, in order to complement the pension amount.

Chart 15

**RELATIVE IMPACT OF THE LEGISLATIVE REFORM
ON THE AVERAGE INITIAL PENSION**


Source: Authors' calculations.

force since January 2006. Taking into account the overall effect of the changes in the computing formulas and retirement conditions, there is a reduction in the average initial pension all through the period.

4.4. The impact of the reform on pension-related expenditure

In order to estimate the overall savings deriving from the reform of the *Estatuto da Aposentação*, pension outlays for the retirees considered in this study were simulated, using both the previous and the current legislation. The number of years during which each individual receives an old-age pension was computed on the basis of life expectancy at retirement according to gender and age (using Pinheiro and Cunha's projections). Taking into account the legislation in force up to December 2005, the retirees receive their pension for 23 years on average. Considering the rules in force since January 2006, this figure decreases to 21 years. Pension-related expenditure was calculated for each year, from 2007 until the system's predictable closure. Then these annual values were accumulated (note that they are at 2005 constant prices - see sub-section 3.2.2).²⁵ Chart 16 presents the savings that derive from the introduction of the new legal framework, both in annual and cumulative terms, excluding the impact of the sustainability factor. In order to provide a relative measure of the respective magnitudes, the amounts were divided by the 2005 GDP.²⁶

The reform brings about a decline in pension-related expenditure, and the resulting saving reaches its maximum between 2015 and 2030. From 2040 onwards, expenditure slightly increases, mostly reflecting the fact that pensions computed in line with the more recent rules will have been, on average, higher since the previous decade (as shown in Chart 15). The saving obtained is predominantly explained by the decline in the number of years during which the retirees receive their pensions.

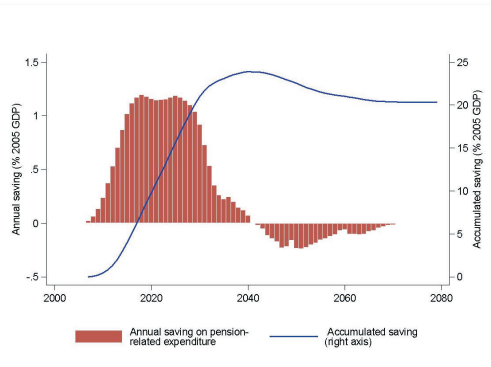
In Chart 17 it is noticeable that the introduction of the sustainability factor sharpens the decline in annual pension-related expenditure, which now lasts over the whole period, instead of ceasing in 2040.

(25) It was assumed that the pensions (at 2005 prices) remain constant once they begin to be paid.

(26) The value so obtained is different from the one that would result from dividing each year's saving, expressed at that year's prices, by the respective GDP. This difference depends, particularly, on the discrepancy between the nominal variation in the compensations underlying the pension calculation and the nominal variation in GDP, occurring throughout the time horizon considered relatively to 2005.

Chart 16

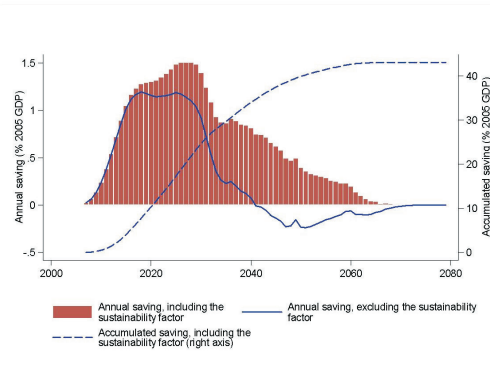
ANNUAL SAVING ON THE PENSION-RELATED EXPENDITURE RESULTING FROM THE REFORM (EXCLUDING THE SUSTAINABILITY FACTOR)



Source: Authors' calculations.

Chart 17

ANNUAL SAVING ON THE PENSION-RELATED EXPENDITURE RESULTING FROM THE REFORM (INCLUDING THE SUSTAINABILITY FACTOR)



Source: Authors' calculations.

