Public Sector Wage Premium Trends in Italy: 1995 - 2010

Paolo Ghinetti[1]

Summary: Public Sector Wage Premium Trends in Italy: 1995 – 2010

This paper analyses the evolution of the public sector wage premium in Italy in the 1995-2010 period. OLS and quantile regressions are used to decompose time variations of the premium into characteristics and rewards *a la* Oaxaca. We show, first, that the well-documented rise of raw public-private wage differentials in the last decade was the result of increased gaps only at top deciles. Second, that, contrary to common beliefs, public versus private net premia did not fundamentally change over time, so that rising public-private raw differentials were due for the most part to changes in the mix of characteristics (especially occupations) across sectors and time. Third, that the long-term net premium is essentially zero at top percentiles and for males - with small fluctuations over time reflecting specific public policies and cycle features –, and decreasing at bottom and middle deciles. This implies a lower dispersion of public wages over time and a less compressed public wage structure. (J.E.L. J31, J45, C14).

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1. Introduction

After being off the agenda of labour economics for a decade, in the last few years the literature on public-private wage differentials has received a renewed attention. One reason is that the wage setting of the public sector can delay or spur labour market adjustments in the overall economy, as the 2008 financial crisis has shown for countries like Spain or Greece. In the fallout of the crisis, most Eurozone countries are considering fiscal consolidation plans, which hinge heavily on the wage bill of the public sector because the size of public pay has important consequences for both monetary and fiscal policies, and for the efficiency of the entire economic system.

This paper uses micro-data to analyse differences between public and private wages in Italy in the 1995-2010 period, which incorporates years before and after the Euro introduction. Italy is an interesting country for the analysis of sector pay differentials since 'excessively' high public wages are considered partly responsible for the ongoing public debt crisis, started at the beginning of the '90s and worsened in more recent years. The common perception is that in the last two decades public workers received disproportionately high wages, without any change in their efficiency or productivity. In recent years, budget laws included specific norms aimed at putting public wages' growth under control, but their effectiveness has been often questioned.

These considerations raise a number of questions. First, whether and to what extent public wages are higher than private ones and how these differences evolved over time. Second, what are the driving forces behind the differential in hourly earnings received by workers in the two sectors, after controlling for their characteristics.

To this purpose, we estimate the evolution of the public pay premium both at the mean by OLS and at various percentiles of the wage distribution, year by year and separately for males and females. The distribution of wages in the two sectors and of the associated pay differential was analysed first by Lucifora - Meurs (2006) who investigate the structure of the public wage premium by gender and its variability at different points of the earnings distribution. However, their

analysis is based on a single cross-section of data and there is no evidence on how these differences evolved over time. Naticchioni - Ricci (2012) investigate the changes in the wage distribution between 1993 and 2004, but only within the public sector, without taking into account what this has implied in terms of relative public-private wages and without any reference to gender issues. In this respect, our paper aims at bringing together these two separate but complementary pieces of evidence on public and private wages in Italy and to look at the extent to which the structure of the public-private wage differential and its determinants has evolved in the last two decades.

At the descriptive level, our analysis shows that Italy in the 1995-2010 period was interested by a deep reallocation of labour income not only within the public sector, as suggested by Naticchioni - Ricci (2012), but also between sectors: while in the mid 90s the raw premium was higher for public employees at the bottom of the wage distribution, by 2010 those who are paid relatively more in the public sector are in the upper part of the wage distribution.

Such increase in the average public-private wage differential was for the most part due to changes in observed characteristics and not to modifications in the return paid to these characteristics in the two sectors: the 'net' premium decreased in the pre-Euro period and then increased after year 2000, but to a much lesser extent than the unconditional differential. The analysis of the net pay premium shows that between 1995 and 2010 public and private pay structures became more similar, and public sector wages are now less compressed than in the mid '90s, even at bottom deciles, especially for males and also, but to a lesser extent, for females.

The paper is organised as follows. Main features of the Italian public sector in the last two decades are described in Section 2. Section 3 contains a review of the empirical literature, with a focus on Italy. In Section 4 we present the data and some preliminary evidence on the evolution of wages in public and private sector. Section 5 discusses the econometric strategy and the main results. Conclusions follow in Section 6.

2. The public sector in Italy: recent reforms

At the beginning of the '90s, Italy introduced significant reforms in the public sector, aimed at putting inflation under control and imposing a more stringent budget constraint on public employment expenditures. On the pay side, since 1993 for the majority of public employees (see below) wages are bargained instead of settled by law. This so-called "privatisation" of wages was intended to subtract their determination from political pressures, and to make them more comparable to private sector ones. On the employment side, several norms were introduced to limit the number of new hiring of workers in the public sector, especially on a permanent basis.

The wage determination system introduced in 1993 has two stages, and it is similar to that of the private sector. The first stage is centralised, and settles the contractual earnings (*retribuzioni contrattuali*), which incorporates a fixed amount and a variable component, which, in principle, should be related to the overall improvements of public sector productivity.[2]

There is then a second stage of negotiations at the level of single Administrations, which can integrate the wages negotiated at the central level through additional components (*retribuzione aggiuntiva*). The financial resources needed for these 'wage drifts' are taken directly from the Administration budget. The outcome of this second stage is the actual compensation of employees (*retribuzioni di fatto*). The economic part of the contract lasts two years. The implementation of the 1993 new industrial relations regime was rather progressive and applied only to new contracts.

Given this framework, the control of the government on the growth of public wages rests on two pillars: first, that contract renewals are not delayed. Second, that the growth of wages incorporated into the new contracts reflects only expected target inflation and a partial recovering of the difference between

[2] Public sector pay negotiations at the central level cover eight functional sub-sectors defined and involves an independent agency (*Agenzia per la RAppresentaNza sindacale nel pubblico impiego* - ARAN) which negotiates wages for the majority of public sector employees. The police and armed forces, university professors and other academic staff, judges and prosecutors, as well as senior

realised and target inflation in the previous two years. However, new contracts were signed on average two years after their expiring. In most cases, workers were 'compensated' for this delay by contract-specific additional wage component.

A second reform was introduced in 1998, within the national collective agreement valid for the 1997-2001 period, by creating a number of intermediate additional sub-grades in the existing classification of jobs and occupations. The main novelty was that these intermediate positions were not subject to external competition for promotions. Instead, within intermediate levels, the criteria for promotions (based on education levels, seniority, productivity, etc.) were explicitly specified in national contracts. More importantly, additional specific criteria could be added at the level of single administrations (see Naticchioni - Ricci, 2012).

On the one hand, the introduction of sub-grades and the related mechanism of internal promotions stimulated a higher heterogeneity of wage increases across public employees with similar individual characteristics. On the other hand, the main problem was that, especially until the mid 2000's, local Administrations used promotions and other degrees of freedom in human resource policies to cheat the constraints on wage growth imposed by the central government and to drive earnings above inflation. This casts some doubts that the reformed wage setting regime was able to meet the wage moderation targets alone.

At the cross-country level, OECD data on total compensations per employee (current values) over the 1995-2008 period show that Germany experienced a similar wage growth rate in public and private sectors, and, as a result, the wage premium of public employees was constant at the 10 percent level.[3] In the French case there was no significant wage premium. The fact that

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civil servants are excluded from these negotiations and still have the wage settled by law, with an automatic economic progressions based on seniority.

[3] The data are taken from the OECD database (www.stats.oecd.org) and refer to the Harmonised National accounts (ESA95). According to the National Accounts definition, the total compensation includes earnings and the social security contributions paid by the employer. We use this measure instead of wages because of its higher homogeneity across countries. For Italy, since since social security contributions are similar in the two sectors and were stable in the observed period, the evolution of gross wages is very similar to that of total compensations. Notice that these are simple

both in France and in Germany the wages in the two sectors moved in parallel reflects the structure of wage negotiations, where the results obtained by the larger unions (in general private sector unions) are taken as a benchmark for the other sector. In France, the system of industrial relations is centralised in both sectors and, not surprisingly, wages tend to be similar. Italy lacks of any application of this comparability principle and the result is that public sector total annual compensations per employee increased more than private ones.[4] Between 1995 and 2008 the total compensation per employee in the public sector rose from about 28,000 € to 47,000 €, with a 62% overall increase (3.5% on a year basis); these values are higher than inflation, and increased by 45% in the whole period (on average, 2.3% each year).

On the employment side, in Italy public employees are still generally recruited through open, competitive examinations and, once hired, they enjoy life-time contracts in which seniority still plays a major role for wage progression. Recruitment policies in the public sector have changed slightly after 1992. In particular, the introduction of a stricter budget discipline induced the government to 'block the turnover' in the public sector by narrowing the possibility of many Administrations to hire new workers on a permanent basis (see Dell'Aringa *et al*., 2007). This resulted into a more experienced and, potentially, more costly workforce in the public sector.

Also the effectiveness of these interventions has often been questioned. For example, while it is true that between 2001 and 2005 there was a reduction of labour units in the public sector (-2%), many Administrations were excluded by the block (Health, Armed Forces, University) and there were several additional exemptions for specific ones (especially Local Units). Overall, it is generally

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(i.e. un-weighted) means and have been obtained simply dividing the total amount of compensations by the number of employees in the two sectors. Hence their evolution may also partly reflect a change in the composition of employees by sub-sectors, industries and occupations, as well as of income tax rates and working hours.

[4] This does not exclude that wage negotiations in the public sector do not feed-back into the private sector: recent empirical results show that, although on the institutional side public sector negotiations may or may nor precede public sector negotiations, public wages have a signalling effect for private wages, especially at within-the-year frequencies (Pérez - Sánchez, 2010, Lamo *et al*., 2012).

agreed that not only the targets were never reached, but also that these policies were never effective in reducing the absolute number of public employees.

