

WAGES AND INCENTIVES IN THE PORTUGUESE PUBLIC SECTOR*

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1. INTRODUCTION

The need to understand and assess the personnel management practices in the Portuguese public sector is justified by its importance as the employer of about one fifth of the workforce as a whole and of the majority of workers in some occupational categories. In this paper we analyse the incentives linked to public sector wages using the benchmark provided by the private sector.¹ We use comprehensive micro datasets for private and public employees, collected in 1996, 1999 and 2005. This time span, though relatively short, allows us to go beyond a static analysis and pinpoint some features that appear to be changing in recent years. While the literature comparing different aspects of the private and public pay systems is extensive, there are not many papers addressing this type of issues for Portugal. A first analysis of this kind was made by Portugal and Centeno (2001) using survey data. Centeno and Pereira (2005) studied the determination of wages in general government based on the same dataset for 1999 we use, but without the benchmark provided by the private sector. This paper takes the analysis further, exploring the datasets for the two sectors in several dimensions.

The article deals with two main issues. The first one concerns incentives linked to the wage level, which are investigated mainly by looking at the premium associated with working in the public sector. This premium is calculated by netting out the effect of the differences in observed characteristics of workers from the raw wage gap between the two sectors. It thus measures the inequality in the returns to those characteristics. We start by focusing on the overall premium and how it has changed for specific groups of workers, namely, men and women and workers in more and less developed regions, and across different points of the wage distribution (Section 3). Section 4 concentrates on the employees with higher education and, specifically, attempts to assess the public sector's ability to attract and retain the best professionals. The issue is investigated on the basis of premia and wage compression, as a whole and also for specific occupational categories. In this section, we also make some considerations about how the interaction of the public and private sectors in the market for highly-skilled labour seems to have influenced the way wages have changed.

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(1) Throughout this study the designation «private sector» refers to the corporate sector as a whole, also including public corporations. The terms «public sector» and «general government» are taken as synonymous.

The second main issue the article deals with are the incentives referring to individual motivation throughout the employees' career-span. Wage progression is an important tool to that end. In Section 5, we compare the typical advancement pattern of employees in both sectors. Additionally we gather evidence about the importance of the workers' (unobserved) individual skills in the determination of wages. The article has two additional sections. Section 2 presents an overview of the data and describes the main features of the wage distribution in each sector. Section 6 summarizes the main findings.

A final remark is in order. This article concentrates on incentives linked to wages. However, there are other incentives, such as those stemming from differences in employment protection and social security systems. These are very important, in particular as far as the sorting of workers between the public and private sectors is concerned. We do not directly address them here but they are brought into the analysis when necessary.

2. DATA

2.1. The datasets

Data for general government workers come from the Public Administration Census (*Recenseamento Geral da Administração Pública*), and for private sector workers from the *Quadros de Pessoal*.² The Census is available for 1996, 1999 and 2005, and the waves of the *Quadros de Pessoal* that are used refer to the same years. The first source is supposed to encompass the whole of public employment in Portugal, with the exception of military personnel, and the second one all private sector employees. The two datasets have altogether over 2 million individual records in each of the years (Table 1). The actual coverage of *Quadros de Pessoal* appears to have increased throughout the period considered, in particular, between 1999 and 2005. This is suggested by a comparison of the number of records in this source with total private employment (without own-account employment) from National Accounts excluding the general government, which indicates a coverage slightly over 50 per cent in 1996, around 55 per cent in 1999, and close to 70 per cent in 2005.³ The actual coverage of the Public Administration Census has also had some fluctuations (see note to Table 1) but these have been small.

The datasets comprise, specifically, information about gender, education, age, monthly wage, hours worked, years of service in the public sector or in the current firm, occupation, and geographic location of the workplace. Wages are measured as the base salary plus other remunerations received on a reg-

(2) The Public Administration Census is carried out by the *Direcção-Geral da Administração e do Emprego Público*. *Quadros de Pessoal* is a yearly survey carried out by the *Ministério do Trabalho e da Solidariedade Social*. In 2002 this latter survey was extended to public employees whose employment relationship assumes the form of individual contract, who were excluded from the dataset we used.

(3) The widening of the survey coverage is also indicated by the fact that the number of firms included increased in the 1996-2005 period, and the average number of employees per firm has decreased from approximately 10 in 1996 to around 8 in 2005.

Table 1

WORKERS IN THE DATASETS				
	Cross Sectional Data			Panel Data
	1996	1999	2005	
Public Sector	548 397	573 904	523 358	289 272
Central Government	447 248	459 986	445 932	
Local Government	101 149	98 310	61 927	
Regional Government	n.a.	15 608	15 499	
Private Sector	1 517 234	1 712 382	2 194 918	305 057
Total	2 065 631	2 286 286	2 718 276	594 329

Sources: Authors' calculations based on the Public Administration Census and the *Quadros de Pessoal*.

Nota: As far as the public sector datasets are concerned, local government does not have a full coverage in 2005. Moreover, data for 1996 referring to the regional government are unavailable and in the remaining years they comprise the Região Autónoma da Madeira only.

ular basis.⁴ Experience is proxied by the age, taking into account the years of schooling.⁵ As regards the location of the workplace, the only aggregate classification available in the two databases for the three years takes the *distrito* (municipal region) as a reference. This information was used to construct an indicator of workplace location in more vs less developed areas.⁶ Only full-time workers (in general, defined as those who work at least 35 hours per week) have been considered in the study, since most of the results are obtained on the basis of monthly wages. We also present some evidence considering hourly wages which - as we shall see - is very much consistent with that for monthly wages.

Data regarding the occupational category in *Quadros de Pessoal* follow the National Occupation Classification (*Classificação Nacional de Profissões*) of 1994. By contrast, the corresponding information in the Public Administration Census is not shown according to a harmonised classification. In this case, the presentation is mainly based on the categorization of employees for pay purposes and is not uniform across the three years. A substantial effort was put into converting the occupational information in the public sector datasets to the National Occupation Classification. Some categories of civil servants, such as judges, doctors, nurses or teachers, could be easily classified because they correspond to occupations set out in the National Occupation Classification. This is not the case of generic categories, such as *Técnico Superior*, which overlap several occupations, like economists, engineers or legal staff. A case-by-case analysis was made for them, taking into account additional information, notably, the details about the service of the employee and, especially for the college-graduated, the area of study. Due to the difficulty of this task, it was only carried out for 1999 (for all employees) and 2005 (for college graduates). The occupations take as a reference the National Occupation Classification at three-digit level, in some cases aggregating more than one of those.

(4) The information about regular remunerations other than the base salary is made available in the *Quadros de Pessoal* for all years considered. In the Public Administration Census, however, this is only the case for 2005. In view of this, we considered the base salary as given in the Census and added to it the meal allowance (whose amount is the same for all workers and known for every year) as the only additional regular remuneration of government employees. This may imply some underestimation of public wages, but of small magnitude (about 1 per cent, on average, considering the figures for 2005).

(5) Experience is computed as the difference between the age of the worker and either the number of years of schooling plus six, if greater than 15, or 15.