5. CONCLUDING REMARKS

This article attempts to evaluate the effects of the recent revision of the *Estatuto da Aposentação*. Firstly, the profile of retirements and the initial old-age pensions were simulated, both in line with the previous legislation and the current one, in force since January 2006 (using the «2005 Public Administration Human Resources Database»). Secondly, the impact of the sustainability factor on the initial pensions was taken into account and the effect of the legislative reform on CGA expenditure was gauged.

As expected, the reform of the *Estatuto da Aposentação* results in the postponement of retirement (with a full pension) for most of the general CGA regime contributors. This effect is particularly marked for employees enrolled until August 1993. For the employees enrolled in the special CGA regimes, the moment of retirement tends to be more affected as a result of the reduction or gradual extinction of the bonuses applying to the computation of the career-length.

In terms of the initial pension amount, the legislative reform has more heterogeneous impacts. For most of the contributors enrolled until August 1993, the revision of the retirement conditions and computing formulas has negative effects on pensions. However, in some cases, the extension of career-length (including or not a bonus) determines a higher initial pension, compared with the amount that would be obtained in terms of the previous legislation. For the majority of the employees of the general CGA regime enrolled since September 1993 the effects are approximately nil. For about 20 per cent of the contributors pension slightly rises, as a consequence of the increase in the reference compensation, in line with the extension of career-length (in this case, in order to fulfil the new minimum age required to obtain a penalty-free pension). For most contributors of the special regimes, the reduction or extinction of the bonuses results in a relatively stronger rise in actual career-length and, consequentially, in the reference compensations. This effect tends to cause an increase in the pension computed under the legal framework in force since January 2006.

The decline in the number of years during which retirees receive their old-age pension, in addition to the introduction of the sustainability factor, generates a non-negligible decrease in pension-related expenditure, throughout the period, until the system closes.

To sum up, the reform of the *Estatuto da Aposentação* results in an extension of the time served and in a reduction in pension-related expenditure that are in line with the rationale for its implementation. In practice, the delay in the moment of retirement and the saving may be less marked than the simulation results suggest, since, as mentioned, a significant number of employees retire before fulfilling the requirements assumed. As for the sustainability factor, it should be remembered that its impact at the individual level may be played down through the alternatives legally set out for that purpose. These were not considered in this exercise. Moreover, the profile of retirements is likely to be very influenced in the coming years by the recent change to the *Estatuto da Aposentação*, which has shortened the minimum career-length required for retirement (with a partial pension).

REFERENCES

- Campos M. M. and M. C. Pereira (2008), "Impact of the recent reform of the Portuguese public employees' pension system", Banco de Portugal – *Working Papers*, mimeo.
- Pinheiro M. e V. Cunha (2007), "MISS: A model for assessing the sustainability of public social security in Portugal", Banco de Portugal – *Occasional Papers*, no. 2/2007.

Appendix 1 – Retirement conditions and pension calculation rules under the new legal framework

1.1. Retirement conditions for the CGA general regime

Table 1.1.1

RETIREMENT AGE	
Age	Transitional period
60.5 years	January 1, 2006 - December 31, 2006
61 years	January 1, 2007 - December 31, 2007
61.5 years	January 1, 2008 - December 31, 2008
62 years	January 1, 2009 - December 31, 2009
62.5 years	January 1, 2010 - December 31, 2010
63 years	January 1, 2011 - December 31, 2011
63.5 years	January 1, 2012 - December 31, 2012
64 years	January 1, 2013 - December 31, 2013
64.5 years	January 1, 2014 - December 31, 2014
65 years	From January 1, 2015 onwards

Source: Law No. 60/2005.

Table 1.1.2

CAREER-LENGTH EQUIVALENT TO A FULL CONTRIBUTORY CAREER	
Career-length	Transitional period
36.5 years	January 1, 2006 - December 31, 2006
37 years	January 1, 2007 - December 31, 2007
37.5 years	January 1, 2008 - December 31, 2008
38 years	January 1, 2009 - December 31, 2009
38.5 years	January 1, 2010 - December 31, 2010
39 years	January 1, 2011 - December 31, 2011
39.5 years	January 1, 2012 - December 31, 2012
40 years	From January 1, 2013 onwards

Source: Law No. 60/2005.

