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Can a fifty percent increase in public sector wages improve the position of public sector employees in the long run? An assessment of the public-private income gap in Hungary

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Abstract

We provide a detailed descriptive analysis of the long-term effects of the 50 percent public sector wage increase initiated by the government in 2002 in order to improve the relative situation of public sector workers. The aim of this policy was to attract high quality workers to the public sector, and to counteract the problem of “brain drain,” the loss of high-skilled workers to abroad. To study the effects on the public-private income gap – and on high-skilled workers in particular – we employ empirical methods that allow us to take differences in the entire wage distribution (quantile regressions), workforce and firm composition (decomposition), as well as various potential biases (corrections for underreported wages and workplace characteristics) into account. Our results indicate that there is a large income premium in favor of the private sector at the higher end of the income distribution, especially once we account for worker and firm characteristics, which suggests that the same person earns substantially less in the public sector. This is especially pronounced for high-skilled workers. The 50 percent increase initially improved the relative income of public sector workers, but in the longer run, income gaps returned to close to the pre-reform level and the distributional differences remained.

Keywords: quantile decomposition, wage level and structure, public-private pay gap

JEL classification: C21, J31, J45

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**Javíthatja egy ötven százalékos béremelés a közsféra
dolgozónak helyzetét hosszabb távon?
A köz- és magánszféra bérkülönbségének
elemzése Magyarországon**

Hámori Szilvia – Lovász Anna

Összefoglaló

A tanulmányban átfogó és részletes képet adunk a 2002-es, a közsféra dolgozóinak munkapiaci helyzetének javítását célzó ötven százalékos béremelés hosszú távú hatásairól. A lépés célja az volt, hogy a közsféra vonzóbb legyen a jó minőségű munkaerő számára, és csökkenjen a magasan képzett munkaerő külföldre vándorolásának mértéke. A köz- és magánszféra bérkülönbségére gyakorolt hosszú távú hatások elemzéséhez – különös tekintettel a magasan képzett munkaerő helyzetére - olyan empirikus módszereket alkalmazunk, amelyek lehetővé teszik a teljes béreloszláson megfigyelhető különbségek figyelembevételét (kvantilis regresszió), a dolgozói, valamint intézményi összetétel hatásainak szűrését (dekompozíció), valamint egyéb lehetséges torzítások korrekcióját (hamis minimálbérek, eltérő munkahelyi körülmények). Az eredmények alapján a közsféra dolgozói továbbra is jelentős bérhátrányt szenvednek a béreloszlás felső részén, különösen a munkaerő megfigyelhető különbségeinek figyelembevétele után. Ez a magasan képzett csoporton belül a leghangsúlyosabb. Az 50 százalékos béremelés először javította a közsféra dolgozóinak helyzetét, de hosszabb távon a bérkülönbségek a reform előtti szinthez közelítenek, az eloszlások eltérései továbbra is fennmaradtak.

Tárgyszavak: kvantilis dekompozíció, bérszint és struktúra, köz-magánszféra bérkülönbség

JEL kódok: C21, J31, J45

1 INTRODUCTION

Contrary to what is seen in western European countries, public sector pay in Hungary has been lower on average compared to the private sector. The widening sector pay gap during the 1990s led to public dissatisfaction and a lower demand for public sector jobs, and eventually promises and measures by the government aimed at improving the situation. Following election campaign promises, the government increased public sector wages by 50 percent on average between 2002 and 2003. Besides reasons of fairness and pleasing public opinion, the goal of the increase in public sector wages was to retain high quality workers in the public sector, as well as entice them to stay in Hungary rather than going abroad.

In light of the public sector wage reform, we study the evolution of the Hungarian public-private income gaps between 2002 and 2008, using a matched employer-employee dataset comprised of large representative samples of both sectors. We focus on the following questions: Who benefited most from the 50 percent wage increase? And, was the policy successful in terms of having a lasting impact on the public-private sector income gap, by making public sector employment more appealing to high quality workers?

To answer these questions, we employ the quantile decomposition technique introduced by Machado-Mata (2005), which allows us to account for the part of the income gap that is due to differences in observable characteristics (of workers and employers), and an unexplained part – an estimate of the difference in the income of the same individual when employed in the public or private sectors – at various points of the income distribution. Accounting for distributional issues is particularly important, given the different shapes of income distributions in the private and public sectors. Furthermore, it allows us to differentiate the effect over the income distribution.

In addition to distributional issues, we address a number of measurement issues to give a comprehensive analysis of the public-private sector income gap. First, we divide the private sector into domestic and foreign subsamples in order to decompose the income gaps between the public sector and domestically owned private sector firms and foreign-owned private sector firms separately, as foreign firms pay higher income to their employees than domestic ones, leading to different public-private income gaps. Since the choices of high quality workers may be reflected better by separating these two types of private sector firms, this provides us with a more accurate picture of the effectiveness of the wage increase in providing them with more appealing public sector opportunities. Second, as high-skilled individuals suffer the greatest disadvantage by choosing to work in the public sector (because of the nature of the public sector wage scale), coupled with the fact that the government

intended to target the wage reforms at attracting them and retaining them in public sector jobs, we restrict the analysis to this group specifically.

The issue of underreporting wages in the private sector needs to be taken into account to give an unbiased estimate of the public-private sector income gap. More specifically, in Hungary (especially in small firms) employers often report workers at the officially declared minimum wage, but actually pay them more. This leads to an underestimation of the pay benefit of working in the private sector as opposed to the public sector, where underreporting of wages is less possible due to strict pay scales. To address the issue of measurement error due to underreported wages (false minimum wage earners), we estimate specifications based on an imputed “true” income variable following the work of Köllő (2008).

Selection bias introduced by sector choice is another important issue in pay gap estimation. It is likely that some workers value certain characteristics of public sector jobs – such as job security – and are willing to work for lower pay to indulge these preferences. Although we do not have the data needed to model sector choice explicitly, we attempt to isolate the effect of differences in the preferences of workers by including some crude measures of job characteristics that are available in the dataset. Subsequently, our preferred specification uses true income and the full set of worker, employee and workplace characteristics.

The results indicate that there is a large negative income gap at the higher end of the income distribution, especially once we account for worker and firm characteristics, which suggests that the same person earns substantially less in the public sector. Based on our preferred estimates, the unexplained public-private income gap is -0.06 and -0.79 at the 10th and 90th quantiles respectively in 2002. Women seem to be better off relative to men based on the raw public-private gaps, but the unexplained gaps are very similar for both genders, especially at the higher income levels. The 50 percent wage increase lessened the disadvantage of public sector workers in 2003, but this effect was eroded over time, with unexplained gaps returning to close to their original levels. The within-dispersion in the unexplained gap was only slightly lower in 2003 than in 2002 and remained relatively unchanged over the period – indicating that those at the higher end of the public sector distribution did not benefit more from the wage reform in the long run than those at the bottom.

Subsample analysis indicates that the disadvantage of the public sector is due to higher income in foreign-owned private sector firms, while domestic firms pay only slightly higher incomes to workers with equal characteristics. The differences among parts of the distribution are especially pronounced when the decomposition is restricted to workers with a diploma, in line with the compressed public sector wage scale.

The rest of the paper is constructed as follows: Section 2 provides a brief description of the evolution of wages and income in Hungary, focusing on the period between 2002 and 2008. Sections 3 and 4 discuss the empirical framework and the measurement issues connected to the estimation of the public-private sector income gap respectively. Section 5 proceeds with a description of the data, and basic descriptive evidence. Section 6 presents the estimation results based on the different specifications. Section 7 concludes.

2 OVERVIEW OF PRIVATE AND PUBLIC SECTOR WAGES AND INCOME IN HUNGARY

Hungary is no exception in the sense that wage setting in the public sector is subject to political pressure and pursues the goals of equity, whereby the public sector wage scale is characterized by the principle of not paying too low wages for low-skilled employees, and not too high for their high-skilled counterparts. Subsequently, the unconditional income distribution is more compressed in the public sector than in the private sector, where competitive goals are pursued, and wages are more productivity-based.

These differences can be seen in the kernel density estimates of income distributions by sector and gender, for the years 2002–2008, shown in Appendix Figure A1. Public sector distributions generally have higher peaks around the mode, while private sector distributions have fatter tails. The figures also point to the significance of the problem of underreporting of wages: private sector distributions, especially in the case of men, have a clear peak at the minimum wage. The peak increases over time, and is the most pronounced in the year 2006, after which it decreases. The trend of false minimum wage reporting and its impact has been documented in a number of studies (Köllő 2008, Elek-Szabó 2008, Elek et al. 2008). Since this leads to a bias of the public-private pay gap estimates that are our focus, we employ the method suggested by Köllő 2008 to impute the true wages of minimum wage earners in our final estimated specifications discussed in Section 4.

In the early 2000s, a number of significant wage reforms were implemented in Hungary, which had an effect on the evolution of the public-private sector wage and income gaps. To address the low statutory minimum wage¹ to average earnings ratio, minimum wages were increased substantially in 2001 from 25,000 HUF to 40,000 HUF and in 2002 to 50,000 HUF.² As a result, the ratio of minimum wage to average monthly gross earnings rose from around 29 in 2000 to 39 percent in 2001 and to 41 by 2002. The increases in minimum wage

¹ The minimum wage, introduced in 1989, is legally binding and covers all employment contracts. Compliance with the minimum wage regulations is high. For instance, in 2001, less than 2 percent of the full-time employees were paid less than the minimum wage (Kertesi-Köllő 2003).

² See Kertesi-Köllő (2003) for detail on the motivation behind the minimum wage increases.

in turn compressed the public sector wage scale even further, as the brackets of the public sector employees were not changed proportionately.

The compressed wage scale, in addition to the severe problem of the widening pay gap between the private and public sectors, led to a number of public sector wage increases in the early 2000s.³ The government increased the wages of certain groups of public sector employees (civil servants, public order officers, army officers and employees in the judiciary system) between 2001 and 2003 in different magnitudes ranging from 15 to 55 percent (for detail see OECD 2004). The most significant public sector wage reform was implemented in 2002: The government in office carried out a 50 percent average increase of the wages of public servants, affecting around 20 percent of the labor force. Furthermore, the government revised the existing wage scale⁴ due to the wage compression caused by the minimum wage increases, thereby altering relative wages. According to the revised wage scale, the wages in the lowest qualification and seniority category (A1) were equal to the statutory minimum wage and those in (the lowest seniority bracket) of the highest qualification category (J1) earned 2.65 times more than the minimum wage. Moreover, the government introduced a minimum monthly wage for tertiary graduates, whereby the wages of the (lowest education and seniority bracket of) tertiary graduates (F1) were set to 100,000 HUF (twice the statutory minimum wage).

After 2003, neither minimum wage increases nor public sector wage increases of such magnitude were implemented by the government. Consequently, the proportion of minimum wage to average monthly gross earnings decreased to 35 percent by 2008 – close to the initial 1998 figure. Public sector income dropped twice under the period under analysis: in 2004 due to the fact that the 13th month payment was postponed to January 2005, and in 2007 due to austerity package implemented in 2006 aiming at macroeconomic stabilization and the reduction of the budget deficit.

The graphs in Appendix Figure A2 depict the evolution of the mean, the 10th, and the 90th quantiles of the unconditional income distributions of the two sectors. The top panels show mean wages and income trends by gender. For men, wages and income (which includes non-wage elements such as bonuses and overtime pay) show a similar pattern: in 2002, mean values were significantly lower in the public sector, the 50 percent wage increase led to roughly equal average wages and income in 2003, and then the gap reappeared and increased

³ See Kertesi-Köllő (2002), Kézdi et al. (1998) and Kézdi (2002a) for detail on the evolution of the private-public sector wage gap during the transition and Telegdy (2007) on the short-term effect of the 50 percent wage increase on average wages.

⁴ The public servants' scale (*Közalkalmazotti bértábla*) assures equal wages for public sector employees for a given job with the same qualification and seniority. The wage scale is such that wages increase mechanically both horizontally and vertically: wages increase along the 10 educational categories (A–J) and for each qualification category wages increase with seniority along 14 brackets in different magnitudes. A separate wage scale exists for civil servants (*Köztisztviselői előmeneteli és illetmény rendszer*).

over time in favor of the private sector. In the case of women, the overall trend is similar, but we can see that the gap is smaller in income than in wages, suggesting that non-wage payments are an important element of income for female public sector workers. This difference in pay measures motivates our use of income in the subsequent analysis.

In the bottom panels we can see that the general belief that public sector workers earn less overall than their private sector counterparts, is actually not true at all income levels, a fact which is hidden by mean-based analysis. Employees at the lower end of the public sector income distribution (10th quantile) enjoy a premium relative to their private sector counterparts at the same point of the private sector income distribution, and the opposite is true at the top of the income distribution (90th quantile), which reflects the principle of “higher floors” and “lower ceilings” in the public sector and again supports the importance of not limiting the analysis to the comparison of mean income and motivates our use of quantile regressions and decomposition discussed in Section 3.

3 METHODOLOGY

An analysis of the public-private sector income gap based on mean income may not give a full picture of the relative situation of public and private sector workers due to the underlying distributional issues discussed in Section 2. The focus on distributional issues in turn motivates the use of quantile regression methods (introduced by Koenker-Bassett 1978), which allow the analysis of the effect of each covariate along the entire wage distribution.⁵ Quantile regression methods have been previously applied to the analysis of the public-private sector pay gap, among others, by Budria (2006), Lucifora-Meurs (2004), Melly (2005), Mueller (1998), Nielsen-Rosholm (2001) and Poterba-Rueben (1994). Hámori (2008) demonstrates that, in line with the existing international evidence, the estimate of the public-private sector income gap in Hungary is highly sensitive to the quantile estimated.

Quantile regression provides a more accurate picture of the public-private sector income gap than OLS regressions⁶, but it is also important to see what part of the gap may be due to differences in the public and private sector workforce, rather than focusing on the gap

⁵ See Buchinsky 1994, 1998, and Koenker-Hallock 2002 for overviews of the quantile regression methodology.

⁶ The most straightforward way of studying the gap between the public and private sectors would be to estimate wage equations on pooled data, including a dummy indicating the public sector as a dependent variable. The coefficient of the sector dummy would then reflect the wage gap between the sectors, while the effects of the other covariates would be constrained to be equal across the two sectors. The inclusion of interaction terms between the sector dummy and worker characteristics such as education and experience helps alleviate this problem to the extent that it allows the prices paid for various characteristics to differ between the sectors, but the wage gap estimate between the two sectors is still referring to a mean effect.

measure alone. The Blinder-Oaxaca methodology (Blinder 1973, Oaxaca 1973) (implemented in Stata by Jann 2008) decomposes the difference in mean income into a component explained by differences in mean characteristics and an unexplained component:

$$\bar{I}_i^{pub} - \bar{I}_i^{priv} = (\bar{X}_i^{pub} - \bar{X}_i^{priv})\hat{\beta}_{priv} + (\hat{\beta}^{pub} - \hat{\beta}^{priv})\bar{X}_{pub}, \quad i = 1, \dots, n \quad (1)$$

where \bar{I} denotes mean income for individual i . The first component is the part of the gap that is due to the difference in mean characteristics between public and private sector workers (characteristics or explained component) and the second component reflects the differences in returns to the characteristics (unexplained component).

The Machado-Mata quantile decomposition method can give us a more accurate picture than decomposition of the mean income gap, and previous studies suggest that this significantly affects the conclusions of the analysis (for example Melly 2005). The Machado-Mata technique (implemented in Stata by Melly 2007), combines quantile regression and a bootstrap approach to stochastically simulate a counterfactual income distribution. This means that we can separate what part of the gap is due to observable differences in worker characteristics and what part is unexplained by these, and thus due to different returns to characteristics of workers in the private and public sectors along the entire income distribution.⁷

In this study, we decompose the differences in income distribution in differences in characteristics and differences in returns using the Blinder-Oaxaca and Machado-Mata procedures. For the Machado-Mata procedure⁸, we estimate our specifications at the 10th, 25th, median, 75th and 90th quantiles of the income distribution using different subsamples, an alternative income measure which corrects for false minimum wage earners in the private sector, and a larger set of control variables, as discussed in Section 4.

⁷ As our goal is to study the incentives of individual workers in terms of their choice of sector, we are interested in seeing how much more or less a given individual would make depending on where they work. Although we only observe the income of each worker in the sector where they are actually employed, and thus we can never measure accurately this income differential for a given person (or two completely identical individuals), accounting for compositional differences and allowing for differing effects along the income distribution brings us closer to answering this question accurately.

⁸ The number of replications is set to 100.

4 MEASUREMENT ISSUES AND ESTIMATED SPECIFICATIONS

4A BENCHMARK SPECIFICATION

(SPECIFICATION 1)

For our benchmark specification (Specification 1), we use the natural logarithm of monthly gross income as dependent variable.⁹ As explanatory variables, we use standard controls for employee and employer characteristics, namely education, experience, tenure, occupation, region, and firm size (see Section 5 for details and statistics of the control variables and sample restrictions). The rest of the specifications (2–6) address various measurement issues as summarized in Table 1.

4B SUBSAMPLE ANALYSIS: DOMESTIC AND FOREIGN FIRMS

(SPECIFICATIONS 2 AND 3)

Specification 2 and 3 restrict the private sector to domestic and foreign firms respectively. Distinguishing between these types of firms is important for three reasons. First, employees actually choose between public, domestic private, and foreign private firms, which offer significantly different opportunities in terms of income and work environment. This selection must be taken into account explicitly when looking at the public-private sector gap, especially since we are interested in the situation of high-skilled workers in particular, who work at foreign firms in a higher ratio. Second, as foreign and domestic firms pay different incomes to their employees, the wage reforms may have affected the income gap between the public and these two types of firms differently in the long-run. Third, implicitly we address the issue of underreporting wages as by focusing on foreign firms given the evidence that in addition to large firms, foreign firms are much less prone to underreporting of wages (Elek et al. 2008).