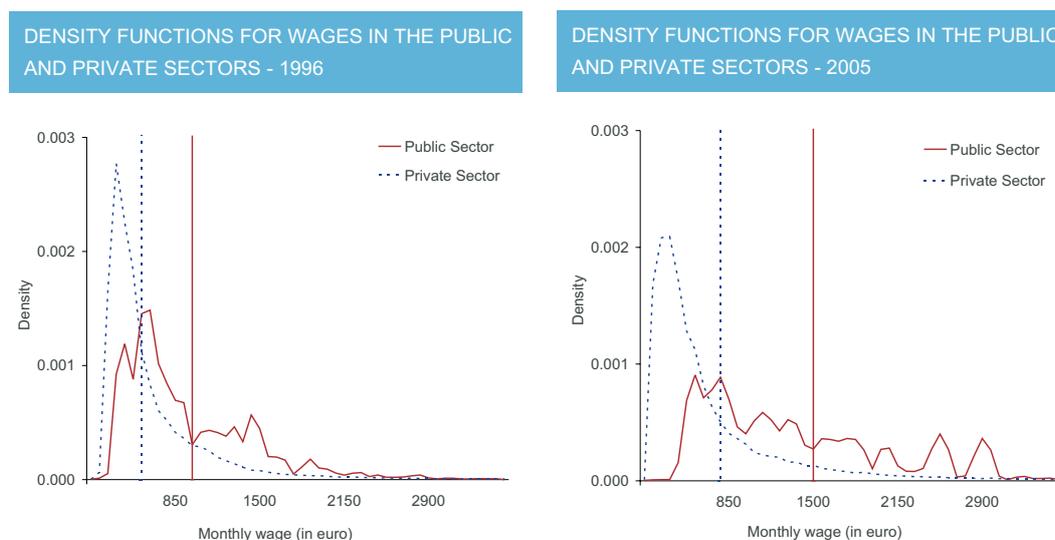
(6) The more developed areas were assumed to be the *distritos* of Aveiro, Braga, Coimbra, Faro, Leiria, Lisboa, Porto, Santarém, Setúbal and Viana do Castelo and the *Região Autónoma da Madeira*. The less developed areas correspond to the *distritos* of Beja, Bragança, Castelo Branco, Évora, Guarda, Portalegre, Vila Real and Viseu and the *Região Autónoma dos Açores*.

The records in the databases identify the individuals, allowing us to trace the continuity of a given worker either in general government or in a firm throughout the period 1996-2005. Hence, besides the cross-sectional datasets for each of the three years, we are able to construct a panel dataset with workers who did not change jobs in that period (i.e. that remained in the public sector or the same firm). The panel is an intersection of the cross sections for the three years, and it is interesting to assess how the results drawn from it differ from those obtained using the full datasets, for instance, as far as public wage premia are concerned. Such differences arise as a result of two effects. Firstly, the panel does not include the workers who joined and retired from the labour market in the decade 1996-2005. We label this as the turnover effect. Secondly, the panel entails a selection effect, as it tends to select advantaged private sector workers, an effect that is relatively unimportant for their public sector counterparts. In the latter sector, jobs are more stable and it is quite reasonable, indeed expectable, for an individual to remain a public employee for his whole career. By contrast, restricting the focus to individuals who stay in the same firm from 1996 to 2005 amounts to selecting more stable and possibly larger companies and workers who are doing well with the current private employer (in view of the fact that, on non-wage grounds, changing jobs within the private sector is less costly than leaving the public). Figures in Table 1 give an indication about the magnitude of the selection effect. For the private sector, the workers in the panel are about 20 per cent of the ones in the sectional dataset with the least number of observations, while this figure goes up to 55 per cent for the public sector.

2.2. Descriptive analysis

Chart 1 depicts the estimates of the density functions of monthly wages earned in the public and the private sectors, in 1996 and 2005. Tables A1 and A2 in the Appendix present some descriptive statistics for this variable as well as the main figures summarizing the characteristics of the labour force in

Chart 1



Sources: Author's computations based on the Public Administration Census and the *Quadros de Pessoal*.
 Notes: The charts depict the kernel density estimates using the Epanechnikov method; the vertical lines represent the average wage.

the two sectors. Wage densities show a concentration of workers in the lower tail of the distribution in both sectors, but this is much more evident for the private, as also indicated by the statistics for skewness. The distribution of wages in the public sector has become less skewed in recent years and this feature is also present in the panel. Such a pattern may indicate a quicker advancement pace for categories of employees occupying lower wage brackets⁷. The earnings distribution in the public sector has several modes, reflecting a concentration of workers at the steps of the wage scales corresponding to the main categories of public employees. By contrast, the one referring to the private sector is very concentrated around the statutory minimum wage level. For this reason, the dispersion at the central part of the respective distribution is comparatively smaller, as indicated by the ratio between wages at percentiles 75th and 25th. The dispersion as a whole is nevertheless larger in the private sector (as indicated by the ratio between the standard deviation and the mean). The average monthly salary in general government is clearly above the one in the private sector, and this gap has widened over time, from around 50 per cent in 1996 to almost 75 per cent in 2005.

The distributions based on hourly earnings have, to a large extent, the features just described. However, comparatively to the results based on monthly wages, the distributions in the public sector are shifted to the right relative to the private sector. Consequently, the public wage gap in terms of hourly wages is larger by around 15 percentage points (p.p.) when computed at the mean wage. This is explained by the longer weekly working time in the private sector.⁸

Considering the panel, the distribution of earnings in the private sector shows less skewness and dispersion, indicating a more homogenous set of workers. The wage gaps go down in comparison to those in the sectional datasets, in line with the selection effect.

Raw wage gaps as given above can be a misleading indicator of wage inequality, as higher wages can be justified, for example, by larger human capital endowments. Figures in Table A2 indeed indicate significant differences in this respect between the public and private sectors in Portugal, in particular as far as formal education is concerned. The proportion of public employees reporting college education approaches 50 per cent in 2005, while it is barely over 10 per cent for the private sector.⁹ General government employees are also, on average, more experienced than their private sector counterparts, although the difference is not very significant (2 to 3 years out of around 20 years of average experience). This means that wages should be compared controlling for the stock of human capital. Figures in Table A2 also point to differences in terms of gender between the two sectors, since public employees are mainly women while in the private sector most jobs are performed by men. There is a marked asymmetry in the regional distribution of employment, with most jobs concentrated in more de-

(7) In recent years (2003 and 2004) there were differentiated wage increases in the public sector, benefiting workers with lower wages and this may have contributed to the observed pattern. The same happens for the insufficient coverage of local government in 2005, since its employees tend to occupy the lower cohorts of the general government wage distribution. Note, however, that the skewness reduction is already present in the 1999 data.

(8) The maximum weekly working time in the private sector was reduced to 40 hours by legislation enacted at the end of 1996. In the 1996 data, which do not yet reflect the effect of such legislation, approximately half of the employees reported a working time longer than 40 hours. In the public sector, the weekly working time stood at 35 hours throughout the analysed period, except for blue-collar employees. This personnel's working time was reduced from 40 hours to 37 hours in 1998, 36 hours in 1999 and 35 hours since 2000.

(9) That proportion is slightly overestimated in the general government 2005 data due to the less-than-full coverage of local government, in which employees without higher education predominate. The figures for 1996 and 1999 show, however, very much the same picture.

veloped areas, particularly in the private sector. These factors should also be controlled for when computing wage premia as described in the next section.