Note: Also applicable to the security force personnel.

1.2. Retirement conditions for some of the CGA special regimes

Table 1.2.1

RETIREMENT AGE: PRIMARY EDUCATION AND KINDERGARTEN TEACHERS	
Age	Transitional Period
55.5 years	January 1, 2006 - December 31, 2006
56 years	January 1, 2007 - December 31, 2007
56.5 years	January 1, 2008 - December 31, 2008
57 years	January 1, 2009 - December 31, 2009
57.5 years	January 1, 2010 - December 31, 2010
58 years	January 1, 2011 - December 31, 2011
58.5 years	January 1, 2012 - December 31, 2012
59 years	January 1, 2013 - December 31, 2013
59.5 years	January 1, 2014 - December 31, 2014
60 years	January 1, 2006 - December 31, 2015
60.25 years	January 1, 2007 - December 31, 2016
61 years	January 1, 2008 - December 31, 2017
61.75 years	January 1, 2009 - December 31, 2018
62.5 years	January 1, 2010 - December 31, 2019
63.25 years	January 1, 2011 - December 31, 2020
64 years	January 1, 2012 - December 31, 2021
65 years	From January 1, 2022 onwards

Source: Decree-Law No. 229/2005.

Table 1.2.2

CAREER-LENGTH EQUIVALENT TO A FULL CONTRIBUTORY CAREER: PRIMARY EDUCATION AND KINDERGARTEN TEACHERS	
Career-length	Transitional Period
30.5 years	January 1, 2006 - December 31, 2006
31 years	January 1, 2007 - December 31, 2007
31.5 years	January 1, 2008 - December 31, 2008
32 years	January 1, 2009 - December 31, 2009
32.5 years	January 1, 2010 - December 31, 2010
33 years	January 1, 2011 - December 31, 2011
33.5 years	January 1, 2012 - December 31, 2012
34 years	January 1, 2013 - December 31, 2013
34.5 years	January 1, 2014 - December 31, 2014
35.25 years	January 1, 2015 - December 31, 2015
36 years	January 1, 2016 - December 31, 2016
36.5 years	January 1, 2017 - December 31, 2017
37 years	January 1, 2018 - December 31, 2018
37.5 years	January 1, 2019 - December 31, 2019
38 years	January 1, 2020 - December 31, 2020
38.5 years	January 1, 2021 - December 31, 2021
40 years	From January 1, 2022 onwards

Source: Decree-Law No. 229/2005.

Table 1.2.3

RETIREMENT AGE: NURSES		
Age	Transitional Period	
57.5 years	January 1, 2006	- December 31, 2006
58 years	January 1, 2007	- December 31, 2007
58.5 years	January 1, 2008	- December 31, 2008
59 years	January 1, 2009	- December 31, 2009
59.5 years	January 1, 2010	- December 31, 2010
60 years	January 1, 2011	- December 31, 2011
60.5 years	January 1, 2012	- December 31, 2012
61 years	January 1, 2013	- December 31, 2013
61.5 years	January 1, 2014	- December 31, 2014
62.25 years	January 1, 2015	- December 31, 2015
63 years	January 1, 2016	- December 31, 2016
63.75 years	January 1, 2017	- December 31, 2017
64.5 years	January 1, 2018	- December 31, 2018
65 years	From January 1, 2019 onwards	

Source: Decree-Law No. 229/2005.

Table 1.2.4

CAREER-LENGTH EQUIVALENT TO A FULL CONTRIBUTORY CAREER: NURSES		
Career-length	Transitional Period	
35.5 years	January 1, 2006	- December 31, 2006
36 years	January 1, 2007	- December 31, 2007
36.5 years	January 1, 2008	- December 31, 2008
37 years	January 1, 2009	- December 31, 2009
37.5 years	January 1, 2010	- December 31, 2010
38 years	January 1, 2011	- December 31, 2011
38.5 years	January 1, 2012	- December 31, 2012
39 years	January 1, 2013	- December 31, 2013
39.5 years	January 1, 2014	- December 31, 2014
40 years	From January 1, 2015 onwards	

Source: Decree-Law No. 229/2005.