4C SUBSAMPLE ANALYSIS: HIGH-SKILLED EMPLOYEES

(SPECIFICATION 4)

Our next specification restricts the analysis to high-skilled individuals (those with a diploma). We focus on the high-skilled group separately, since they are those who suffer a great

⁹ Alternatively, we also decompose the gap in wages. As seen in Figure A2, wage and income gaps follow a similar pattern, except for a slight difference in the case of women, who seem to receive more non-wage income in the public sector. Since our goal is to assess individual's decisions regarding sector choice, real income is the basis of the preferred gap measure.

disadvantage of working in the public sector due to the wage ceilings, and the goal of lessening “brain drain” pertains mostly to these workers. Therefore, we are particularly interested in whether the 50 percent mean wage increase, coupled with the revision of the public sector wage scale in their favor, lessened their disadvantage in the long-run relative to their private sector counterparts.

4D MEASUREMENT ISSUES: CORRECTING FOR UNDERREPORTED WAGES (SPECIFICATION 5)

As previously seen in the kernel density graphs, another major estimation issue is the effect of underreporting of employee wages (reporting at the officially declared minimum wage but paying employees above that level) by private firms seeking to avoid high employer contribution payments (Elek-Szabó 2008, Elek et al. 2008, Köllő 2008). The potential underreporting of wages affects the comparison of the public and private sector income directly. That is, if private sector firms report false minimum wages, the income of private sector workers will appear lower, leading to a false wage premium (or smaller wage deficit) in favor of the public sector.¹⁰ To address the potential bias due to the underreporting of wages in the private sector, we rely on Köllő (2008) who develops a technique for imputing the true wage of false minimum wage earners in order to assess the tax revenue loss due to the underreporting of wages. He estimates the returns to worker characteristics on the sample of workers whose wage is above the minimum wage – and are assumed to not be underreporting – and imputes the “true wage” of minimum wage workers based on these coefficient estimates and the workers’ observed characteristics.

We apply this method to construct an alternative wage variable (true wage) for the workers in our sample. Based on this true wage measure, we then calculate “true income” by adding the non-wage payments received by each worker, and use this as the dependent variable in Specification 5. Kernel estimates of the unconditional “true income” distributions are presented in Appendix Figure A3. As expected, the peak at the minimum wage that was characteristic of the private sector unconditional income distributions (Figure A1) due to underreporting disappears, yielding distributions closer to normal in shape.

¹⁰ As public sector institutions are bound by wage scales, underreporting of wages is not as likely to pose a problem for this sector. For this reason, the specification presented here assumes that false wage reporting only applies to the private sector.

4E ACCOUNTING FOR WORKPLACE CHARACTERISTICS (SPECIFICATION 6)

One general problem of estimating the public-private sector income gap is the issue of public-private sector choice of workers and selection bias: if people choose to work for less in public sector due to their preference for certain work conditions (flexibility, less pressure, etc.), then a part of the income gap between sectors is due to this choice (compensating wage differentials). According to Kézdi (2002a), Hungarian employees work under very different conditions in the private and public sectors with shorter real working hours, foreseeable allowances, and greater job security in the latter sector of employment.

In order to control for differences across the two sectors, we augment the benchmark regression model with a number of variables that capture workplace characteristics, subject to our data limitations. More precisely, in our 6th specification, we add three workplace variables meant to capture differences in working conditions: a dummy variable indicating whether the workplace allows for a lunch break (to capture some of the non-wage worker characteristics), a set of dummy variables for the type of employment contract (a proxy measure of job security), and a constructed variable indicating the deviation from expected work hours (to control for unpredictability of work hours and, indirectly, the stress level of the job). These are clearly very crude measures of workplace characteristics, and they certainly cannot capture all differences that influence sector choice. However, the results give some indication of the direction of the selection bias and whether the effect has varied over time. This specification gives our preferred estimates, as we also use true income as our dependent variable, and it includes the most comprehensive set of controls. Table 1 summarizes the details of our specifications.

Table 1

Specifications

Specification	Sample restriction	Dependent variable	Controls
Specification 1	Excludes all employees (i) working part-time (ii) reported to work full-time but earn below the minimum wage (iii) firms with 20 employees or less	Log income	Employee characteristics: education, potential labor market experience and its square, tenure and its square, occupation Employer characteristics: region, firm size
Specification 2	Specification 1 plus (iv) excludes all foreign firms in the private sector	Log income	Specification 1
Specification 3	Specification 1 plus (iv) excludes all domestic firms in the private sector	Log income	Employee characteristics: potential labor market experience and its square, tenure and its square Employer characteristics: region, firm size
Specification 4	Specification 1 plus (iv) excludes all education categories other than tertiary graduates	Log income	Specification 1
Specification 5	Specification 1	Log true income	Specification 1
Specification 6	Specification 1	Log true income	Specification 1 plus workplace characteristics: time for lunch, deviation of actual and expected work hours, type of employment contract

5 DATA

For the empirical analysis, data is drawn from the Hungarian Wage and Employment Survey (WES), an annual representative cross-section dataset covering both the public and private sectors of employment.¹¹ From 2000 onwards, the WES includes a 20 percent random sample of firms with 5–19 employees, which provide information on all of their full-time employees, and all firms with more than 20 employees, which provide information on a random sample of their full-time employees.¹² The WES covers all public sector institutions;

¹¹ See The Hungarian Labour Market: Review and Analysis (2002) for a detailed description of the Wage Survey.

¹² Random sampling in both sectors of employment means that data is collected on employees born on certain days of the month. The sampling design differs for physical and intellectual workers, so individual weights as well as firm level weights are provided in the dataset.

the majority (those included in the TAKEH central payroll system) provides information on all their employees and the rest as a random sample of their employees. The public sector institutions cover public servants, civil servants, and judges and public prosecutors.

We use a number of restrictions to arrive at our estimation sample. Due to computing restrictions, we were provided with a random and representative 10 percent sample of the original public sector data. We restrict the analysis to prime-aged (25–55) employees. We exclude those working part-time (working at least 36 hours per week).¹³ Furthermore, we exclude all firms employing less than 20 employees, as the practice of underreporting wages is most common in small firms (Elek et al. 2008, Köllő 2008, Tonin 2007). We exclude all observations where monthly wage is larger than monthly income. We restrict the analysis to public servants, who make up around 85–89 percent of public sector employees, as only their wages were affected by the 50 percent wage increase and because the wage scales are different for judges and civil servants.¹⁴

Income is defined as monthly gross wage plus one twelfth of the sum of all other payments and irregular incomes connected to the full-time job paid over the previous year. Income and wage are given as 2008 real values. One of the advantages of the WES is that data is reported by the employer, and hence the earnings measures are more reliable than if they were self-reported.¹⁵ We use individual and firm weights to correct for sampling biases.

Appendix Tables A1 and A2 provide a description of the means of the variables for our regression samples in the first and last year of the period under analysis. Mean real income is higher in the private sector than in the public sector in 2002 for both men and women. This is especially true for high-skilled workers, who earn more than twice as much in the private sector on average. Foreign firms pay a significantly higher mean income than public and domestic private firms, while the latter two are almost equal. The means of the true income variable reflect the increase seen in the private sector when false minimum wages are corrected. In 2008, we still see higher wages in the private sector on average, and foreign firms still pay more. However, domestic private firms now pay a lower mean income than public employers.

The educational composition of both male and female samples suggests that the average skill level is higher in the public sector, which also characterizes western European economies (Dustmann-van Soest 1997, Lucifora-Meurs 2004, Melly 2005) and the US

¹³ In 2002, there private sector part-time employees are not available in the dataset. We carried out the estimation using the full sample of employees between 2003 and 2008, yielding identical results as those based on the sample of full-time employees only.

¹⁴ The income of civil servants and judges are higher than those of public servants, and thus, despite the fact that the former two groups only account for around 21–25 percent of the public sector employees, estimation results are different (i.e. leading to a higher income gap in favor of the public sector) when they are also included in estimation.

¹⁵ See Kézdi (2002b) for evidence on the systematic differences between self-reported and employer-reported earnings data.

(Poterba-Rueben 1994). Whereas around 42 and 40 percent of men and women respectively possess a tertiary degree in the public sector in 2002, only 13 and 11 percent do so in the private sector. The occupational composition is also in favor of the public sector, with a higher fraction of professionals, technicians and associate professionals. This reflects the nature of public sector employment (health and education). While private and public employees possess around the same years of labor market experience, years of tenure is higher in the public sector. The distributions of employer characteristics (region and firm size) are similar for the two sectors. In terms of the workplace characteristics, it is important to point out that the fraction of employees whose contract explicitly specifies a lunch break within working hours is substantially higher in the public sector. Note that there is no significant change in the composition of the samples over the period under analysis.

6 RESULTS

As a first step, we present the Blinder-Oaxaca mean decomposition results for males and females respectively in Figure 1 and Tables A3 and A4 of the Appendix. We then turn our attention to the quantile decomposition results, subsample results, and various robustness checks in Figures 2–7.

6A MEAN DECOMPOSITION RESULTS

(SPECIFICATION 1)

Figure 1.a and 1.b depict the mean raw income gap for, which does not take differences in observable characteristics into account, the explained component of the gap, and the remaining unexplained part for men and women respectively. The unexplained gap gives a more accurate measure of the difference in the income of the same individual when working in the two sectors, but this is still an estimate, since factors that may affect pay may remain unobserved (we control for the composition of the two sectors in terms of worker education level, tenure, potential work experience, and occupation, as well as the region and size of their place of employment).

For men, the mean raw gap in income is -0.08 in 2002, indicating that average income for men is eight percentage points lower in the public sector than in the private sector. The explained component of the decomposition results indicates that public sector employees have better productive characteristics. The mean explained gap is positive and relatively stable over time, increasing slightly from 0.26 in 2002 to 0.3 in 2008. The mean unexplained

gap that remains after we take characteristics into account is in favor of the *private* sector, amounting to around 0.34 in 2002. In 2003, as a result of the wage increase implemented in the public sector, the mean raw income gap is in favor of the public sector (0.12). The mean unexplained gap, however, is still in favor of the *private* sector, at around 0.13. Between 2004 and 2008, the unexplained differential increases (in absolute value) close to the 2002 level. The unexplained gap remains negative and significant at around -0.22 in 2008. Based on this result, we do not find evidence of a significant long term improvement in the average situation of male public sector employees. The initial improvement in the raw and unexplained income gap of public sector workers was eventually offset by the continued higher growth of private sector incomes.

For women, the situation is similar: the sharp rise and gradual decline of the raw and unexplained gap can be seen here too. The main difference is that even in 2002, the raw gap was much closer to zero, indicating that women's relative situation in the public sector was generally better than in the case of men. The wage increase in 2003 seems to benefit women more: the raw gap in favor of the public sector is around 0.23, almost twice that of men. After taking observable differences into account, women also receive a premium for working in the private sector, the unexplained gap remains negative, and is increasingly so in the long-run.

Tables A3 and A4 of the Appendix present the full results of the mean decomposition for men and women, allowing the assessment of the contributions and significance of each characteristic individually. The biggest compositional difference between the sectors is in the ratio of workers with a diploma, and within occupational categories, specifically skilled jobs. Region and firm size, as well as experience and tenure of workers play a lesser, though significant role. Overall, it is clear that compositional differences must be taken into account when considering the choice of sectors faced by workers: the public sector pays significantly less on average to individuals with equal (observable) productive characteristics. However, an analysis of based on mean income may not give a full picture of the relative situation of public and private sector workers due to the underlying distributional issues.

Figure 1.a

**Blinder-Oaxaca decomposition, worker and firm controls,
public-private income gap, 2002–2008, men**

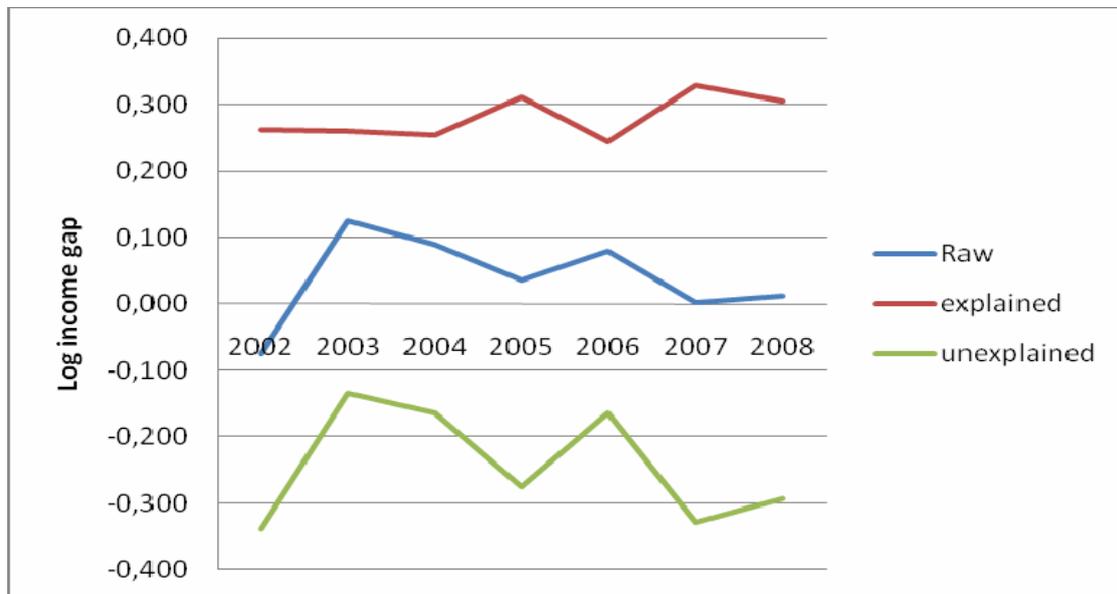
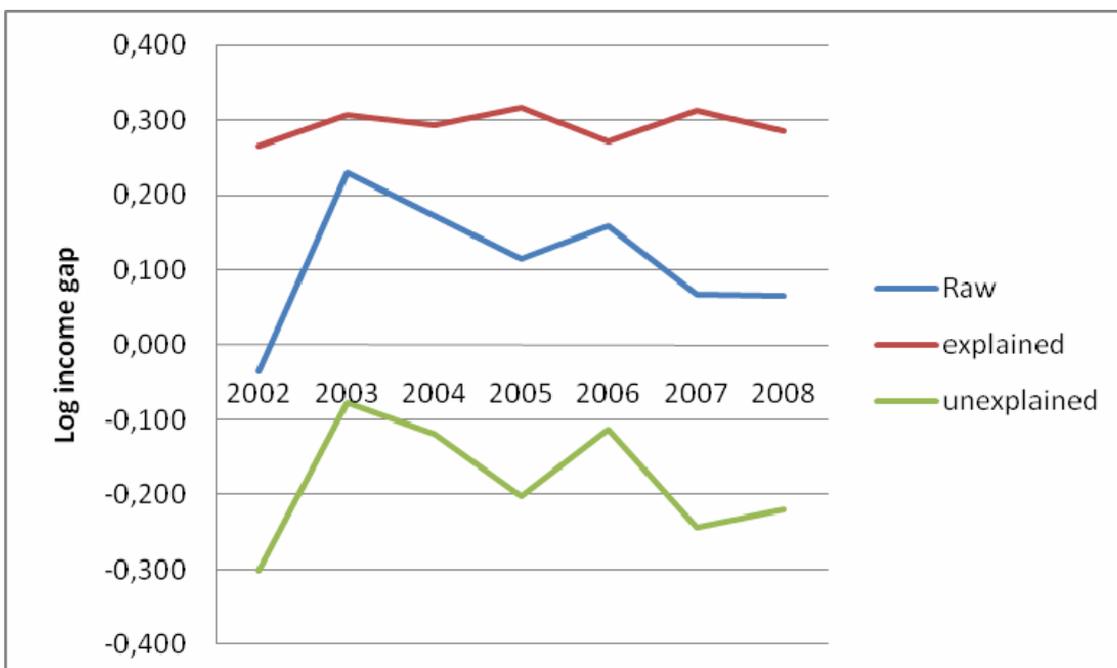


Figure 1.b

**Blinder-Oaxaca decomposition, worker and firm controls,
public-private income gap, 2002–2008, women**



6B QUANTILE DECOMPOSITION RESULTS: WORKER AND FIRM CONTROLS (SPECIFICATION 1)

We begin with the quantile equivalent of the mean decomposition presented in Section 6A, with controls for worker and firm characteristics. Figure 2.a. presents the trends in the raw, explained, and unexplained public-private gaps for men. Starting with median estimates for 2002, (i) the raw gap amounts to -0.02 , indicating that median log income for men is 2 percent lower in the public sector than in the private sector, (ii) the part of the gap explained by worker and firm characteristics is in favor of the *public* sector and (iii) the unexplained income gap is -0.28 . These results differ from the mean results slightly, an indication of the different shapes of the two sector's income distributions. Not surprisingly, in 2003, the median raw income gap is in favor of the public sector (0.27). The unexplained gap in 2003, however, is -0.11 , indicating a public sector deficit. The median raw gap decreases in magnitude between 2004 and 2008, but remains in favor of the public sector. The median unexplained gap, on the other hand, which indicates a public sector deficit throughout the period, returns to its pre-reform level at -0.27 .

