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

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Impact of the recent reform of the Portuguese public employees' pension system[*]

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Abstract

This paper analyses the effects of the recent reform of the *Estatuto da Aposentação,* applicable to the contributors of the *Caixa Geral de Aposentações* (CGA). Using the "2005 Public Administration Human Resources Database", a simulation exercise is undertaken in order to evaluate the impact of the reform on the time-profile of retirements, initial pensions and CGA pension-related expenditure. The results show that the reform has heterogeneous effects, but, for most public employees, it results in an extension of the contributory career and a decrease in initial pensions, generating a reduction in the CGA pension-related expenditure.

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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 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, as stipulated in Law No. 60/2005 of December 29.[1] In fact, the public employees' retirement requirements and pension formulas were subject 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 Law No. 60/2005 of December 29, Law No. 52/2007 of August 31, and Law No. 11/2008 of February 20).

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 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 at 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

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[1] In Appendix 1 an enumeration of the legislation used for this study is presented.

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 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, on the basis of personal choices or specific 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 paper is structured as follows. Section 2 briefly outlines the database and the changes 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

2.1. Preliminary procedures

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.

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. This file contains data concerning the employees' professional category, gender, age, legal nature of the labour relationship, years of service and education. However, there is no information about wages or cross-tabulations for most key variables, except age by gender. In order to overcome this limitation, and starting

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[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).

from the latter tabulation, the structure for the relevant variables for the employees of the *Região Autónoma da Madeira* was replicated using the RAA data.

In order to approximate the local government and judges' data (military personnel were excluded from the study), the "1999 Public Administration Human Resources Database" was used. It was updated by simulating the retirements that occurred between 2000 and 2005 in terms of the rules in force during that period.[3] However, for local government, the strict application of the retirement rules led to retirement flows smaller than those that actually occurred (according to statistics published by the CGA). This arises from the fact that many public employees retire earlier (for instance, due to disability). To bring results closer to reality, 65 years was assumed as the age limit (instead of 70 years), since for the age group from 65 to 70 years disability-based retirement seems more likely. The individuals who in each year fulfilled the prerequisites were excluded from the database. Moreover, the observations corresponding to the employees hired from 2000 to 2005 were created in line with the available data. In the case of local government, the variables professional category, labour relationship, gender, education and age were created for these new employees by reference to the structure observed for those hired in the five years prior to 2000.

Note that it is necessary to know the wages received by each employee throughout their contributory career, in order to compute the retirement pensions. A wage progression profile was estimated for each professional category (as explained in section 3.2.2) on the basis of the December 2005 information for central government and *Região Autónoma da Madeira*. These profiles were assumed to be also suitable for the cases of local government and the RAA. For the judges, a similar procedure was undertaken, but based on the relationship between length of service and salary reported in the December 1999 database. The estimated wages were then adjusted in line with the across-the-board updates between 2000 and 2005.

2.2. Data treatment

The information for the different sub-sectors (central, regional and local government) was put together into a single database comprising roughly 700 thousand observations. The data were then treated, starting with the exclusion of the observations

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[3] Until December 2003, public employees could retire as long as they had a career-length of 36 years and there was no inconvenience from the viewpoint of the service (Decree-Law No. 116/85 of 19 April). Since January 2004 penalty-free retirement is only possible upon reaching the age of 60 and a career-length of 36 years (Law No. 1/2004 of 15 January).

referring to individuals whose age was either unknown or above 72 years in December 2005. The years of service of the individuals for whom the difference between age and this variable implied that they would have been hired before the age of 15 were not considered. The same happened with the salaries on the left of the 1st or on the right of the 99th percentiles, assumed to be errors in the data. However, it should be stressed that, in both cases, these observations were not eliminated. The same applies to the ones referring to individuals whose salary was unknown because, as already mentioned, the simulation exercise is based on estimated wage progression profiles.

Career-length, when unknown, was estimated on the basis of the employees' age, using the following rule:

- if in December 2005 the reported age was higher than the average enrolment age, career-length is given by the difference between those variables;
- if in December 2005 the reported age was lower than the average enrolment age, career-length is assumed to be zero.
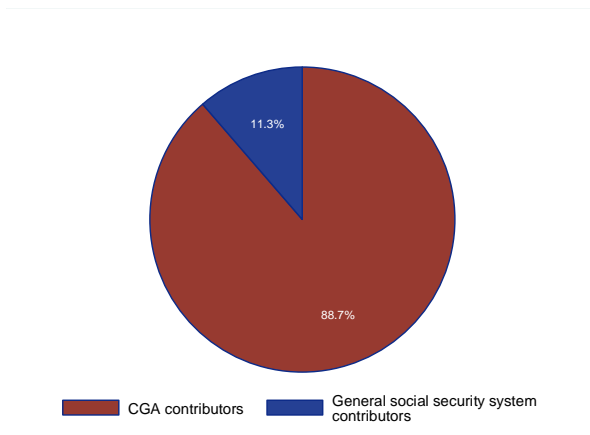
In addition to these issues, it was detected the existence of employees occupying more than one position in the public administration and, as a consequence, with more than one observation in the database. In these cases, the maximum career-length reported and the corresponding professional category were selected. If this procedure did not allow for only one category to be picked up, the choice was made at random.

2.3. Delimitation and description of the relevant group of contributors

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 (Chart 1). The simulation exercise was implemented for this group, consisting of about 612 thousand individuals.[4]

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[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.

Chart 1
PUBLIC EMPLOYEES ENROLLED IN THE CGA
AND IN THE GENERAL SOCIAL SECURITY
SYSTEM

Chart 2
PUBLIC EMPLOYEES ENROLLED IN THE
GENERAL AND SPECIAL CGA REGIMES

11.3%

88.7%

CGA contributors

General social security system contributors

19.7%

80.3%

General regime   Special regimes

Source: Authors' calculations.
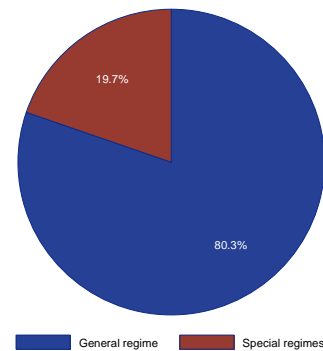
Source: Authors' calculations.

Furthermore, 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 2). The special regimes considered in the exercise are those aplicable 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 3 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 4).
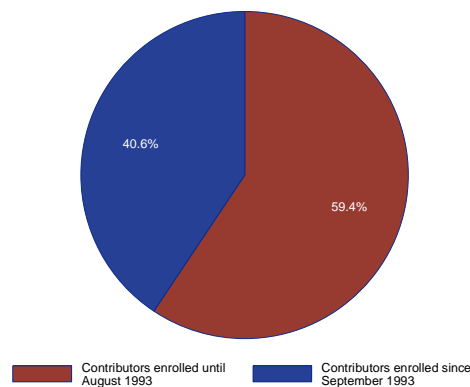
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[5] *Guarda Nacional Republicana* and *Polícia de Segurança Pública*, respectively.

Chart 3
PUBLIC EMPLOYEES ENROLLED IN THE MAIN
SPECIAL CGA REGIMES
Distribution by professional category
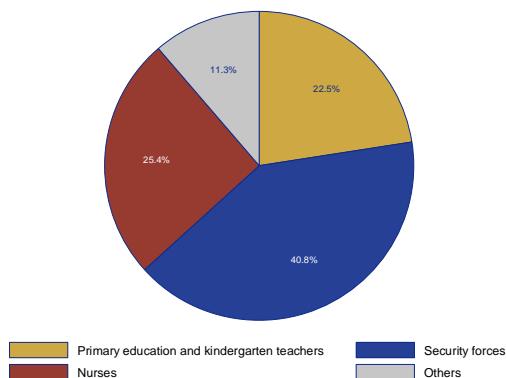
Chart 4
ENROLMENT DATE IN THE CGA

Source: Authors' calculations.

