

# WAGE INEQUALITY BETWEEN AND WITHIN PUBLIC AND PRIVATE SECTOR IN SERBIA IN THE TIMES OF AUSTERITY

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## *Abstract*

Responding to a high fiscal deficit in the country, Serbian government introduced a set of fiscal consolidation measures at the beginning of 2015, including a ten percent public sector wage cut. This paper analyses the changes in the public sector wages and public sector wage premium after the measures were introduced. We also compare the changes in two subsectors within the public sector: state sector and state-owned enterprises. Results show that the public sector wage premium dropped by 6 percentage points in 2015, indicating a decrease in the wage inequality between the public and the private sector. Within the public sector, before the fiscal consolidation, the wages were *ceteris paribus* higher in the state-owned enterprises than in the state sector, mainly due to higher premium at upper parts of the wage distribution. The drop of the premium between the years was lower for the state-owned enterprises, due to their lower compliance to the wage cut. This trend resulted in an increased wage inequality within the public sector as a consequence of the fiscal consolidation.

**JEL:** J31, J45, J38

**Keywords:** Public-private wage gap, Austerity measures, Wage decomposition, Conditional and unconditional quantile regression.

## **1. Introduction**

Public sector wage premium research has been gaining academic and public interest in since the onset of the 2008 economic crisis. A number of countries implemented austerity measures in order to reduce their public spending, which often included a reduction of the public sector wages, since this was considered to be less harmful than reducing other public expenditures, such as public investments (de Castro et al, 2013). In addition to good efficiency, higher *ceteris paribus* wages in the public sector (e.g. Ghinetti, 2007; Bargain & Melly, 2008; Giordano et al., 2011; de Castro et al., 2013) indicated that wage reduction, if designed properly, would also bring higher levels of wage equity and lower additional labour market inefficiencies, such as the workers "waiting in line" for public sector jobs, while the private sector jobs get filled with less

skilled workers, therefore bringing productivity losses (Cavalcanti & Rodrigues dos Santos, 2015). According to a recent study (Campos et al., 2017) fiscal consolidation caused a decrease in public sector wage premium in Europe<sup>1</sup> from 8,9% in the pre-crisis years (2004-2009) to 4,8% in the crisis years (2010-2012), with larger falls for countries with higher pre-crisis levels. However, there is little known on the effects of the specific austerity measures, as well as the effects that the austerity had on the inequality within the subsectors of the public sector.

The austerity measures in Serbia were introduced in 2015, following a very high fiscal deficit in 2014 (6.6% of GDP). The measures, among other, included a ten per cent reduction of the public sector wages higher than RSD 25,000 for a full time job<sup>2</sup> (Republic of Serbia, 2014). The wage reduction was applied across the entire public sector which includes both employees in the state sector (public administration, education and health) and state-owned enterprises, and after the cut. After the wage cut, the public sector wages were set to be frozen until the end of 2017.

The aim of this paper is to investigate the changes in the public sector wages and wage premium in Serbia after the wage cut was introduced and to compare the effects of the wage cut in two subsectors within the private sector: state sector and state-owned enterprises<sup>3</sup>. The motivation for the comparison of the two subsectors comes from the fact that the state sector is typically financed directly and exclusively from the budget, while state-owned enterprises often have revenues from own activities at disposal, which is partially then used to finance the wages. However, in almost all the papers that deal with the public wage premium, the distinction between the state-owned enterprises and state sector (public administration, health and education) is either neglected by including workers from state-sector and state-owned enterprises in one group (e.g. Melly, 2006; Laušev, 2012; Nikolić et al, 2017) or resolved by dropping workers from either state-sector or state-owned enterprises (e.g. Bargain and Melly, 2008; Campos et al, 2017). Additionally, in recent years, many comments have been made on the lack of fiscal discipline in Serbia, focusing particularly on reducing the excessive state interventions in state-owned enterprises, which are heavily subsidized and often publicly criticized for inefficient spending their resources, even by the government (e.g. IMF, 2015). Finally, while the wage cut for the state sector included a reduction of the net wage base and was controlled directly from the budget; state-owned enterprises were required to pay the amount of savings generated through the wage cut to the central budget. Although the anticipated effects on employee wages should have been identical, the latter method leaves more room for lower compliance to the wage reduction.