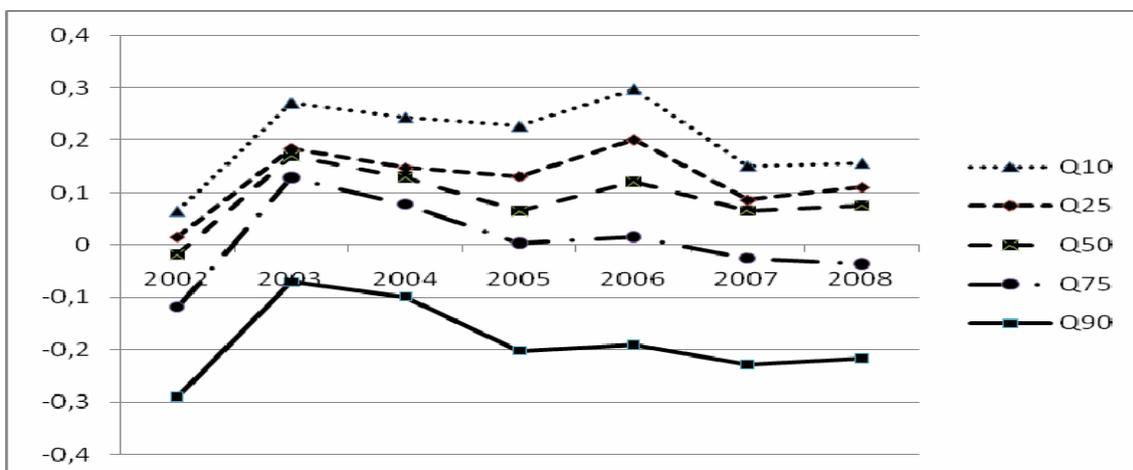
Turning to the different quantiles, from Figure 2.a we see that the raw gap varies strongly with the estimated quantile, due to the compressed public sector income structure: the premium is in favor of the public sector at the bottom of the distribution and in favor of the private sector at the top. Even after the wage reform, the public-private gap amounts to -0.07 at the 90th quantile of the income distribution and increases to around -0.22 by 2008. At all estimated quantiles throughout the period, the public sector has better overall endowment in worker and firm characteristics (mainly due to their higher education levels and higher fraction of professionals): the explained gap is positive. The characteristics gap is higher at higher points of the income distribution, and remains relatively stable over time, with a slight increase by the end of the period, especially at the 10th and 25th quantiles.

In terms of the unexplained gap, we see a much bigger private sector advantage compared to the raw gap, due to the better overall endowment of the public sector at all points of the distribution. The unexplained gap increases along the distribution, and is very high in the case of the highest quantiles: the 90th quantile shows a gap of -0.75 in 2002. After the wage increase, there is an improvement in the relative income situation of public sector workers at all estimated quantiles. At the lower end of the income distribution, workers received a premium for working in the public sector (0.2 for the 10th quantile). However, at the median (and above), the unexplained gap is still negative in 2003, at around -0.11 . The unexplained gap returns close to the 2002 level by 2008 at most quantiles, more so than the raw gap (due to the slight betterment of endowments mentioned above): for the 90th quantile, the gap fell to -0.62 , while for the 10th quantile, the gap returned to near zero.

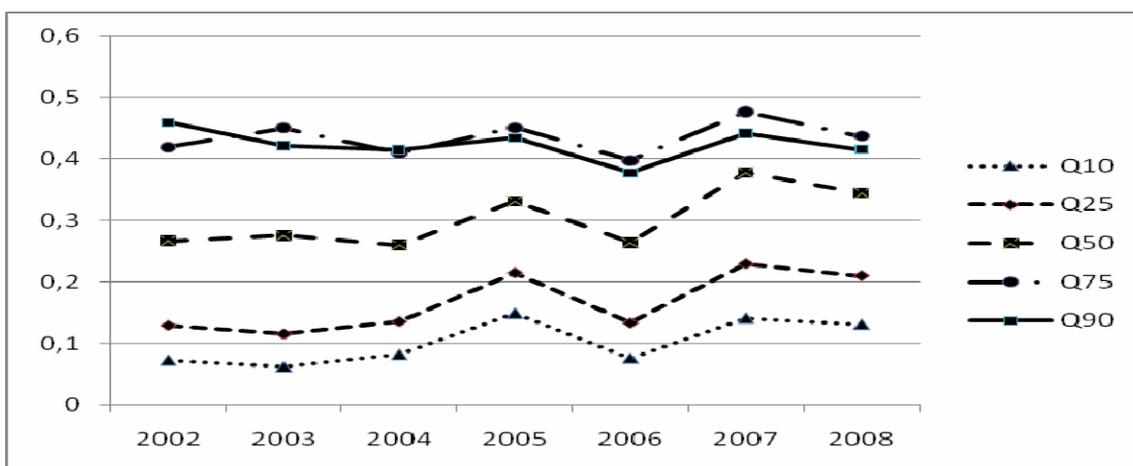
Figure 2.a

Quantile decomposition, worker and firm controls, 2002–2008, men

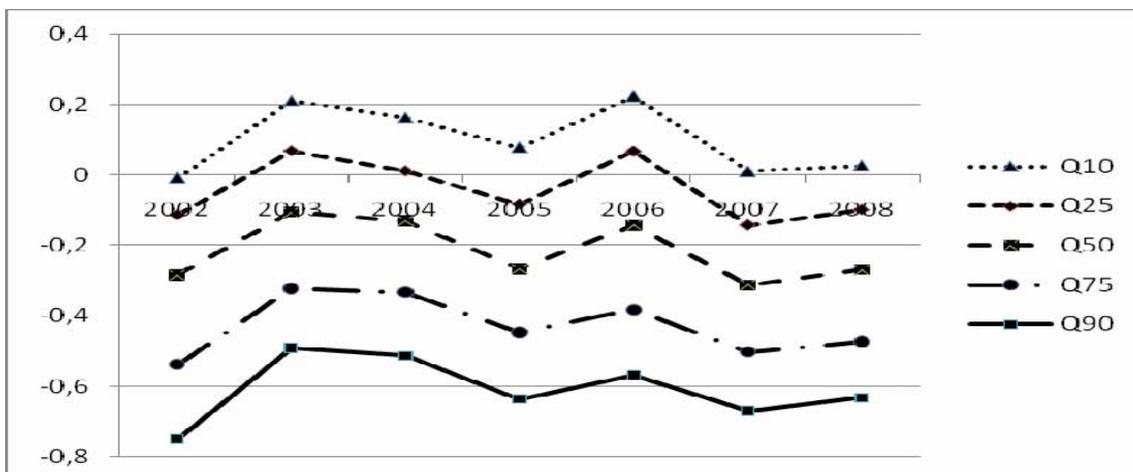
Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps



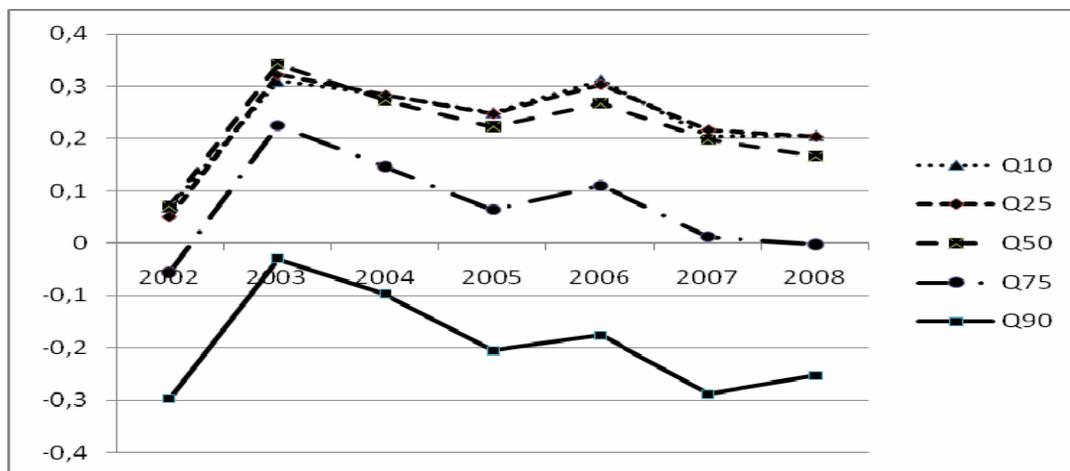
The raw public-private income gaps of female workers depicted in Figure 2.b show that the relative situation of women is better in the public sector than that of men: quantiles 10 through 50 earn higher incomes than they do in the private sector. However, at the high end of the distribution, the raw gap is around -0.3 for women in 2002, which is equal to that of male workers, and by 2008, it is more negative than men's, at around -0.25 (vs. -0.22 for men). The part of the gap explained by differences in characteristics remains relatively stable over time with slight increases at the lower end of the distribution, as we saw in the men's results. Most remarkably, the graph depicting the unexplained gaps is very similar for both genders, with a slight difference: the effect of the 50 percent wage increase seems to have lasted longer for women, with slightly lower negative unexplained gaps at the end of the period.

To assess the decisions of these individuals in greater detail, we now focus on an important element of their choice: rather than choosing between the two sectors, there may be important distinctions between firms under different ownership within the private sector.

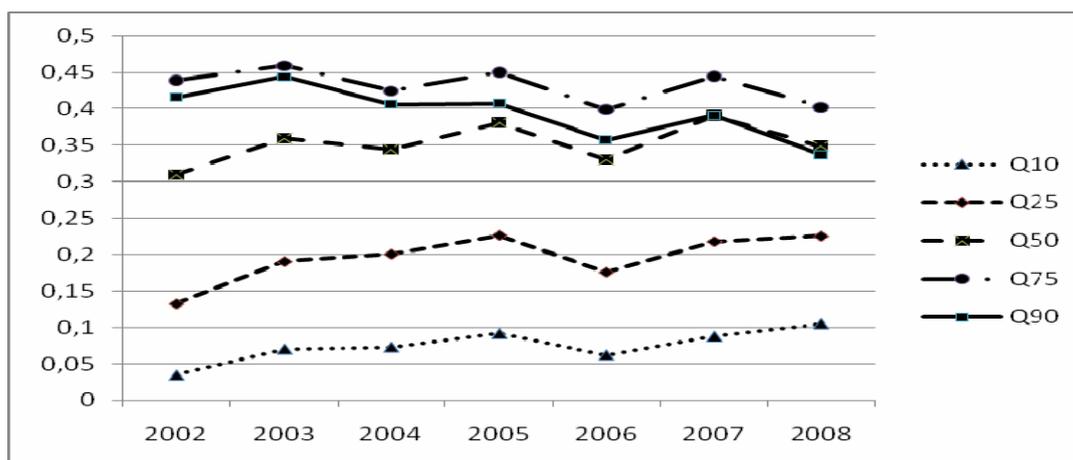
Figure 2.b

Quantile decomposition, worker and firm controls, 2002–2008, women

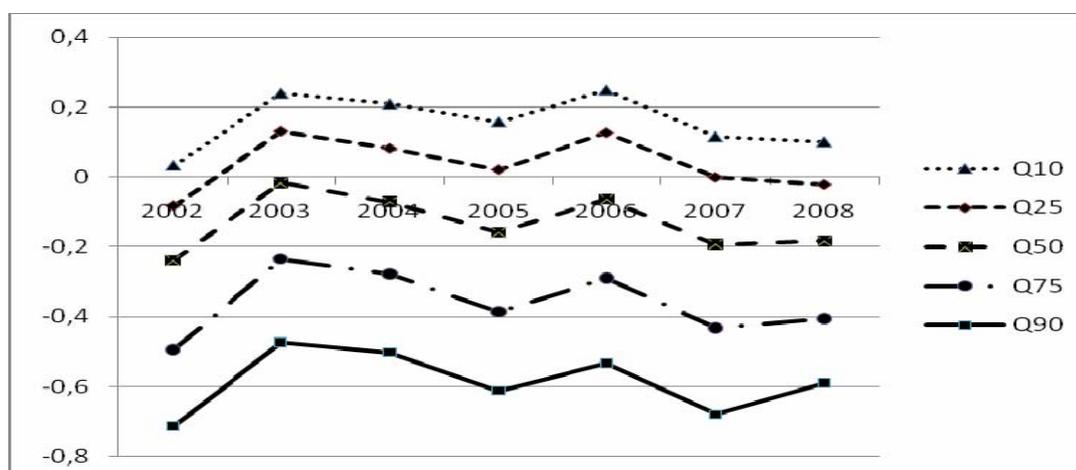
Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps



6C QUANTILE DECOMPOSITION RESULTS: FOREIGN AND DOMESTIC PRIVATE SUBSAMPLES (SPECIFICATIONS 2 AND 3)

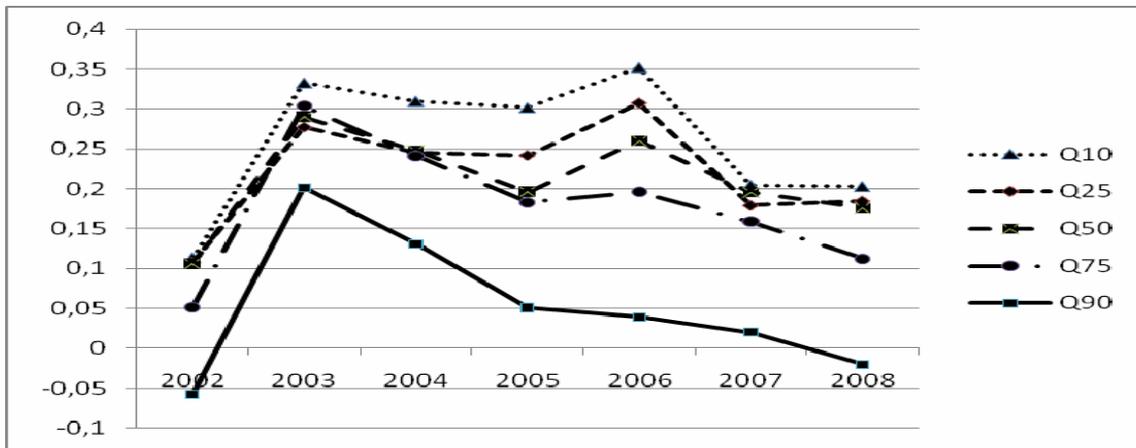
In the next two specifications, we restrict the private sector to the subsample of domestic and foreign firms respectively. Thus we are decomposing the income gaps between the public sector and domestically owned private sector firms and foreign-owned firms separately. Figure 3.a presents the results of the public-domestic private decomposition for men. The raw gaps suggest that compared to domestic firms, the public sector generally pays better: the raw gap is positive at all quantiles except for the 90th, where it is near zero. The effect of the wage increase is also eroded by the end of the time period. In terms of characteristics, public sector workers are better endowed than domestic firm workers, there is a positive explained gap that increases along the income distribution, and is relatively stable over time. The unexplained gap shows that once we take compositional effects into account, even domestic private firms pay better than the public sector, except at the lowest quantiles. There is an increasingly negative gap along the distribution, the gap of the 90th quantile is -0.52 in 2002, and following the increase -0.28 in 2003, it falls back to -0.5 by 2008. In the long term, the 50 percent increase had little effect.

The results for women, shown in Figure 3.b. give a similar picture: positive raw gaps, except for the highest income quantile, and a return close to initial levels by 2008. The unexplained gap is similarly positive for the lower end of the distribution, but negative at the top end.

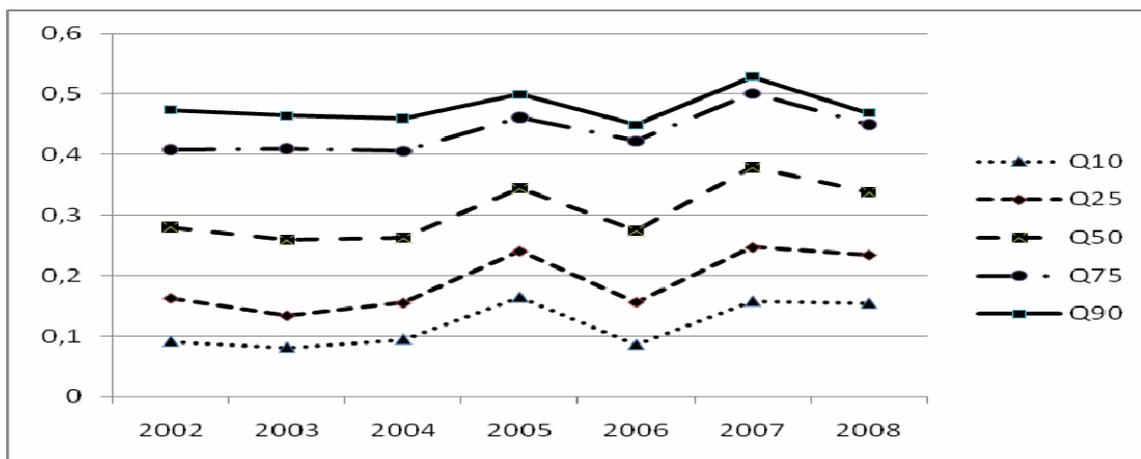
Figure 3.a

Quantile decomposition, worker and firm controls, public-private domestic income gap, 2002–2008, men

Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps

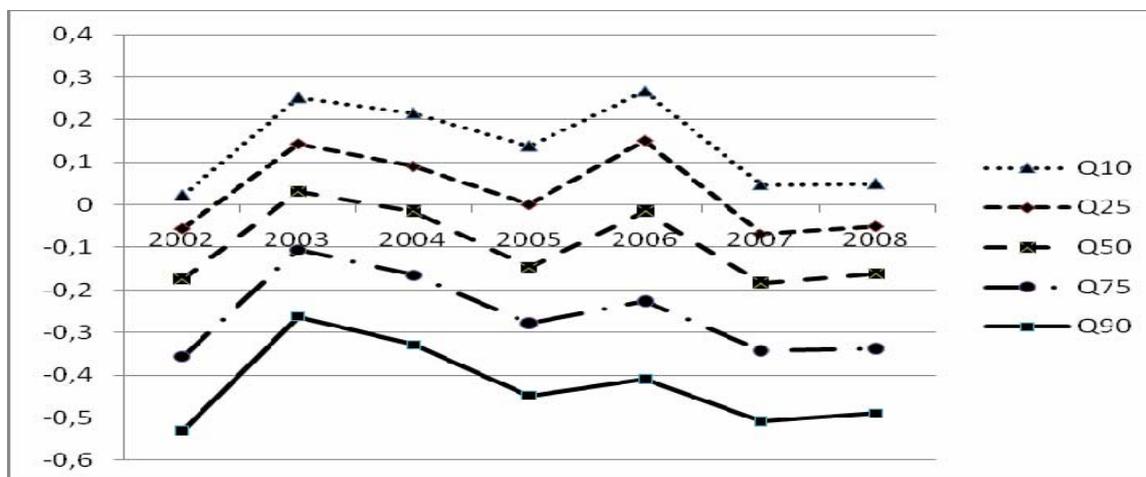
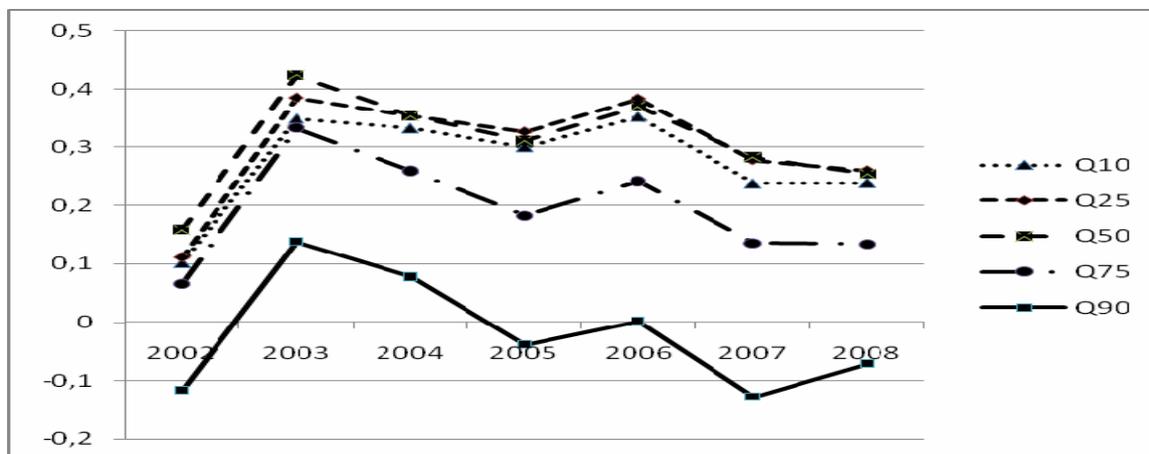