3. A GENERAL CHARACTERIZATION OF THE PUBLIC WAGE PREMIUM

3.1. Empirical approach

In order to study the raw wage gap between public and private sectors in Portugal we use decomposition techniques based on wage regressions. Such decompositions break down the gap as:

$$\boxed{\text{Raw wage gap}} = \boxed{\text{differential in workers' characteristics}} + \boxed{\text{premium or differential in the returns to the characteristics}}$$

The first term is the part of the gap that can be assigned to differences in the covariates appearing in the wage regressions, i.e. the features of the labour force in each of the sectors. The second term is the unexplained wage premium (or penalty), reflecting the wage inequality that would prevail if workers in the two sectors shared the same characteristics. Recent studies applying similar methodologies are, for instance, García-Pérez and Jimeno (2005) for Spain, Lucifora and Meurs (2006) for France, Great Britain and Italy, and Melly (2005) for Germany.

We compute the wage decompositions using two methods: ordinary least squares (OLS) and quantile regressions. In the former, the gap is explained at the mean of the wage distribution, while the latter brings additional insight by explaining it at different percentiles of the curves. The decompositions are computed on the basis of wage regressions ran separately over the set of workers in each sector. The specification we use is quite standard: the logarithm of the monthly (or hourly) wage is regressed on a constant, indicator variables for three levels of education (basic, secondary and higher – the omitted category corresponds to less than basic education), male gender and more developed regions, as well as experience and experience squared. For the OLS-based decompositions this procedure was replicated for men and women (excluding the gender dummy) and, within these groups, for employees with workplaces located in more and less developed areas (excluding, in addition, the workplace location dummy). It is worth noting that the OLS-based decompositions match exactly the raw gap, a property not shared by the ones based on quantile regressions.

Throughout this paper we follow the convention of defining the wage gap as the difference between the wages of the group with higher pay, the public sector, and with lower pay, the private sector. The differences in returns are evaluated taking as a reference the characteristics (covariates) prevailing in the public sector - see note to Table 2 for more details. This is arbitrary since one could equally define the gap in the opposite way and evaluate the differences in returns at private sector's covariates. Thus we considered it appropriate to present (for the overall gap at the mean) the coefficient of an indicator variable for the public sector in a regression pooling the data for both sectors. In addition, using data for

1999, we also checked the impact of the inclusion of occupational indicator variables on this coefficient.

It should be mentioned that the results of these methodologies are affected by the omission of factors explaining wages, if they also influence the sorting of workers between sectors. Thus, the wage premia we calculate may reflect, besides a «pure» premium, a preference for one of the sectors by workers with certain (unobserved) characteristics. To formally address such an issue is beyond the scope of this study, but we briefly discuss it when interpreting the results.

3.2. Premium at the mean of the wage distribution

Table 2 summarizes the results of the OLS-based decompositions for the full datasets in each of the three years considered. Recall that we define the wage premium as the premium associated with working in the public sector. The first conclusion is that the raw wage gap between the two sectors presented in the last section is mostly explained by differences in the labour force characteristics. This should come as no surprise in view of the evidence adduced about the latter differences. Nonetheless, controlling for such characteristics there is an unexplained premium, implying that, for the same endowments, wages are higher in the public sector. This is in line with the findings in Portugal and Centeno (2001). Moreover, the premium has risen over the period 1996-2005. In terms of monthly wages, it increased from almost 10 per cent in 1996 to 15 per cent or a bit more at the end of the ensuing decade. Results for hourly wages are consistent with the evidence just described, as the larger raw gap is essentially accommodated by a larger premium. With wages defined in this way, the figures rise by approximately 10 p.p. in each year and the premium stands at around 25 per cent in 2005.

When one controls also for the occupational category (available for 1999 only), the premium decreases. This is expectable because unequal pay in the two sectors partly materialises through the predominance of public employees in relatively better paid occupations. Results also indicate that there is inequality even after this effect is taken out.

In order to analyse the documented increase in the wage premium over time it is useful to look at the results for the panel, which includes the individuals who have not switched jobs in the 1996-2005 period (Table 3). These results indicate that the premium has remained stable over the period, implying that the improvement in the relative position of public employees in Table 2 is not linked to the workers in the panel. In particular, such an improvement did not result from higher wage increases in the public sector comparatively to the ones benefiting employees that remained in the same firm. If it had, then the premia computed for the panel would feature an ascending profile. The evolution in the sectional data should thus reflect, on the one hand, the fact that job switchers had a particularly small rise (or, perhaps, a reduction) in wages. On the other hand, it may also result from the fact that the public premium is higher for workers who entered the labour market than for those who left it during the period under analysis. In Section 4 we focus on this point as far as college-educated employees are concerned, as the widening of the premium over the decade chiefly occurred for them.

Table 2

DECOMPOSITIONS BASED ON LEAST SQUARES REGRESSIONS, SECTIONAL DATASET									
Per cent									
Monthly wage	1996			1999			2005		
	Raw gap	Wage premium	Differential in characteristics	Raw gap	Wage premium	Differential in characteristics	Raw gap	Wage premium	Differential in characteristics
Overall	44.9	8.6	36.3	51.8	14.5	37.3	56.3	16.9	39.4
Government indicator variable ^(a)		9.4			13.2			14.9	
Government indicator variable (with occupation) ^(b)					9.2				
Men	29.3	-2.6	31.9	36.5	5.1	31.5	47.0	6.2	40.8
More developed regions	31.4	-6.7	38.1	35.1	1.0	34.1	45.8	3.3	42.5
Less developed regions	46.9	17.9	29.0	57.2	27.2	29.9	62.2	25.8	36.5
Women	64.9	19.4	45.5	70.5	23.8	46.7	68.6	24.3	44.3
More developed regions	64.1	15.5	48.5	69.1	20.9	48.2	67.2	22.0	45.2
Less developed regions	80.8	50.4	30.4	87.7	48.6	39.1	82.3	42.6	39.7
Overall - hourly wage	57.0	17.7	39.3	61.5	22.4	39.1	67.6	26.3	41.3
Government indicator variable ^(a)		18.8			21.3			25.0	

Source: Authors' calculations.

Notes: The decompositions are given by $\bar{Y}^{pub} - \bar{Y}^{priv} = \bar{X}^{pub} \hat{\beta}^{pub} - \bar{X}^{priv} \hat{\beta}^{priv} = \bar{X}^{pub} (\hat{\beta}^{pub} - \hat{\beta}^{priv}) + (\bar{X}^{pub} - \bar{X}^{priv}) \hat{\beta}^{priv}$, where \bar{Y}^i and \bar{X}^i , $i=pub, priv$, are the average values of log wages and covariates for each sector within the groups considered. (a) refers to the coefficient of an indicator variable for the public sector in OLS regressions over the data for both sectors with otherwise the same covariates; same in (b) but including occupational indicator variables. These coefficients are significant at the 1 per cent level. The number of observations is 1 999 669 in 1996, 2 244 790 in 1999 (2 063 633 with occupations), and 2 694 524 in 2005.

Table 3

DECOMPOSITIONS BASED ON LEAST SQUARES REGRESSIONS, PANEL DATASET									
Per cent									
Monthly wage	1996			1999			2005		
	Raw gap	Wage premium	Differential in characteristics	Raw gap	Wage premium	Differential in characteristics	Raw gap	Wage premium	Differential in characteristics
Overall	41.2	6.6	34.5	44.6	8.4	36.3	49.0	8.1	40.8
Men	31.6	-6.2	37.8	35.1	-3.0	38.1	36.5	-3.6	40.1
More developed regions	34.5	-9.7	44.2	34.4	-5.8	40.3	37.3	-7.0	44.2
Less developed regions	44.5	6.9	37.6	51.0	12.4	38.7	52.3	9.9	42.4
Women	60.8	17.3	43.4	60.9	15.5	45.4	61.4	12.3	49.1
More developed regions	56.5	12.0	44.5	59.4	12.5	47.0	65.3	13.0	52.3
Less developed regions	71.7	41.6	30.1	76.3	39.2	37.1	79.3	34.4	44.9

Source: Authors' calculations.