3. Related literature

Pioneered by Smith (1977), several studies analysed public-private wage differences for many countries. For the most part, they find that, on average, public sector workers earn more than private employees, even after controlling for a number of observable characteristics, such as age and education (see Bender, 1998, for a review). Some studies have also addressed the issue of endogenous selection of workers in the two sectors using instrumental variable methods or endogenous switching models (among the others, see Hartog - Oosterbeek, 1993, van Ophem, 1993, for Netherlands; Belman - Heywood, 1989, Borjas, 2002, for the US; Disney - Gosling, 1998, for the UK; Adamchick - Bedi, 2000, for Poland; Dustmann - Van Soest, 1998, for Germany). In general, results depend a lot on the model's specification and estimates are very sensible to the instrument used and the year considered (Nawata - Nagase, 1996).[5]

To overcome these limitations, few recent papers went beyond cross section estimates and use panel data, by either structural estimates of sector choices and wage dynamics (see Postel-Vinay - Turon, 2007, for Britain) or fixed effects models (Disney - Gosling, 1998, 2003, for UK; Bargain - Melly, 2008, for France).

The main disadvantage of these models is that identification is ensured by 'movers', i.e. workers that change sector of employment. Unfortunately, in Italy

[5] These features considerably complicate the possibility to use instrumental variables methods or selection correction models to consistently estimate the evolution of the public premium over time. In a preliminary stage, we experimented by estimating a model with an (endogenous) dummy for public employment either with IV and Heckman methods, under alternative identification strategies. The first instrument used to identify endogenous sector was whether the father or the mother was a civil servant; second, we exploit exogenous variations in the probability of joining the public sector induced by "block of turnover" policies – restrictions in the possibility to hire on a permanent basis - in the public sector in the '90s. Overall, in our case IVs or Heckman correction models – one for each year – produced very unstable estimates of the premium over time, and this was mainly driven by the different impact of the set of exclusion restrictions on sector choices from year to year. For this reason, we abstract from issues related to endogenous sector selection.

only few workers move across public and private sectors during their career. As a result, fixed effect models would require a long and large panel of individual job histories, which is currently not available for Italy.

Given these limitations, our results are more descriptive and based on simple OLS and quantile regressions.[6] The use of quantile regressions is particularly useful since because of more 'egualitarian' pay policies and higher centralisation of bargaining procedures in the public sector, in most countries the public sector wage distribution is more compressed, so that the State pays a higher net premium to the workers (especially males) at the bottom of the wage distribution, and a smaller or even a negative premium at the top (especially for females).[7]

About Italy, the evidence is far from being conclusive and typically based on a single cross-section. In general, results indicate a relatively large raw positive wage differential in favour of public workers, which becomes moderate for males (9-12 percent) and higher for females (17-22 percent) once controlling for a number of individual characteristics (Bardasi, 1996; Brunello - Rizzi, 1993; Brunello - Dustmann, 1997; Dell'Aringa *et al*., 2007; Lucifora, 1999; Lucifora - Meurs, 2006; Ghinetti - Lucifora, 2012). Controlling for endogenous sector choices produces estimates that are in general less robust across specifications and sensitive to identification assumptions.[8] Results from decomposition methods show that the largest share of raw differentials can be attributed to differences in observable characteristics of workers, whilst the part due to differences in returns is rather small, especially for males.

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[6] Since the emphasis of the paper is on the evolution of the public wage gap rather than on the causal estimation of the pay gap, we believe that sample selection problems are of less concern here: To the extent which endogenous sector selection mechanisms are constant over time, they may affect the level of the average public wage gap, but not the pattern of its time variation.

[7] Studies of public wage gaps based on quantile regressions include Poterba - Rueben (1995) for the US, Mueller (1998) for Canada, Disney - Gosling (1998) for UK, Melly (2005) for Germany, Bargain - Melly (2008) for France. Lucifora - Meurs (2006) provide a comparative analysis of UK, Italy and France.

[8] Cappellari (2002) takes an alternative route to the approach based on static differences in earnings between the two sectors and investigates the dynamic of earnings. He finds that life cycle considerations matter in the formation of the differential; in the private sector careers are less stable and the growth rate of wages is more volatile that in the public sector, where wages are more homogeneous over the life.

A key point is that both the premium and its share explained by returns and characteristics may vary over the wage distribution. For Italy, this issue was addressed first by Comi - Ghinetti (2002) and Lucifora - Meurs (2006), who, using Bank of Italy SHIW data for 1998 and quantile regressions, both show that the public-private wage differential is sensitive to the choice of quantile, which rejects the hypothesis of a constant wage differential implied by previous studies based on OLS methods (see also Ghinetti - Lucifora, 2013, for a similar approach applied to ECHP – European Comminity Household Panel - data). Using a model based on single wage equation with a public sector dummy, in the lower part of the distribution the net public premium is higher (17 percent in a model without occupation dummies; 11 percent with a specification which includes them) than in the upper part (6 percent and zero, respectively). The effects are more pronounced for females, who are better off in the public sector at the lowest deciles, whilst the opposite is true for men at the highest deciles.

Using the more flexible specification with separate wage equations by sector and an Oaxaca-Ransom type decomposition applied at each decile, Lucifora - Meurs (2006) also shows that the portion of the premium explained by observed characteristics is substantial (over 60 percent on average) and increasing over the wage distribution. Symmetrically, the part due to differences in returns between public and private sector (the 'net' premium) is about 8 percent at the lowest decile, but it monotonically decreases and becomes close to zero at the highest one, suggesting that differences in observed characteristics are more important at higher quantiles.

In a recent paper, Naticchioni - Ricci (2012) analyse wage dynamics in the public sector, and relate these tendencies to the institutional reforms occurred in the public sector (see Section 2). Using Bank of Italy data for 1993 and 2004, they find that in the period considered there were no significant changes in the lower half of the distribution of public wages. The 75^{th} percentile raised by 2.7 percent, but the more substantial upward shifts was at the top of the distribution (11 percent at the 90^{th} percentile). As a result, the $90^{th}/10^{th}$ ratio increased by 11 percent between 1993 and 2004. They also perform a trivariate decomposition of

the changes in wage quantiles.[9] The effect of coefficients was negligible at all deciles, and the share explained by characteristics was roughly constant (about 3 percent at each level), suggesting that the increase of endowments of public employees shifted upwards the whole wage distribution. The only decomposition component which had a different impact on lower and upper quantiles is the residual (within group dispersion), which explains 8 percent of the 11 percent change at the 90^{th} percentile, and -3.2 percent at the -0.6 percent overall change of the 10^{th} percentile.

Hence, increased residual 'unexplained' within group wage dispersion in the public sector was the main responsible for the change of public wages in the 90^{th} percentile and of increased inequality ($90^{th}/10^{th}$). According to the authors, the reason is that, while average wages in the 1993-2004 did not change much except at higher deciles, wage dispersion in the public sector increased especially among the managers and the white collars, who are more likely to be found in the 90^{th} percentile. Naticchioni - Ricci (2012) suggest that this might be the result of the reformed institutional framework in the public sector, and in particular that since 1998 similar employees might be paid differently in different administrative units, and this possibility is available especially to white collars and high level occupations.

We complement and extend the analysis of Naticchioni - Ricci (2012) by looking at what these trends in public wages - matched with the corresponding ones in private wages - imply for the evolution of wage differentials between the two sectors in the last fifteen years, and by considering gender issues.

[9] In the tradition of the Oaxaca decomposition, the residual component can be computed from a threefold decomposition of wage changes between two groups or two points in time, which distinguished between effects of coefficients (evaluated at characteristics of, say, the initial year), covariates (evaluated at coefficients of the final year) and a residual part due to the interaction of simultaneous changes of coefficients and covariates over time. Given the difficulty to implement the threefold decomposition in the context of quantile regressions, in our analysis we will use the standard twofold decomposition approach, which distinguishes only between the 'explained' (characteristics) and 'unexplained' effects (coefficients plus potential effects of differences in unobserved variables, see Section 5).

4. Data and Descriptive Statistics

We use data drawn by the 1995, 1998, 2000, 2002, 2004, 2006, 2008 and 2010 waves of the Bank of Italy's Survey of Household Income and Wealth (SHIW). Run since 1977, each survey year covers approximately 8,000 households, corresponding to around 20,000 individuals and 14,000 labour income earners. In the first waves, each time there was a new draw of individuals from the population. Since a panel component was added in 1987, each wave contains both 'old' and 'new' individuals.

For the purposes of the present study, we treat the data as a repeated cross-section, thus not considering its longitudinal dimension: the panel component is relatively small especially at the beginning of the period, and only in recent waves it reached half of the overall sample. Restricting the analysis to either the balanced or unbalanced panel would therefore limit the empirical analysis to a relatively small number of observations. This would imply that to track the evolution of the public wage premium over time we needed to estimate public and private wage equations separately for each year of data, and this requires a large sample of possibly constant size for each cross-section. Moreover, limiting the analysis to the panel dimension is not justified even on methodological grounds, since we use cross-sectional estimators on repeated samples and not panel data models.

The construction of the sample used in the empirical investigation follows the criteria used by many studies reviewed in Section 3. We restrict the analysis to employees who work in the non-agricultural sector and are in the age interval 15-65, who represents the typical male employee in the private and public sectors.[10] These selection criteria produce cross-sectional samples which goes from a minimum of about 5,400 units (year 1998) to a maximum of about 5,700 (year 2000). The pooled final sample includes approximately 44,000 observations.

[10] Main excluded categories: retired, unemployed, self-employed and students. We experimented with alternative sample selection rules, to make more comparable ex ante public and private workers in terms of their age. We used ranges such as 20-65 and 20-60 to account for the fact that to be hired in the private sector typically at least an high school diploma is needed and that the retirement age is lower than in the private sector. Results were in line with those presented in the paper.

The SHIW provides a measure of annual earnings inclusive of extra-time compensations and fringe benefits, and net of taxes and social security contributions.[11] Additional information is on the average number of hours worked per week and on the number of months worked per year. Based on that, we follow most empirical studies and construct an estimate of hourly net wages (inclusive of fringe benefits), which is obtained dividing annual earnings by months worked plus number of average weekly hours plus 52/12 (which is an estimate of the number of weeks worked per month).[12]

Public employees have been identified by combining information from two survey's questions: the first asks to report the employment sector among a set of alternatives, that includes 'Public Administration, Defense, Education, Health, Public Services'; the second is the variable "firm size", which classifies public employees in a specific category and thus allows to exclude private workers employed in Education and Health. Sector affiliation is captured by a dummy which equals one for public workers.