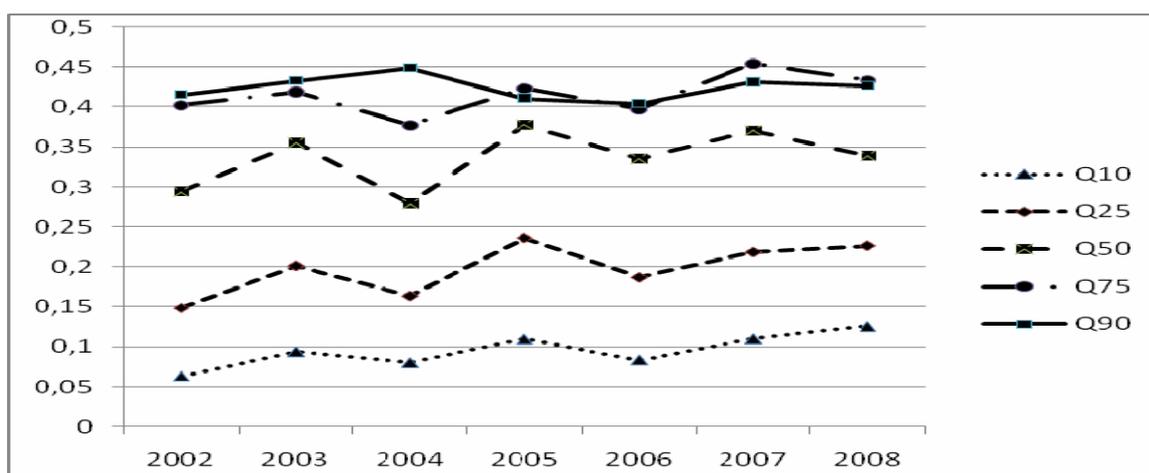
Figure 3.b

Quantile decomposition, worker and firm controls, public-private domestic income gap, 2002–2008, women

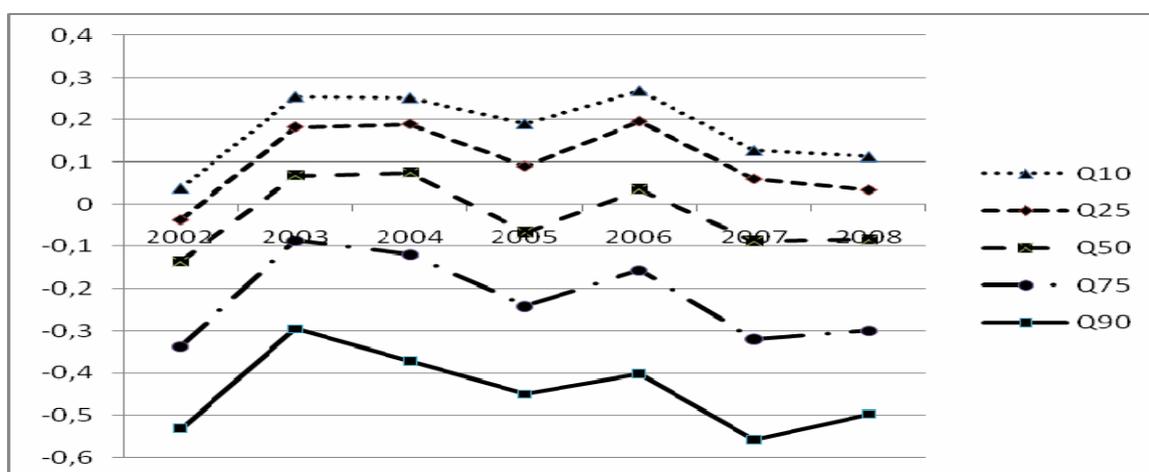
Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps



The results of the decomposition between the public sector and foreign-owned private firms are depicted in Figures 4.a. and 4.b. for the two genders respectively. The raw gaps reveal that foreign firms pay better: in 2002, the raw gap is -0.22 at the 10th quantile, and -0.67 at the 90th quantile. The raw income gap between the public and foreign firms varies much more along the distribution than that between public and domestic firms, indicating that the income distribution in the foreign private sector is the most spread out. The raw gap remains negative throughout all periods and for all quantiles, despite the wage increase in 2003. This suggests that the negative public-private sector gaps seen in the previous results are driven by the differences in incomes of foreign firm workers and public sector workers specifically.

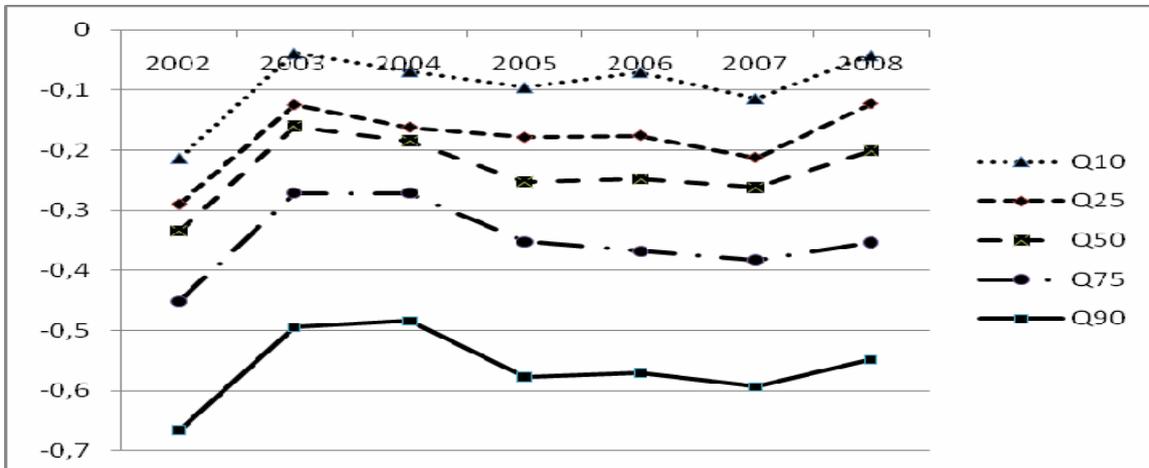
The explained gaps reveal that in terms of endowments, there are smaller differences between foreign firms and the public sector than those seen in the domestic private firm comparison. The explained gaps are still positive (showing the public sector's better endowments), but smaller. The unexplained gaps, as expected, are negative, and more so than the gap between public sector and domestic firm workers. At the 10th quantile, the gap is -0.16, and it increases along the distribution to -0.97 at the 90th quantile in 2002, indicating a higher within-dispersion in unexplained gap between the public and foreign firms than between public and domestic firms. The 50 percent wage increase appeared to have an even smaller effect when comparing public sector and foreign firm workers, suggesting that foreign firms increased incomes more than domestic firms during the period.

The trends reflected in Figure 4.b for women paint a similar overall picture of the great disadvantage of the public sector compared to foreign firms. It is clear that high quality workers face great incentives to choose employment at private, and, in particular, foreign-owned firms. As this issue has been raised the most with respect to professions requiring higher skill levels, and the public sector wage ceilings affect the high-skilled group in particular, the next specification focuses on this group specifically.

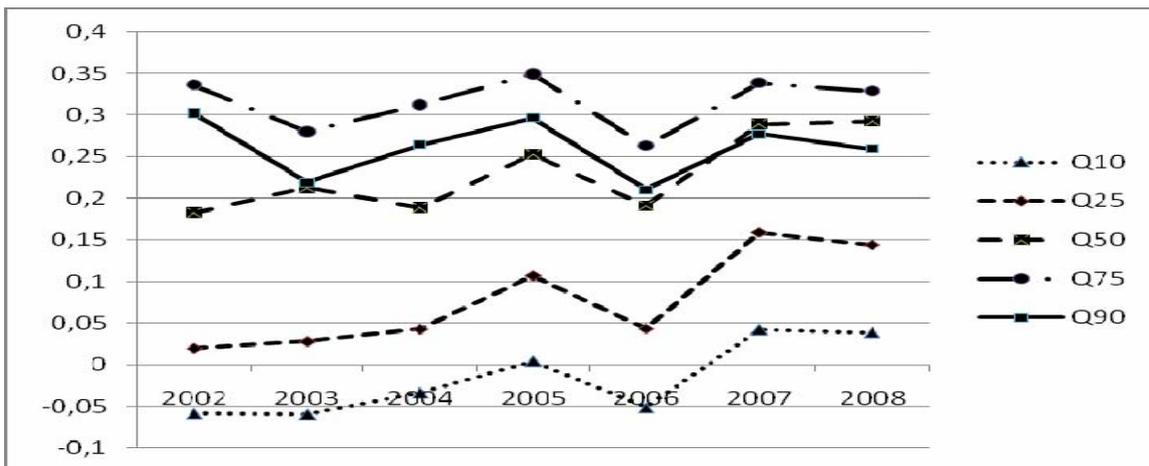
Figure 4.a

Quantile decomposition, worker and firm controls, public-private foreign income gap, 2002–2008, men

Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps

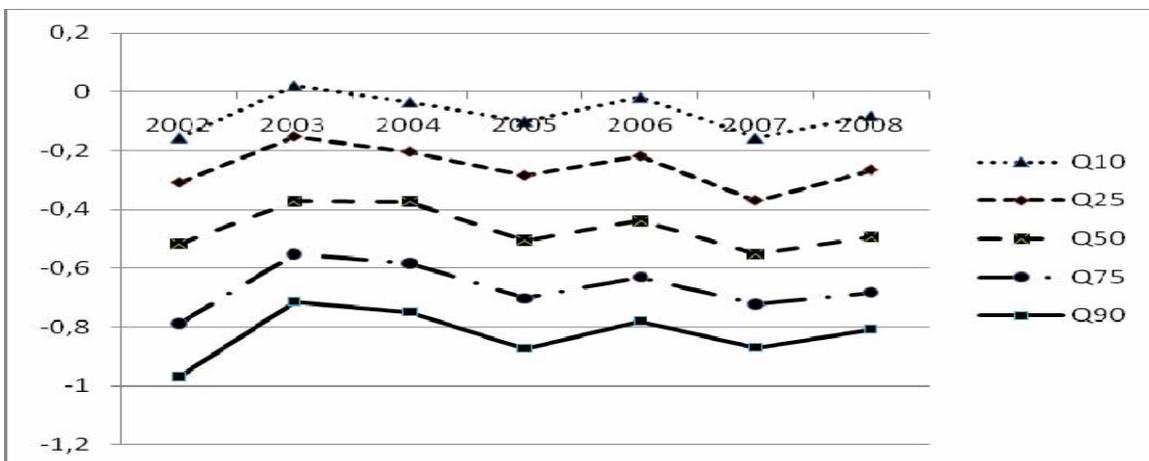
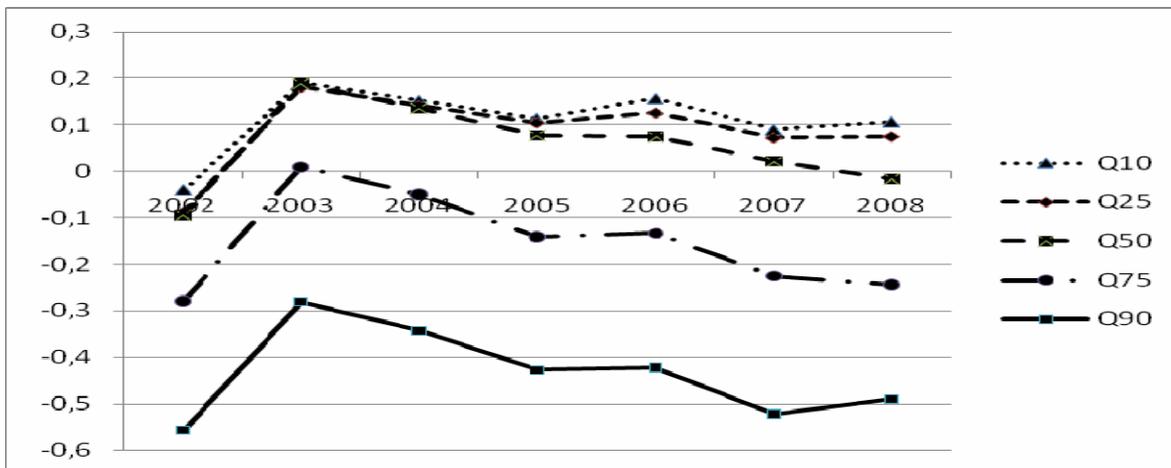


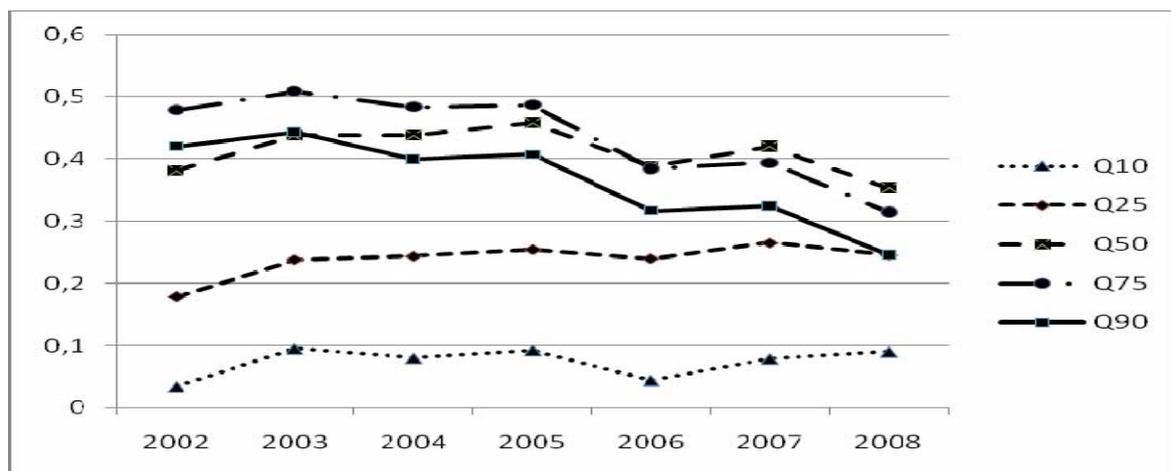
Figure 4.b

Quantile decomposition, worker and firm controls, public-private foreign income gap, 2002–2008, women

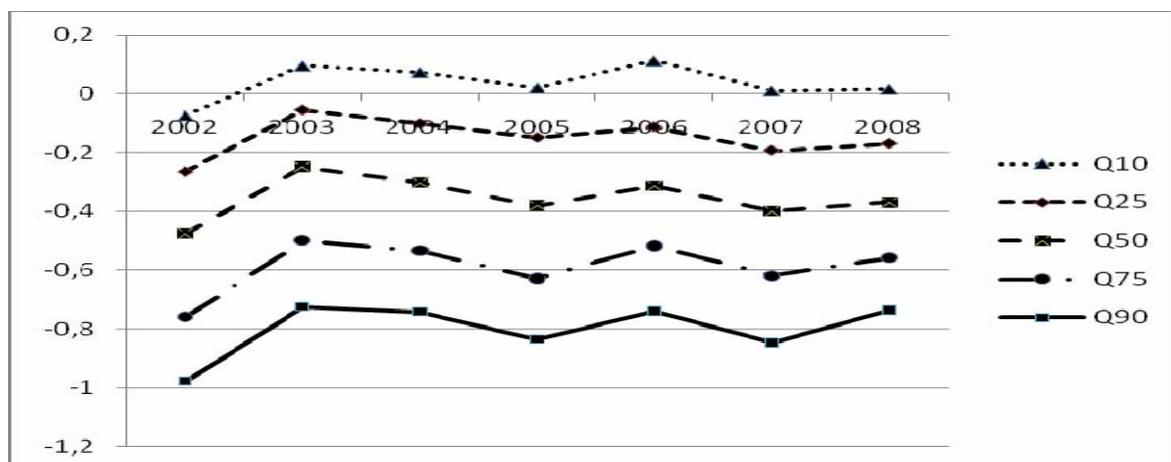
Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps



6D QUANTILE DECOMPOSITION RESULTS: HIGH-SKILLED SUBSAMPLE (SPECIFICATION 4)

Our next specification restricts the analysis to the highly skilled employees (those with a diploma), with results shown in Figures 5.a. and 5.b. This means that we are decomposing the public-private income gap at different points of the distribution of incomes of this subsample of workers. In line with the compressed public sector wage scale, we find significant differences along the distribution in terms of the raw gap: for men, while the gap in income at the 10th quantile is -0.07 and 0.02 in 2002 and 2008 respectively, that at the 90th quantile is -1 and -0.85 in 2002 and 2008 respectively. These figures indicate a substantially larger private sector premium especially at the top of the distribution compared to the full sample results (at the 90th quantile -0.29 and -0.22 in 2002 and 2008 respectively).