1.3. Pension accrual rate

Table 1.3.1

DEFINITION OF THE REFERENCE COMPONENTS INDEXED TO THE IAS (OR THE MANDATORY MINIMUM WAGE, WHEN APPLICABLE)		
Components	Reference compensation	Annual accrual rate of pension
1st Component	Until 1.1 x IAS	2.30%
2nd Component	Between 1.1x IAS and 2 x IAS	2.25%
3rd Component	Between 2x IAS and 4 x IAS	2.20%
4th Component	Between 4 x IAS and 8 x IAS	2.10%
5th Component	Higher than 8 x IAS	2.00%

Source: Decree-Law No. 187/2007.

Appendix 2 – Breakdown of the impact of the reform on pensions

2.1. Public employees enrolled until August 1993

- Pension in terms of the previous legislation:

$$P^P = RC_L \times C^P \times \frac{0.9}{36} = RC_L \times C^P \times r^P = \underbrace{r^P \times RC_L \times C1}_{P_1^P} + \underbrace{r^P \times RC_L \times C2^P}_{P_2^P},$$

where:

RC_L is the reference compensation, corresponding to the monthly wage in the last position held.

C^P is the length of service required to warrant a full pension, which is equal to 36 years.

$C1$ is the length of service up to December 2005.

$C2^P$ is the length of service since January 2006 required to build up a full contributory career (36 years).

r^P is the annual pension accrual rate implicit in both components, which is given by $\frac{0.9}{36} = 2.5\%$.

- Pension in terms of the current legislation:

$$P^N = \frac{RC_L \times 0.9 \times C1}{C^N} + RC_A \times r_2^N \times C2^N = \underbrace{RC_L \times r_1^N \times C1}_{P_1^N} + \underbrace{RC_A \times r_2^N \times C2^N}_{P_2^N},$$

where:

RC_L is the first component reference compensation, corresponding to the monthly wage in the last position held.²⁸

r_1^N is the annual pension accrual rate applicable to the first component, which is given by $\frac{0.9}{C^N}$.

$C1$ is the length of service up to December 2005 (which does not change with the legal reform).

RC_A is the second component reference compensation, corresponding to the average wage over the best $C2^N$ contributory years since January 2006.

r_2^N is the annual pension accrual rate applicable to the second component, which is linked to reference compensation and career-length.

C^N is the length of service required to warrant a full pension, which varies between 36.5 and 40 years (see Table 1.1.2).

$C2^N$ is the length of service since January 2006 required to build up a full contributory career (C^N).

- Differential between the amounts:

(27) Assuming retirement with full pension only.

(28) Since it was assumed that, from the 36th year of the contributory career onwards the wage remained constant, the wage in the last position held is the same, in terms of both the current and the previous legislation.

$$d_P = P^N - P^P = \underbrace{(P_1^N - P_1^P)}_{d_{P_1}} + \underbrace{(P_2^N - P_2^P)}_{d_{P_2}}, \text{ where:}$$

$$d_{P_1} = P_1^N - P_1^P = (r_1^N \times RC_L \times C1) - (r_1^P \times RC_L \times C1) = (RC_L \times C1) \cdot (r_1^N - r_1^P);$$

$$d_{P_2} = P_2^N - P_2^P, \text{ which can be broken down into:}$$

$$1. d_{r_2} = (r_2^N \times RC_A \times C2^N) - (r_2^P \times RC_A \times C2^N) = (RC_A \times C2^N) \cdot (r_2^N - r_2^P);$$

$$2. d_{RC_2} = (r_2^P \times RC_A \times C2^N) - (r_2^P \times RC_L \times C2^N) = (r_2^P \times C2^N) \cdot (RC_A - RC_L);$$

$$3. d_{C2} = (r_2^P \times RC_L \times C2^N) - (r_2^P \times RC_L \times C2^P) = (r_2^P \times RC_L) \cdot (C2^N - C2^P).$$