Against this background, we formulate four research questions which we test by using the Labour Force Survey data for 2014 and 2015 and rigorous econometric analysis to estimate the

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<sup>1</sup> Based on the EU-SILC data for 25 countries: 23 EU countries (without Bulgaria, Malta, Romania, Finland and Croatia), Norway and Iceland.

<sup>2</sup> In 2014, minimum wage for full time job in Serbia stood at about RSD 20,000, while the wages of RSD 25,000 represented the start of the second decile of the distribution of the public wages according to Labour Force Survey.

<sup>3</sup> The definition of the sectors can be found in Table A2-1 in the Appendix 2.

public sector wage premium change and direct impact of the wage cut. Firstly, we investigate the effects that the proposed wage reduction had on the public sector wage premium in Serbia. Secondly, due to reasons listed above, we investigate whether the reform had different effects on the wages in the state sector and state-owned enterprises. Thirdly, by using the panel structure of the data, we estimate the compliance to the wage cut, and compare the results for two subsectors. Finally, having in mind that low wages (below RSD 25,000) were exempted from the cut and that the premium varies significantly across the wage distribution (Depalo et al, 2015; Bargain & Melly, 2008), we use conditional and unconditional quantile regression methods, to investigate if the changes were different at different parts of the wage distribution.

We believe that this paper offers significant contribution to the literature for several reasons. Firstly, we estimate the effects of the wage reduction on the public sector wages in the country with high public sector wage premium. Secondly, in this paper we investigate and compare the public sector wage premium in two largely distinct subsectors of the public sector: state sector and state owned enterprises, which has been largely neglected before; and compare the effects of the austerity measures in the subsectors. Thirdly, wage premium and wage premium changes are analysed by using both conditional and unconditional quantile regression, and draw conclusions from both, while previous research usually arbitrary restrict the analysis to one of the two methods. Finally, we utilise the panel structure of the data to estimate the compliance to the wage cut, by comparing the actual wage changes to those proposed in the fiscal consolidation.

This paper is structured as followed. After the introduction, in the next section we review the literature on the public sector wage premium in Europe and in transition countries with a special focus on previous research for Serbia. In section three we introduce the data that will be used in this paper. In section four we present the econometric methods and models we use to estimate the changes in the public sector wage premium and direct impact of the wage cut on the public sector wages. Section five presents the results of our estimates, while in section six we summarize the results. Section seven discusses the results and concludes.

## **2. Public sector wage premium in developed and transition economies and in Serbia**

In developed economies, public sector wage premium is, regardless of the estimation method, usually estimated around zero or positive (e.g. Ghinetti, 2007; Bargain & Melly, 2008; Giordano et al., 2011; de Castro et al., 2013; European Commission, 2014, Campos et al., 2017). Positive public sector wage premium in the developed economies is contributed to numerous factors, which can be grouped into two large groups: 1) *noncompetitive wage settlements* – due to monopoly on providing certain goods and services and political decisions that influence the wage-setting process in the public sector; and 2) *wage setting institutions*, higher union participation in the public sector, higher degree of collective bargaining etc. (Campos et al., 2017; Giordano et al., 2011).