The educational structure is summarised by a set of dummies for the highest completed schooling level being: primary or less, low secondary, high secondary, university (both three years university diploma and four/five years BA degrees, as well as the few cases of postgraduate qualifications), respectively. About other variables, we use standard controls used in human capital equations such as time dummies (whenever needed), a rather disaggregated set of age dummies, a marital status and a gender dummy, controls for the geographical area of residence and a set of occupation dummies.

A description of the variables used in the empirical analysis and summary statistics are given in Table 1 on the pooled sample, and for the first and the last available year. The share of public employees dropped from 37 percent in 1995 to 25 percent in more recent years, probably as a result of hiring restrictions and of the privatisation of many formerly Public Services. As expected, females are more

[11] We also experimented with wages net of fringe benefits and non-monetary compensations, but the results were basically the same as those reported in Section 6.

represented in the public sector. For similar reasons, the public sector employs the highest fraction of workers with both a university and a high secondary school degree.

(Table 1 here)

Unsurprisingly, public employees are on average older and more concentrated in the South of Italy. As a result of the lengthening of education and of the difficulty of youths to access the labour market, as well as of the social security reforms that have increased *de facto* the retirement age, our sample gets increasingly older in more recent waves. This phenomena is more evident in the public sector, possibly as a result of the previously discussed turnover block. Public administrations are well represented in the whole Italian territory, while the largest share of private employees is concentrated in the Centre-North. Since the public sector pays similar wages over the whole territory for comparable occupations, the public wage premium varies a lot across geographical areas (see Dell'Aringa *et al*., 2007).

Table 1 also shows that average hourly wages are higher in the public sector, especially for females. There are deep differences in the occupational structure both across genders and sectors. First, blue collars are strongly over-represented in the private sector This difference has obvious consequences for the distribution of wages in the two sectors.

Second, there are substantial gender differences in the sector distribution of occupations: females are in general over-represented in non-manual works and under-represented in high skill jobs. The exception is represented by intermediate occupations, which in our case include teachers. For all of these reasons, particular care will be given to the treatment of gender differences and the effect of the distribution of occupations across gender and sectors in the empirical analysis.

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[12] Real wages are expressed in 2010€ using the consumer price index to deflate nominal values. To avoid extreme and unusual values, for each year we excluded observations falling in the top and bottom 0.5 percent of the wage distribution.

The key features of the distribution (mean, median, 10th and 90th percentile) of public and private net hourly wages obtained from individual level SHIW data are plotted in Figure 1, for the whole sample and separately by gender.

Public wages were rising by the middle to the end of the '90s, then decreased in the years just before the euro introduction, probably as a result of fiscal rigor and stringent budget policies (also at the level of single public administrations) to meet the Euro criteria, and then increased again until 2006, to compensate for the previous loss in purchasing power. After that, they decreased again until 2008. The dynamic of average private wages is somehow different: the rate of growth was higher until 2000 and there is no evidence of declining wages before the Euro introduction. In the last decade, wages were stable until 2004. Afterwards, public and private wages moved in parallel.

In general, wage dynamics in the two sectors were similar in the central part (median) of the distribution - especially for males -, but very different in the upper and lower parts: at the 10th percentile, public wages were stable or even declining. The opposite occurred in the upper part of the distribution (90th percentile). This result is consistent also with the evidence presented by Naticchioni - Ricci (2012).

In the private sector, real hourly wages followed a rather stable pattern during the whole period considered. Both the reduction of wage differences in the lower percentiles and the increase in the upper ones are more pronounced for males. Overall, females experienced lower rates of wage growth in both sectors.

(Figure 1 here)

What these wage dynamics imply for the evolution of the raw public-private wage differential is shown in Figure 2. From 1995 to 2000, the overall mean public premium decreased by almost 10 percentage points (from 32 to 24 percent), and then increased again up to the 30 percent level. However, it never recovered its initial level. In general, the differential is higher for males than for females, and the post-2000 evolution of the premium for males is substantially flat, while it is steeper for females and back to the 1995 levels by the end of the period considered.

(Figure 2 here)

Interestingly, the premium at the 10th percentile decreased from the initial 40 percent level to the 30 percent of 2002. Until year 2000 the evolution of the premium at the 90th percentile was similar: it was initially equal to 34 percent, then it decreased until year 2000. Afterwards it increased sharply, moving up to 40 percent by 2010, which is a value higher than what is observed at the bottom and at the middle of the wage distribution in the same period.

In Section 5 we analyse the extent to which the above results reflects genuine price effects or differences between sectors in workers and job attributes.

5. Public-Private Wage Differences

5.1. Empirical Approach

Summary statistics showed that public and private sectors are very different in terms of individual and job characteristics. In order to capture these features we estimate separate earnings equations for public and private sectors. Results are used, first, to compute the unconditional public-private wage differential and to evaluate its statistical significance.[13] Second, to decompose this differential *a la Oaxaca* into a part due to different characteristics of employees in the two sectors (the covariates effect) and a part attributable to differences in returns to given characteristics (the coefficients effect).

The covariates effect captures that public and private sector workers have different observable characteristics in terms of education, age and gender composition, geographical distribution, occupation; and it is typically interpreted as the result of differences in recruitment and human resource management policies between sectors. Instead, the coefficients effect measures of the 'true' differential, i.e. the different prices that given characteristics receive in the two sectors. We refer to it as the 'net' public wage premium.

[13] Remember that the algebra of linear regressions and the law of iterated expectations imply that the predicted individual wages evaluated at the mean of observable characteristics gives the average sample wage. As a result, the total differential (average predicted public wages minus

We estimate public and private wage equations, first, by OLS and perform the associated standard decomposition, evaluated at the mean of observable characteristics (Oaxaca - Ramson, 1994). We then use quantile regressions to estimate sector-specific wage equations and the associated public wage premium at key percentiles of the distribution. At each percentile, we again use results to decompose the predicted unconditional differential into characteristics and returns, using a technique developed, among the others, by Melly (2005, 2006) which can be seen as a generalisation of the standard Oaxaca methodology.[14] OLS and quantile results are obtained by pooling data for all the years and by running separate estimates for each year, on all individuals as well as separately by gender.

We consider two specifications: the first ('no occupations') includes only standard controls for individual attributes such as education, age, gender, region of residence plus year dummies (whenever needed).[15] In the second specification ('yes occupations') we add the set of occupation dummies to capture sector differences in work related characteristics and the skill requirement of jobs.[16]

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average predicted private wages) computed within the Oaxaca methodology is equal (except for rounding errors) to the raw (unadjusted) differential that can be computed directly from the data.

[14] A complication with quantile regressions is that, differently to the OLS case for the mean, there is no guarantee that the estimated conditional quantile evaluated at the mean of characteristics (the *X*s of a standard regression) is equal to the unconditional quantile because the law of iterated expectations does not applies to quantiles. The trick is to use the fact that the conditional (estimated) quantile function is the inverse of the conditional distribution of the outcome (log wages in the, say, public sector, in our case), i.e. estimated conditional quantiles are a sufficient statistics to construct the inverse of the distribution of $logW|X$. The strategy to get the raw unconditional differential at different quantiles and to compute its decomposition is then to generate an estimate of a sufficient number of conditional quantiles. By their inversion, the conditional distribution function of $\log W(t)$ can be recovered. Then, the unconditional distribution function can be estimated by integrating the conditional distribution function over the range of the covariates. Finally, the unconditional distribution function can be inverted in order to obtain the unconditional quantiles of interest. See Machado - Mata (2005) and Melly (2005, 2006) for technical details, and Naticchioni - Ricci (2012) for additional insights.

[15] As a robustness check, we also estimated the model with a richer specification which includes experience and its square as additional regressors, and even a more general one which also includes a set of dummies for the region of birth. Beside all the endogeneity issues associated with the inclusion of experience, we find that estimates are almost unchanged since the age variables as usual absorb also the effect of experience. Similarly, the addition of region of birth variables does not improve the quality of the estimates since, conditional of the region of residence, the associated coefficients are often poorly estimated. This is probably the result of the low internal mobility in Italy, which makes the two set of regional variables highly collinear.

[16] Disney (2007) and Belman - Heywood (2004) highlighted that controlling for occupation in the context of public-private wage differences is crucial, otherwise the differences in occupational

Table A1 in the appendix shows the matrix of correlations between covariates. All the regressors are correlated, but not at levels that would induce multi-collinearity problems in the estimates.

5.2. Main Findings

Point estimates of the average differential, decomposition results and significance levels are in Table A2 in the appendix.[17] Pooled OLS estimates show that the raw public-private wage differential was about 28.5 percent over the whole period, which is consistent with the finding of Lucifora - Meurs (2006) obtained using 1998 data. On average, included characteristics account for about half of the premium: public sector workers have on average better characteristics than their private counterparts so that the net gain (without occupational controls) is about 15 percent. Differences in the occupational structure matter for an additional 7-8 percent and in favour of public employees. Accordingly, the 'net' premium computed on the pooled sample is approximately 8 percent, in line again with the findings of Lucifora - Meurs (2006).

Gender specific estimates produce the known finding that both the raw and the net overall premium is higher for women (12 percent) than for men (3.5 percent). For both males and females, workers' characteristics account for 20 percent of the raw gap. The resulting larger public net premium for females confirms the usual perception that discrimination in the public sector is lower and that the State is a fairer employer.

(Figure 3 here)

The next step is to estimate the time evolution of the average public-private wage differential. Results are summarised in Figure 3, which plots both the raw and the 'net' premium (with and without occupation controls), i.e. the rewards' effect in the Oaxaca decomposition. The difference (distance) between the raw and the net differential is a measure of the covariates effect. Looking at the full

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structures and in the skill mix across sectors would contaminate results, especially when estimates are replicated over time.

[17] To save space, full estimates of the public and private wage equations are not reported but available from the authors.

specification (with occupational dummies), the portion of raw wage differences explained by characteristics of public workers increased over time, so that the net average public pay premium is substantially flat in the period considered: given characteristics, the relative public versus private rewards for such characteristics did not change. This suggests that wage moderation policies in the public sector were probably effective to meet their targets.