Notes: Same as note to Table 2. The number of observations is 576668.

The results based on the panel also imply that the public sector was accompanied by the private in the wage growth contention implemented in the post-2002 years, otherwise the relative position of public workers in the panel would have worsened. There are some factors that, in broad terms, may have limited wage growth in the private sector in recent years. Firstly, in this sector the unionisation rate has sharply decreased, which tends to undermine the bargaining strength of unions and their success in improving pay conditions. According to Cerdeira (2004), the average unionisation rate for the years 1991-95, in comparison to 1979-84, went down from 61 to 31 per cent and 60 to 38 per cent, respectively, in the secondary and tertiary sectors as a whole. For government employees this indicator remained relatively more stable, falling from 56 to 45 per cent.¹⁰ The increased international competition faced by some private industries also tends to limit the extent to which they can afford to pay higher wages.

There is a data issue that may contribute to increase the public premium as measured in our results. This is the abovementioned fact that the coverage of the datasets for the private sector got fuller over time. Indeed, the enlargement of the base of the *Quadros de Pessoal* was basically made by means of the inclusion of more smaller firms, which typically feature a wage penalty.

There are substantial differences according to gender and location of the workplace (Table 2). Taking the figures obtained from the OLS decomposition for 2005, the premium ranges from around 3 per cent for males working in more developed areas (who in 1996 still had a penalty) to over 40 per cent for females in less developed regions. In general, there is a clear tendency for differences in pay between men and women and between more and less developed regions to appear attenuated in the public sector. This is explained by the fact that public wages are set nationwide, using a common wage scale for all employees of a given category, regardless of gender and region. In terms of the dichotomy between more and less developed regions, results indicate that the public sector does not have the same level of flexibility to respond to local economic conditions as firms have. As a matter of fact, in broad terms, the public sector activity is framed by equity and redistributive constraints that prevail over profit-maximization goals. Pay uniformity in this sector has redistributive effects among regions and, in that regard, it may serve public policy purposes.

The evolution of the public premium by group in the sectional datasets deviates from the general tendency only in the case of women working in less developed areas, for whom the indicator goes down between 1996 and 2005. Since such a decrease also shows up in the panel, it appears to stem from a quicker growth of this group's wages in the private sector.

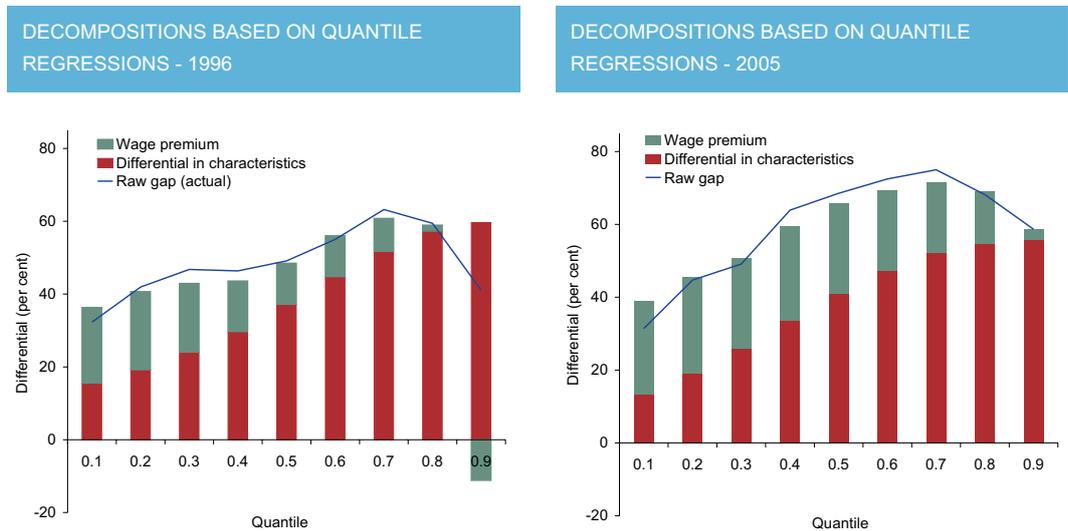
(10) According to the OECD Labour Market Database, figures for the period after 1995 do not indicate a further decline in the global unionisation rate, but the evolution by activities is not available.

3.3. Premium across the wage distribution

Chart 2 displays the decompositions based on quantile regressions for the sectional datasets. It shows, in the first place, that the public premium is not invariant to the point of the distribution where it is measured and that it decreases as one moves up the wage distribution. Specifically, in 1996 its value was approximately nil at the 8th decile of the conditional distribution and there was a penalty at the 9th. Thought relatively less marked, the same profile is present in the 2005 data. Such evidence is consistent, in particular, with the fact that the premium tends to be larger for less-educated workers than for their counterparts with higher education (the explained part of the raw gap also rises across the distribution of earnings, as it is mostly related to education endowments). The chart also shows that the conditional wage distribution is more compressed for workers in the public sector¹¹, a fact coherent with a greater rigidity of the wage setting. In particular, the existence of common wage scales for a broad range of occupations in the wage curve, as it happens with the *carreiras do regime geral*, is likely to contribute to that result.

The second aspect arising from the chart is that the shrinkage of the wage premium across the distribution is less obvious in 2005 than in 1996. The rise in the relative wage between the public and the private sectors evaluated at the mean, documented in Table 2, is thus mostly associated with increases at the upper part of the distribution, although there is a slight increase at the lower quantiles as well. In contrast, the profile of decrease in premia when one moves up the wage distribution remains approxi-

Chart 2



Source: Author's calculations.

Notes: The decompositions are given by $Y_{\theta}^{pub} - Y_{\theta}^{priv} = ([X^{pub} \hat{\beta}^{pub}]_{\theta} - [X^{pub} \hat{\beta}^{priv}]_{\theta}) + ([X^{pub} \hat{\beta}^{priv}]_{\theta} - [X^{priv} \hat{\beta}^{priv}]_{\theta}) + e_{\theta}$, where Y_{θ}^j is the θ^{th} decile of the distribution of log wages in sector i and, $[X^j \hat{\beta}^j]_{\theta}$ is the θ^{th} of the distribution of log wages resulting if the covariates from sector j (X^j) were associated with the coefficients from sector i ($\hat{\beta}^i$), $i, j = pub, priv$. the text for the covariates. The coefficients were obtained using quantile regressions. The decomposition was computed using a random sample of 50 000 workers of each sector, as in Machado and Mata (2005), using the variant presented in Albrecht *et al.* (2003).

(11) The difference between the premium at upper and lower quantiles of the conditional wage distribution gives an indication of the relative compression of wages in the two sectors, since it may be rewritten as the difference in the amplitudes between the upper and lower quantiles in each sector.

mately stable over time in the panel (not shown). This is in line with the already mentioned fact that the variation of the premia in the 1996-2005 period is associated with the wage evolution for college-educated employees, particularly those at the beginning of the employment spell.