The premium varies significantly across countries and across the wage distribution, and it's usually the highest at the bottom, and insignificant or negative at the top of the wage distribution (Depalo et al, 2015; Bargain & Melly, 2008). This pattern is frequently explained by political decisions which influence the wage setting in the public sector. Public sector employers want to present themselves as good employers for low-paid workers and frequently set their wages at the level higher than the one in the private sector (Depalo et al., 2015). Additionally, as public workers are more frequently members of the workers' unions, workers in public sector have higher likelihood of having higher wages at the bottom of the wage distribution, as well as lower likelihood to have wages below minimum wage than the workers in private sector. On the other hand, public sector employers frequently set the wages of the top-paid public sector workers at lower level to avoid image of the unjust spending of the government money (Giordano et al, 2011). This argument is in line with the results of Depalo et al. (2015) who show that differences at the bottom of the wage distribution can be attributed to the differences in wage returns to characteristics, while the wage differentials at the top of the distribution are explained by differences in characteristics.

There are only a few studies which investigate the effects of austerity measures on the public sector wage premium. Campos et al. (2017) use difference in cyclically adjusted primary balance (CAPB) and find a significant cross-country correlation between the difference in CAPB and the public sector wage premium reduction. Furthermore they find that the conditional public sector pay gap in Europe before the crisis (2004-2009) stood at 8.9%, while in the crisis years (2010-2012), during which the austerity measures were introduced the premium fell to 4.8%. The fall was larger for the countries with higher public sector wage premiums before the crisis, since these countries typically suffered more fiscal stress during the crisis. Piazzalunga & Di Tommaso (2016) observe that wage freeze, implemented in Italy in early 2011, caused a discontinuity in the public sector wage premium and indicate a sectorial effect - the large wage drop in education.

#### *Public sector wage premium in transition countries*

In the countries that were in transition from a socialist to a market economy, at the beginning of the transition, private sector usually paid ceteris paribus higher wages (Laušev, 2014). Adamčík and Bedi (2000), argue that one of the reasons for the lower earnings in the public sector at the beginning of the transition were fiscal and inflationary pressures that put these countries' budgets as well as the public sector wages, under considerable control. According to Brainerd (2002), higher private sector wages were caused by lower job security and employers' desire to motivate their workers for efforts needed when starting a new company, due to which they paid so-called effective wages. Additional factors contributing to lower wages in the public sector were privatisation of state-owned enterprises, as well as increased migration possibilities. Both processes led to disproportionately high transitions of high-paid qualified workers from the public sector as they opted for higher wages in the private sector or abroad (Lausev, 2014).

However, as the transition unfolded, the wages in the public sector became equal or even higher than in the private sector. Laušev (2014) provides an excellent review of the papers which estimated the public-private wage differences in the Eastern European economies. She reports that at the beginning of the transition the wages in transition countries' public sectors were on average 20 percent lower than in the private sector, while at the end of the transition the difference was not statistically significant. Furthermore, in almost all empirical studies the advantage of the private sector disappears when the maturity of the economic transition is achieved. Laušev (2014) concludes that the market mechanisms that are responsible for the positive public sector wage premiums in developed economies took over, as the impact of transition mechanisms started to fade.

### *Serbia: country background and public sector wage premium trends*

Serbia is a country with socialistic heritage, which transition towards the market economy was delayed until fall of the Milošević regime at the turn of the century. The change of the government coincided with a liberal-type change of the economic system, which also included the reform of the labour market (Žarković-Rakić et al., 2017). However, the public sector wage setting system remained largely unchanged and based excessively complex system of over 600 coefficients for different positions in the public sector, with additional wage supplements, and is a part of public sector legislation which restructuring was unsuccessful (Nikolić et al., 2017).

Contrary to low level of development and low employment rate, Serbia is a country with a large public sector. The employment rate in Serbia is one of the lowest in Europe (52.0% in 2015 for those aged 15-64), while the share of the public sector workers in employment and the share public sector wage bill in GDP are among the highest, at 28.3% and 9.8% respectively (Vladislavljević et al., 2017). For small open economies, like Serbian, large public sector could be one of the causes of GDP growth's lower pace, lower level of overall economic efficiency, and relatively bad external competitive position (European Commission, 2014).