By converse, the increase of the raw premium after the Euro introduction was a compositional effect driven by a change in those observable characteristics of public employees which *di per se* are associated with higher wages. The comparison between the specifications with and without occupations shows that the share of the premium explained by individual characteristics (age, education, region, etc.) decreased over time, while an increasing share of the public wage premium was explained by the occupational structure. This is not surprising: as shown by Table 1, in the 1995-2010 period the occupational structure of public employees registered a reduction of manual workers (low wage earners) from 21 to 12 percent, and an increase in the share of clerks from 46 to 52 percent. Also the private sector was interested by similar movements across occupations, but of smaller magnitude. Moreover, the share of public managers increase by 2.5 percentage point and since they are among the high wage earners, this has obvious consequences also on the average public wage premium.

One possibility is that this change in the composition of public employment was favoured by policies such as the privatisation of former public services (and of the associated workforce) and the constraints to hire employees on a permanent basis, which applied to many Public Administrations (see Section 2): for example, a constrained administration would probably keep the bulk of public workers with specific competencies (high skilled) and buy the services provided by the low skilled in the market, where close substitutes are available (school attendant, cleaning services, etc.).

About gender differences, the net premium was roughly constant for males. For females, it declined from 20 percent in 1995 to 8 percent in 2000 and then it recovered up to 12 percent in the following years.

Next, we analyse the evolution of the public wage gap at different point of the wage distributions. The quantiles considered are the 10th, the 25th, the 50th, the 75th and the 90th. The main findings are summarised in Figure 4, which displays the evolution of raw and net differentials at key quantiles.

Full results are in Table A3 in the appendix. For simplicity, the table reports only values for the specification with occupational dummies. Results for the pooled sample reveal a U-shaped raw differential, which is higher at the bottom (34.5 percent at the 10th percentile) and at the top (30.5 percent at the 90th percentile) of the wage distribution and lower at the median. The decomposition shows that, especially at top deciles, only a small part of the raw differential is due to differences in returns. As a result, the net public premium in Italy declines over the wage distribution, being 18 percent at the bottom and close to zero at the top. Similar results were obtained by Lucifora - Meurs (2006) using a single cross-section. At top deciles, the premium become negative for males and still positive (but insignificant) for females.

Figure 4 shows that the share of the total wage differential explained, respectively, by coefficients and characteristics was not constant over time. In particular, the net premium measured at the 10th percentile of public and private wages declined monotonically until 2006. The steeper profile of the net versus the raw differential suggests that an increasing share of differences between public and private wages was, again, explained by differences in characteristics of workers in the two sectors and not to price effects.

The results for the median are qualitatively similar: the stable pattern of the raw differential hides a faster diminishing of the net gain for public employees, from 14 to 4 percent in the initial versus final year. In the upper part of the distribution, the upward trend of the raw differential at the 90th percentile observed in the post-2000 period was totally explained by an increase of the part due to better characteristics (especially occupations).

(Figure 4 here)

Matched with the evidence of a zero-centred net gain at top deciles, the decreasing trends of the premium at bottom and middle portions of the wage

distribution imply a reduction of its dispersion. In other words, once we take into account the differences in the characteristics of workers in the two sectors, in the last fifteen years the structure of public and private wages became more similar, with a reduction of the premium at bottom and middle quantiles, and a convergence (at least until 2006) towards the values of top deciles, which are in general lower. As a result, the structure of public wages became less compressed.

The picture is qualitatively similar for males and females: the drop of the premium at the 10^{th} percentile was higher for males. Among females, the public premium at the 10^{th} percentile fell until 2002, but then it started to increase again until the end of the period. However, also for females it is true that by the end of the period public wage premium across different percentiles were more similar and, on average, lower than at the beginning. Overall, at all the percentiles considered net differentials reached their minimum in the years around the Euro introduction. In the subsequent period they partially recovered, at least until 2006, but they were never back to the mid '90s levels.

6. Conclusions

In this paper, we used micro-data for the 1995-2010 period to study the time evolution of the public-private wage differential in Italy. Its time evolution may reflect, first, the change of the prices paid in the two sectors to a constant set of individual and job characteristics. Second, a change of these characteristics keeping constant the rewards. We used decompositions based on OLS and quantile regressions to analyse these issues at different points of public and private wage distributions.

The main results are, first, that the well-documented increase of the raw average public-private wage differential experienced in the last decade was due to a shift of the premium in the upper part of the wage distribution, which left unchanged relative wages at bottom and middle deciles.

Second, such wage dynamics were driven for the most part by changes in the composition of the occupational structure of public versus private employees. While Naticchioni - Ricci (2012) showed that more favourable endowments of

public employees were uniformly distributed over the quantiles of the public wages distribution and therefore did not exert any significant impact on the evolution of wage inequality *within* the public sector, our findings suggest that in the public sector the higher availability of occupations associated with higher wages were key determinants of the rising wage differentials *between* public and private sectors. Once we control for compositional effects, the net average premium decreased from 11 percent in 1995 to 7-8 percent in 2000, and remained roughly constant since then, especially for males. On average, they earn an higher public pay premium than females, but gender differences reduced over time.

Third, the compression of the public sector wage structure decreased substantially from 1995 to 2010, so that the net public premium at the 10^{th} and 50^{th} percentile progressively converged to the (lower) values estimated at top deciles.

From a policy perspective, the stability of the net premium and the reduction of its dispersion across wage deciles suggest that the reforms in the process of public wage setting that Italy introduced in the mid 90s for wage moderation purposes and to establish a convergence between public and private wages for workers with similar characteristics were at least party successful.

By converse, the increased share of the premium explained by job characteristics, and especially by the occupational structure, may represent an unintended effect of reforms introduced in the public sector on the employment side, in particular those targeted at reducing the number of public employees by limiting the ability of many public administration to hire new workers on a permanent basis. Indeed, the more penalised were probably the manual and low skilled workers, who are more easily substitutable by similar private counterparts. Though other explanations are probably available, the fact that high-level and high-pay occupations are now over-represented in the public sector thus driving upwards relative public-private wages, goes in the direction of our 'institutional' interpretation, which, of course, cannot be directly tested.

According to our explanation, the effectiveness of the turnover block policy would be obviously called into question: not only it is not clear whether it met its

targets in terms of reduction of public employees; but it might have also boosted public pays well above private ones, especially in recent years and in the upper part of the wage distribution.

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Tables

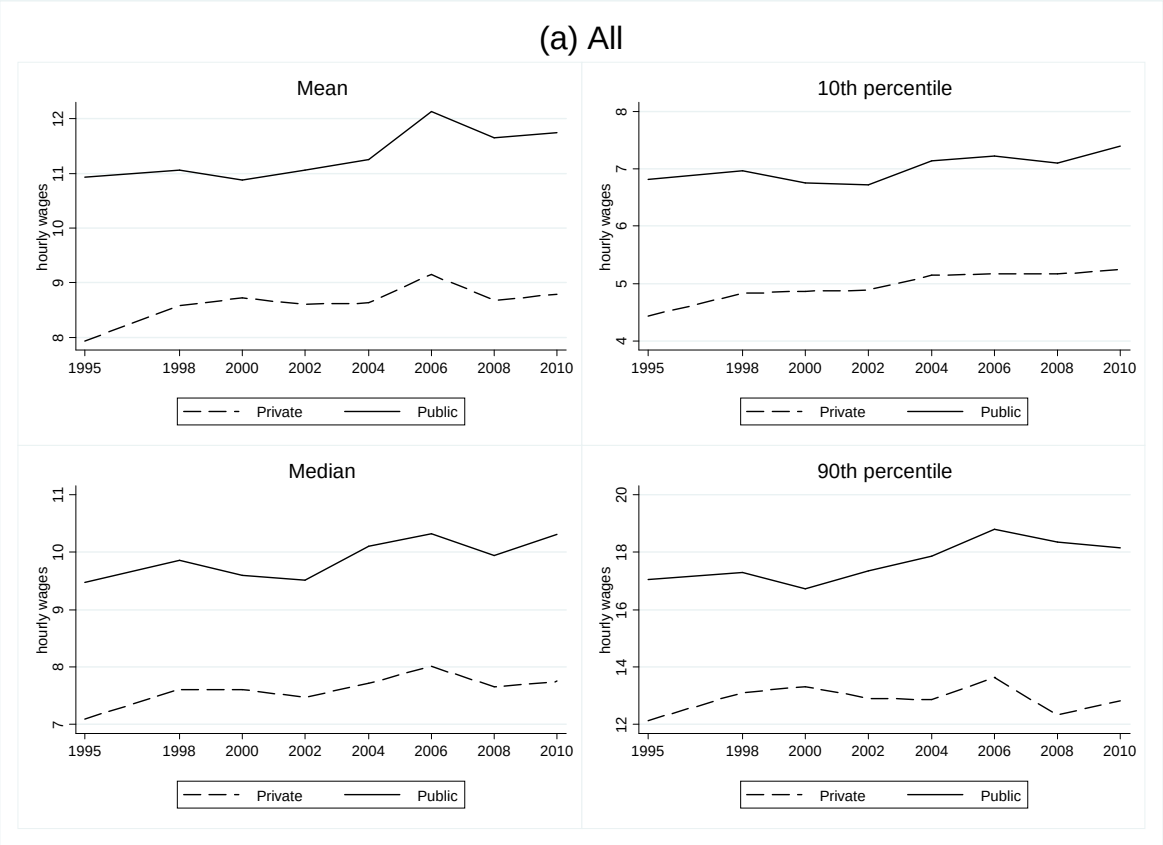
Table 1 – Descriptive statistics (variables and means)