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 2.1.1, in Appendix 2).[6] For the employees whose enrolment date was 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 2.1.2, in Appendix 2). Regarding the contributors enrolled since September 1993, a career-length of 40 years 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 was 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

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

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
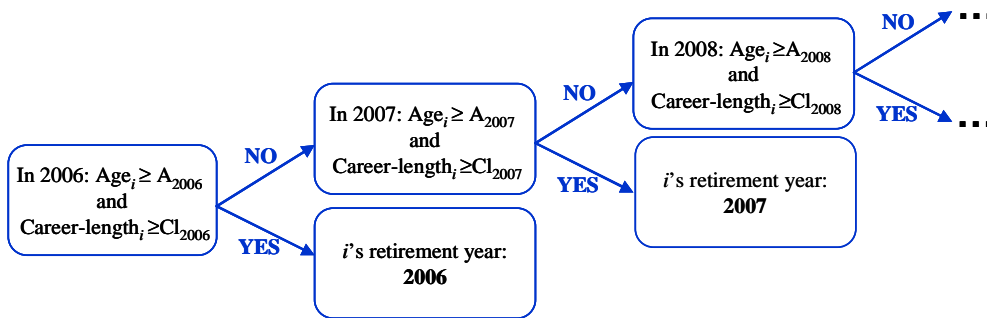
in which:

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 CGA contributors enrolled until August 1993 in terms of the *Estatuto da Aposentação* then in force was:

$$Pension = \frac{RC_L \times 0.9 \times C}{36}, \text{ where:}$$

RC_L = monthly wage received in the last position held (reference compensation).

C = length of service, with an upper limit of 36 years.

The reform of the *Estatuto da Aposentação* set down a new formula:

Pension = $P1 + P2$, being

$$P1 = \frac{RC_L \times 0.9 \times C1}{C}$$

$$P2 = RC_A \times r_2 \times C2, \text{ where:}$$

RC_L = monthly wage in the last position held (first component reference compensation). If retirement occurs from 1 January 2008 onwards, this amount has an upper limit given by 12 times the *Indexante dos Apoios Sociais* (IAS).[7]

$C1$ = length of service up to December 2005.

C = length of service required to warrant a full pension, which varies between 36.5 and 40 years (see Table 2.1.2 in Appendix 2).

RC_A = average wage over the best $C2$ contributory years since 1 January 2006 (second component reference compensation).

$C2$ = length of service since 1 January 2006 required to build up a full contributory career.

r_2 = annual pension accrual rate applicable to the second component.

The r_2 rate is linked to retirement year, length of service and amount of the reference compensation. It was equal to 2% for employees retired by December 2007 and this value is still in force for retirements taking place after that date, as long as the individuals have 20 or less years of contributions.[8] 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 IAS)[9], as indicated in Table 2.3.1 in Appendix 2.

From January 2008 onwards, the pensions awarded to contributors enrolled until August 1993 are calculated as the product of the formula above by a sustainability factor.[10]

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[7] All financial variables in this exercise are expressed at 2005 prices, including the IAS. However, since in 2005 the IAS had not yet been created, it was assumed that its value corresponded to the mandatory minimum wage then in force (374.70 euros).

[8] As set down in Law No. 60/2005 of 29 December, the 2% rate should be applicable to individuals who retired until December 2015. However, Law No. 52/2007 of 31 August brought forward the changeover to a variable annual pension accrual rate.

[9] Until 31 May 2007 the pension accrual rate was linked to the mandatory minimum wage, whilst after this date it is computed taking the IAS as a reference (Decree Law 187/2007 of 10 May). However, for the exercise it was considered that this rule has been in force only since 1 January 2008.

[10] The sustainability factor is given by the ratio between the average life expectancy at 65 years in 2006 and the average life expectancy at 65 in the year before the pension is paid for the first time.

- 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, pension is the weighted average of two components:

$$Pension = \frac{P1 \cdot C1 + P2 \cdot C2}{TC}, \text{ with}$$

$P1 = RC_{A_1} \times r_1 \times C$ and $P2 = RC_{A_2} \times r_2 \times C$, where:

$C1 = $ length of service up to December 2006.

$C2 = $ length of service since January 2007 required to build up a full contributory career.[11]

$TC = $ overall career-length.

$RC_{A_1} = $ average wage over the best 10 out of the last 15 contributory years (first component reference compensation).

$r_1 = $ annual pension accrual rate applicable to the first component, which is equal to 2%.

$C = $ length of service, with an upper limit of 40 years.

$RC_{A_2} = $ average wage over the total contributory career, or over the best 40 contributory years if number of years served exceeds that length (second component reference compensation).

$r_2 = $ annual pension accrual rate applicable to the second component. For employees with 20 years of contributions or less, it corresponds to 2%. For the remaining contributors it varies between 2% and 2.3% in line with the abovementioned bracket mechanism.

It should be noted that for some individuals the latter formula may not apply. This happens when:

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[11] In the exercise, for the determination of the weights, *C1* and *C2*, it was considered a maximum length of service of 40 years (i.e. it was assumed that $TC = C$). Hence, for employees with a full career-length, $C2 = 40 - C1$.

Case 1:

If $(RC_{A_1} \times r_1 \times C > RC_{A_2} \times r_2 \times C$ and $RC_{A_1} \times r_1 \times C > 12 \cdot IAS$ and $RC_{A_2} \times r_2 \times C \leq 12 \cdot IAS)$ or $(RC_{A_1} \times r_1 \times C = RC_{A_2} \times r_2 \times C$ and $RC_{A_1} \times r_1 \times C > 12 \cdot IAS)$:

$$Pension = \frac{P1 \cdot C1 + P2 \cdot C2}{TC}, \text{ where } P1 = 12 \cdot IAS \text{ and } P2 = RC_{A_2} \times r_2 \times C.$$

Case 2:

If $(RC_{A_1} \times r_1 \times C > RC_{A_2} \times r_2 \times C$ and $RC_{A_1} \times r_1 \times C > 12 \cdot IAS$ and $RC_{A_2} \times r_2 \times C > 12 \cdot IAS)$:
$$Pension = RC_{A_2} \times r_2 \times C.$$

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 (C1) refers to the service completed up to 31 December 2001 and the second (C2) to the subsequent contributory years.

Finally, for CGA members enrolled since 1 January 2002, initial pensions are calculated in terms of the following formula:

$Pension = RC_A \times r \times C$, where:

RC_A = average wage over the total contributory career, or over the best 40 contributory years if the number of years served exceeds that length (reference compensation).

C = length of service, with an upper limit of 40 years.

r = annual pension accrual rate, which varies between 2% and 2.3% in line with the bracket mechanism.

From January 2008 onwards, the pensions of the employees enrolled since September 1993 result from the product of the outcome of the formulas above by a sustainability factor.

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 included 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 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 several professional categories (see Chart 5)[12].

Chart 5
PUBLIC EMPLOYEES DISTRIBUTION BY PROFESSIONAL CATEGORY
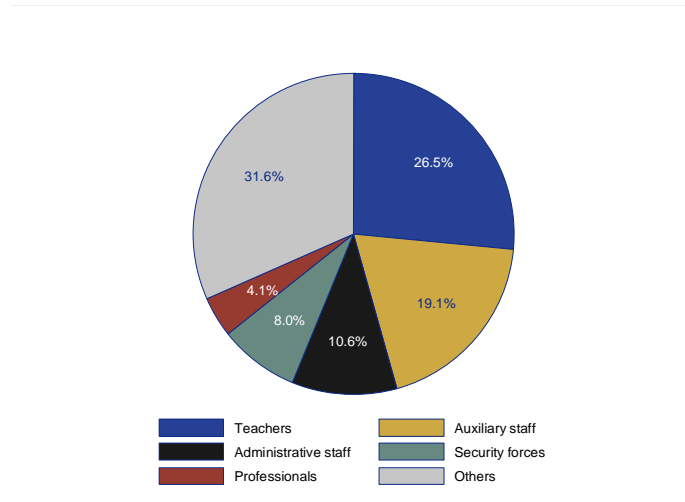
Source: Authors' calculations.

For each professional category the following regression was estimated:

$\ln MW_i = \alpha + \beta_1 \cdot C_{5i} + ... + \beta_{33} \cdot C_{37i} + \xi_i$, where:

MW_i is the monthly wage earned by individual i in December 2005.

$C_{5i} ... C_{37i}$ are dummy variables defined in line with the following rule:

$$C_{xi} = \begin{cases} 1, & \text{if career-length}_i = x \text{ in December 2005} \\ 0, & \text{if career-length}_i \neq x \text{ in December 2005} \end{cases}, \quad x \in \{5, 6, ..., 36\}$$

$$C_{37i} = \begin{cases} 1, & \text{if career-length}_i \geq 37 \text{ in December 2005} \\ 0, & \text{if career-length}_i < 37 \text{ in December 2005} \end{cases}$$

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,

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[12] 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.

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. Since the progression profile resulting from this estimation procedure was somewhat irregular, it was smoothed by means of a polynomial adjustment on the estimated wages using a third degree polynomial in the years of service. It was assumed that the salary remained constant upon reaching the respective maximum or, at the latest, by the 36th year. The results are illustrated in Chart 6.

The wage progression profiles reflect the relationship between earnings and seniority that was observed in 2005, meaning that the simulated pensions are also at 2005 prices.[13] 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-a-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.