Similarly to other transition countries, in Serbia, at the beginning of the transition, public wage premium was distinctly negative, and estimated at about -28% in 1995 (for men, Krstić et al, 2007). As the transition went on, the wages in the public sector first became, *ceteris paribus*, equal to those in private sector, around the turn of the century (Laušev, 2012), while in the recent years we observe positive premium as high as 17.7% in 2013 (Vladislavljević and Jovančević, 2016). While the lowering of private sector premium can be contributed to increase of private sector job security and minimum wage increase (Jovanović and Lokšin, 2003; Krstić et al 2007), current high level of public sector wage premium is due to exaggerated increase of the public wages, during the 2000s, which has been assessed as fiscally irresponsible (e.g. Arandarenko 2011). Previous research for Serbia (e.g. Nikolić et al, 2017) also indicated that the public sector

wage premium is high at the bottom of the wage distribution, and low at the top of the wage distribution.

### **3. Data and sample**

In this paper we use Labour Force Survey (LFS) data, the only data which includes all the information necessary to estimate the public sector wage premium: monthly wages, sector of ownership<sup>4</sup>, workers' (gender, age, education, etc), and job characteristics (hours worked, occupation, sectors of activity, etc), as well as the regional and household identifiers. We use data for 2014, the year before the austerity measures were implemented, and for 2015, the year after they were introduced. LFS is conducted on a quarterly basis by the Statistical Office of the Republic of Serbia (SORS) and provides nationally representative data on the labour market in Serbia and represents the essential instrument for the assessment of the key labour market indicators (employment rates, unemployment and inactivity) in Serbia, as well as in the European Union. Data include weights, calculated by SORS, which are used to correct the descriptive statistics and econometric estimates for the probability that a household is selected into the sample from a population of Serbian households.

The sample for each quarter consists of five rotating groups which are independent subsamples and each subsample is representative of the whole population. The rotation panel is introduced in order to ensure the comparability of the results between the waves. Each of the subsamples rotates based on the 2-2-2 system, in which each subsample is: firstly selected into the sample for two waves, then is out of the sample for the two waves, and then once again two times selected into the sample.

According to the LFS data (SORS, 2016), public sector workers represent about one third of the total employment in Serbia and approximately one third of the public sector workers is employed in state-owned enterprises. In 2014, the estimated number of public sector workers was 764,127 (29.9%), while their number decreased to 729,828 (28.3%) in 2015. In the same period the number of workers in the private sector in Serbia increased by approximately 40,000 employees (from 1,744,477 to 1,785,324).

As a standard approach in the literature, we exclude self-employed as their wages are not registered in the LFS, as well as unpaid family members, farmers, occasional and seasonal workers, workers working below 16 hours per week, persons in education, individuals younger

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<sup>4</sup> Main independent variable in this research - sector of ownership is based on the answer to the question "Type of ownership you work in?", and is not available in alternative data sets such as EU-SILC. Respondents answer the question by choosing among the four alternatives: "Private-registered", "Private-unregistered", "Public" and "Other". In the analysis we drop "Private-unregistered" employees as they are informally employed and "Other" as the ownership of their business does not belong to either of the groups.

than 20 and older than 64 years, those refusing to report their wages or reporting zero wages<sup>5</sup>, and workers who state that their working organization's sector of ownership is "other". Additionally, we exclude informally employed, to enable greater comparability of the public and private sector, as practically all jobs in the public sector are formal. Finally, as recommended in the literature (Cameron & Trivedi, 2010, p. 96), we drop the respondents who fall within the top or bottom one percent of the hourly wage distribution and whose wages, at the same time, would have unusual influence in the regression estimations. The total sample for the analysis for both years includes 32,698 respondents, 17,322 working in private (53.0%) and 15,376 (47.0%) working in public sector. Within the public sector 5,773 workers work in the state-owned enterprises (37.5% of the public sector workers), while 9,603 works in the state sector (62.5%).