	Pooled years		1995		2010	
Variables:	Private	Public	Private	Public	Private	Public
Male	0.622	0.480	0.667	0.509	0.588	0.427
Primary school degree or less	0.101	0.038	0.163	0.065	0.052	0.010
Low secondary school degree	0.362	0.191	0.386	0.208	0.335	0.136
High secondary school degree	0.453	0.485	0.406	0.482	0.494	0.478
Tertiary education degree (1)	0.084	0.286	0.045	0.246	0.119	0.375
Age	38.641	44.467	36.327	42.294	41.305	47.749
Married	0.596	0.754	0.603	0.767	0.596	0.736
North-West	0.270	0.216	0.282	0.209	0.239	0.237
Noth-East	0.261	0.178	0.277	0.181	0.257	0.191
Centre	0.215	0.222	0.210	0.210	0.218	0.213
South	0.173	0.255	0.173	0.282	0.180	0.229
Main Islands	0.080	0.129	0.058	0.118	0.105	0.129
Males:						
Hourly wage (2)	9.033	11.549	8.378	11.017	9.213	12.258
Hours worked (weekly)	40.885	36.802	42.144	36.465	39.832	36.888
Manual	0.626	0.158	0.658	0.215	0.627	0.122
Clerk	0.278	0.538	0.241	0.462	0.286	0.526
Intermediate profession (3)	0.071	0.236	0.078	0.260	0.067	0.266
Manager (4)	0.025	0.068	0.023	0.063	0.020	0.086
Females:						
Hourly wage (2)	8.039	11.231	7.039	10.842	8.169	11.367
Hours worked (weekly)	35.298	32.359	36.439	31.652	34.285	33.174
Manual	0.480	0.108	0.563	0.119	0.488	0.109
Clerk	0.435	0.401	0.384	0.362	0.449	0.393
Intermediate profession (3)	0.077	0.467	0.051	0.507	0.055	0.452
Manager (4)	0.007	0.024	0.002	0.012	0.008	0.046
Share public sector workers	27.5%		37.7%		25.2%	
N. observations	36306	13779	3571	2163	3985	1340

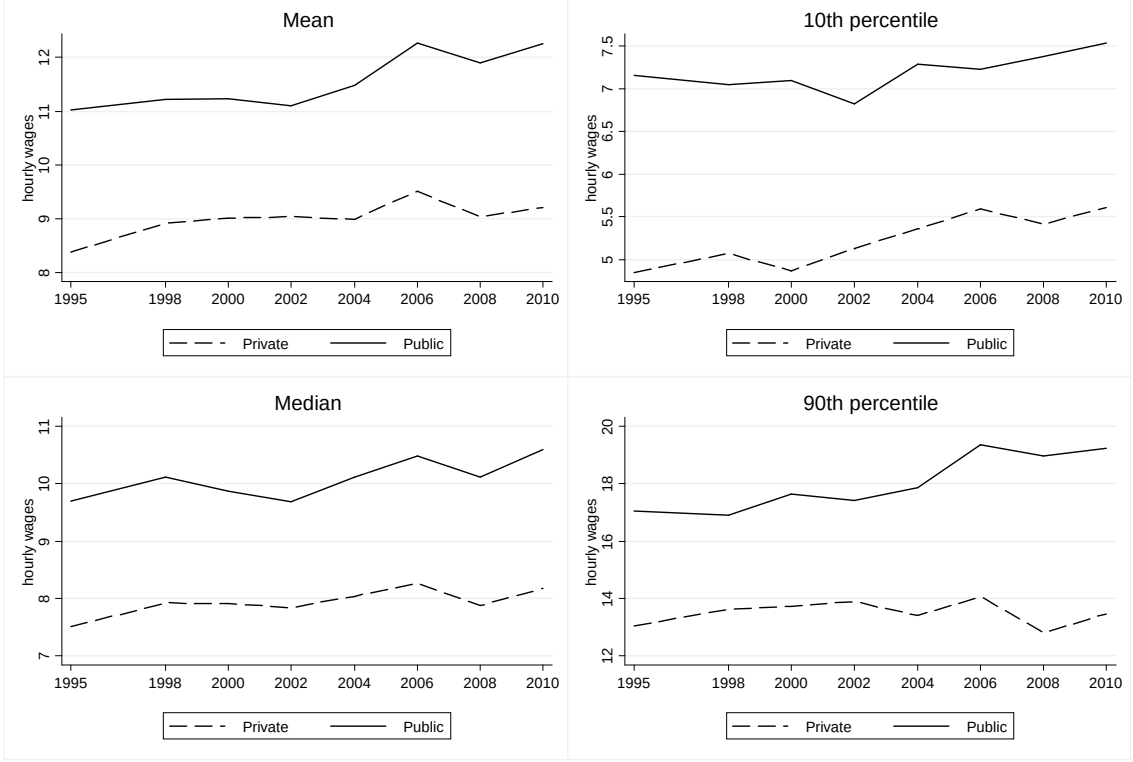
Note: (1) includes short-term university degrees (three years), standard university degree (four-five years) and postgraduate education (Master level, doctorate). (2) Wages are net of taxes and social contributions, and include all bonuses and premia received over the year, and are expressed in 2010 euro. (3) includes professors of any school level, except university professors. (4) Managers include University professors and other high intellectual tasks. Geographical dummies (North-west, etc.) refer to the area of residence.

Figures

Figure 1 – Evolution of Public and Private Mean Hourly Wages in Italy - SHIW microdata



(b) Males



(c) Females

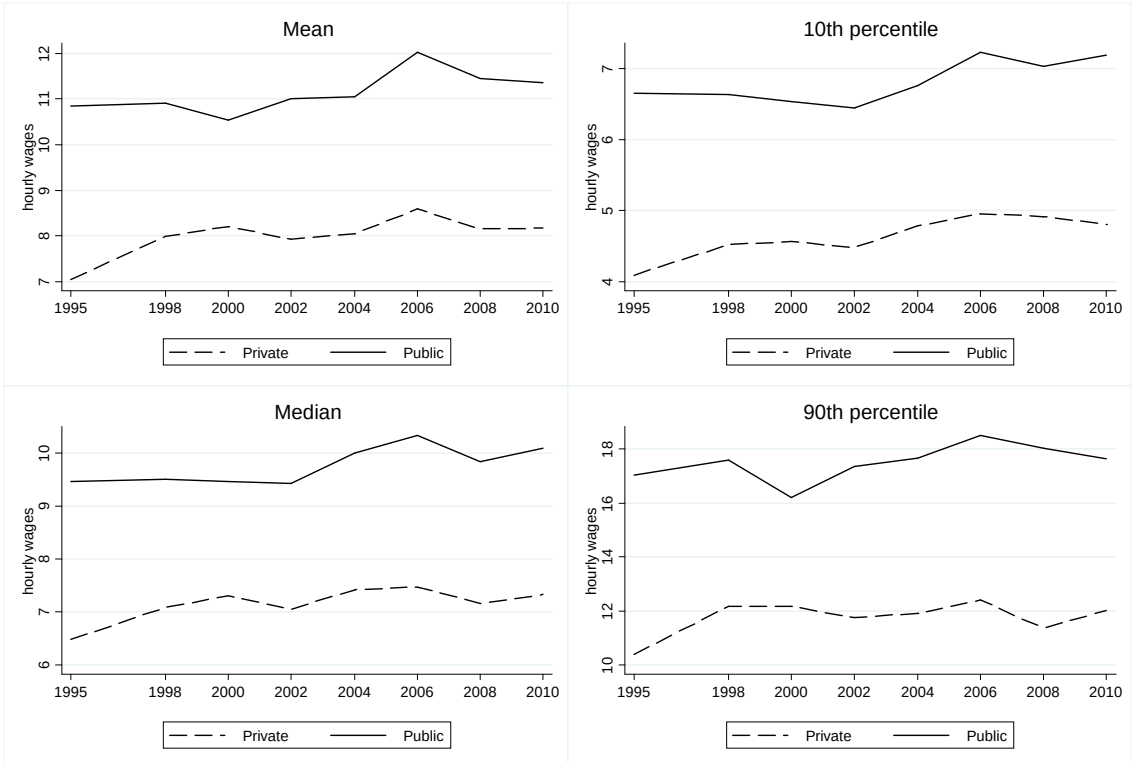


Figure 2 – Raw public-private wage differential (log wages)