There are smaller differences among the quantiles in terms of characteristics, which is due to the fact that within this subsample of highly educated workers, we are only examining differences in a smaller number of observable variables (experience, tenure, region and firm size). However, we see bigger changes over time than for the full sample, and the explained gap is negative, suggesting that within this educational category, public sector workers are *worse* endowed in terms of the other observed characteristics.

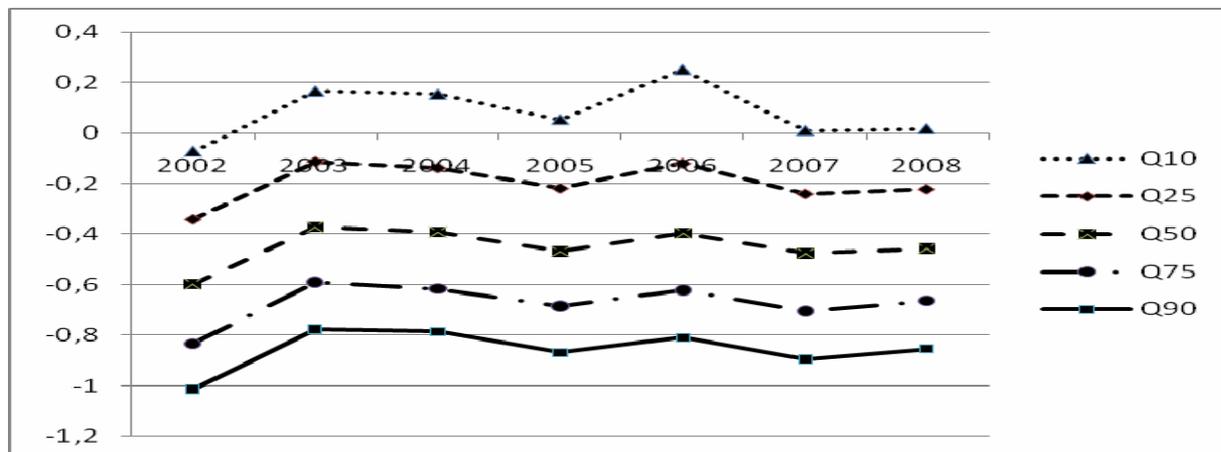
The unexplained gaps reveal big differences along the income distribution as well. Again, we see a positive effect on the relative situation of public sector incomes initially in 2003, and a gradual decline over time. The unexplained income differential of -0.81 at the top of the distribution in 2008 is of the same magnitude as that for the public-foreign subsample and is substantially larger than the corresponding full sample (-0.63) and the public-domestic subsample differential (-0.49).

These results, as well as the similar trends in the case of women in Figure 5.b. indicate no substantial long term improvement of the public sector employees' relative situation.

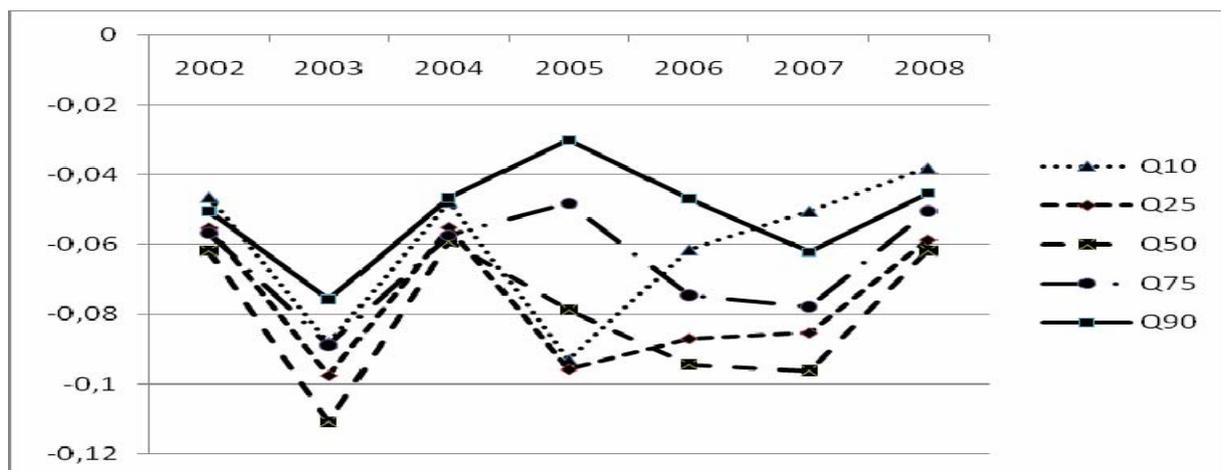
Figure 5.a

Quantile decomposition, worker and firm controls, public-private income gap, high-skilled workers, 2002–2008, men

Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps

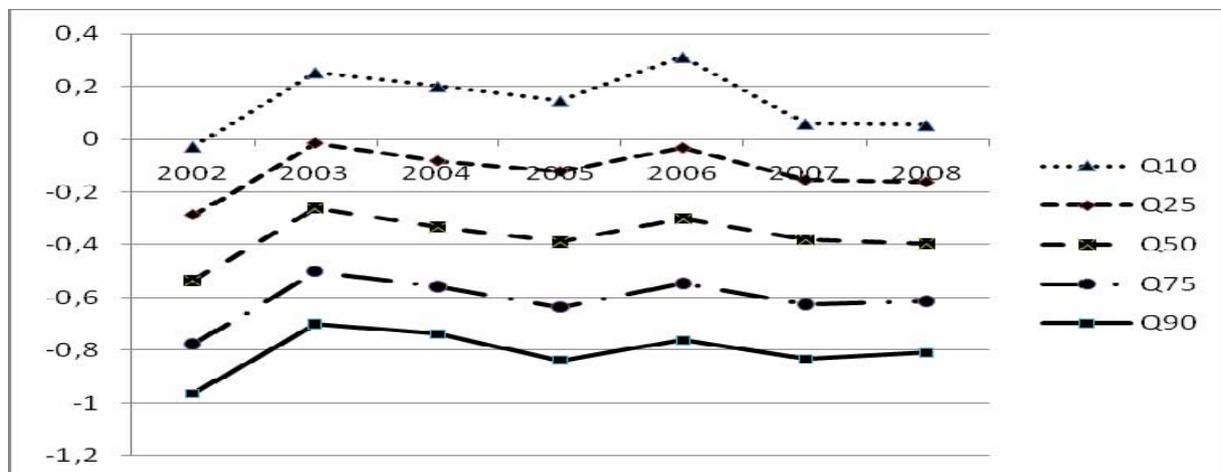
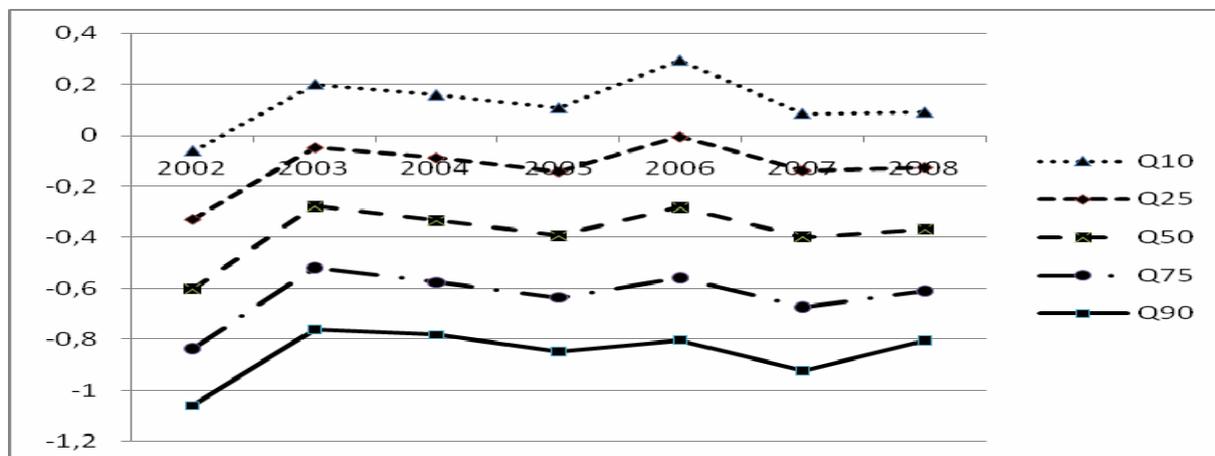


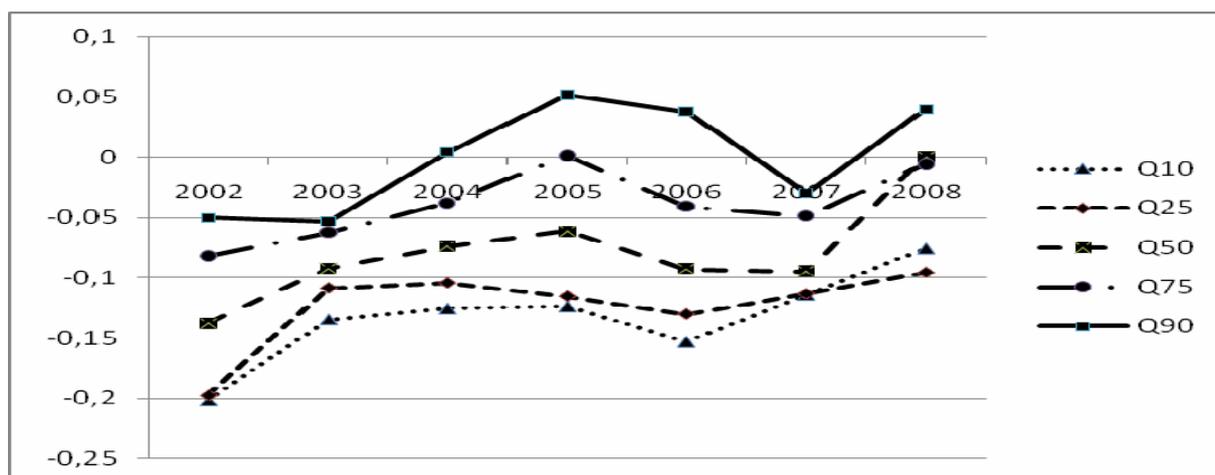
Figure 5.b

Quantile decomposition, worker and firm controls, public-private income gap, high-skilled workers, 2002–2008, women

Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps



6E QUANTILE DECOMPOSITION RESULTS: CORRECTED UNDERREPORTED WAGES (SPECIFICATION 5)

The remaining two specifications serve as further robustness checks. First, we correct for bias due to the underreporting of wages in the private sector as described in Section 4D, by imputing the true income of individuals reported as earning minimum wage based on the prices paid for characteristics of non-minimum wage workers.¹⁶ Appendix Figures A3 present the kernel density estimates of the true income variable distribution. Compared to the income variable seen in Figures A1, the peak at the minimum wage has decreased, as these wage (and consequently, income) observations were assigned their true, higher value. In the results presented in Figures 6.a. and 6.b., true income is used as the dependent variable. The correction for underreporting income in the private sector is expected to have an effect at the bottom of the distribution, manifested in the reduction of the public sector premium at the bottom of the distribution, and to a lesser extent, in the increase of the private sector premium at the top of the distribution.

As expected, the 2002 raw income gap for men at the bottom quantile of the distribution changes from 0.06 to -0.03, indicating that once we correct for underreporting, there is in fact a *private* sector premium even at the bottom quantile of the income distribution. As we move up along the income distribution, the correction has less of an effect: in 2002, the private sector premium at the top of the distribution is -0.3, as in the uncorrected income case. The time trend for the uncorrected raw income differential coincides with that of the corrected one.

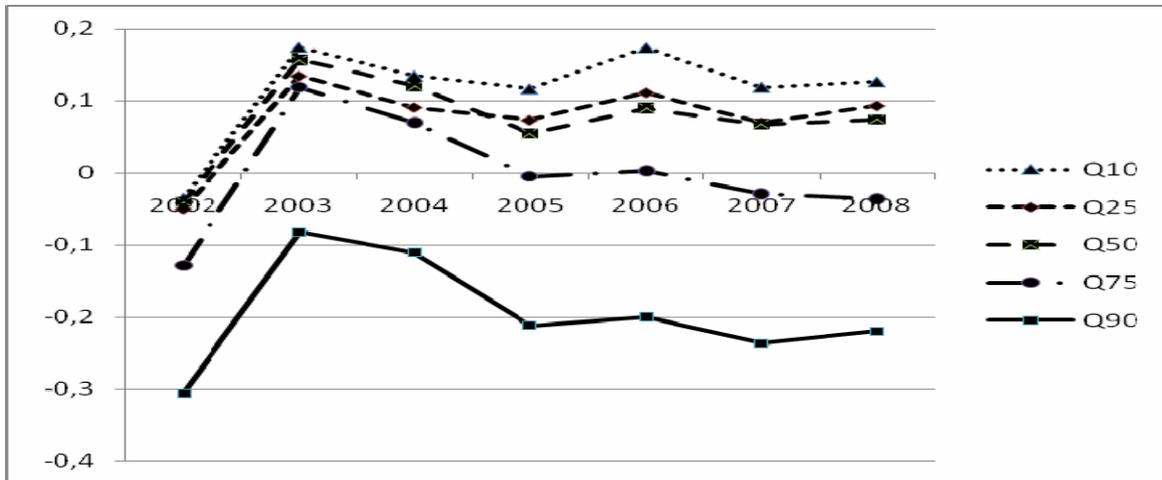
The explained gaps are, as in the original specification, relatively stable over time, and point to better overall endowment of the public sector. The differences become higher along the distribution, with a dip in 2006 suggesting a change in composition, with a gradual correction in the following years. The unexplained gap becomes slightly more negative, as the disadvantage of public sector workers in terms of income becomes even greater once underreported wages are corrected. Women's results support the same conclusions.

¹⁶ Alternatively, we also imputed the wages of minimum wage earners in the public sector. In this case, we estimated the prices of characteristics separately for the two sectors based on observations of workers with reported wages above the minimum wage. We then used these prices to construct the true wage of minimum wage workers (assumed to be false) based on their characteristics, and added the non-wage income elements to construct the true income variable. In the public sector, there were very few altered observations, and the trends seen in the decomposition results were very similar to those presented here.

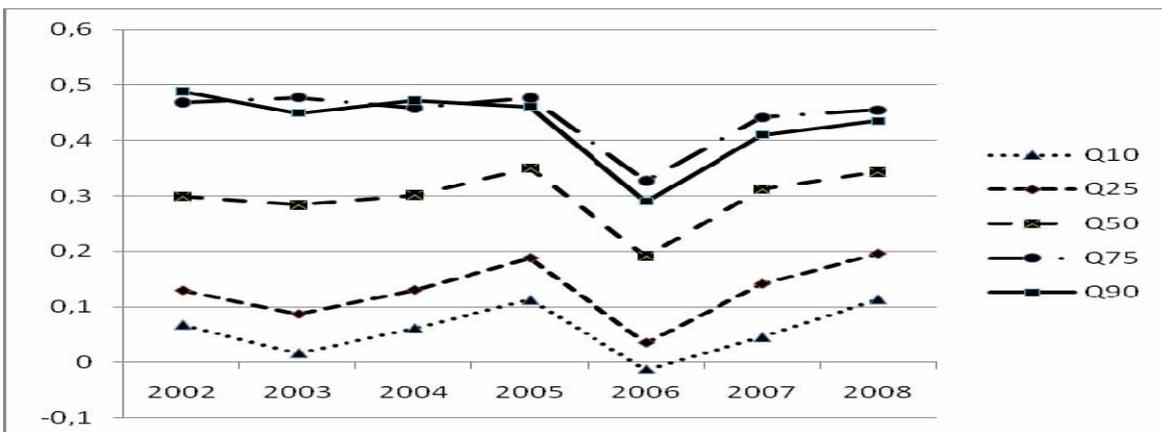
Figure 6.a

Quantile decomposition, worker and firm controls, public-private true income gap, 2002–2008, men

Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps

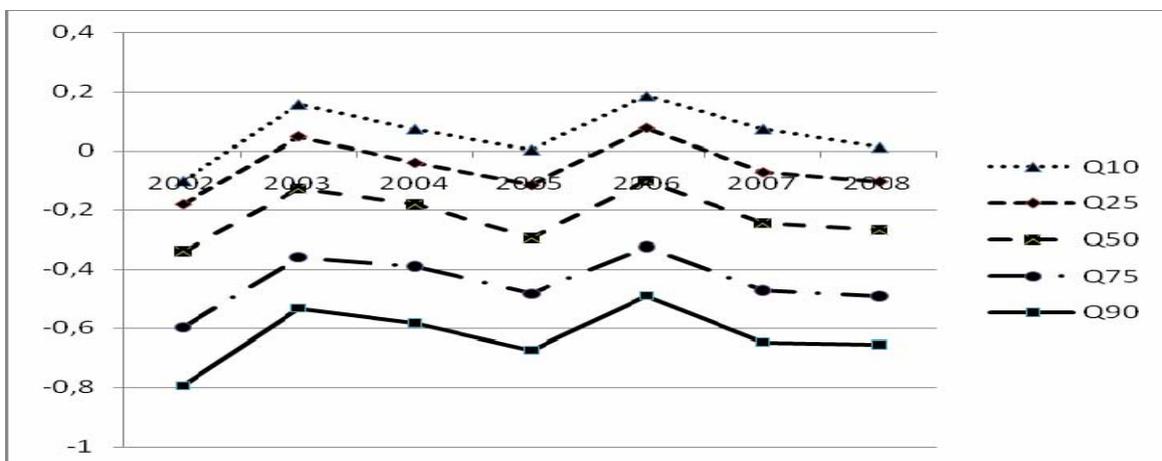
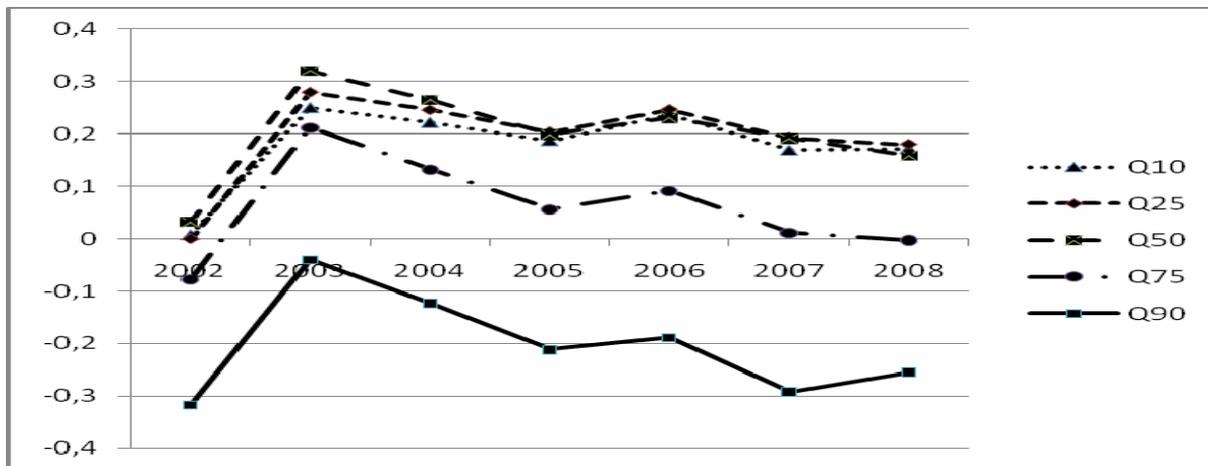