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[13] The annual wages used to calculate the reference compensation were not updated in line with retirement year's prices (as foreseen in the legislation) and are expressed at 2005 prices.

Chart 6
WAGE PROGRESSION BY PROFESSIONAL CATEGORY
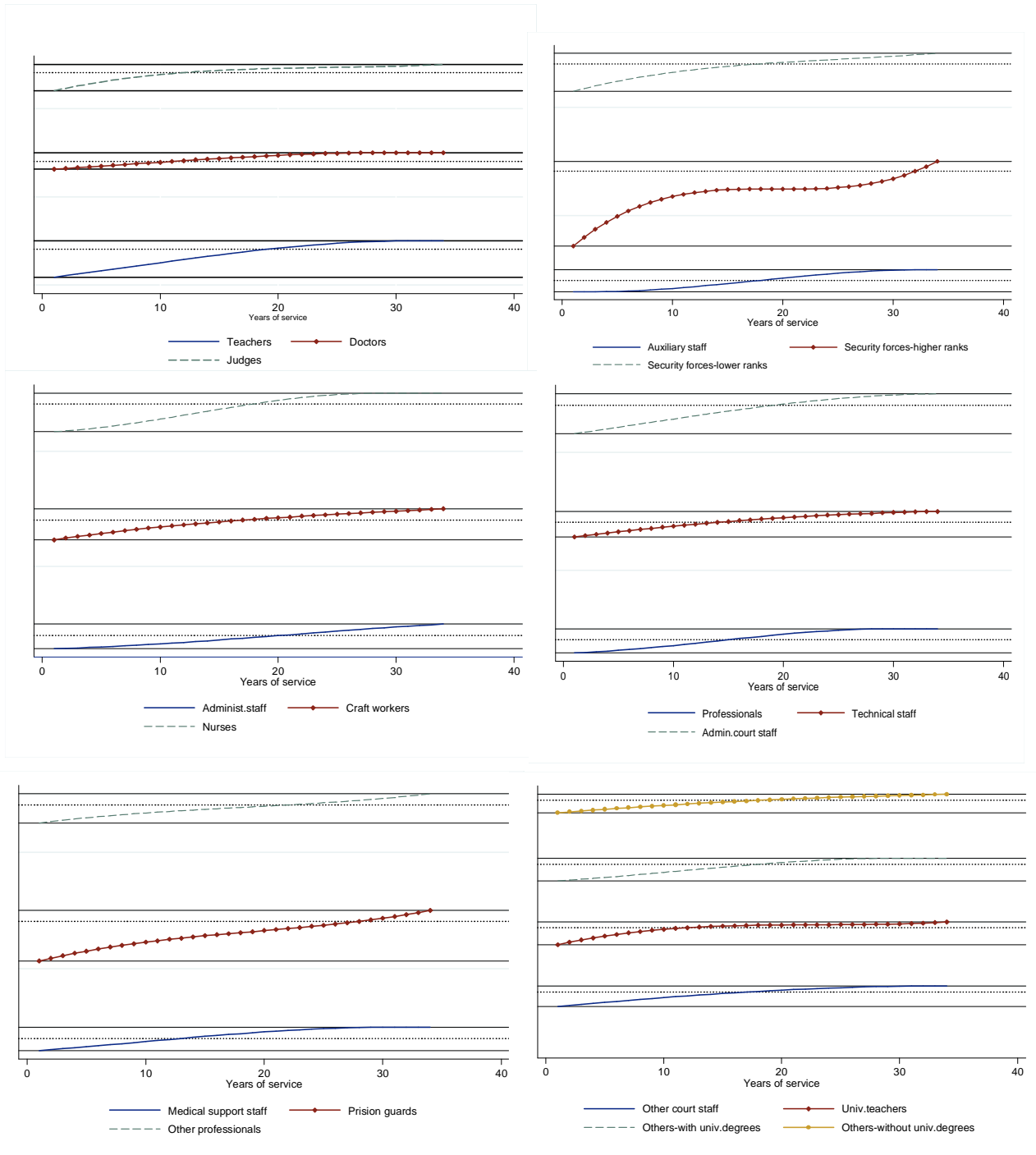
Source: Authors' calculations.
Note: For each professional category, the lower line refers to the salary at the beginning of the career and the upper line concerns the salary at its end. Therefore, the wider the amplitude between these two lines, the lower will be the initial salary as a proportion of the final one. The intermediate, dotted, line shows the moment in which 80 per cent of the final wage is reached, measuring the advancement pace.

4. Results

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

4.1.1. Time-profile of retirements[14]

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 7 and 8). The most obvious effect 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 8). Such increase 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 8, the increase in the flow spreads until about 2018, while in Chart 7 it ends in 2014.

Chart 7

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

■ Enrolled until 31 August 1993   □ Enrolled since 1 September 1993
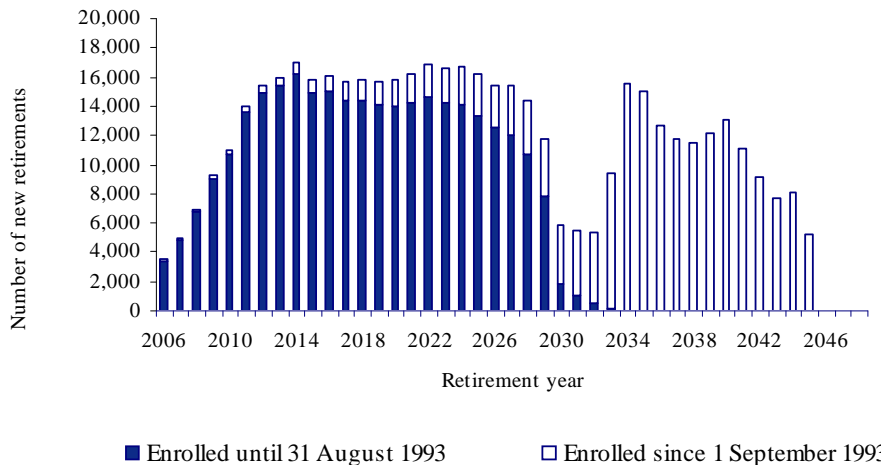
Source: Authors' calculations.

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[14] 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 8

PROFILE OF RETIREMENTS – LEGISLATION IN FORCE SINCE JANUARY 2006

CGA general regime

Enrolled until 31 August 1993 □ Enrolled since 1 September 1993
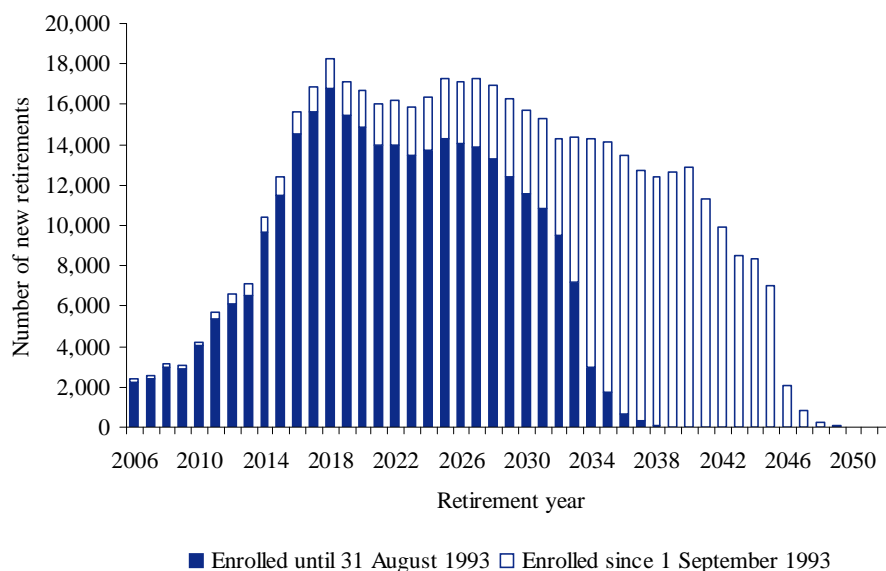
Source: Authors' calculations.

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 7). 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 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.[15]

Chart 9 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 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

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[15] 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.

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.