Table A1 in Appendix 1 presents descriptive data on the private and public sector workers, as well as the comparison of the workers working in two subsectors within the public sector. Compared to the private sector, workers in the public sector are more likely to be female, married, older (and with longer working experience), to live in urban areas, to be better educated, and to work in better-paid occupations (such as Managers, Professionals, Technicians or Clerks) and less likely to work as temporary workers. There are also large differences between the workers in the state sector and state-owned enterprises. Women represent almost two thirds of workers in the state sector, while their share in the state-owned enterprises is about 28%. Workers in the state-owned enterprises are also older, have longer working experience, and have lower shares of tertiary education and low shares of Professionals and Technicians. Surprisingly, the share of Clerks in state-owned enterprises is higher than in the state sector.

The structure the private sector workers has not changed much over the years. Only notable change is a higher share of temporary workers in the private sector, indicating that the majority of the new workers is employed on temporary contracts<sup>6</sup>. On the other hand, the decrease of the public sector workers is mainly due to the lower number of people with secondary education in the state-owned enterprises (Table A1 in Appendix).

Hourly wages in the public sector in 2014 were, on average, by 32.8% higher than in the private sector. Within the public sector, average wages are lower for state-owned enterprises than for the state sector by 7%. In 2015, the hourly wages in the private sector grew by 2.7%, while the wages in the public sector fell by 1.9%. This led to a decrease of the (unadjusted) gap between the sectors to 28.2%. The average drop was higher for the wages in the state sector - 3%, than for the workers in state-owned enterprises, where they decreased by 0.4% on average.

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<sup>5</sup> In 16.4% of the cases respondents refused to give any information about wage and in 1.9% of the cases the respondents reported zero wages.

<sup>6</sup> This is in line with the changes of the Labour Law, according to which, among other this, fixed-term contracts can last up to three years instead of one.

#### 4. Econometric methods and models

##### *Estimation of the public sector wage premium at mean*

We estimate public sector wage premium for 2014 and 2015 at mean by using Mincer wage equation and Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973). Additionally, we use the methods of conditional and unconditional quantile regression to estimate the public sector wage premium at different levels of the wage distribution. The dependent variable in all estimation of the public sector wage premium is the log hourly wage, calculated using the information on monthly wage<sup>7</sup> and usual weekly working hours during the normal week<sup>8</sup>.

In order to estimate the public sector wage premium, we regress, separately for 2014 and 2015, the log hourly wages on the public sector dummy (*Pub*), which takes the value 1 if person is working in the public and 0 if the person is working in the private sector; and  $\mathbf{X}$  - vector of other individual (gender, age, settlement, region and education) and job characteristics (working experience, occupation, part-time and temporary work)<sup>9</sup>:

$$y = \ln(Y) = \alpha + \beta Pub + \mathbf{X}'\boldsymbol{\theta} + \varepsilon, \quad (1)$$

Coefficient  $\beta_t$  in the equation 1 is an estimate of the public sector wage premium in the year  $t$ ,  $\boldsymbol{\theta}$  is the vector of wage equation coefficients, i.e. returns to characteristics, while  $\varepsilon$  represents the error term. As already mentioned, in this paper we also aim to look separately into the premiums of two subsectors within the public sector: state sector and state-owned enterprises. In order to calculate premiums for two subsectors we estimate the following equation:

$$y = \ln(Y) = \alpha + \beta_1 StaSec + \beta_2 StaEnt + \mathbf{X}'\boldsymbol{\theta} + \varepsilon, \quad (1a)$$

where  $\beta_1$  and  $\beta_2$  in equation (1a) represent the premiums for working in the state sector (*StaSec*) and state-owned enterprises (*StaEnt*), compared to working in the private sector, while other coefficients and variables are the same as in equation (1).