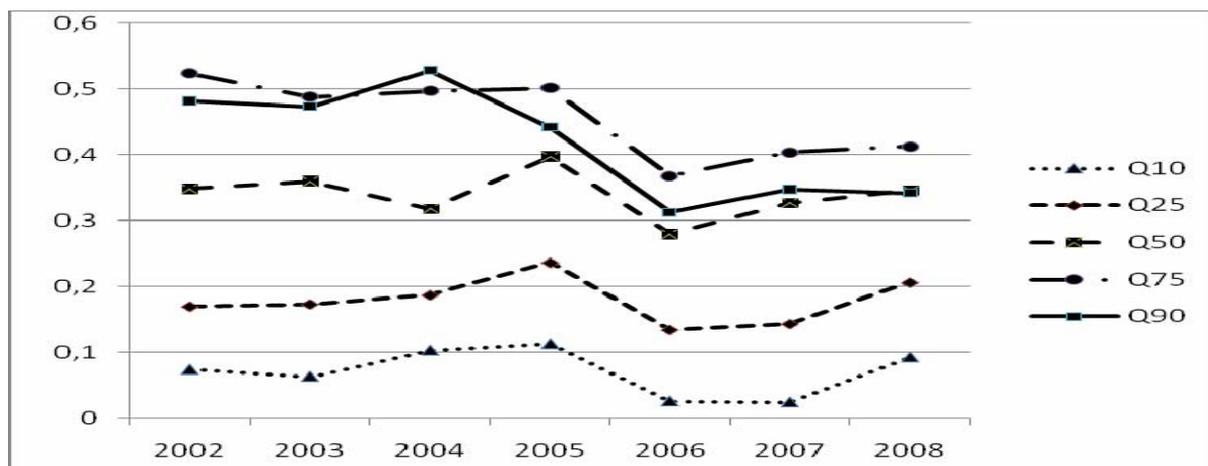
Figure 6.b

Quantile decomposition, worker and firm controls, public-private true income gap, 2002–2008, women

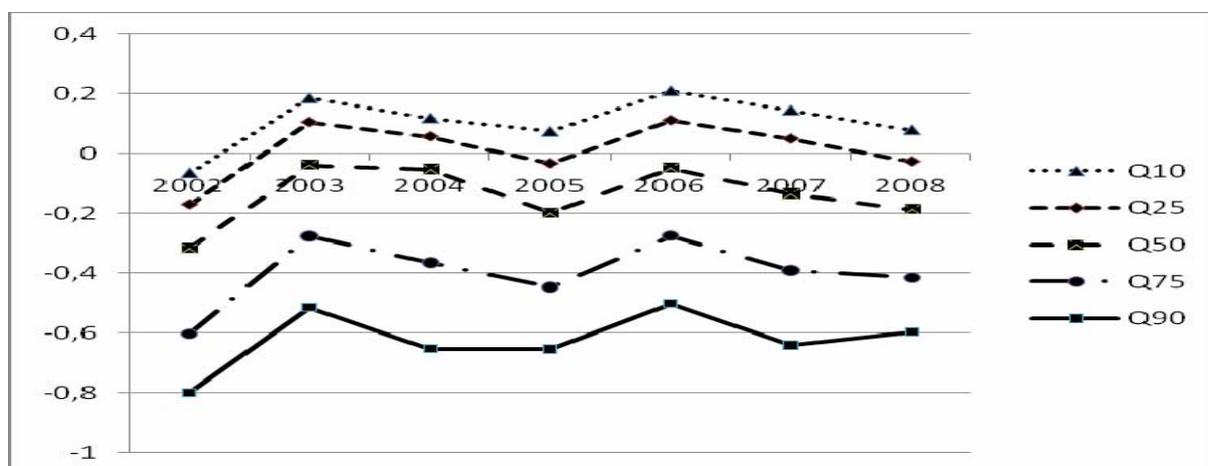
Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps



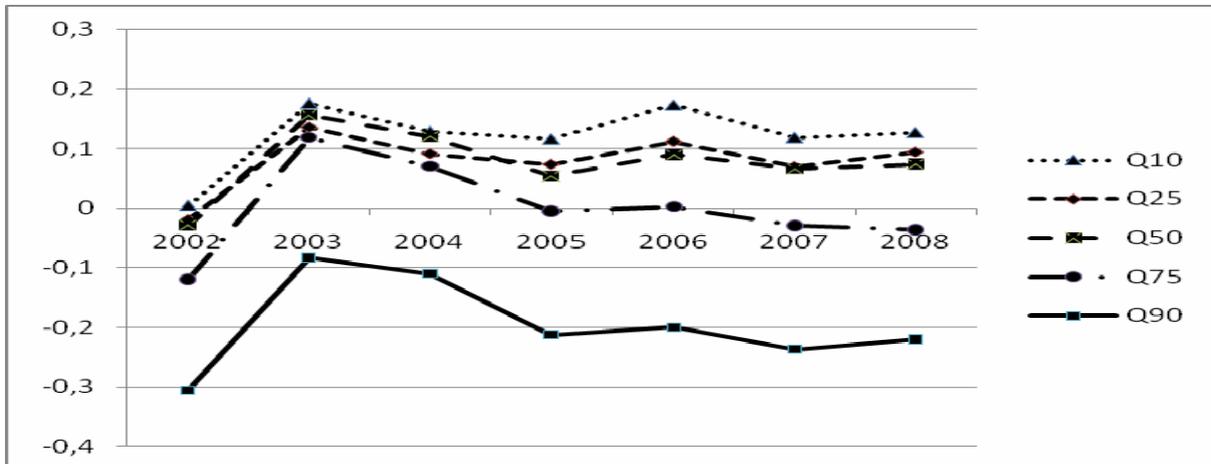
6F QUANTILE DECOMPOSITION RESULTS: WORKPLACE CHARACTERISTICS (SPECIFICATION 6)

In the final specification, we use the true income as dependent variable and add three available measures for workplace characteristics to the set of explanatory variables. The results are presented in Figures 7.a. and 7.b. This can be seen as an attempt to correct for the selection bias that arises from sector choice of workers, which may be based on unobserved differences in the preferences of workers. Our workplace characteristics measures do not seem to change the decomposition results of Specification 5 significantly. The only observed difference is in the results for 2006 and subsequent years, where the explained gaps are lower, and consequently, the unexplained gaps are higher than in the previous specification. This points to some change in the composition of the observed workplace characteristics in that year, which benefited the private sector. Overall, though, the inclusion of these controls does not affect the trends seen in the gaps. This is most likely due to the weakness of our measures in describing workplace characteristics.

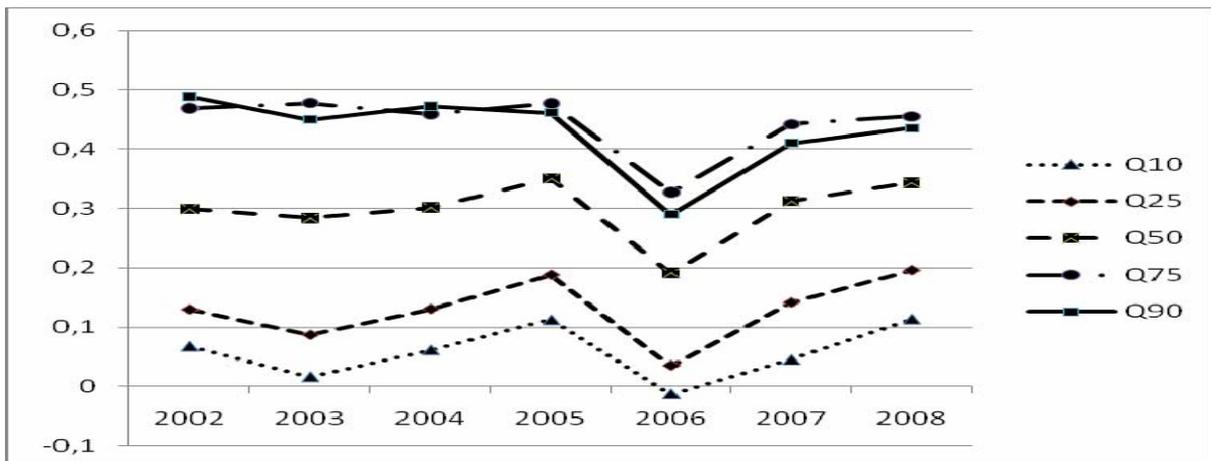
Figure 7.a

Quantile decomposition, worker, firm, and workplace characteristics controls, public-private true income gap, 2002–2008, men

Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps

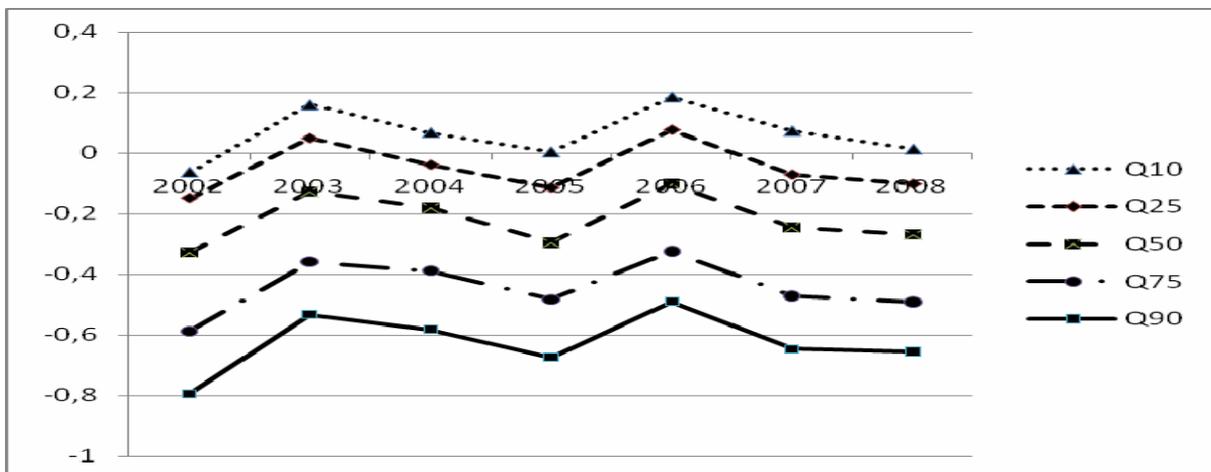
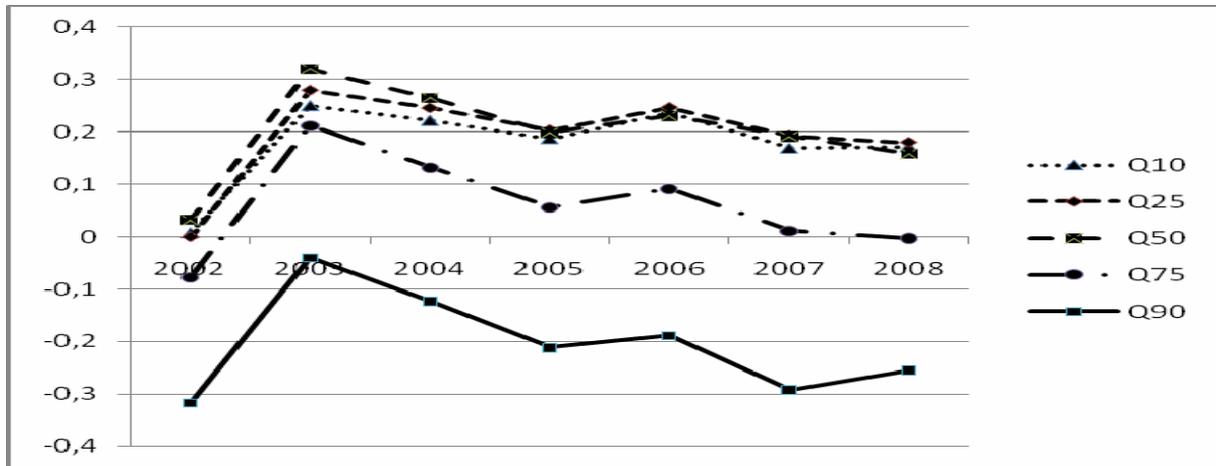


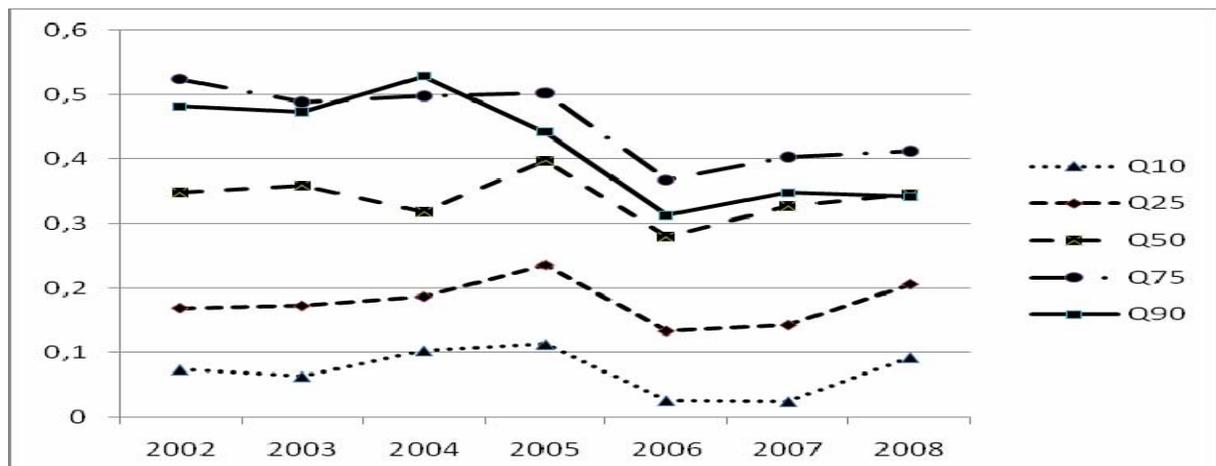
Figure 7.b

Quantile decomposition, worker, firm, and workplace characteristics controls, public-private true income gap, 2002–2008, women

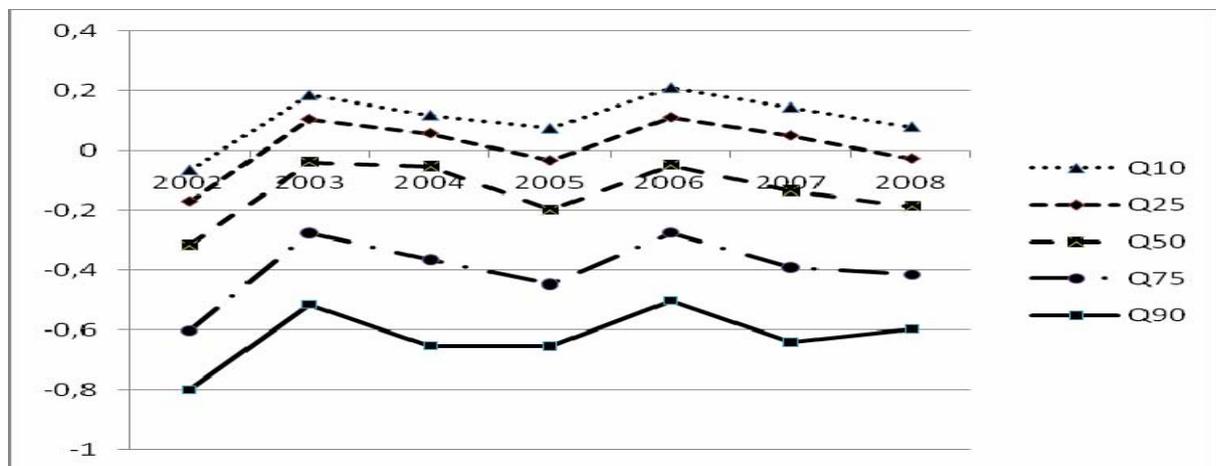
Raw public-private income gaps



Explained public-private income gaps



Unexplained public-private income gaps



7 CONCLUSION

Our goal was to describe the public-private income gap, and, more specifically, the unexplained public-private income gap over the time period 2002–2008, during which the Hungarian government raised public sector wages suddenly by 50 percent between 2002 and 2003, with the goal of retaining high quality workers in the public sector and in Hungary.

Overall, both genders' results lead to the same conclusions: there is a large income disadvantage for public sector workers at the high end of the distribution – in line with the public sector wage ceiling – which is even worse if we take differences in worker, firm and workplace characteristics into account. They suffer a greater disadvantage choosing to work in the public sector, while those at the low end of the income distribution receive similar pay in both sectors, even when we correct for false minimum wages. The large income premium for the private sector at the high end of the distribution stems from the high income in foreign firms and for high-skilled workers. While these distributional differences remain throughout the period, the large beneficial effect of the 50 percent wage increase is eroded over time, though public sector workers at all quantiles were better off in 2008 than in 2002 in terms of relative income.