Chart 9

PROFILE OF RETIREMENTS – IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*
CGA general regime
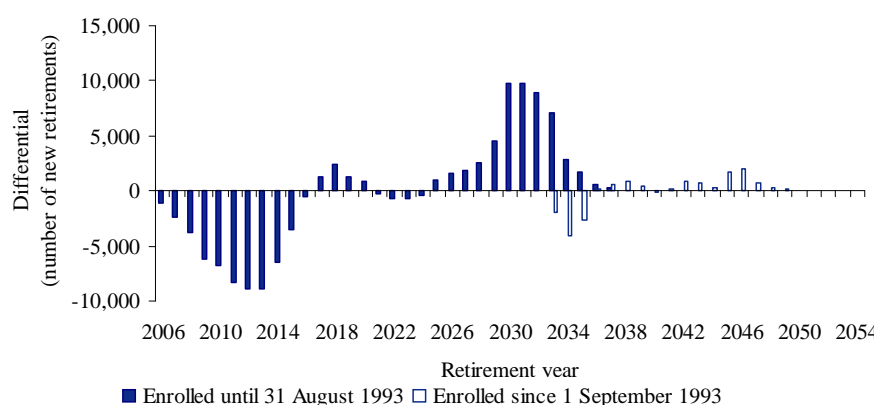
Source: Authors' calculations.

4.1.2. Retirement moment and initial pensions[16]

- Public employees enrolled until 31 August 1993

Chart 10 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 10 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 31 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 11). The

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

remaining employees retire when reaching the age limit; hence, for them the retirement year remains unchanged.

Chart 10
IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*
CGA general regime, employees enrolled until August 1993
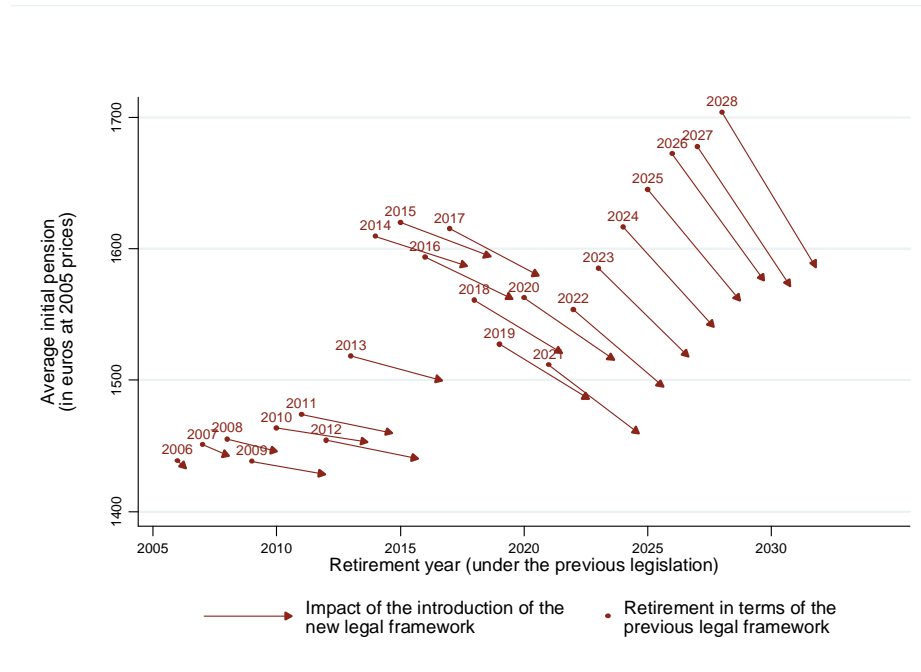
Source: Authors' calculations.
Note: The horizontal shift represents the average postponement of the retirement moment, whilst the vertical one measures the variation in the average initial pension. Only those individuals whose retirement takes place before 2029 were considered, since from that year onwards the number of retirements is small.

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 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 10, but is clearly seen in Chart 12.

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Chart 11

POSTPONEMENT OF RETIREMENT

CGA general regime, employees enrolled until August 1993
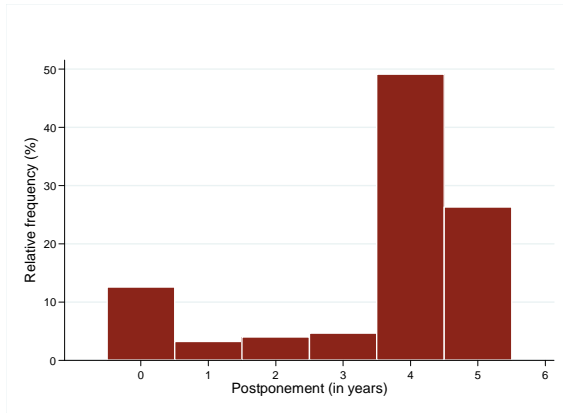
Chart 12

RELATIVE DIFFERENTIAL BETWEEN THE INITIAL PENSIONS COMPUTED UNDER THE PREVIOUS AND THE CURRENT LEGISLATION

CGA general regime, employees enrolled until August 1993

Source: Authors' calculations.
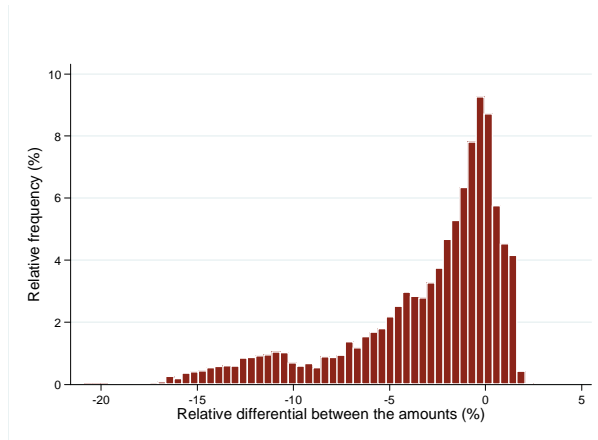
Source: Authors' calculations.

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.

Breakdown of the change in the initial pension[17]

The formula applicable before the legislative reform was rewritten as the sum of two components (P_1^P and P_2^P), following the rationale underlying the new rules:

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

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

$$\frac{0.9}{36} = 2.5\% \, .$$

---

[17] The breakdowns presented in this paper rely on the assumption that the individuals retire with a full pension, thus excluding the ones who retire when they reach the age limit.

Since 1 January 2006, the amount of the pension for these employees is calculated using a formula that can be also written as the sum of two components (P_1^N and P_2^N):

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

RC_L is the first component reference compensation, corresponding to the monthly wage in the last position held.[18]

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 2.1.2).

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

Hence, 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:

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

$d_{P_1} = P_1^N - P_1^P = (r_1^N \times RC_L \times C1) - (r^P \times RC_L \times C1) = (RC_L \times C1) \cdot (r_1^N - r^P)$ represents the differential explained by the first component, due to the difference between the implicit pension accrual rates (the other elements do not change);

$d_{P_2} = P_2^N - P_2^P$ is the differential explained by the second component, which can be split into:

---

[18] 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.

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

referring to the impact of the change in the accrual rate applicable;

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

ponding to the effect of the change in the reference compensation;

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

the impact of the change in the length of service corresponding to a full

contributory career.

Chart 13 presents this breakdown (with the individuals grouped by the retirement under the previous framework).

Chart 13
BREAKDOWN OF THE AVERAGE CHANGE IN INITIAL PENSIONS
CGA general regime, employees enrolled until August 1993
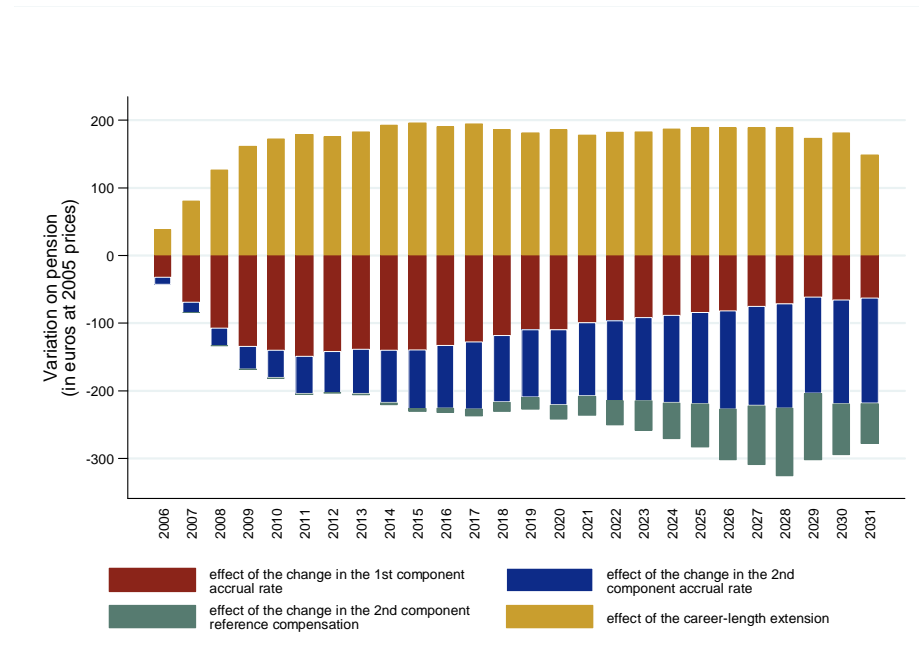
Source: Authors' calculations.