2.2. Public employees enrolled between September 1993 and December 2001

- Pension in terms of the previous legislation²⁹

$$P^P = \frac{C1 \times (RC_{A_1}^P \times r_1 \times C) + C2 \times (RC_{A_2}^P \times r_2^P \times C)}{C} = \underbrace{(RC_{A_1}^P \times r_1 \times C1)}_{P_1^P} + \underbrace{(RC_{A_2}^P \times r_2^P \times C2)}_{P_2^P}$$

where:

$RC_{A_1}^P$ is the first component reference compensation, corresponding to the average wage over the best 10 out of the last 15 contributory years.

r_1 is the annual pension accrual rate applicable to the first component, which is equal to 2% (it did not change with the legal reform).

C1 is the length of service up to December 2001.

$RC_{A_2}^P$ is the second component reference compensation, corresponding to the average wage over the best 40 years of the contributory career.

r_2^P is the annual pension accrual rate applicable to the second component, which is linked to reference compensation and career-length.

C2 is the length of service since January 2002 required to build up a full contributory career (C).

C is the length of service required to warrant a full pension, which corresponds to 40 years (both in terms of the new and the previous legal framework).

- Pension in terms of the current legislation:

$$P^N = \underbrace{(RC_{A_1}^N \times r_1 \times C1)}_{P_1^N} + \underbrace{(RC_{A_2}^N \times r_2^N \times C2)}_{P_2^N}$$

in which the variables have the same meaning as before, but refer to the values that result from the current version of the *Estatuto da Aposentação*.

- Differential between the amounts:

$$d_P = P^N - P^P = \underbrace{(P_1^N - P_1^P)}_{d_{P_1}} + \underbrace{(P_2^N - P_2^P)}_{d_{P_2}}, \text{ where}$$

$$d_{P_1} = P_1^N - P_1^P = (RC_{A_1}^N \times r_1 \times C1) - (RC_{A_1}^P \times r_1 \times C1) = (r_1 \times C1) \cdot (RC_{A_1}^N - RC_{A_1}^P);$$

(29) As mentioned in the text, when computing each component's weights it was assumed a maximum career-length of 40 years. Moreover, since only retirement with full pension is considered, the breakdown does not apply to contributors who retire prior to 2017.

$d_{P_2} = P_2^N - P_2^P$ which can be broken down into:

1. $d_{r_2} = (RC_{A_2}^N \times r_2^N \times C2) - (RC_{A_2}^N \times r_2^P \times C2) = (RC_{A_2}^N \times C2) \cdot (r_2^N - r_2^P)$;
2. $d_{RC_2} = (RC_{A_2}^N \times r_2^P \times C2) - (RC_{A_2}^P \times r_2^P \times C2) = (r_2^P \times C2) \cdot (RC_{A_2}^N - RC_{A_2}^P)$.

2.3. Public employees enrolled since January 2002

- Pension in terms of the previous legislation:

$$P^P = RC_A^P \times r^P \times C, \text{ where:}$$

RC_A^P is the reference compensation, corresponding to the average wage over the best 40 years of the contributory career.

r^P is the annual pension accrual rate, which is linked to reference compensation and career-length.

C is the length of service required to warrant a full pension, which corresponds to 40 years (in terms of both the current and the previous legal framework).

- Pension in terms of the current legislation:

$$P^N = RC_A^N \times r^N \times C,$$

in which the variables have the same meaning as before, but refer to the values that result from the current version of the *Estatuto da Aposentação*.

- Differential between the amounts:

$$d_P = P^N - P^P = \underbrace{(RC_A^N \times r^N \times C)}_{d_{P_1}} - \underbrace{(RC_A^P \times r^P \times C)}_{d_{P_2}},$$

that can be broken down into:

1. $d_{P_1} = (RC_A^N \times r^N \times C) - (RC_A^P \times r^N \times C) = (r^N \times C) \cdot (RC_A^N - RC_A^P)$;
2. $d_{P_2} = (RC_A^P \times r^N \times C) - (RC_A^P \times r^P \times C) = (RC_A^P \times C) \cdot (r^N - r^P)$.