To put the Hungarian estimates in perspective, note that in Germany the estimated unexplained public-private sector wage gap (stable between 1984 and 2001) is five percent at the bottom quantile and decreases to -17 percent at the top quantile for men (Melly 2005). The corresponding estimates for Hungary (when correcting for the underreporting of wages) amount to -10 and -75 percent in 2002 and zero and -65 percent in 2008. This implies that public sector pay at the high end of the distribution is not only low in absolute terms in comparison to Germany – which in itself drives “brain drain” especially for those working in the health sector – but also in *relative* terms compared to the private sector.

In order to retain high quality workers in the public sector, future policies should concentrate not only the *general* improvement of the public sector workers relative to the private sector, but also the improvement of the high-skilled workers within the public sector, who are the most likely to leave public sector employment to abroad and to foreign private firms. This could be achieved by a targeted approach, such as the revision of the wage scale, rather than by a large scale increase in public sector wages.

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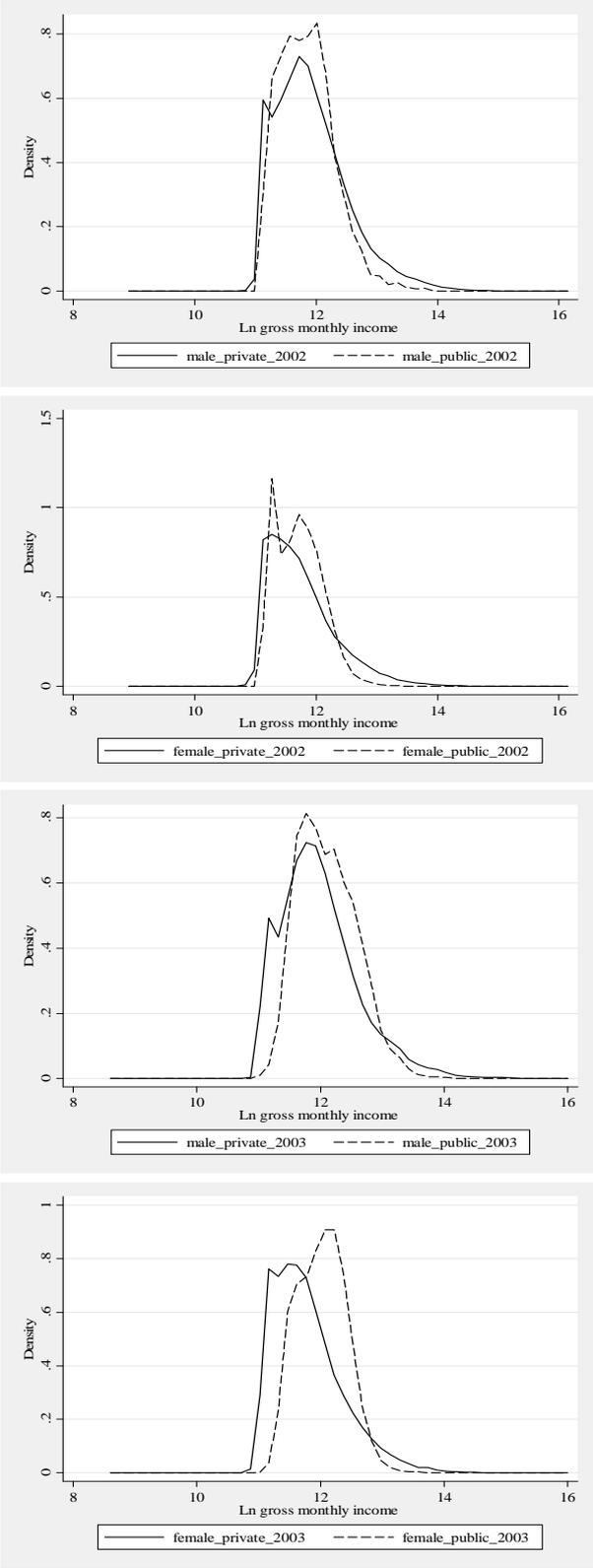
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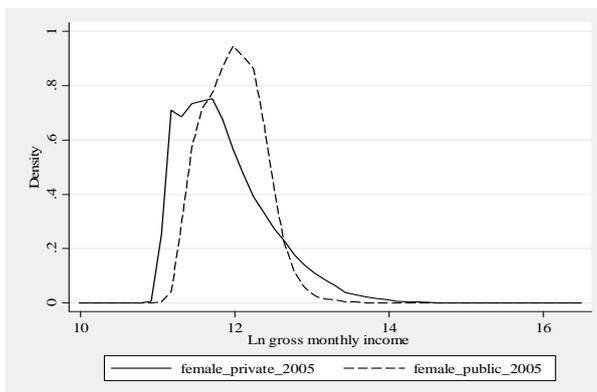
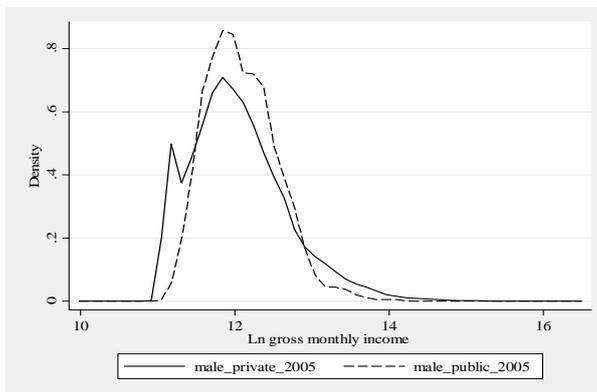
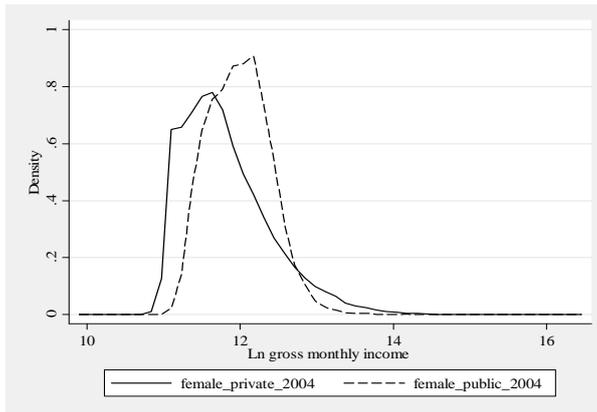
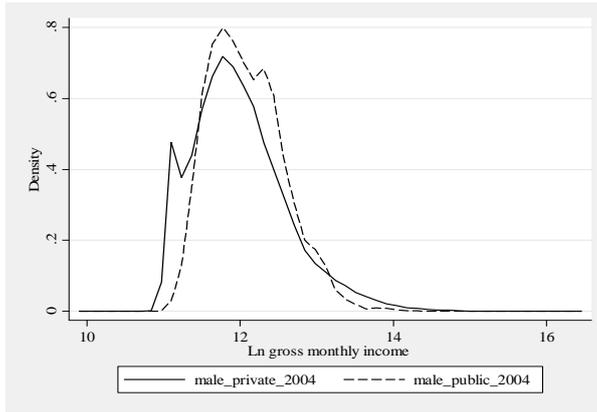
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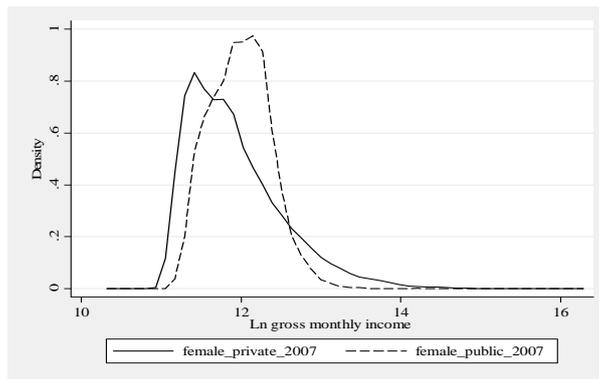
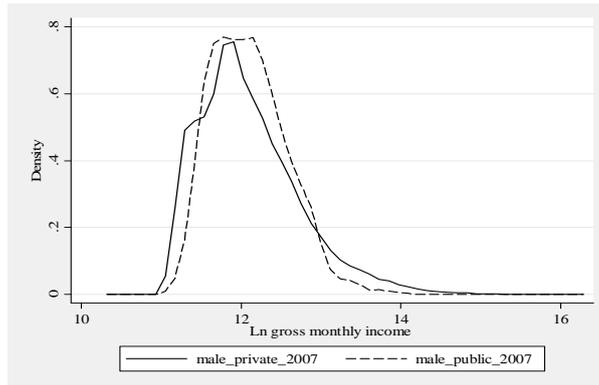
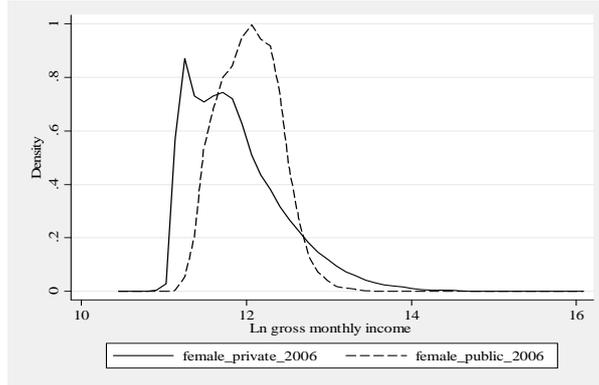
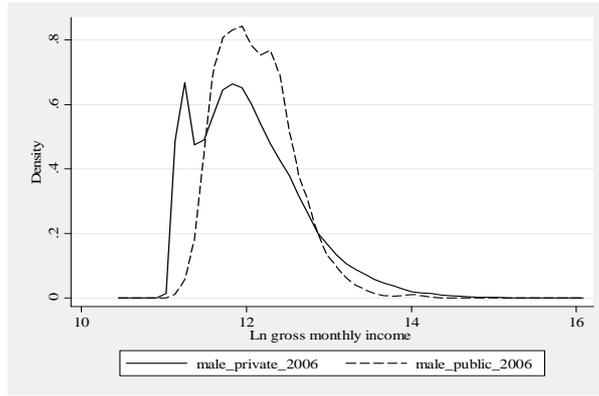
APPENDIX

Figure A1

Kernel density estimates of the unconditional private and public sector income distributions by gender, 2002 – 2008







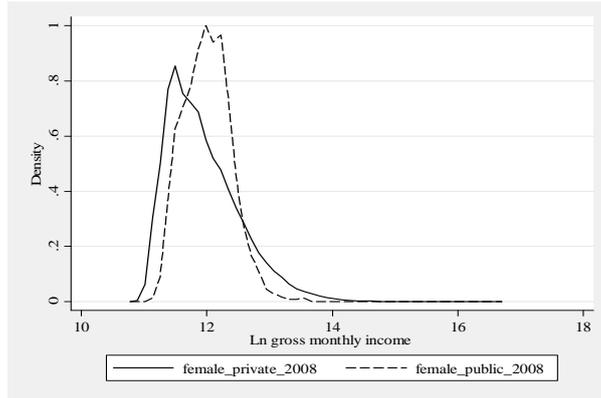
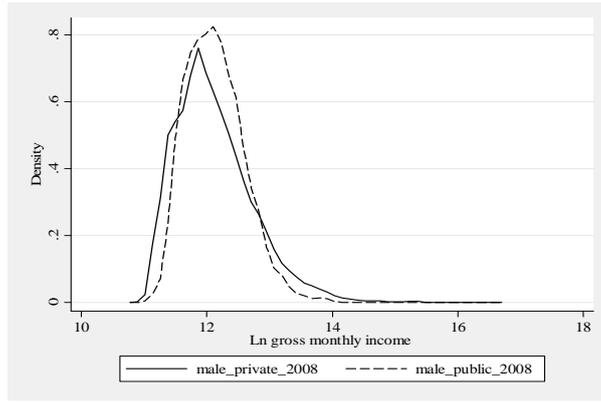
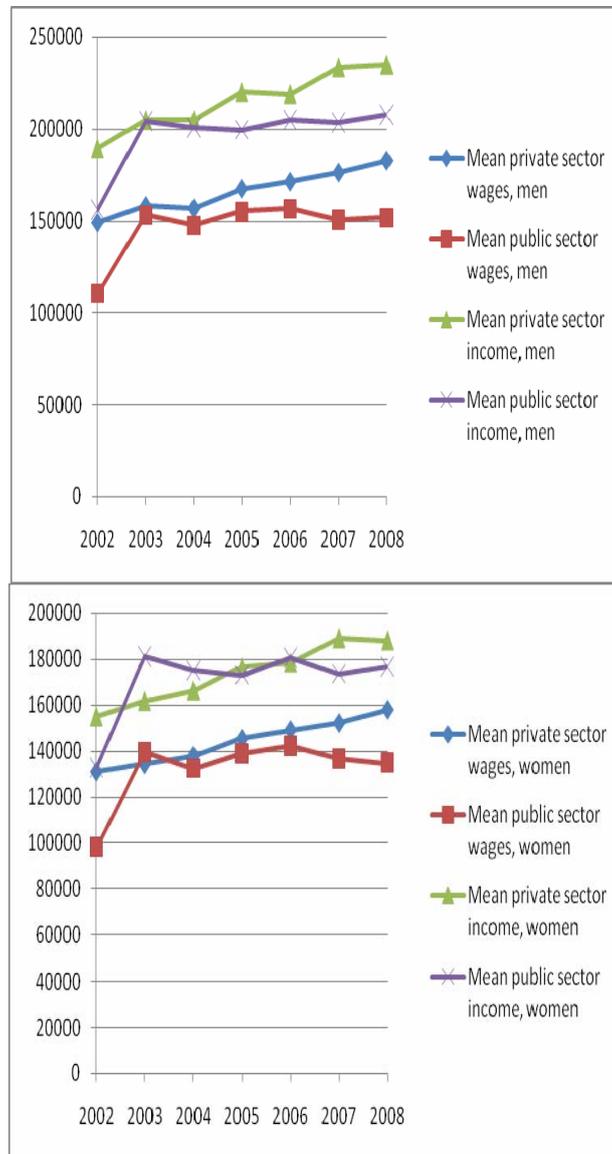


Figure A2

Evolution of unconditional income and wages in the private and public sectors, by gender, 2002 – 2008



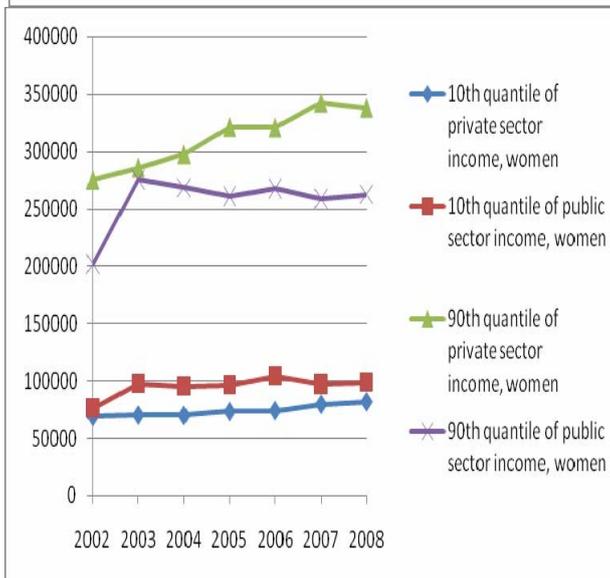
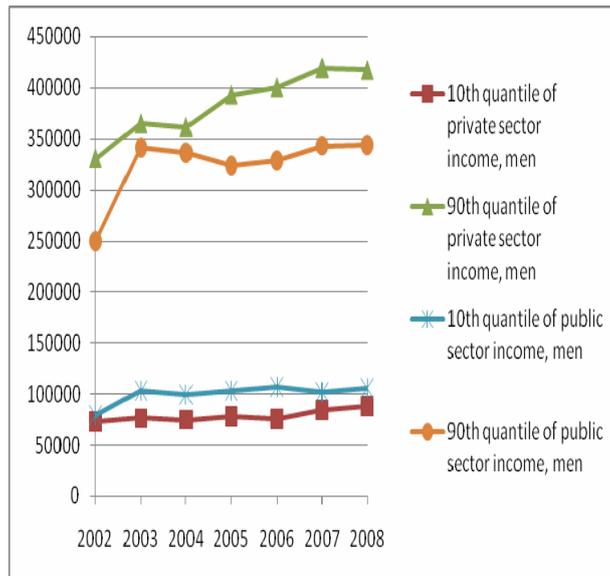
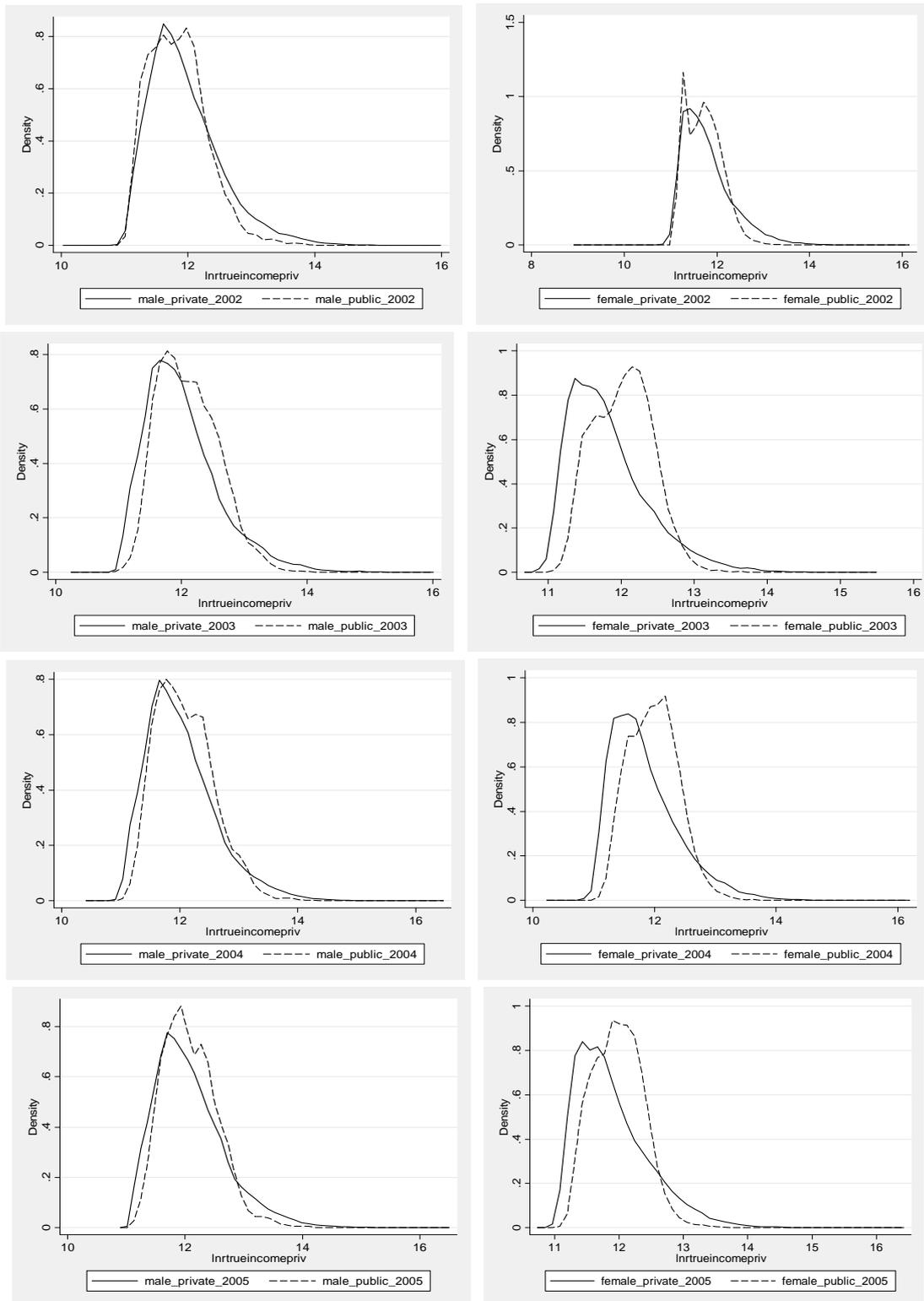