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<sup>7</sup> For the majority of the employees (64.9%) the data on the wages are available as the exact amounts of wages, while for the remaining employees the wages are available as wage intervals. For the latter group a matching procedure is used to impute the exact amounts of the wages (instead of intervals). For each individual with interval wages the matching procedure requested fifty "nearest neighbours", with exact match on occupation, gender and ownership sector (public or private), while sector of activity, type of contract (permanent or temporary), hours of work, years of education, working experience, age, and regional and settlement dummies served as additional matching criteria. After the matching, only the wages of the "nearest neighbour" which fell within the interval reported by the respondents were kept. The imputed wage was then calculated as median of the matched wages which fall within the reported interval. In 97.5% of the cases the procedure succeeded in imputing the wages.

<sup>8</sup> LFS contains both usual and actual working hours. According to the LFS questionnaire actual working hours refer to the hours worked in the observed (last) week, while the wages refer to monthly income. Since the actual (i.e. weekly) working hours might be a subject to weekly fluctuations, we opted to use the usual working hours.

<sup>9</sup> We omit indexation of the coefficients and variables in order to simplify the presentation.

In order to perform the Blinder-Oaxaca decomposition we estimate the separate equations for public and private sector

$$y^{\text{Pub}} = \mathbf{X}^{\text{Pub}} \boldsymbol{\theta}^{\text{Pub}} + \varepsilon^{\text{Pub}}, \text{ for the public sector} \quad (2a)$$

$$y^{\text{Pri}} = \mathbf{X}^{\text{Pri}} \boldsymbol{\theta}^{\text{Pri}} + \varepsilon^{\text{Pri}}, \text{ for the private sector} \quad (2b)$$

where  $X^{\text{Pub}}$  and  $X^{\text{Pri}}$  are the vectors of characteristics, and  $\theta^{\text{Pub}}$  and  $\theta^{\text{Pri}}$  are vectors of coefficients from the public and private wage equations respectively. The difference in mean wages between the sectors can, after transformations, be written in a form of two-fold Blinder-Oaxaca decomposition (Jann, 2008):

$$\bar{y}^{\text{Pub}} - \bar{y}^{\text{Pri}} = (\bar{X}^{\text{Pub}} - \bar{X}^{\text{Pri}})' \hat{\theta}_k^* + (\bar{X}^{\text{Pub}})' (\hat{\theta}^{\text{Pub}} - \hat{\theta}^*) + \bar{X}^{\text{Pri}}' (\hat{\theta}^* - \hat{\theta}^{\text{Pri}}) \quad (2c)$$

where  $\bar{X}^{\text{Pub}}$  and  $\bar{X}^{\text{Pri}}$  are the average characteristics of the public and private sector workers, and  $\hat{\theta}^*$  is the so-called reference coefficient. The first part of the right side of the equation  $(\bar{X}^{\text{Pub}} - \bar{X}^{\text{Pri}})' \hat{\theta}_k^*$  represents the *explained part of the gap* (composition, or the quantity effect), which is due to the differences in the individual and job characteristics between the sectors. The second part of the right side of the equation (2c)  $(\bar{X}^{\text{Pub}})' (\hat{\theta}^{\text{Pub}} - \hat{\theta}^*) + \bar{X}^{\text{Pri}}' (\hat{\theta}^* - \hat{\theta}^{\text{Pri}})$  represents the *unexplained part of the gap*, which is due to the differences in returns and unobservable differences. It can be shown that if we use estimates from the pooled model, in which the public sector dummy is included, i.e. coefficients from equation (1), as reference coefficients  $\hat{\theta}^*$ , the unexplained part of the gap is equal to the  $\beta$  coefficients from that equation. Similarly, we use Blinder-Oaxaca decomposition to estimate separate differences between the state sector and state-owned enterprises from one, and the private sector on the other side.