4. HIGHLY-SKILLED WORKERS: IS THE PUBLIC SECTOR COMPETITIVE VIS-A-VIS THE PRIVATE SECTOR?

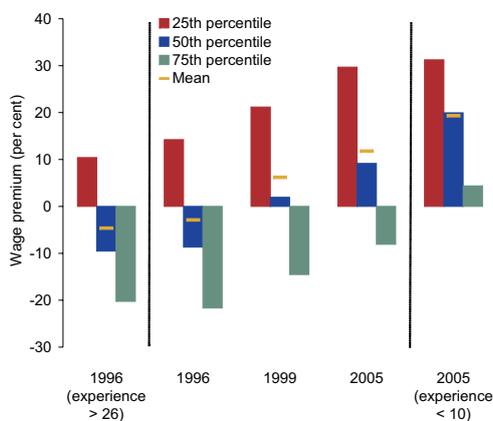
4.1. General trends

We estimated wage regressions similar to those presented in the previous section (see note to Chart 3) considering college-educated workers only. Charts 3 and 4 depict the estimated coefficient of the public sector indicator variable in quantile regressions, at the 25th, 50th and 75th percentiles, and the least squares estimate for the sectional and panel datasets, respectively. In the first case, two additional subgroups of workers are considered: those whose experience was over 26 years in 1996 and those with less than 10 years of experience in 2005. These two subgroups broadly correspond to the turnover during the period and the results for them are important to reconcile the evidence for the two datasets. Moreover, the results for the second group allow the assessment of the relative entry-level pay conditions between sectors currently prevailing in the labour market for college-educated employees.

In the cross-sections, the relative position of public sector workers considerably improved over 1996-2005, with the respective conditional distribution of earnings shifting progressively to the right in comparison with that for the private sector. While in 1996 there was a penalty associated with working

Chart 3

PUBLIC WAGE PREMIA FOR EMPLOYEES WITH COLLEGE DEGREES, SECTIONAL DATA

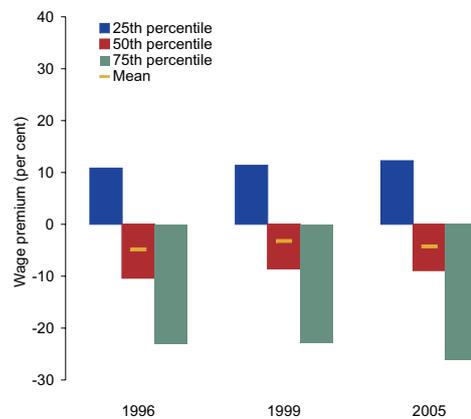


Source: Author's calculations.

Notes: Coefficient of the indicator variable for the public sector in a regression of log wages (monthly) on a constant, experience and experience squared, and indicator variables for male gender, jobs located in more developed areas and public sector. Number of observations: 261259 in 1996, 332724 in 1999 and 477497 in 2005. The estimates are significant at the 1 per cent level.

Chart 4

PUBLIC WAGE PREMIA FOR EMPLOYEES WITH COLLEGE DEGREES, PANEL DATA



Source: Author's calculations.

Notes: Regressions specified in the same way as in Chart 3. Number of observations: 127736 in 1996, 135720 in 1999 and 146336 in 2005. The estimates are significant at the 1 per cent level.

in the public sector already at the median of the distribution, this region is approximately confined to the last quartile in 2005. By contrast, for the panel there is a wage penalty associated with the civil service except roughly at the lower quartiles, and the level is rather stable. As in the previous section, there is a different evolution of the premium depending on the dataset used, but the magnitude of its increase is more substantial in the cross sections. Such an increase stands now close to 15 p.p. compared with 5 to 7 p.p. for all workers (Table 2). The first and the last sets of bars in Chart 3 illustrate an important reason why the premium is rising for college graduates: the figure for those who joined the labour market is clearly above that for those who left it during the period considered.

The evidence presented suggests an ascending trend in the relative wage between the public and private sectors for entrants with advanced education. We collected further evidence on this issue by looking at the premium for employees with less than 10 years of experience at the mean of the earnings distribution at different points in time. For 2005, the figure appears in Chart 3 (last set of bars) and it stands at approximately 19 per cent. The same calculations on the basis of the 1996 data, i.e. for entrants between the mid-eighties and mid-nineties, yield a premium of around 4 per cent. We do not have a dataset collected around the mid-eighties that would provide information about starters in the preceding decade. However, we do have indirect information inferred by looking at those who in 1996 had 10 years or more and less than 20 years of experience. In this case, the figure goes down to a penalty of about 7 per cent. This figure will of course reflect, besides the conditions at entry, the subsequent evolution of wages. The evidence presented in the next section indicates that career advancement is quicker in the private sector and thus the entry-level penalty could be smaller. Nevertheless, it seems reasonable to conclude that there has been an increase in the premium at the beginning of the career, in spite of the decrease in the relative importance of government as an employer of college graduates. Such relevance has come down as a result of the gradual stabilization of the size of the public sector and, more recently, of the enhancement of budgetary constraints. It is possible to get an approximate idea about how the allocation of entrants with advanced degrees between the two sectors has evolved by looking at their proportion in each sector, by experience cohorts. In the dataset for 2005, the public sector employs roughly 30 per cent of college graduates with 10 or less years of experience, over 50 per cent of those reporting between 10 and 20 years of experience and around 70 per cent of graduates with 20 to 30 years of experience.¹²

Taken together, these pieces of evidence offer some insight into the way public and private labour markets in Portugal have interacted. They indicate that the relative public/private wages are largely unresponsive to the sorting of workers between the two sectors. In the past, the public sector was paying relatively less when it was hiring relatively more, and vice-versa in recent years. Such an evidence should stem, firstly, from the fact that wages in the private sector respond to market conditions whilst public wages are more rigid and stable. Given the rapid growth in the number of college graduates coming to the market and the slowdown in recruitment by the public sector, firms had to compete less

(12) This only gives an approximate indication since more experienced workers may not have joined the sector where they are now at the beginning of their careers, but moved later. As the flow of workers is presumably more important from the private to the public sector than the opposite, the figures may somewhat overstate the actual proportion of entrants into general government in the past. Nevertheless, taking into account the fact that sector switching typically occurs when workers are relatively younger, the distortion may not be all that substantial.

for highly-skilled labour and are likely to have adjusted the entry points downwards. An analysis by occupation made below shows an increase in the premium for jobs in which the two sectors are important employers. Moreover, part of the additional supply of college-graduated labour that was accommodated by private employers occupies worse-paid jobs, traditionally performed by workers with intermediate to low education. This is indicated by an increase in the share of those jobs in the employment structure of college graduates in the private sector, from approximately 40 per cent in 1996 to 45 per cent in 2005.¹³ The evidence gathered also indicates that other factors on the side of the labour supply have played an important role, allowing, particularly in the past, a large intake by the public sector despite a wage penalty. Specifically, the attractiveness of public jobs, due to aspects such as employment protection and earlier retirement, appears to have influenced the behaviour of labour supply in terms of selecting preferentially into the public sector (equivalently, the premium does not provide an exact measure of how workers value jobs in the two sectors).

Another implication following from this analysis is that the increase in the public premium for starters does not appear to reflect a deliberate public policy aiming at hiring better professionals, but rather a reaction of the private sector to an increased supply of highly-skilled labour. Note also that such an evolution contrasts with that for other countries in which the public sector has had difficulties to keep up with the rise in the private wages offered to skilled professionals (e.g. the United States, see Borjas (2002), and Great Britain, see Disney and Gosling (1998)).