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. 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

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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.[19] Chart 14 represents the second component rate, which varies inversely with the reference compensation.

Chart 14
SECOND COMPONENT ANNUAL PENSION
ACCRUAL RATE
Employees enrolled until August 1993
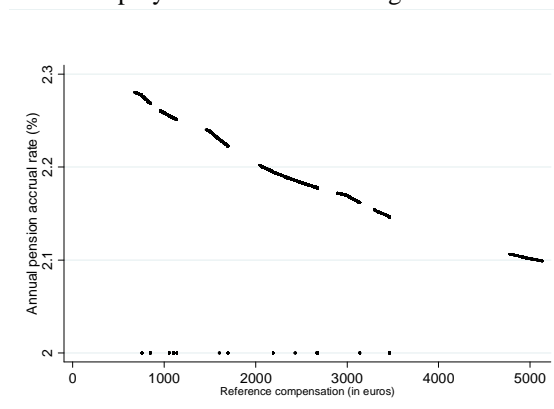
Source: Authors' calculations.

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 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 10).

Finally, the variation in the career-length has a positive influence on pension amounts. As previously shown in Chart 11, 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

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[19] 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 2.1.2 in Appendix 2). The second component rate varies between 2% and 2.3%.

rates, may result in global accrual rates that are higher than the previous maximum.[20] When this happens, the pension computed under the revised 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

Chart 15
IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*
CGA general regime, employees enrolled since September 1993
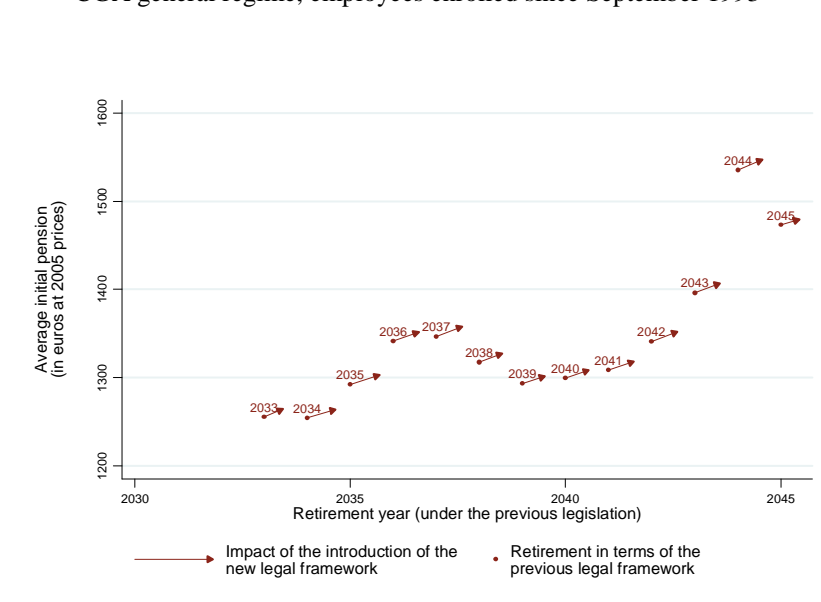
Source: Authors' calculations.
Note: The horizontal shift represents the average postponement of the retirement moment, whilst the vertical one measures the variation in the average initial pension.

In Chart 15 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,

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[20] 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.

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 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 compensation, 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 16 and 17). In order to analyse these results, a breakdown of the change in pensions was undertaken. This is similar to the one previously presented for the contributors registered until August 1993.

<table>
<tr>
<td align="center">Chart 16
POSTPONEMENT OF RETIREMENT
CGA general regime, employees enrolled since
September 1993</td>
<td align="center">Chart 17
RELATIVE DIFFERENTIAL BETWEEN THE
INITIAL PENSIONS COMPUTED UNDER THE
PREVIOUS AND THE CURRENT LEGISLATION
CGA general regime, employees enrolled since
September 1993</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Source: Authors' calculations.</td>
<td>Source: Authors' calculations.</td>
</tr>
</table>
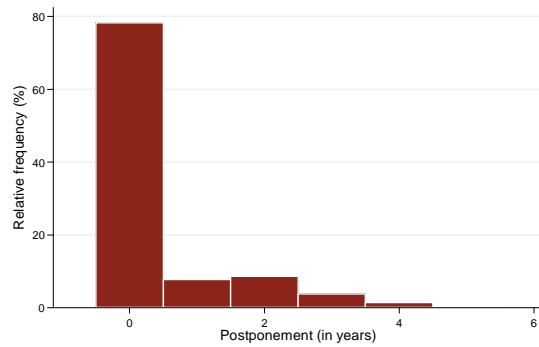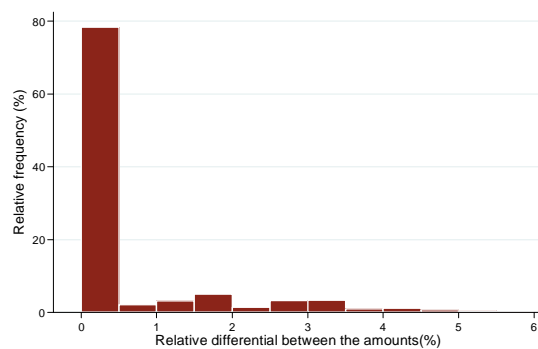
Breakdown of the change in the initial pension

For the contributors whose enrolment in the CGA took place between September 1993 and December 2001, the computing formula stipulated in the previous legislation (P^A) may be presented as the sum of two components (P_1^P and P_2^P):[21]

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

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 the 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).[22]

Even though the minimum career-length required for receiving a full pension remains unchanged, the new legal framework implies a rise in the minimum age from 60 to 65 years. 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. Hence, under the new legislation the pension amount corresponds to:

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[21] No individual meets the conditions leading to the alternative formulas presented in section 3.2. Moreover, 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.

[22] Remember that, when determining the weights relevant for the underlying formula, a maximum length of service of 40 years was considered (see footnote 11).

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

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*.

The difference between the two amounts corresponds to:

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

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

ferential explained by the first component, due to the change in the reference compensation;

$d_{P_2} = P_2^N - P_2^P$ is the differential explained by the second component, which can be split

into:

1. $d_{r_2} = (RC_{A_2}^N \times r_2^N \times C2) - (RC_{A_2}^N \times r_2^P \times C2) = (RC_{A_2}^N \times C2) \cdot (r_2^N - r_2^P)$, referring to

   the change in the applicable pension accrual rate;

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

   ponding to the change in the reference compensation.

For the employees whose registration occurred since January 2002, the computing formula has also remained unchanged. Under the previous version of the *Estatuto da Aposentação* it was given by:

$P^P = RC_A^P \times r^P \times C$, 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).

For these employees the reform of the *Estatuto da Aposentação* may as well result in variations in the reference compensation and, as a consequence, in the annual accrual rate. In this case, the formula is expressed as follows:

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

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*.

Therefore, the difference between the two amounts corresponds to

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

that can be split into:

1. $d_{P_1} = d_{RC} = (RC_A^N \times r^N \times C) - (RC_A^P \times r^N \times C) = (r^N \times C) \cdot (RC_A^N - RC_A^P)$, the impact of the change in the reference compensation;

2. $d_{P_2} = d_r = (RC_A^P \times r^N \times C) - (RC_A^P \times r^P \times C) = (RC_A^P \times C) \cdot (r^N - r^P)$, the impact of the change in the accrual rate.