Differences in wages between the private and the public sector can be the result of the non-random sector selection effects, due to the possible correlation between the sector choice and wages. These effects, as well as the effects of the non-random selection to employment can lead to bias estimates of the coefficients from the equations (1) to (2b). To account for the sample selection, we test the robustness of our results by using Bourguignon, et al. (2007) procedure which corrects for multinomial selection effects, as the bias can arise from the selection into one of the three sectors: 1) non-employment (i.e. unemployed or inactive), 2) private or 3) public sector. The model, similarly to the Heckman's (1979) proposal, considers the selection problem as the omitted variables problem. In the first stage, we use multinomial probit to estimate sector choice probability, conditional on the already described personal characteristics and household structure variables are available from the LFS: number of children and household members, marital status and the status of the household head. Based on the estimated probability of sector choice we compute the inverse Mills ratios (IMRs) as the ratio of the probability density function

to the cumulative distribution function. In the second stage, IMRs is then added to the list of covariates  $X$  in the equations (1) to (2b), which are then re-estimated.

*Estimation of the public sector wage premium at different parts of the wage distribution*

Public sector wage premium at different points of the wage distribution was estimated by conditional and unconditional quantile regression methods. In conditional quantile regression (Koenker and Basset, 1978; Koenker 2005) models (1) and (1a) are estimated by using the conditional quantile regression (CQR) functions  $Q_q(y|X)$ , instead of conditional mean function  $E(y|X)$ , which is used in OLS. CQR minimizes the sum of absolute residuals weighted by the asymmetric penalties

$$Q(\beta_q) = \sum_{i:y_i \geq x_i' \beta} q |y_i - x_i' \beta_q| + \sum_{i:y_i < x_i' \beta} (1 - q) |y_i - x_i' \beta_q|, \quad 0 < q < 1 \quad (3).$$

Least absolute-deviations estimator is obtained through optimization based the linear programming methods (simplex iterations). Similarly to the OLS regression, quantile conditional function assumes a linear relation between the dependent variable and its covariates, while the standard errors are obtained via bootstrapping. (Cameron and Trivedi, 2010; p. 217).

Unconditional quantile regression (UQR) estimates are obtained by using the methodology proposed by Firpo et al. (2009). The authors propose that UQR can be estimated by regressing the recentered influence function (RIF) of the dependant variable on the set of explanatory variables. In quantile regression RIF can be defined as

$$RIF(Y; q_\tau; F_y) = q_\tau + \tau - 1\{Y \leq q_\tau\} / f_y(q_\tau) \quad (4).$$

After replacing the dependant variable with its RIF, we run OLS regression on covariates to obtain UQR estimates. The authors argue that the unconditional quantile regression estimates represent the partial effects of the variable, i.e. in our case the effect of increasing the proportion of the public sector workers on the  $\tau$ th quantile of the unconditional wage distribution (Firpo et al., 2009). According to the Firpo et al. (2009), CQR estimates can be viewed as the within-group estimate of inequality: public sector workers have higher earnings than private sector workers in the group of people at  $\tau$ th quantile of the respective conditional wage distribution, with the workers share the same values of covariates  $X$ . Therefore CQR estimates represent the effects on the wage distribution, rather than on individuals since they cannot account for the effect that switch from private to public sector could have on the person's position in the wage distribution. On the contrary, UQR estimate has the "OLS interpretation", as it indicates the counterfactual wage of a person if he/she switches from working in the private to working the public sector or vice-versa.

### *The effects of the wage cut on the wage reduction*

As the LFS is conducted quarterly, respondents who are involved in rotating groups are present in the same quarters for two years (for example, in the first quarter of 2014 and the first quarter of 2015). We use the panel structure of the data to investigate the compliance between the proposed wage cut and the actual wage change that occurred between 2014 and 2015. We restrict the sample to include only people who were employed in the public sector in both 2014 and 2015, since they are the ones affected by the fiscal consolidation. Due to the rotating nature of the data the sample for this part of the analysis is much lower than for the estimation of the public sector wage premium and it drops to 1,007 persons who work in the public sector in both years and for whom we observe wages for both years.