The conditional distribution of earnings of college-educated workers is more compressed in the public sector than in the private. This characteristic can be assessed by analysing the difference in the premia at the 75th and 25th percentiles for each year (see footnote 11). Such a difference is smaller in the public sector by approximately 35 p.p., a magnitude that remains broadly stable along the decade 1996-2005 and is similar for the cross sections and the panel. The higher wage compression is more evident for the subset of workers with advanced education than when considering all workers (Chart 2). The room to reward differentiated individual performances is typically much larger in the case of higher-educated workers, and government seems to make a much more limited use of wages to this end.

4.2. An analysis by occupational category

Jobs for college graduates in the public sector are quite diverse and it might thus be expected that the overall results above are subject to considerable variation across occupational categories. We now examine this issue by breaking down the data according to the National Occupation Classification. Some jobs in the public sector do not have private analogues, among them judges, foreign office personnel, criminal investigation personnel and security forces (recall that the military are absent in our data). These were excluded from the analysis now carried out. The remaining jobs were divided into two main categories. The first one aggregates those for which the public sector is largely predominant in Portu-

⁽¹³⁾ These figures were calculated taking into account the proportion of college-graduate employees in the *Quadros de Pessoal* in occupations with codes 3 or higher according to the National Occupation Classification.

gal although they also exist in the private sector. This includes doctors, nurses, university teachers and primary and secondary education teachers. The second category covers the occupations well represented in both sectors, namely, managerial staff, engineers and life sciences professionals, IT specialists, legal professionals, social science professionals and economists (codes 1 and 2 of the National Occupation Classification). As explained in Section 2, we only have comparable occupational information for both sectors for the years 1999 and 2005. For these years, Table 4 presents the public premia computed separately for each of the two categories as a whole, and for the jobs that are well represented in both sectors.¹⁴ It is also possible to find college graduates in intermediate technical, administrative and personal service occupations (codes 3 to 5 of the National Occupation Classification). We also present the premium computed for them (labelled as «non-professional»).

The most striking result coming out of the table is the high level of the mean public premium associated with occupations in which the public sector is the predominant employer, contrasting with a penalty for those in which both sectors share the employment. The penalty is particularly marked for the jobs that the private sector seeks most, such as engineers, IT staff and economists. In 1999, such occupations featured penalties not far from 20 per cent at the mean and, despite an attenuation in more recent years in line with the developments described above, they are still significant in 2005. This indicates a limited ability on the side of the public sector to hire or retain the most skilled workers in these occupations. Added to this is the fact that we are considering only regular remunerations, while in-kind compensation and fringe benefits are likely to be relatively more important in the private sector.

The high level of the premium for the predominantly public jobs may indicate that they are not fully comparable between the two sectors. Indeed, certain workers in the areas of health and higher education in government perform particularly skill-intensive tasks that have no analogue in the private sector.

Table 4

PUBLIC WAGE PREMIA FOR EMPLOYEES WITH COLLEGE DEGREES, BY OCCUPATION										
Per cent										
Occupations	1999					2005				
	Proportion		Wage Premium			Proportion		Wage Premium		
	Public	Private	P25	Mean	P75	Public	Private	P25	Mean	P75
Mostly public	96.8	3.2	56.6	42.8	28.7	91.3	8.7	33.6	27.5	13.6
Public and private	35.2	64.8	-3.8	-11.7	-28.7	20.7	79.3	6.2	-5.9	-25.7
Managerial staff	23.5	76.5	23.3	10.2	-18.1	14.3	85.7	19.7	4.5	-23.4
Eng. and life sciences spec.	34.4	65.6	-10.0	-17.5	-29.7	17.0	83.0	2.7	-4.3	-19.1
IT specialists	17.9	82.1	-9.2	-19.0	-34.5	15.5	84.5	-4.7	-13.8	-26.3
Legal specialists	75.7	24.3	4.4	-12.1	-32.7	64.9	35.1	10.3	-1.1	-21.8
Social sciences specialists	75.2	24.8	34.0	18.4	7.9	45.5	54.5	34.1	21.7	10.3
Economists	34.1	65.9	-6.7	-17.3	-36.1	31.0	69.0	-3.3+	-18.6	-36.6
<i>Non-professional</i>	15.1	84.9	-10.6	-13.6	-22.2	8.5	91.5	-1.3+	-9.3	-21.7

Source: Authors' calculations.

Notes: Coefficient of the indicator variable for the public sector in regressions of log (monthly) wages on a constant, experience and experience squared, and indicator variables for male gender, jobs located in more developed areas and public sector. All coefficients are significant at the 1 per cent level, except the ones marked with +, significant at the 5 per cent level.

(14) Note that the figures presented in the table cannot be interpreted as a breakdown of the overall premium figures presented in Chart 3, in particular because the latter are also influenced by relative wages between occupations, given that the occupational structure is very different in the two sectors.

The size of the premia might be expected to shrink over time, as the role of the private sector becomes progressively more important (as it is currently taking place in the area of health care). This has indeed happened between 1999 and 2005.¹⁵ Nevertheless, the relatively higher public wages in those occupations are also likely to reflect the bargaining strength of the respective workers, arising from the social importance of the functions they perform and the role of the respective unions. In fact, all the occupations in this group have specific legal frameworks and wage scales.

The tendency for less compression of salaries in the private sector is generalized across jobs. The findings in this respect stand out for managerial positions featuring a difference over 40 p.p. in the inter-quartile range between the two sectors. Such positions seem to occupy a much broader spectrum in the earnings distribution for the private sector. Finally, public sector employees in non-professional occupations have a penalty across almost the whole distribution. Within these relatively low-grade jobs, private employers seem to have more room to reward the skills of workers with advanced education.

To finalise the discussion of wage premia, we address the question of how our results may be impacted by a preference for one of the sectors by employees sharing some (unobserved) characteristics that also determine wages. Studies finding a premium associated with working in government at the lower quantiles, as we do, relate it to more strict admission requirements in this sector (e.g. Bargain and Melly (2008)). This conclusion is reasonable in the case of countries in which the recruitment of public employees relies on nationwide examination practices (such as Spain and France, for instance). We find this conclusion unlikely to hold for Portugal, where no such mechanisms exist.

The higher relative wage for private employees at the upper part of the distribution is often associated with specific characteristics of this group of workers. We cannot exclude that such an effect is present, for instance, in the results for the upper quantiles in occupations of shared public/private employment. An analysis of this issue would require a deeper investigation.