Figure A3

Kernel density estimates of the unconditional private and public sector imputed “true income” distributions by gender, 2002 – 2008



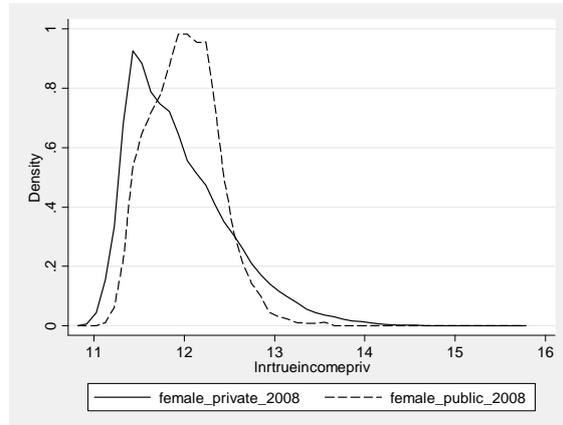
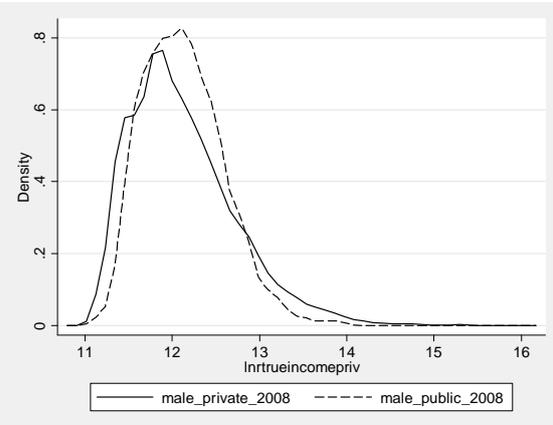
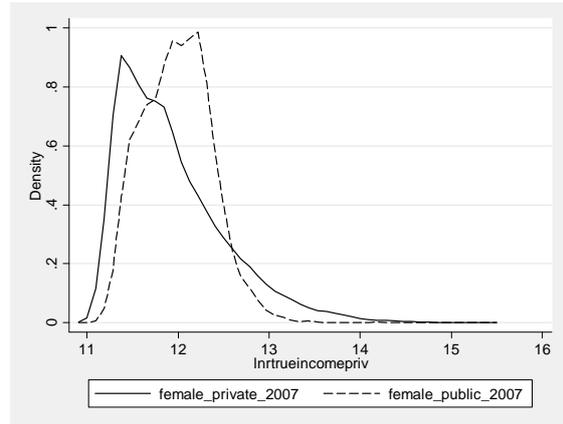
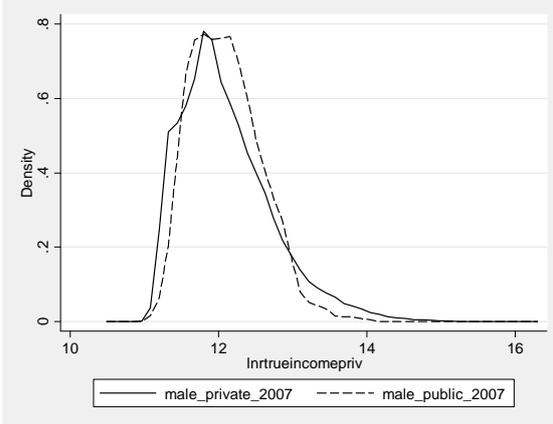
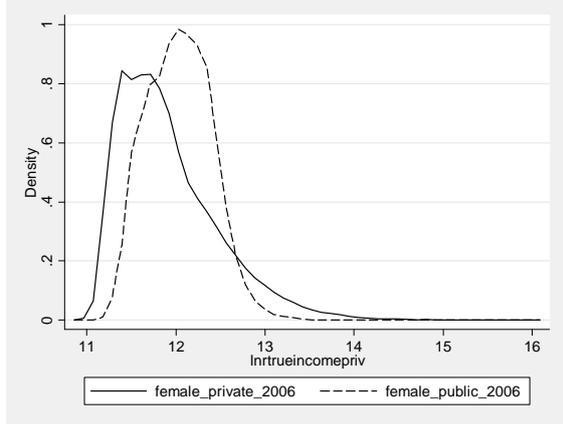
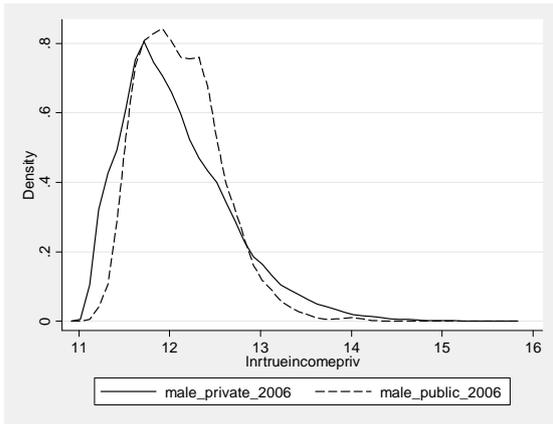


Table A1

Descriptive statistics, 2002

Variable	Males		Females	
	Private	Public	Private	Public
Mean income	189472	155990	155125	132546
Mean "true income"	198873	155990	166654	132546
Mean income for the subsample of foreign private firms	287955		208567	
Mean income for the subsample of domestic private firms	159582		141095	
Mean income for the subsample of tertiary graduates	456424	213042	375436	172134
Education: At most primary school	0.16	0.14	0.25	0.19
Education: Vocational school degree	0.45	0.22	0.25	0.10
Education: Secondary school degree	0.26	0.21	0.40	0.32
Education: Tertiary degree	0.13	0.42	0.10	0.40
Potential labor market experience	22.20	22.97	23.67	23.36
Tenure	104.68	113.70	106.01	131.41
Occupation: Legislators, senior officials and managers	0.09	0.09	0.07	0.06
Occupation: Professionals	0.05	0.33	0.04	0.32
Occupation: Technicians and associate professionals	0.09	0.12	0.21	0.31
Occupation: Clerks	0.01	0.01	0.14	0.07
Occupation: Service workers and shop and market sales workers	0.09	0.10	0.12	0.07
Occupation: Skilled agricultural and fishery workers	0.03	0.01	0.01	0.00
Occupation: Craft and related trades workers	0.35	0.13	0.17	0.01
Occupation: Plant and machine operators and assemblers	0.22	0.12	0.13	0.00
Occupation: Elementary occupations	0.07	0.10	0.10	0.16
Region: Central Hungary	0.31	0.36	0.36	0.28
Region: Central Transdanubia	0.13	0.07	0.11	0.10
Region: Western Transdanubia	0.13	0.08	0.13	0.09
Region: Southern Transdanubia	0.09	0.10	0.08	0.10
Region: Northern Hungary	0.11	0.11	0.09	0.14
Region: Northern Great Plane	0.12	0.15	0.11	0.17
Region: Southern Great Plane	0.12	0.13	0.11	0.13
Size: 21–50	0.17	0.12	0.13	0.21
Size: 51–300	0.34	0.40	0.33	0.44
Size: 301–1000	0.21	0.19	0.24	0.16
Size: 1001–3000	0.12	0.13	0.13	0.13
Size: More than 3000	0.16	0.16	0.16	0.06
Lunch break	0.46	0.92	0.40	0.98
Deviation of expected and actual work hours	6.81	7.10	6.46	6.75
Type of employment contract: Permanent	0.94	0.94	0.94	0.97
Type of employment contract: Fixed-term	0.06	0.05	0.06	0.02
Type of employment contract: Other	0.00	0.01	0.00	0.01
N	50859	6947	35689	29815

Notes Income is gross monthly total labor income, denoted in HUF and converted to 2008 income by the annual CPI. Experience is potential labor market experience, defined as age minus years of schooling minus school starting age.

Table A2

Descriptive statistics, 2008

Variable	Men		Women	
	Private	Public	Private	Public
Mean income	233020	207681	188004	176512
Mean "true income"	234377	207681	195104	176512
Mean income for the subsample of foreign private firms	336613		250866	
Mean income for the subsample of domestic private firms	194423		167565	
Mean income for the subsample of tertiary graduates	519452	272358	380039	224666
Education: At most primary school	0.13	0.10	0.18	0.13
Education: Vocational school degree	0.43	0.20	0.24	0.09
Education: Secondary school degree	0.28	0.21	0.41	0.33
Education: Tertiary degree	0.16	0.49	0.16	0.45
Potential labor market experience (measured in years)	22.14	22.46	22.63	23.64
Tenure (measured in months)	94.26	115.17	85.96	133.57
Occupation: Legislators, senior officials and managers	0.09	0.07	0.07	0.06
Occupation: Professionals	0.07	0.40	0.06	0.36
Occupation: Technicians and associate professionals	0.11	0.16	0.24	0.30
Occupation: Clerks	0.01	0.01	0.14	0.10
Occupation: Service workers and shop and market sales workers	0.09	0.09	0.14	0.05
Occupation: Skilled agricultural and fishery workers	0.01	0.00	0.01	0.00
Occupation: Craft and related trades workers	0.30	0.09	0.11	0.00
Occupation: Plant and machine operators and assemblers	0.24	0.10	0.14	0.00
Occupation: Elementary occupations	0.06	0.08	0.09	0.12
Region: Central Hungary	0.36	0.39	0.41	0.32
Region: Central Transdanubia	0.14	0.06	0.14	0.08
Region: Western Transdanubia	0.11	0.07	0.11	0.08
Region: Southern Transdanubia	0.07	0.11	0.07	0.11
Region: Northern Hungary	0.10	0.09	0.09	0.11
Region: Northern Great Plane	0.12	0.16	0.10	0.16
Region: Southern Great Plane	0.10	0.13	0.09	0.14
Size: 21–50	0.18	0.10	0.13	0.17
Size: 51–300	0.32	0.40	0.33	0.46
Size: 301–1000	0.23	0.17	0.24	0.14
Size: 1001–3000	0.14	0.15	0.18	0.14
Size: More than 3000	0.13	0.18	0.12	0.09
Lunch	0.50	0.96	0.43	0.98
Deviation of expected and actual work hours	2.95	2.84	2.60	2.53
Type of employment contract: Permanent	0.96	0.88	0.94	0.92
Type of employment contract: Fixed-term	0.04	0.05	0.05	0.03
Type of employment contract: Other	0.00	0.07	0.00	0.05
N	53284	5465	36407	22048

Notes Income is gross monthly total labor income, denoted in HUF. Experience is potential labor market experience, defined as age minus years of schooling minus school starting age.

Table A3

Mean decomposition of public-private income gap, men

Log real income	2002			2008		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
Overall						
Public sector	11.843	0.011	0.000	12.128	0.011	0
Private sector	11.919	0.003	0.000	12.116	0.003	0
Raw difference	-0.076	0.012	0.000	0.011	0.012	0.325
Explained	0.262	0.013	0.000	0.304	0.013	0
Unexplained	-0.338	0.010	0.000	-0.293	0.010	0
Explained						
Education: Vocational school degree	-0.020	0.002	0.000	-0.025	0.002	0
Education: Secondary school degree	-0.010	0.003	0.002	-0.017	0.003	0
Education: Tertiary degree	0.214	0.010	0.000	0.237	0.011	0
Experience (measured in years)	0.006	0.002	0.003	0.007	0.005	0.205
Experience squared	-0.006	0.002	0.006	-0.009	0.005	0.071
Tenure (measured in months)	0.007	0.002	0.001	0.033	0.005	0
Tenure squared	0.001	0.001	0.170	-0.016	0.005	0.001
Occupation: Professionals	-0.052	0.006	0.000	-0.060	0.007	0
Occupation: Technicians and associate professionals	-0.008	0.002	0.000	-0.013	0.002	0
Occupation: Clerks	-0.001	0.001	0.366	-0.001	0.002	0.509
Occupation: Service workers and shop and market sales workers	-0.003	0.005	0.584	-0.003	0.005	0.53
Occupation: Skilled agricultural and fishery workers	0.010	0.001	0.000	0.007	0.001	0
Occupation: Craft and related trades workers	0.098	0.005	0.000	0.109	0.005	0
Occupation: Plant and machine operators and assemblers	0.040	0.005	0.000	0.066	0.006	0
Occupation: Elementary occupations	-0.020	0.005	0.000	-0.015	0.004	0
Region: Central Transdanubia	0.004	0.001	0.000	0.005	0.001	0
Region: Western Transdanubia	0.005	0.001	0.000	0.008	0.001	0
Region: Southern Transdanubia	-0.003	0.002	0.073	-0.009	0.003	0.003
Region: Northern Hungary	0.000	0.001	0.713	0.003	0.001	0.017
Region: Northern Great Plane	-0.007	0.002	0.000	-0.013	0.002	0
Region: Southern Great Plane	-0.003	0.001	0.011	-0.005	0.002	0.001
Size: 51–300	0.012	0.003	0.000	0.014	0.002	0
Size: 301–1000	-0.010	0.004	0.006	-0.020	0.004	0
Size: 1001–3000	0.006	0.003	0.064	0.001	0.003	0.816
Size: More than 3000	0.001	0.005	0.882	0.021	0.005	0

Table A4

Mean decomposition of public-private income gap, women

Log real income	2002			2008		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
Overall						
Public sector	11.718	0.004	0.000	12.005	0.004	0
Private sector	11.753	0.003	0.000	11.940	0.004	0
Raw difference	-0.035	0.005	0.000	0.065	0.005	0
Explained	0.265	0.007	0.000	0.285	0.007	0
Unexplained	-0.300	0.007	0.000	-0.220	0.006	0
Explained						
Education: Vocational school degree	-0.004	0.001	0.000	-0.005	0.001	0
Education: Secondary school degree	-0.017	0.001	0.000	-0.016	0.001	0
Education: Tertiary degree	0.215	0.006	0.000	0.186	0.005	0
Experience (measured in years)	-0.001	0.001	0.031	0.011	0.002	0
Experience squared	0.001	0.001	0.043	-0.007	0.001	0
Tenure (measured in months)	0.019	0.002	0.000	0.063	0.005	0
Tenure squared	-0.004	0.001	0.000	-0.029	0.003	0
Occupation: Professionals	-0.047	0.007	0.000	-0.022	0.006	0
Occupation: Technicians and associate professionals	-0.029	0.002	0.000	-0.015	0.002	0
Occupation: Clerks	0.030	0.002	0.000	0.013	0.002	0
Occupation: Service workers and shop and market sales workers	0.031	0.003	0.000	0.050	0.002	0
Occupation: Skilled agricultural and fishery workers	0.007	0.001	0.000	0.003	0.000	0
Occupation: Craft and related trades workers	0.091	0.003	0.000	0.058	0.002	0
Occupation: Plant and machine operators and assemblers	0.060	0.002	0.000	0.067	0.003	0
Occupation: Elementary occupations	-0.037	0.003	0.000	-0.022	0.003	0
Region: Central Transdanubia	0.003	0.001	0.000	0.009	0.001	0
Region: Western Transdanubia	0.008	0.001	0.000	0.006	0.001	0
Region: Southern Transdanubia	-0.004	0.001	0.000	-0.013	0.001	0
Region: Northern Hungary	-0.012	0.001	0.000	-0.006	0.001	0
Region: Northern Great Plane	-0.016	0.001	0.000	-0.019	0.001	0
Region: Southern Great Plane	-0.005	0.001	0.000	-0.011	0.001	0
Size: 51–300	0.015	0.001	0.000	0.015	0.001	0
Size: 301–1000	-0.020	0.001	0.000	-0.016	0.001	0
Size: 1001–3000	0.000	0.001	0.775	-0.008	0.001	0
Size: More than 3000	-0.019	0.001	0.000	-0.009	0.001	0

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