Chart 18
BREAKDOWN OF THE AVERAGE CHANGE IN INITIAL PENSIONS
CGA general regime, employees enrolled between September 1993 and December 2001

Source: Author's calculations.
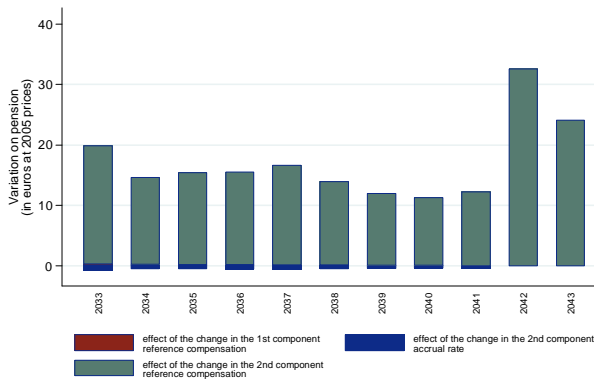
Chart 19
BREAKDOWN OF THE AVERAGE CHANGE IN INITIAL PENSIONS
CGA general regime, employees enrolled since January 2002
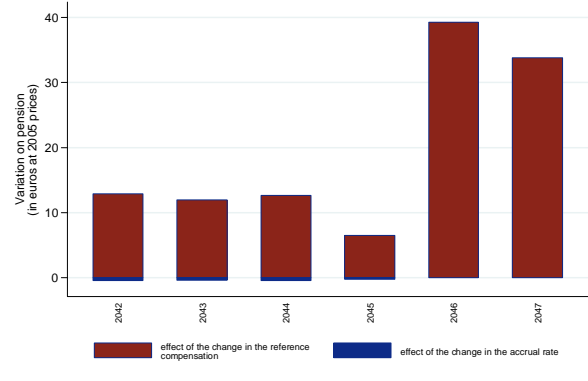
Source: Author's calculations.

Charts 18 and 19 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 16), 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) – as shown in Chart 20. This effect is nonetheless small relative to that of the increase in the reference compensation.

Chart 20
RELATIONSHIP BETWEEN PENSION ACCRUAL RATE AND REFERENCE
COMPENSATION
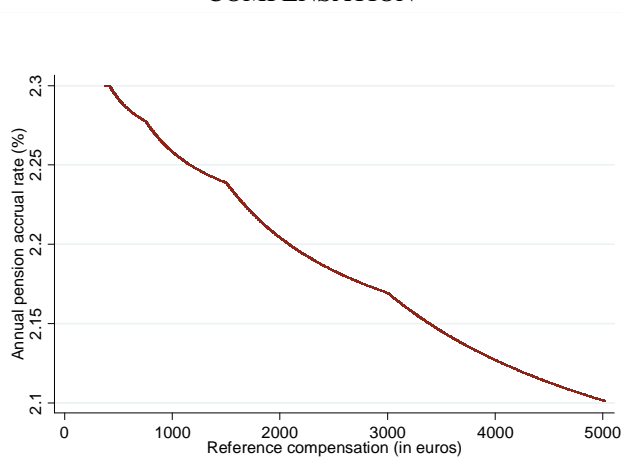
Source: Authors' calculations.

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

This section presents the impact of the change in 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.

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.

4.2.1. Primary education and kindergarten teachers

Chart 21
PROFILE OF RETIREMENTS – IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*
Primary education and kindergarten teachers
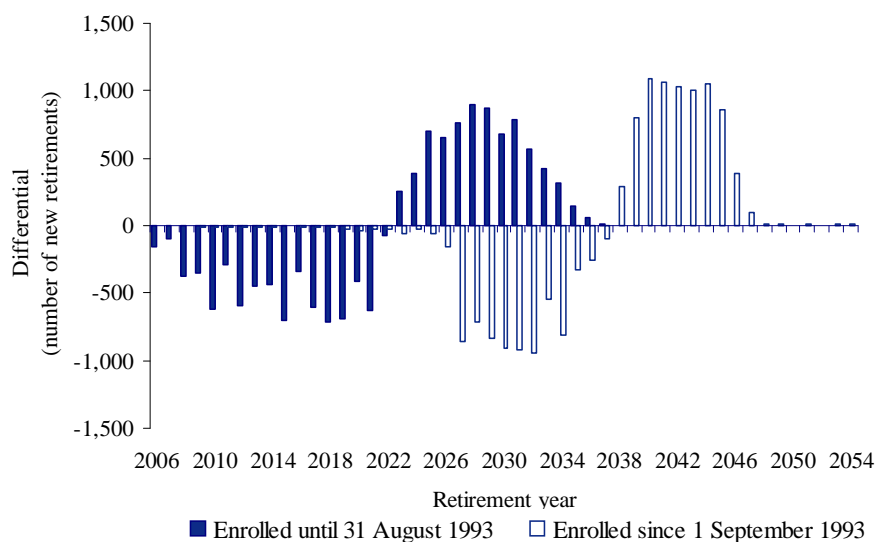
For the primary education and kindergarten teachers enrolled until August 1993, career-length and minimum age required to warrant a full pension rise progressively from 30 to 40 years (with the resulting gradual elimination of the implicit bonus)[23] and from 55 to 65 years, respectively (see Tables 2.2.2 and 2.2.3 in Appendix 2). The convergence takes place during a transitional period that ends in 2022. In 2005 the maximum age until which these employees are allowed to remain in service was also raised from 65 to 70 years.

The revision of the legal framework for primary education and kindergarten teachers registered until August 1993 results in a decrease in the number of new retirees until 2022 (as shown in Chart 21). Afterwards, an offsetting effect takes place, and the flow of retirements determined by the legislation currently in force becomes higher than the one resulting from the previous rules.

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[23] 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.

The delay in the retirement moment amounts to 7.3 years on average. In fact, the impact of the rise in the minimum age and career-length (10 years) is attenuated by the existence of the transitional period and also by 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 by October 1989)[24]. There is no change in retirement year for contributors retiring under this alternative.

The results for these contributors' pensions are quite heterogeneous.[25] For roughly half of them, pensions decrease when computed in accordance with the legislation in force since January 2006. Such a decrease is on average smaller than 2 per cent and is mostly explained by the lower accrual rate and reference compensation corresponding to the period subsequent to 2005. For about 1/4 of the primary education and kindergarten teachers, old-age pensions are higher (by 1.8 per cent on average). This fact can be explained not only by the direct effect of the career-length extension on the pension amount (which is more marked than for the general CGA regime), but also by an indirect effect that results in a higher reference compensation in the first component.[26]

For the primary education and kindergarten teachers enrolled since September 1993, the impact of the reform is also explained by the increase in the maximum and minimum age limits, as well as the reduction of the implicit bonus. However, in this case, that reduction is smaller than the one that is observed for employees whose enrolment took place before. In fact, under the previous legislation a 33.3-year career-length requirement was assumed for employees registered in the CGA since September 1993 (corresponding to 40 years with a 36/30 bonus).

As shown in Chart 21, the reform of the legislation brings about a reduction in the number of retirees in the first decades following the introduction of the new legal framework (up to 2038). The average postponement in retirement stands at 7.1 years. For virtually all of the primary education and kindergarten teachers, the extension of the actual career-length has a positive impact on both reference compensations and, consequentially, on pensions (these increase by 8 per cent on average). Exceptions to this are the employees who retire when they reach the age limit (which was changed in

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[24] It was considered that whole contributory career of the teacher corresponds to teaching service.

[25] In order to explain the variation in the initial pensions, breakdowns following the same rationale as for the general CGA regime were undertaken.

[26] In fact, for contributors enrolled before September 1993, as the actual length of service is extended under the new legislation, the last wage (i.e. the first component reference compensation) may also be higher.

2005) both under the previous and the current versions of the legislation. In these cases, as the applicable bonus was eliminated, the career-length used to compute the initial pension decreases, even thought the actual professional life is extended (for these employees pensions decrease by approximately 0.3 per cent on average).

4.2.2. Nurses

Chart 22
PROFILE OF RETIREMENTS – IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*
Nurses

■ Enrolled until 31 August 1993 □ Enrolled since 1 September 1993
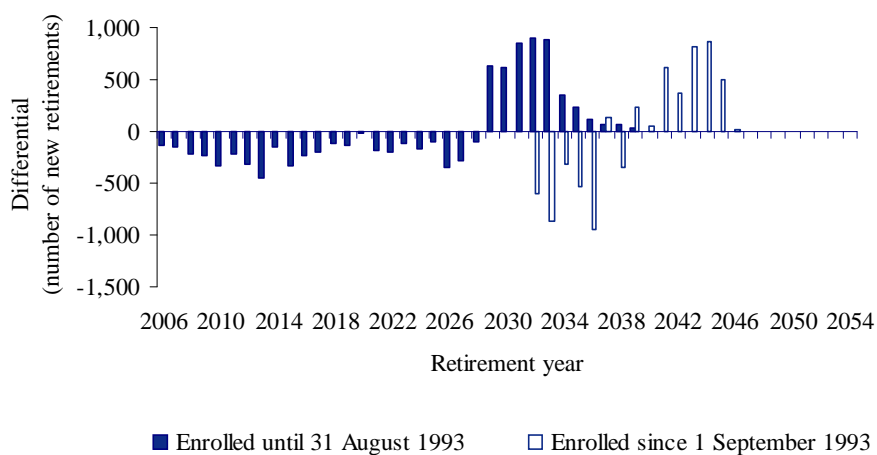
Source: Authors' calculations.