5. INCENTIVES LINKED TO CAREER ADVANCEMENT AND REWARD TO INDIVIDUAL SKILLS

Wage premia are important indicators from the point of view of attracting and retaining workers in the public sector. However, in a sector with full employment protection, these are unlikely to play a significant role as far as the motivation of workers throughout the career spell is concerned. We now look at other incentives that may be important in that regard, starting by the advancement prospects faced by workers in each sector. We measure these prospects over time as the average gain in relation to the initial salary. Since the progression pattern may vary according to whether the occupation corresponds to higher or lower wage cohorts, we separate workers in accordance with educational attainment, considering workers with basic education or less and workers with higher education. We estimate the pro-

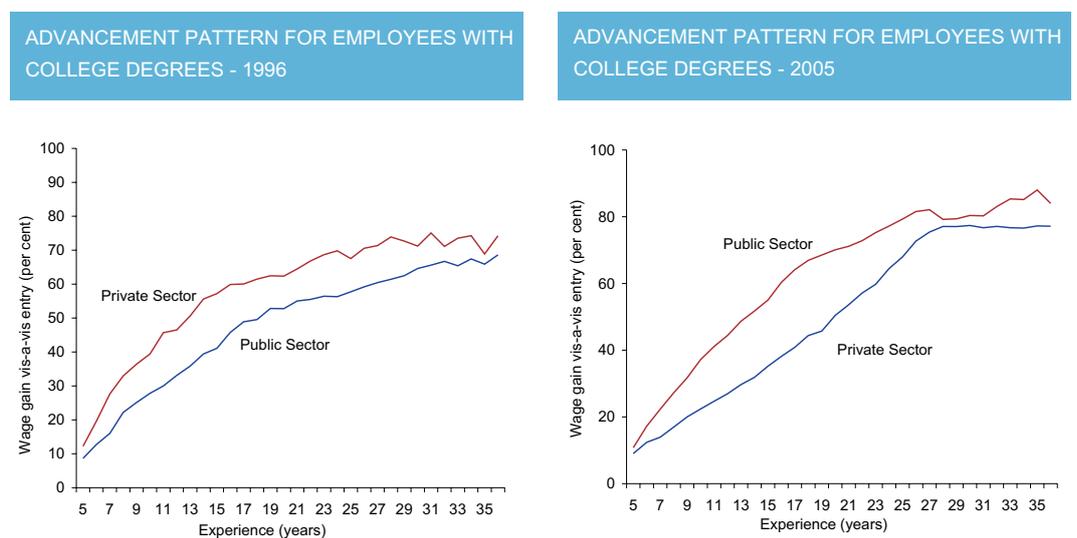
(15) Detailed figures by job within this subset (not shown) indicate strong reductions in the premia for the occupations in which the number of private sector workers increased substantially in our sample in 2005 (nurses and primary and secondary teachers). Note that this increase may also reflect to some extent the fact that the coverage of *Quadros de Pessoal* became fuller.

gression pattern in each sector by including indicator variables for the years of experience, starting from the 5th (given that in the initial years it is typically difficult to accurately estimate the gains). Thus, the estimated coefficients capture the difference between the average earnings in the first four years and in each of the following years over the employment spell, controlling for gender and workplace location, as well as education for the first group of employees.¹⁶

Chart 5 plots the wage advancement patterns in each sector for college graduates in 1996 and 2005. The curves have the usual shape, indicating decreasing marginal returns to experience, which in the regressions in the preceding sections was captured by the (negative) coefficient of experience squared. The important point is that college-graduate employees working in the general government have smaller wage gains vis-a-vis the entry point than their counterparts in the private sector. In 1996 the difference stands at about 12 p.p. after 10 years of experience and then remains very much stable over the career spell; in 2005 the figures are a bit larger, featuring a difference in the gains around 15 p.p. after 10 years of experience and 20 p.p. after 20 years. The private sector manages to have a faster advancement pace that should impact positively on workers' motivation, even with lower wage levels than the public sector (particularly in 2005).

For less-educated employees (Chart 6) the difference in the gains in comparison with the entry point also stood at around 10 p.p. over the whole employment spell in 1996. In 2005 the picture is similar in the first two decades of the career, but then there is an upward swing in the progression pattern for public sector employees, who end their careers with a quicker advancement pace. We do not have a good explanation for the change in comparison to the profile estimated using the 1996 data. In any

Chart 5



Source: Author's calculations.
Notes: Charts are based on OLS regression of log wages (monthly) on a constant and indicator variables for male gender, jobs located in more developed regions and each year of the career span (from the 5th to the 36th). The coefficients of the latter are shown.

(16) The private sector as an employer is much more differentiated than government. Indeed, in the former wages are explained by factors such as industry and firm size that have no counterpart in the latter. Thus, we could have controlled for those factors when measuring the progression profiles. However, as the point we want to make concerns the comparability between the two sectors, we considered it appropriate to include the same covariates. The outcome of the regression in terms of estimated coefficients is not much affected, as long as the factors omitted are approximately uncorrelated with the covariates included.

case, overall, this clearly suggests that the public sector could benefit from modifying the design of wage scales, specifically by reducing relative wages between the steps occupied by entrants and the steps occupied by more experienced workers.¹⁷

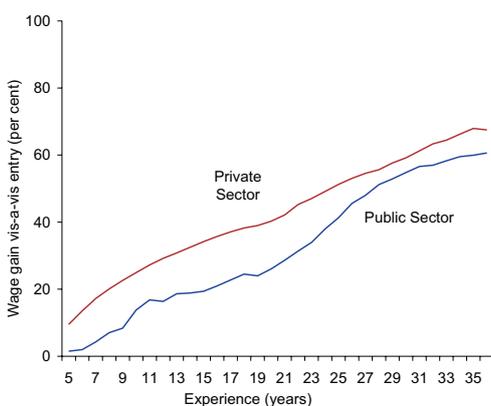
Another important incentive in terms of workers' motivation is their perception that wages depend on individual performance. It might be expected that, in general, workers whose wages are determined by some automatic rules have a weaker commitment to the job. In the public sector it is generally difficult to evaluate employees' performance, given the nature of the services produced and the fact that these are not traded in the market. Career advancement tends to heavily depend on experience.

The relevance of attributes associated with workers' individual skills in the determination of wages cannot be explicitly measured, since these are typically unobserved. The covariates we have been using measure general human capital (education and experience), and determinants related to demography, geography and occupation. However, we can assess the role of unobserved skills in wage determination in each sector by considering the unexplained proportion of the wage variability in the regressions we have been running. The greater this proportion, the bigger that role. A caveat is in order: the proportion of unexplained wage variability in the private sector may be attributed, to a certain extent, to factors unrelated to workers without counterpart in the public sector and that are not being controlled for (see footnote 16).

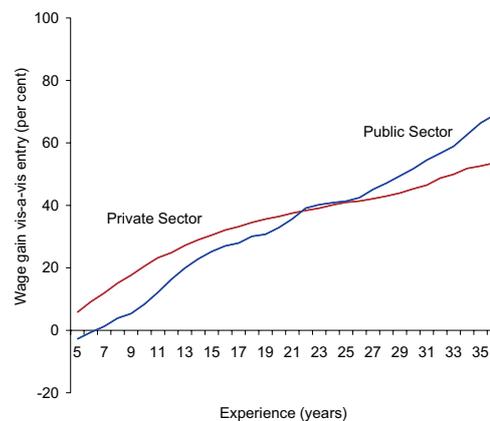
Independently of the differences between the two sectors, an additional aspect that should be taken into account is the fact that unobserved individual skills may interact with experience and become more important in wage determination as employees move forward in their career. Such an interaction may translate, for instance, into the workers' capability to acquire specific human capital. Therefore,

Chart 6

ADVANCEMENT PATTERN FOR EMPLOYEES WITH BASIC OR LESS THAN BASIC EDUCATION - 1996



ADVANCEMENT PATTERN FOR EMPLOYEES WITH BASIC OR LESS THAN BASIC EDUCATION - 2005



Source: Author's calculations.