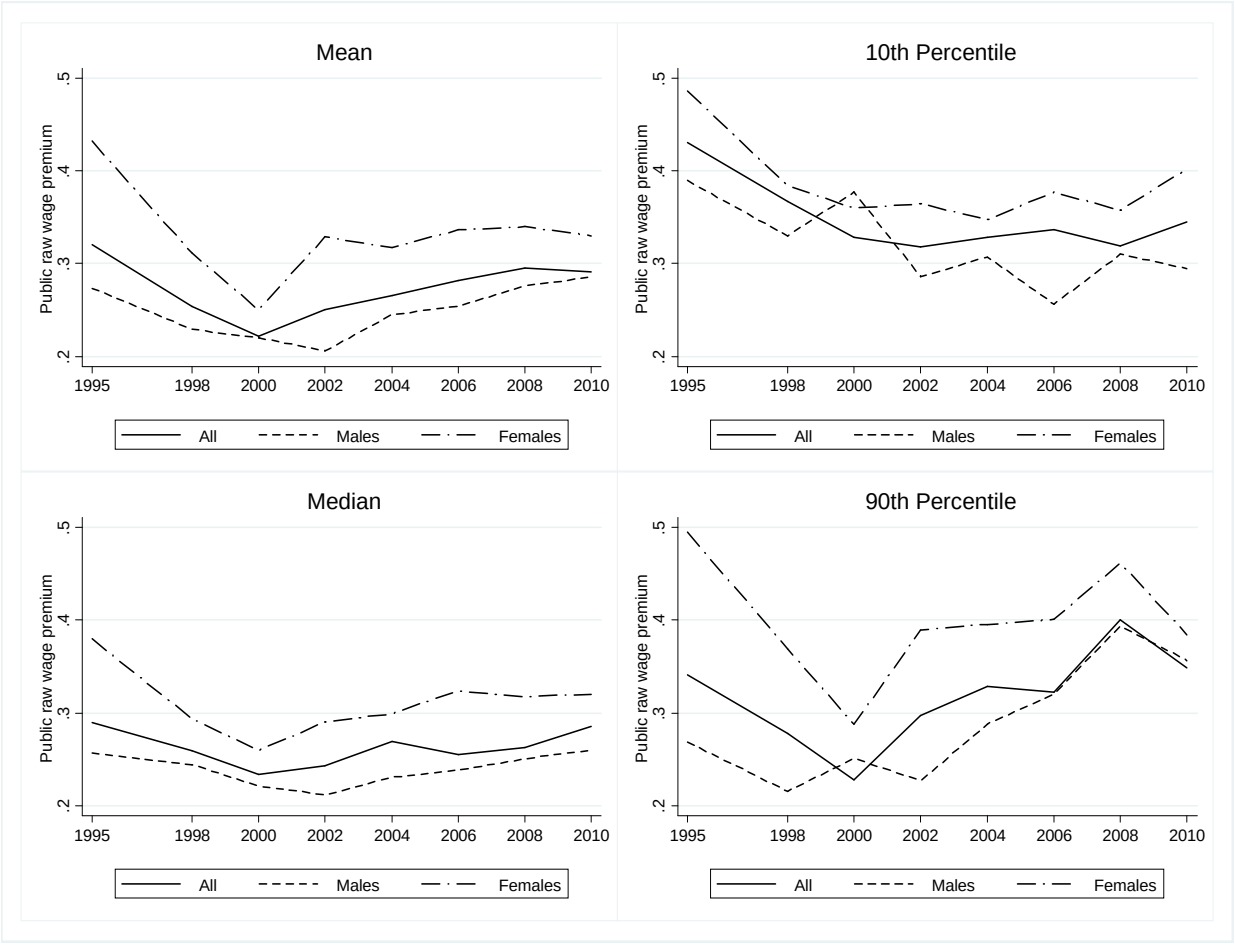
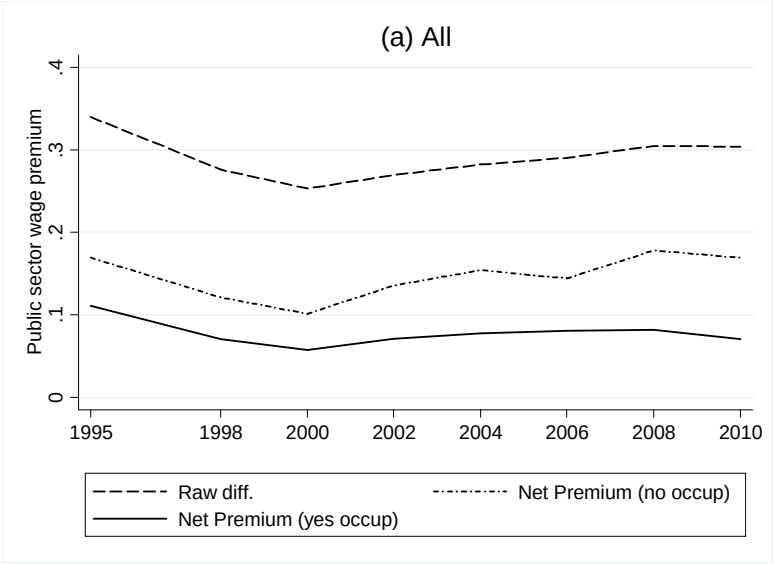
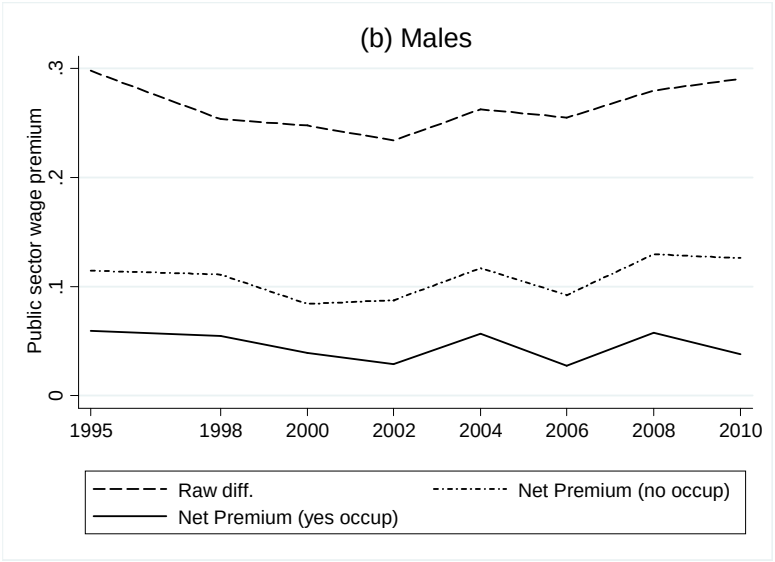


Figure 3 – Public wage premium:

OLS decomposition, raw and net premium (coefficients' effect)





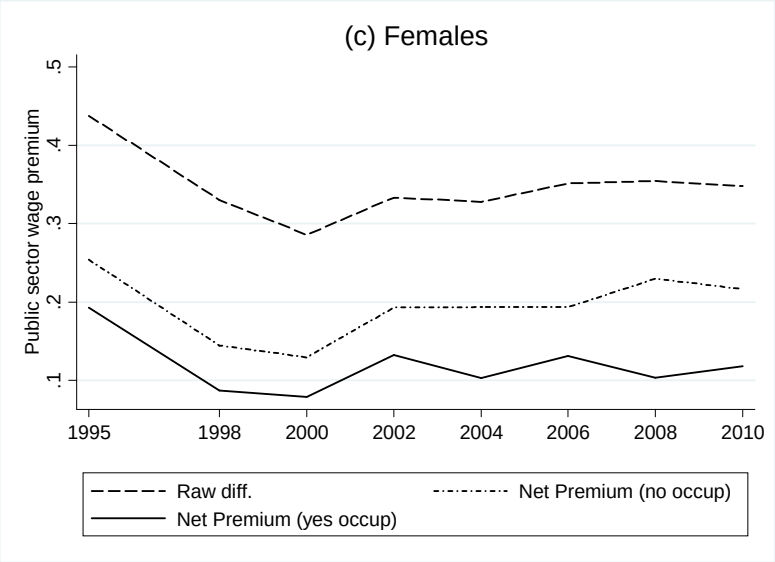
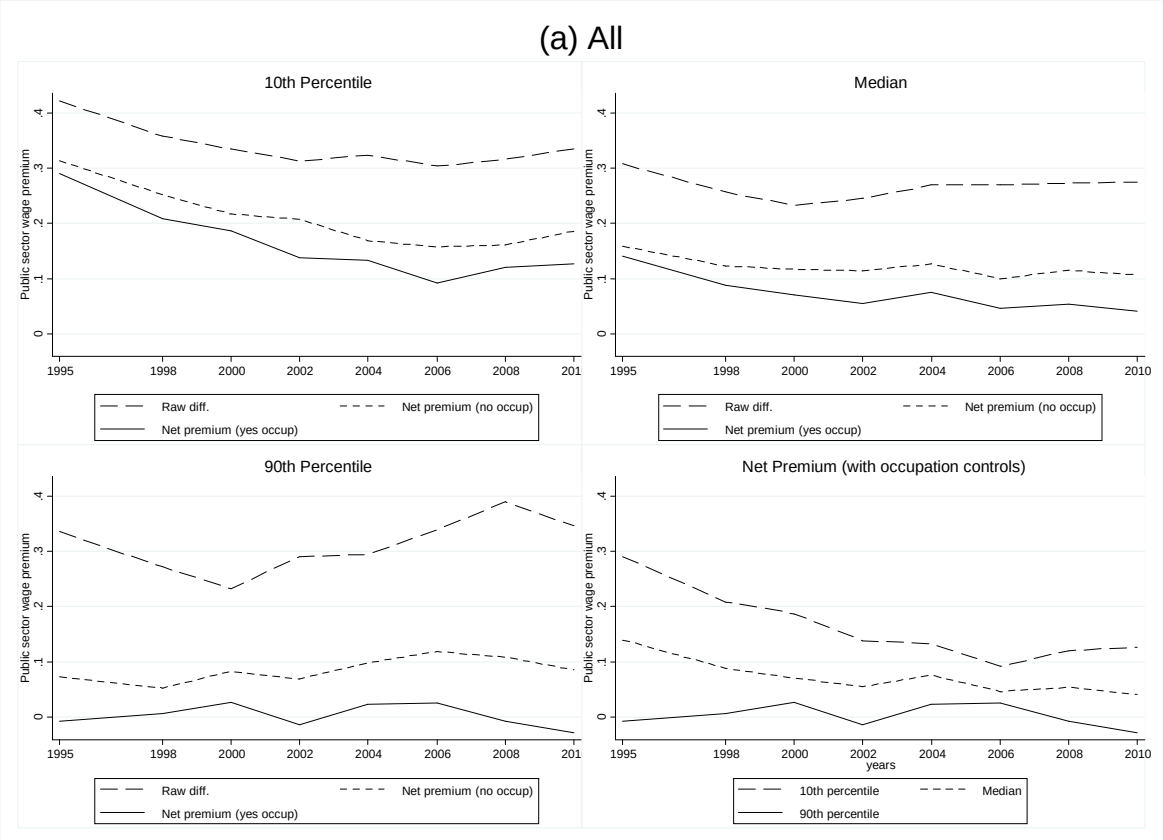
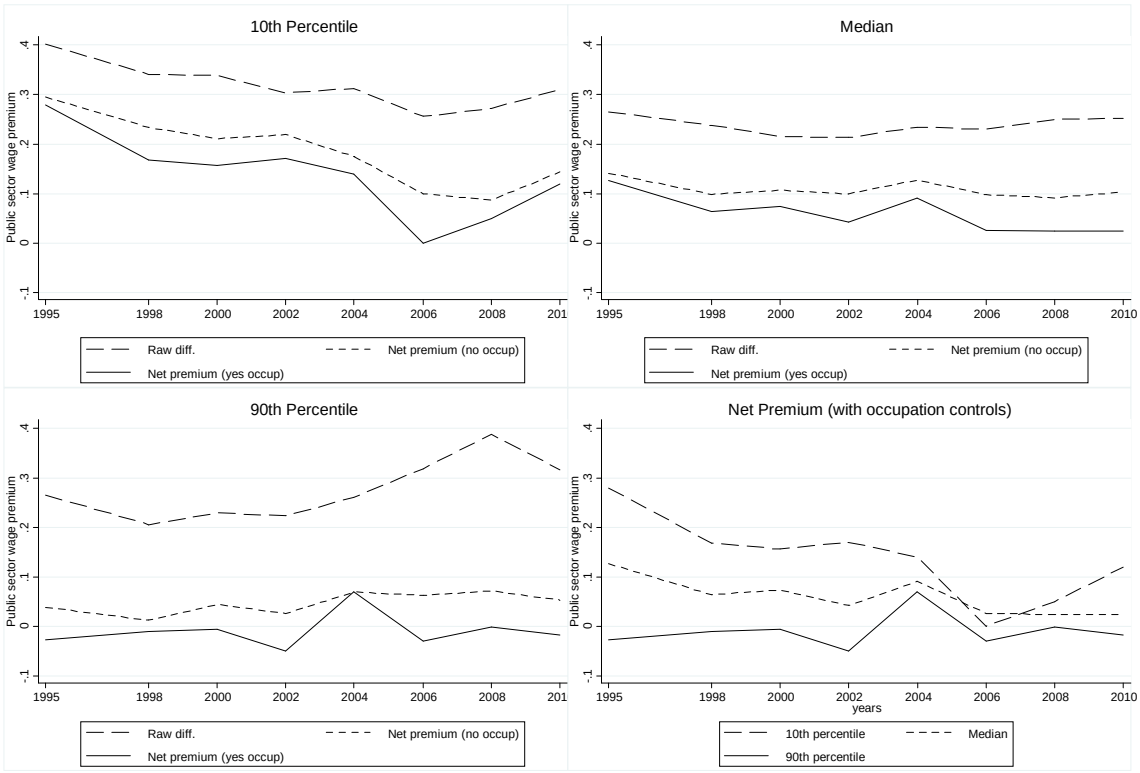