For nurses enrolled until August 1993, 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 receiving a full pension, from 35 to 40 years (see Table 2.2.4 and 2.2.5). In Chart 22 it is noticeable that these changes result in a decrease in the number of retirements until 2028. From this year onwards, there is an increase that offsets the initial negative variation. On average, there is a 5.5-year extension in the length of service.

For more than 3/4 of the nurses enrolled until August 1993, the initial pension is lower (by about 3 per cent on average) when computed in line with the legislation currently in force. This basically reflects the decrease in the second component reference compensation and in the accrual rates. On the contrary, for approximately 14 percent of the nurses enrolled until August 1993 pensions are now higher, by 0.5 per cent on average. This fact can be explained by the positive impact of the career-length

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extension that, in these cases, prevails over the remaining effects. It should be highlighted that for this professional group, as the maximum wage is reached before completing 30 years of service (see Chart 6), the extension of the actual career-length does not imply additional salary gains (hence, the wage received in the last position held is not higher under the most recent version of the legislation).

Chart 22 shows that the reform has weaker effects for the nurses enrolled since September 1993. For these individuals the main change consists in the rise in the minimum age required to qualify for a penalty-free pension, from 57 to 65 years, as in terms of the previous legislation a 38.9-year career-length requirement was assumed (equivalent to 40 years computed including a 36/35 implicit bonus). Since most nurses would have worked beyond the age of 57 in order to fulfil that requirement, which is close to the one set down in the current legislation, the average delay in retirement caused by the reform is only 1.7 years.

The effects on pensions for the nurses enrolled since September 1993 are quite heterogeneous. For over 3/4 of them, pensions are higher under the current legislation (those increase by 2.8 per cent on average). This outcome stems from the positive impact of the career-length extension on the reference compensation. For most of the remaining nurses, pensions are lower if computed in line with the more recent version of the legislation. Those typically retire when reaching the age limit, in the same year in both versions of legislation. Hence, their actual career-length and the other relevant variables do not change. Nevertheless pension decreases (by 3 per cent on average), given the revision in the bonuses applied to the years they served.

4.2.3. Security Forces

Chart 23
PROFILE OF RETIREMENTS – IMPACT OF THE REFORM OF THE *ESTATUTO DA APOSENTAÇÃO*
Security forces
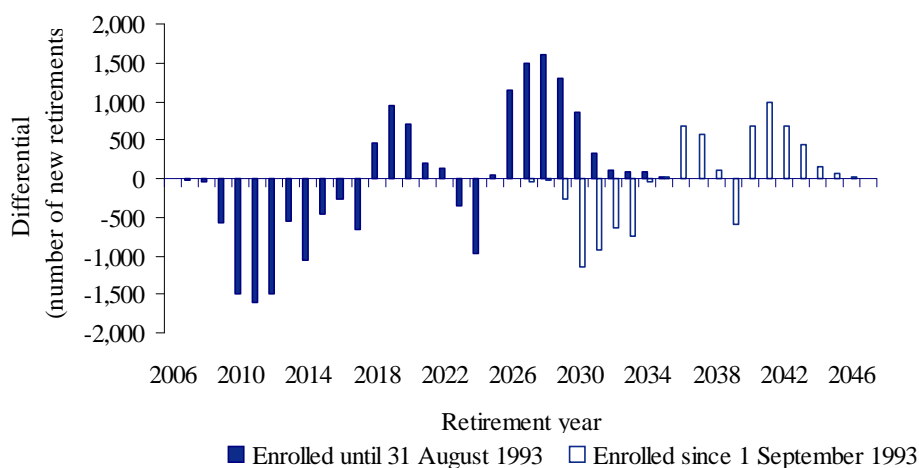
Source: Authors' calculations.

For the security force personnel (GNR and PSP) registered until August 1993, the legislative changes were the increase in the years of service required for receiving a full pension, from 36 to 40 (see Table 2.1.2, also applicable for the general CGA regime), and the reduction in the bonus applied in their computation, from 25 to 15 per cent of the actual period of service. Additionally, access to the pre-retirement situation[27] is now possible only upon reaching 55 years of age – besides 36 years of service. Chart 23 shows that the changes result in a decrease in the number of new retirees until 2017. Then an offsetting effect takes place.

Most security force employees extend their careers in order to fulfil the new prerequisites, thus retirement is delayed, on average by 3.8 years. Those whose retirement year does not change, either reach the age limit, or fulfilled the 36-year career-length requirement by December 2005 (the legislation stipulates that the retirement conditions in force in December 2005 hold for the individuals in this situation).

For approximately 4/5 of the employees whose registration date is prior to September 1993, initial pensions increase when computed in terms of the current

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[27] 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. There are transitional alternatives allowing access to pre-retirement on the basis of career-length and/or age requirements (see Table 2.2.1, concerning GNR employees). The alternatives based only on age were not taken into account for the exercise, since in this case pension may not be a full one.

legislation (by 4.6 per cent on average). In fact, besides the direct positive effect of the career-length extension (including the one stemming from the reduction of the bonus) on the pension amount, there may also occur an indirect one. 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 is particularly relevant for the higher ranks of the security forces, for which the estimated wage progression profile shows salary gains at the end of the contributory career (see Chart 6). For about 11 per cent of the employees in this professional group enrolled until August 1993, pensions are now 1.4 per cent lower (on average). In these cases the effect of the introduction of the new reference compensation referring to the period subsequent to 2005 (that tends to be lower that the last wage received) prevails. This impact is reinforced by the introduction of the new annual accrual rates.

In the previous legislation applying to security force employees registered since September 1993, a 40-year career-length was already required to warrant a full pension (although under the previous framework career-length was computed including a 25 per cent bonus, which was reduced to 15 per cent). Hence, for these individuals the effects of the reform are less marked and more homogenous. Most of them extend their contributory career and the average postponement of retirement amounts to approximately 1.8 years. This delay is essentially explained by the introduction of a minimum age requirement to access the pre-retirement situation.

For more than 3/4 of the employees enrolled since September 1993, the extension of the career-length brings about a rise in reference compensations and, as a consequence, in initial pensions. On average the latter increase by 2.4 per cent. For the remaining individuals, the pension formula remained unchanged and the revision of retirement conditions was not substantial, thus the reform has nil or almost nil effects on pensions.

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 factor by means of the following alternatives:

- extension of professional life beyond the minimum requirements for receiving a full pension;
- voluntary contribution to a public or private capitalization scheme, in order to complement the pension amount.

However, these alternatives are 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).[28] They allow the computation of the sustainability factor applicable to the amount of the statutory pension for each year, from 2008 onwards (see Chart 24). 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 24
SUSTAINABILITY FACTOR BY RETIREMENT
YEAR AND GENDER
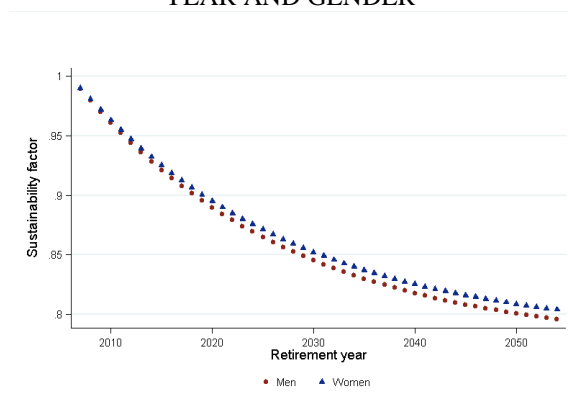
Source: Authors' calculations.

Chart 25 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

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[28] 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.

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 dominant as shown in Chart 15.

As expected, the introduction of the sustainability factor has a negative impact on the initial pension of all CGA members and it 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 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 throughout the period.

Chart 25
RELATIVE IMPACT OF THE LEGISLATIVE REFORM ON THE
AVERAGE INITIAL PENSION
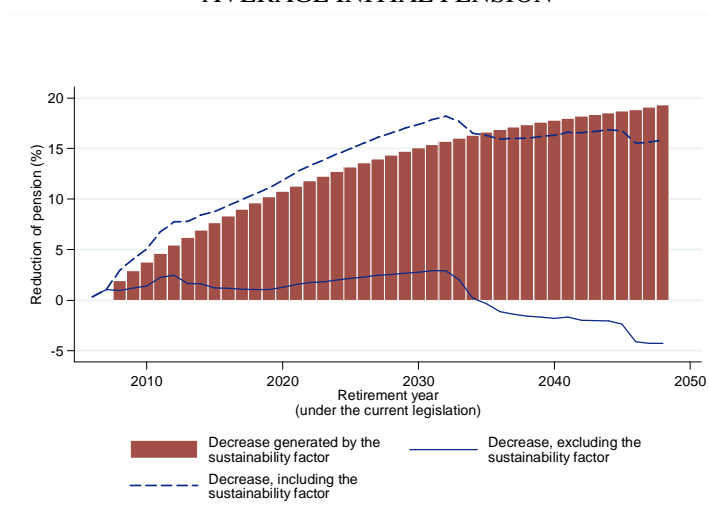
Source: Authors' calculations.
Note: Negative figures mean increases in the average initial pension.