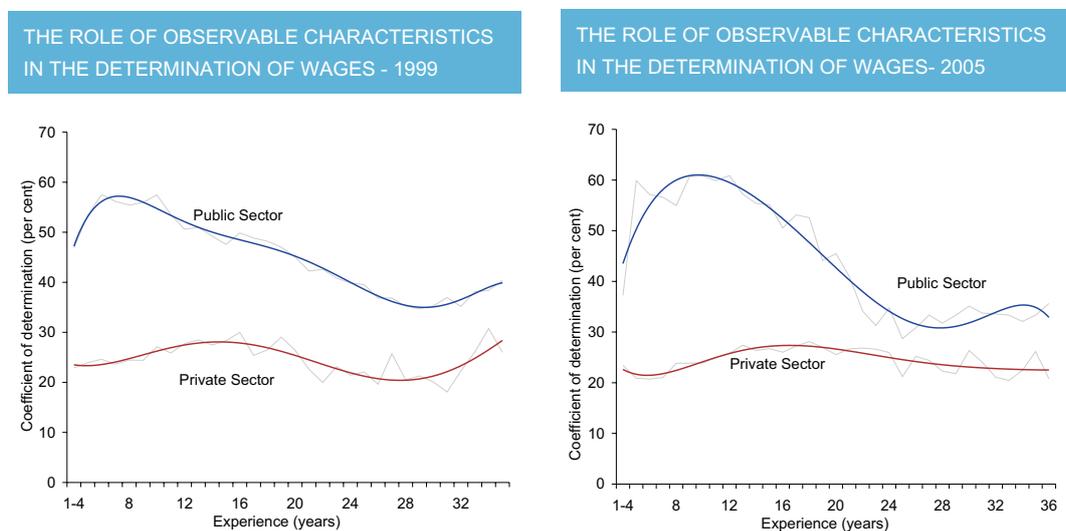
Note: Same as note to Chart 5 but controlling also for basic education.

(17) The results obviously reflect the wage scales in force when and before the collection of the data. These wage scales were substantially modified by recently enacted legislation.

we sectioned the data for college-graduate employees into 36 groups according to the sector and the years of experience. For each group we estimated the usual wage regressions (see note to Chart 7) and computed the coefficients of determination in order to measure the explanatory power of the covariates (which also depends on the functional specification used, that is the same for both sectors). The results are depicted in Chart 7 for 1999 and 2005, the years for which information on occupations is available for both sectors.

Chart 7 clearly indicates that non-observable skills are less likely to play an important role in the public sector than in the private. The covariates in the regression explain about 30 p.p. less of the wage variability in the latter sector after 10 years of experience. The gap goes down as workers become more experienced, to about 20 p.p. after 20 years of experience and then further to 10 p.p. towards the end of the employment spell. These results should be interpreted carefully in view of the caveat made above, but they are consistent, in particular, with the evidence about wage compression presented in the previous sections. The pattern over the career span obtained for the public sector is more in line with what one would expect, since it is compatible with an increase in the relevance of specific human capital in wage determination.

Chart 7



Source: Author's calculations.
Note: Coefficients of determination from OLS regression by experience cohorts: 1-4 and 5 to 36 years. Regression of log (monthly) wages on a constant and indicator variables for male gender, jobs located in more developed regions and occupations.

6. CONCLUDING REMARKS

The goal of this paper was to analyse the incentives related to wages in the Portuguese public sector, using the private sector as a benchmark. The results obtained can be summarized as follows.

After controlling for observable individual endowments, public sector employees earn higher wages than their private sector counterparts and this premium has risen over the 1996-2005 period. Such a development occurred particularly for college graduates at the beginning of their career spell.

The premia vary according to gender and location of the workplace. Women (particularly in less developed areas) attract a higher premium than men (particularly in more developed regions).

An analysis across the wage distribution shows that the public premium decreases as one moves from the lower to the upper quantiles, in line with the higher relative wages of public employees with lower educational levels.

The rise in the public wage premia for college-graduate entrants is explained, in particular, by an increase in the supply of these workers directed to the private sector, which has been accommodated by changes in the respective employment structure and a downward adjustment of wages at the entry-level.

There is considerable variation in the level of the public premia across occupational categories. Occupations in which the private and the public sectors share the employment feature a wage penalty, suggesting that the general government has a low capacity to attract the workers performing them. On the contrary, there is a large premium in the areas of health and education, in which the public sector is the predominant employer, partially reflecting the strong bargaining power of public employees in those areas.

Public sector employees have a slower advancement pace than their counterparts in the private sector. This may impact negatively workers' motivation. There is also evidence that the reward to non-observable skills is likely to play a relatively less important role in terms of wage determination in the public sector.

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Appendix

Table A1

WAGES, DESCRIPTIVE STATISTICS						
	Public Sector			Private Sector		
	1996	1999	2005	1996	1999	2005
Cross-Sectional Data						
Monthly wage						
Mean (euro)	950	1 142	1 491	619	692	859
Mean 1996=100	100.0	120.2	157.0	100.0	111.6	138.6
Median/Mean	754	894	1 250	455	504	626
Median	566.2	698.6	897.9	487.0	533.3	693.7
Std. Dev.	0.79	0.78	0.84	0.73	0.73	0.73
Skewness	1.9	1.6	1.3	3.6	3.5	3.8
Std. Dev./Mean	0.60	0.61	0.60	0.79	0.77	0.81
P75/P25	2.3	2.3	2.4	2.0	2.0	1.9
Hourly wage						
Mean (euro)	6.6	8.0	10.5	3.9	4.4	5.5
Median/Mean	5.3	6.2	8.9	2.8	3.2	3.9
Median	4.1	4.9	6.2	3.3	3.6	4.6
Std. Dev.	0.80	0.77	0.84	0.71	0.71	0.71
Skewness	1.8	1.5	1.2	3.5	3.5	3.8
Std. Dev./Mean	0.62	0.61	0.59	0.84	0.81	0.84
P75/P25	2.4	2.3	2.4	2.1	2.0	1.9
Panel Data						
Monthly wage						
Mean (euro)	968	1 202	1 663	644	772	1 042
Mean 1996=100	100.0	124.2	171.9	100.0	120.0	161.9
Median	809	972	1 358	499	589	774
Std. Dev.	557.4	710.4	968.4	456.8	550.3	801.4
Median/Mean	0.84	0.81	0.82	0.78	0.76	0.74
Skewness	1.9	1.5	1.3	3.4	3.1	3.2
Std. Dev./Mean	0.58	0.59	0.58	0.71	0.71	0.77
P75/P25	2.3	2.4	2.5	1.9	2.0	2.1

Source: Author's calculations, based on the *Quadros de Pessoal* and the *Recenseamento Geral da Administração Pública*.

Table A2

LABOUR FORCE CHARACTERISTICS						
	Public Sector			Private Sector		
	1996	1999	2005	1996	1999	2005
Experience (years)	23.4	24.2	24.6	21.1	21.4	21.8
Std. Dev.	11.5	11.3	11.4	11.6	11.7	11.6
Education						
<Basic Ed. (%)	33.4	30.6	20.9	65.2	59.9	47.8
Basic Ed. (%)	13.8	13.7	11.3	15.4	16.4	21.7
Secondary Ed. (%)	17.6	16.5	19.8	14.3	17.1	19.9
College grads. (%)	35.2	39.3	47.9	5.1	6.7	10.6
Gender						
Male (%)	43.8	42.2	35.1	61.3	59.1	57.9
Female (%)	56.2	57.9	65.0	38.7	40.9	42.1
Region						
More developed areas (%)	82.2	82.5	83.1	91.0	90.5	89.6
Less developed areas (%)	17.9	17.5	16.9	9.0	9.5	10.4

Source: Author's calculations, based on the *Quadros de Pessoal* and the *Recenseamento Geral da Administração Pública*.
 Note: Based on the cross-sectional datasets.