Figure 4 – Public wage premium:

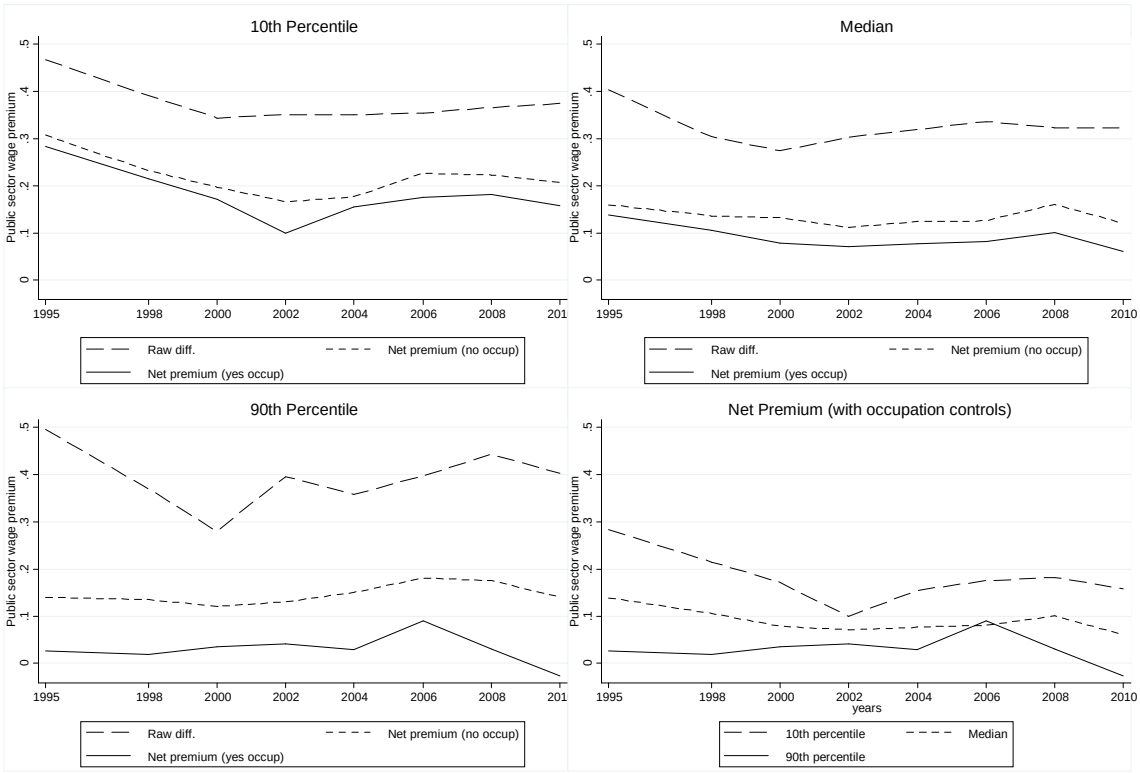
Quantile regression decomposition, raw and net premium (coefficients' effect)



(b) Males



(c) Females



Appendix

Table A1 – Correlation matrix between covariates used in the empirical analysis

	Male	Primary or less	Low second.	High second.	Tertiary Edu.	Age	Married	North-West	Noth-East	Centre	South	Main Isl.	Manual	Clerk	Interm. prof.	Manag.
Male	1.000															
Primary or less	0.066	1.000														
Low second.	0.127	-0.205	1.000													
High second.	-0.088	-0.280	-0.628	1.000												
Tertiary educ.	-0.096	-0.122	-0.273	-0.373	1.000											
Age	0.033	0.220	-0.050	-0.123	0.068	1.000										
Married	0.063	0.106	0.008	-0.069	0.004	0.475	1.000									
North-West	-0.041	-0.017	0.007	-0.003	0.008	-0.013	-0.015	1.000								
Noth-East	-0.045	-0.044	-0.014	0.055	-0.025	-0.078	-0.048	-0.328	1.000							
Centre	-0.018	-0.006	0.001	0.005	-0.003	0.017	-0.001	-0.308	-0.294	1.000						
South	0.085	0.055	-0.010	-0.032	0.016	0.061	0.053	-0.289	-0.276	-0.259	1.000					
Main Islands	0.038	0.023	0.023	-0.039	0.007	0.028	0.021	-0.189	-0.180	-0.169	-0.159	1.000				
Manual	0.166	0.282	0.421	-0.311	-0.342	-0.145	-0.087	-0.020	0.025	0.032	-0.024	-0.020	1.000			
Clerk	-0.088	-0.182	-0.212	0.321	-0.031	-0.007	0.007	0.007	-0.001	-0.021	0.004	0.015	-0.698	1.000		
Interm. prof.	-0.141	-0.124	-0.252	0.021	0.406	0.156	0.083	0.005	-0.029	-0.015	0.035	0.007	-0.382	-0.325	1.000	
Manager	0.068	-0.048	-0.105	-0.049	0.249	0.123	0.066	0.029	-0.012	-0.003	-0.016	-0.002	-0.147	-0.125	-0.069	1.000

Table A2 – OLS estimates of the average public-private wage differential and decomposition (pooled sample and year by year)

	Pooled		1995		1998		2000		2002		2004		2006		2008		2010	
	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.
								Whole sample										
Raw Different.	0.285	0.004	0.340	0.010	0.276	0.012	0.253	0.012	0.270	0.013	0.282	0.012	0.290	0.014	0.305	0.012	0.304	0.012
Decomposition:																		
Without occupat																		
- Characteristics	0.138	0.003	0.171	0.010	0.155	0.009	0.152	0.009	0.134	0.009	0.128	0.008	0.146	0.009	0.127	0.009	0.135	0.009
- Coefficients	0.147	0.004	0.169	0.012	0.121	0.012	0.101	0.012	0.136	0.013	0.154	0.012	0.144	0.014	0.178	0.013	0.169	0.013
With occupation																		
- Characteristics	0.207	0.004	0.229	0.011	0.206	0.010	0.196	0.010	0.198	0.011	0.205	0.010	0.209	0.011	0.223	0.011	0.234	0.011
- Coefficients	0.078	0.005	0.111	0.012	0.071	0.013	0.058	0.013	0.071	0.013	0.077	0.012	0.081	0.014	0.082	0.014	0.070	0.013
								Males										
Raw Different.	0.259	0.006	0.298	0.013	0.253	0.016	0.248	0.017	0.234	0.017	0.263	0.017	0.255	0.020	0.280	0.018	0.290	0.018
Decomposition:																		
Without occupat																		
- Characteristics	0.152	0.004	0.183	0.012	0.142	0.012	0.163	0.012	0.146	0.012	0.146	0.012	0.163	0.013	0.150	0.012	0.164	0.012
- Coefficients	0.107	0.006	0.115	0.013	0.111	0.015	0.084	0.016	0.087	0.017	0.117	0.017	0.092	0.019	0.130	0.017	0.126	0.018
With occupation																		
Characteristics	0.214	0.005	0.239	0.013	0.199	0.013	0.208	0.013	0.205	0.014	0.206	0.014	0.227	0.015	0.222	0.014	0.252	0.015
Coefficients	0.046	0.006	0.059	0.014	0.055	0.015	0.039	0.016	0.029	0.017	0.057	0.017	0.028	0.018	0.058	0.017	0.038	0.018
								Females										
Raw Different.	0.340	0.006	0.438	0.016	0.330	0.018	0.286	0.018	0.333	0.019	0.328	0.017	0.352	0.019	0.355	0.017	0.348	0.017
Decomposition:																		
Without occupat																		
- Characteristics	0.143	0.005	0.184	0.020	0.186	0.015	0.156	0.014	0.140	0.015	0.134	0.012	0.158	0.014	0.125	0.013	0.131	0.013
- Coefficients	0.197	0.007	0.254	0.023	0.145	0.021	0.129	0.020	0.193	0.021	0.194	0.018	0.194	0.020	0.230	0.019	0.216	0.018
With occupation																		
- Characteristics	0.221	0.006	0.246	0.026	0.243	0.018	0.207	0.016	0.201	0.018	0.225	0.016	0.220	0.017	0.251	0.021	0.230	0.019
- Coefficients	0.119	0.008	0.193	0.028	0.087	0.022	0.079	0.021	0.132	0.023	0.103	0.019	0.131	0.022	0.103	0.024	0.118	0.022

Note: Estimates obtained with the Stata command 'oaxaca' and using the standard twofold Oaxaca decomposition: differences in coefficients are weighted at the mean of characteristics of public employees: differences in characteristics are evaluated using private sector coefficients as weights. As a result, the portion of the differential attributed to 'Characteristics' includes the pure endowment effect of public employees and a residual interaction term (differences across sectors in endowments and returns). Separate Public and private wage equations were estimated using the controls in Table 1, with and without occupation dummies depending on the specification adopted, plus a set time dummies in the case of the pooled model. Instead of the continuous variable age, we use a rather disaggregated set of age dummies: less tha 30 (omitted); 31-40, 41-50, 51-65.