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 value decreases to 21 years. Pension-related expenditure was calculated for each year, from 2007 until the system's predictable closure. Then these annual amounts were accumulated (note that they are at 2005 constant prices - see subsection 3.2.2).[29] Chart 26 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.[30]

Chart 26
ANNUAL SAVING ON THE PENSION-RELATED EXPENDITURE
RESULTING FROM THE REFORM (EXCLUDING THE
SUSTAINABILITY FACTOR)
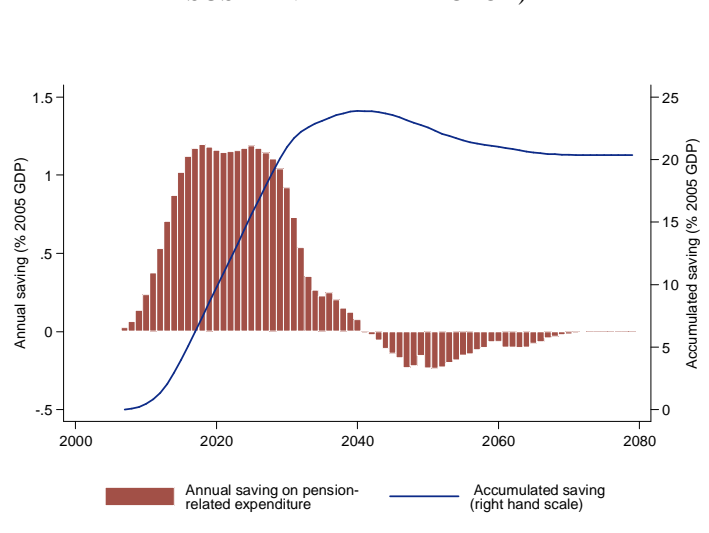
Source: Authors' calculations.

The reform brings about a decline in pension-related expenditure. 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 25). The saving obtained is predominantly explained by the decline in the number of years during which the retirees receive their pensions.

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[29] It was assumed that the pensions (at 2005 prices) remain constant once they begin to be paid.
[30] 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 calculations and the nominal change in GDP, occurring throughout the time horizon considered relatively to 2005.

In Chart 27 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.

Chart 27
ANNUAL SAVING ON PENSION-RELATED EXPENDITURE RESULTING FROM
THE REFORM (INCLUDING THE SUSTAINABILITY FACTOR)
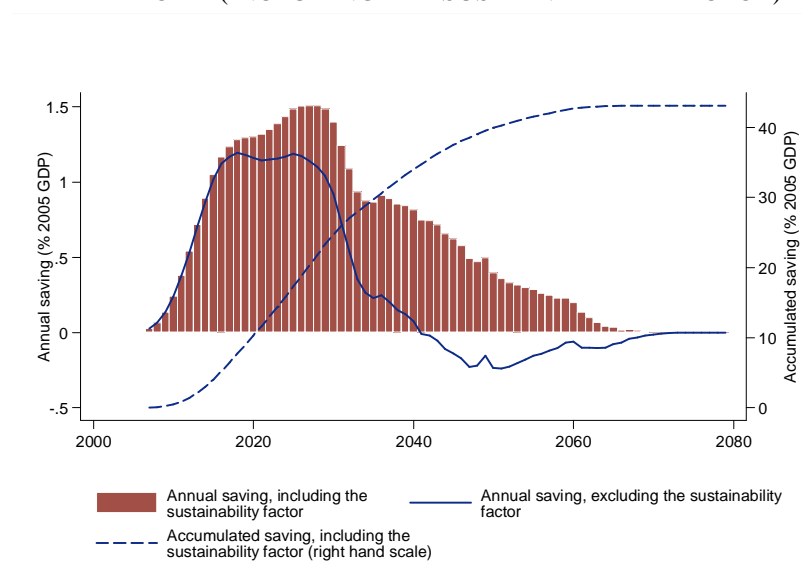
Source: Authors' calculations.

5. Concluding remarks

This paper 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 elimination 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 calculation 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 elimination 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 reason for its implementation. In practice, the delay in the moment of retirement and savings 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).

Appendix 1 – Legislation

Decree-Law No. 498/72 of 9 December 1972, *Diário da República* **nº. 285, Série I** (approved the *Estatuto da Aposentação*)

Decree-Law No. 116/85 of 19 April 19 1985, *Diário da República* **nº. 91, Série I** (created the possibility of voluntary retirement for beneficiaries with 36 years of service, regardless of age)

Decree-Law No. 265/93 of 31 July 1993, *Diário da República* **nº. 178, Série I-A** (approved the *Estatuto dos Militares da GNR*)

Decree-Law No. 286/93 of 20 August 1993, *Diário da República* **nº. 195, Série I-A** (established the pension calculation rules for the new contributors to the *Caixa Geral de Aposentações*)

Decree-Law No. 170/94 of 24 June 1994, *Diário da República* **nº. 144, Série I-A** (established rules for the GNR and PSP personnel in pre-retirement situation)

Decree-Law No. 511/99 of 24 November 1999, *Diário da República* **n.º 274, Série I-A** (approved the *Estatuto do Pessoal da PSP*)

Decree-Law No. 35/2002 19 February 2002, *Diário da República* **nº. 42, Série I-A** (modified the rules for the calculation of old-age pensions in the General Social Security System)

Law No. 1/2004 15 January 2004, *Diário da República* **nº. 12, Série I-A** (modified the *Estatuto da Aposentação*)

Decree-Law No. 157/2005 20 September 2005, *Diário da República* **nº. 181, Série I-A** (modified the retirement and pre-retirement rules applicable to the PSP personnel)

Decree-Law No. 159/2005 of 20 September 2005, *Diário da República* **nº. 181, Série I-A** (modified the retirement and pre-retirement rules applicable to the GNR personnel)

Decree-Law No. 229/2005 of 29 December 2005, *Diário da República* **nº. 249, Série I-A** (modified the rules applicable to certain CGA special regimes, specifically those related to career-length, retirement age, and pension computing formulas)

Law No. 60/2005 of 29 December 2005, *Diário da República* **nº. 249, Série I-A** (established the convergence rules between the public employees' and the general social security schemes)

Decree-Law No. 187/2007 of 10 May 10 2007, *Diário da República* **nº. 90, Série I** (modified the old-age protection rules applying in the General Social Security System)

Law No. 52/2007 of 31 August 2007, *Diário da República* **nº. 168, Série I** (modified the *Estatuto da Aposentação*)

Law No. 11/2008 20 February 2008, *Diário da República***, nº. 36, Série I** (modified the *Estatuto da Aposentação*)

Appendix 2 – Retirement conditions and pension calculation rules under the new legal framework

2.1. Retirement conditions for the CGA general regime

Table 2.1.1
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 2.1.2
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 forces personnel.

2.2. Retirement conditions for some of the CGA special regimes

Table 2.2.1
Requirements to access pre-retirement
(transitional regime applicable to the GNR personnel)

Year	Career-Length	Age
2007	36.5 years	50.5 years
2008	37 years	51 years
2009	37.5 years	51.5 years
2010	38 years	52 years
2011	38.5 years	52.5 years
2012	39 years	53 years
2013	39.5 years	53.5 years
2014	40 years	54 years
2015	40.5 years	54.5 years

Source: Decree-Law No. 159/2005.

Table 2.2.2

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
60.25	years	January 1, 2015	-	December 31, 2015
61	years	January 1, 2016	-	December 31, 2016
61.75	years	January 1, 2017	-	December 31, 2017
62.5	years	January 1, 2018	-	December 31, 2018
63.25	years	January 1, 2019	-	December 31, 2019
64	years	January 1, 2020	-	December 31, 2020
64.75	years	January 1, 2021	-	December 31, 2021
65	years	From January 1, 2022 onwards		

Source: Decree-Law No. 229/2005.

Table 2.2.3

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
40.0	years	From January 1, 2022 onwards		

Source: Decree-Law No. 229/2005.

Table 2.2.4

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 2.2.5

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.

2.3. Pension accrual rate

Table 2.3.1

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.

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