Table A3 – Quantile regression estimates of the public-private wage differential at key percentiles and decomposition (pooled sample and year by year, model with occupation dummies)

	All						Males						Females					
	Raw differential		Decomposition:				Raw differential		Decomposition:				Raw differential		Decomposition:			
			Characterist.		Coefficients				Characterist.		Coefficients				Characterist.		Coefficients	
Quantile:	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.
Pooled																		
0.1	0.345	0.008	0.166	0.006	0.180	0.010	0.332	0.009	0.162	0.012	0.170	0.018	0.376	0.008	0.189	0.010	0.187	0.014
0.25	0.280	0.004	0.163	0.005	0.117	0.006	0.264	0.005	0.153	0.009	0.112	0.010	0.319	0.006	0.192	0.008	0.127	0.009
0.5	0.258	0.004	0.186	0.004	0.072	0.005	0.230	0.005	0.163	0.006	0.067	0.006	0.315	0.007	0.232	0.007	0.083	0.005
0.75	0.293	0.006	0.259	0.006	0.034	0.005	0.250	0.007	0.220	0.008	0.031	0.007	0.371	0.010	0.316	0.010	0.055	0.005
0.9	0.305	0.009	0.308	0.009	-0.002	0.010	0.261	0.013	0.283	0.011	-0.022	0.014	0.385	0.010	0.361	0.010	0.024	0.010
1995																		
0.1	0.421	0.015	0.131	0.016	0.290	0.023	0.402	0.024	0.123	0.018	0.280	0.024	0.468	0.027	0.185	0.020	0.283	0.034
0.25	0.352	0.011	0.141	0.012	0.211	0.014	0.332	0.016	0.129	0.012	0.203	0.021	0.404	0.020	0.202	0.020	0.202	0.017
0.5	0.307	0.012	0.168	0.010	0.140	0.011	0.265	0.017	0.139	0.014	0.126	0.018	0.403	0.020	0.264	0.020	0.139	0.014
0.75	0.319	0.014	0.260	0.015	0.059	0.013	0.238	0.024	0.196	0.015	0.042	0.022	0.457	0.023	0.375	0.020	0.081	0.017
0.9	0.336	0.020	0.343	0.024	-0.007	0.018	0.265	0.023	0.292	0.024	-0.027	0.028	0.496	0.036	0.469	0.022	0.027	0.027
1998																		
0.1	0.358	0.017	0.149	0.020	0.209	0.024	0.341	0.022	0.173	0.033	0.168	0.046	0.391	0.023	0.176	0.025	0.215	0.032
0.25	0.293	0.012	0.147	0.014	0.147	0.014	0.292	0.014	0.170	0.021	0.122	0.023	0.311	0.015	0.163	0.025	0.148	0.027
0.5	0.256	0.011	0.168	0.012	0.088	0.011	0.238	0.012	0.174	0.014	0.064	0.014	0.304	0.023	0.198	0.022	0.106	0.021
0.75	0.264	0.018	0.218	0.017	0.046	0.018	0.223	0.016	0.199	0.019	0.024	0.020	0.354	0.032	0.290	0.027	0.065	0.024
0.9	0.271	0.018	0.265	0.023	0.007	0.032	0.206	0.026	0.217	0.028	-0.011	0.029	0.369	0.036	0.351	0.026	0.018	0.040
2000																		
0.1	0.334	0.018	0.147	0.020	0.187	0.027	0.339	0.023	0.183	0.031	0.156	0.041	0.344	0.028	0.173	0.036	0.171	0.048
0.25	0.275	0.013	0.143	0.013	0.131	0.016	0.271	0.016	0.144	0.017	0.127	0.021	0.294	0.018	0.167	0.027	0.127	0.033
0.5	0.233	0.014	0.162	0.011	0.071	0.014	0.215	0.018	0.142	0.020	0.074	0.019	0.274	0.018	0.195	0.020	0.079	0.019
0.75	0.249	0.016	0.214	0.012	0.035	0.019	0.229	0.031	0.183	0.032	0.046	0.027	0.297	0.021	0.238	0.029	0.059	0.024
0.9	0.232	0.024	0.206	0.028	0.027	0.034	0.229	0.038	0.235	0.051	-0.006	0.046	0.280	0.035	0.245	0.040	0.035	0.048

2002																		
0.1	0.312	0.017	0.174	0.029	0.138	0.035	0.304	0.019	0.133	0.018	0.170	0.027	0.351	0.033	0.251	0.046	0.099	0.055
0.25	0.265	0.012	0.178	0.018	0.087	0.019	0.234	0.018	0.151	0.016	0.083	0.023	0.315	0.017	0.222	0.026	0.093	0.035

Table A3 - Continued

0.5	0.245	0.013	0.190	0.018	0.055	0.015	0.213	0.016	0.171	0.014	0.042	0.017	0.303	0.018	0.232	0.024	0.071	0.020
0.75	0.278	0.018	0.267	0.019	0.011	0.015	0.231	0.023	0.226	0.021	0.006	0.019	0.354	0.027	0.307	0.022	0.047	0.018
0.9	0.290	0.026	0.304	0.022	-0.014	0.026	0.224	0.034	0.274	0.030	-0.050	0.034	0.396	0.033	0.355	0.025	0.041	0.030
2004																		
0.1	0.323	0.015	0.191	0.022	0.132	0.024	0.313	0.021	0.173	0.039	0.139	0.046	0.350	0.018	0.195	0.035	0.155	0.038
0.25	0.273	0.010	0.176	0.016	0.097	0.017	0.271	0.014	0.157	0.029	0.114	0.030	0.300	0.013	0.202	0.023	0.098	0.022
0.5	0.269	0.014	0.193	0.016	0.076	0.014	0.234	0.014	0.144	0.019	0.091	0.016	0.319	0.022	0.243	0.019	0.077	0.020
0.75	0.297	0.019	0.249	0.021	0.047	0.017	0.260	0.023	0.221	0.021	0.039	0.019	0.364	0.026	0.305	0.030	0.058	0.026
0.9	0.294	0.028	0.272	0.030	0.023	0.020	0.261	0.027	0.252	0.034	0.009	0.030	0.359	0.036	0.329	0.037	0.030	0.034
2006																		
0.1	0.303	0.018	0.211	0.038	0.092	0.043	0.256	0.029	0.256	0.073	0.000	0.089	0.354	0.024	0.178	0.024	0.176	0.032
0.25	0.262	0.013	0.201	0.026	0.061	0.023	0.243	0.012	0.218	0.033	0.025	0.036	0.310	0.013	0.217	0.020	0.093	0.016
0.5	0.269	0.015	0.223	0.020	0.046	0.017	0.230	0.013	0.204	0.026	0.026	0.024	0.336	0.017	0.255	0.018	0.081	0.020
0.75	0.320	0.013	0.286	0.018	0.034	0.016	0.270	0.030	0.270	0.031	0.000	0.020	0.397	0.018	0.318	0.026	0.079	0.028
0.9	0.339	0.020	0.313	0.017	0.026	0.018	0.318	0.036	0.349	0.033	-0.030	0.023	0.396	0.034	0.306	0.039	0.090	0.039
2008																		
0.1	0.316	0.016	0.195	0.018	0.120	0.024	0.272	0.023	0.222	0.022	0.050	0.033	0.366	0.018	0.184	0.028	0.182	0.031
0.25	0.277	0.011	0.198	0.015	0.079	0.016	0.247	0.018	0.217	0.020	0.030	0.024	0.328	0.011	0.190	0.019	0.137	0.018
0.5	0.272	0.013	0.218	0.018	0.054	0.016	0.250	0.016	0.226	0.023	0.024	0.019	0.322	0.015	0.222	0.022	0.100	0.018
0.75	0.333	0.023	0.306	0.022	0.027	0.016	0.307	0.030	0.293	0.033	0.014	0.016	0.391	0.023	0.326	0.035	0.065	0.020
0.9	0.389	0.025	0.396	0.023	-0.007	0.021	0.388	0.044	0.389	0.037	-0.001	0.027	0.443	0.036	0.413	0.033	0.030	0.032
2010																		
0.1	0.335	0.014	0.208	0.019	0.127	0.022	0.310	0.017	0.191	0.041	0.120	0.041	0.374	0.024	0.216	0.027	0.158	0.036
0.25	0.277	0.009	0.204	0.017	0.073	0.015	0.259	0.015	0.195	0.027	0.064	0.025	0.317	0.016	0.219	0.020	0.098	0.019
0.5	0.275	0.013	0.234	0.017	0.041	0.012	0.252	0.017	0.228	0.022	0.025	0.022	0.322	0.021	0.261	0.018	0.061	0.014

0.75	0.321	0.016	0.307	0.017	0.014	0.014	0.304	0.025	0.298	0.021	0.006	0.019	0.366	0.021	0.333	0.020	0.032	0.019
0.9	0.346	0.020	0.374	0.020	-0.028	0.022	0.317	0.034	0.334	0.023	-0.017	0.028	0.402	0.032	0.428	0.030	-0.026	0.029

Note: Estimates obtained with the Stata command 'cdeco' to estimate unconditional and countefactual distributions using quantile regression results. Counterfactual distributions are obtained by estimating 50 conditional quantile regressions. Standard errors are bootstrapped (20 replications). See Table A2 for details about the specification of the model.