As already described, the 2015 wage cut was applied to the wages above 25,000 RSD. Lower wages were protected from the reform in order to introduce a progressivity into the measure. Additionally, in order to ensure the equity of the measure, the wage cut design also secured that if the wage cut would result in a wage lower than 25,000 RSD, wages would not be reduced by 10 percent, but would simply be decreased to 25,000 RSD. At the same time the reform was introduced, the “solidarity tax” (Republic of Serbia, 2013), introduced in the previous year and applied to wages above 60,000 RSD, ceased to exist and was replaced by the wage cut. Due to the complex interlink between the “solidarity tax” and the 2015 wage cut, we exclude wages higher than 60,000 RSD from this part of the analysis. This drop excluded additional 86 public sector workers from the sample.

According to described rules, we formulate variables for assessing the effects of the wage cut on the actual wage change. For wages lower than 25,000 RSD there was no wage reduction, for wages in the range between 25,000 and 27,778 RSD, wage cuts was equal to the difference between the 2014 wage and 25,000 RSD, while for the wages between 27,778 and 60,000 RSD, the wage reduction was 10% of the 2014 wage. We therefore define two wage cut variables, each describing the austerity rule for its part of the wage distribution.

$$\begin{aligned} \text{wage cut}_1 &= \text{wage}_{2014} - 25,000, & \text{if } 25,000 < \text{wage}_{2014} < 27,788 \\ &= 0, \text{ otherwise} \\ \text{wage cut}_2 &= \text{wage}_{2014} * 0.1, & \text{if } 27,788 \leq \text{wage}_{2014} \leq 60,000 \\ &= 0, \text{ otherwise} \end{aligned}$$

we then use the two wage cut variables to estimate the following model (via OLS):

$$\Delta \text{wage} = \alpha + \gamma_1 \text{wage cut}_1 + \gamma_2 \text{wage cut}_2 + \varepsilon \quad (5)$$

where  $\Delta \text{wage}$  is an actual change in earnings - a variable that is calculated as a difference between the wages from 2014 and 2015. The expected value of coefficients  $\gamma_1$  and  $\gamma_2$  is 1,

because we expect the change in earnings described in fiscal consolidation corresponds to a real wages change. A stochastic model error is indicated by  $\varepsilon$ .

In order to investigate whether the compliance was different for state-owned enterprises and state sector we extend the model (5) and estimate the following model:

$$\Delta \text{wage} = \alpha + \gamma_1 \text{wage cut}_1 + \gamma_2 \text{wage cut}_2 + \gamma_3 \text{wage cut}_1 * SOE + \gamma_4 \text{wage cut}_2 * SOE + \varepsilon \quad (6)$$

where, coefficients  $\gamma_3$  and  $\gamma_4$ , indicate whether the wage cut was administered differently within the state sector and state-owned enterprises and remaining variables and coefficients are the same as in equation (5).

## 5. Results

### *Public sector wage premium at mean*

Table A2 in Appendix represents estimations of the Models (1) and (1a) at mean, separately for 2014 and 2015<sup>10</sup>. The results show expected signs of all wage determinants: wages are higher for men than for women, higher for workers with higher education and longer working experience, in better-paid occupations, workers working part-time, compared to full-time; and workers working with permanent contracts, compared to temporary workers. Wages are also higher in Belgrade than in other regions, as well as for workers from urban, compared to rural settlements. Finally, negative returns for age (with working experience also included in the specification) indicate lower wages for older workers working with the same level of working experience.

The coefficients in the first part of the table A1 indicate a positive wage premium for working in public sector (model 1), and both state sector and state-owned enterprises (model 1a). To analyse the wage premiums at mean we use the Blinder-Oaxaca decomposition (Figure 1 and Table A3 in Appendix).

The unadjusted gap (represented by the total size of the vertical bar in Figure 1) between the public and private sectors in 2014 stood at 32.3%<sup>11</sup>. Almost half of this difference (14.9%) is due

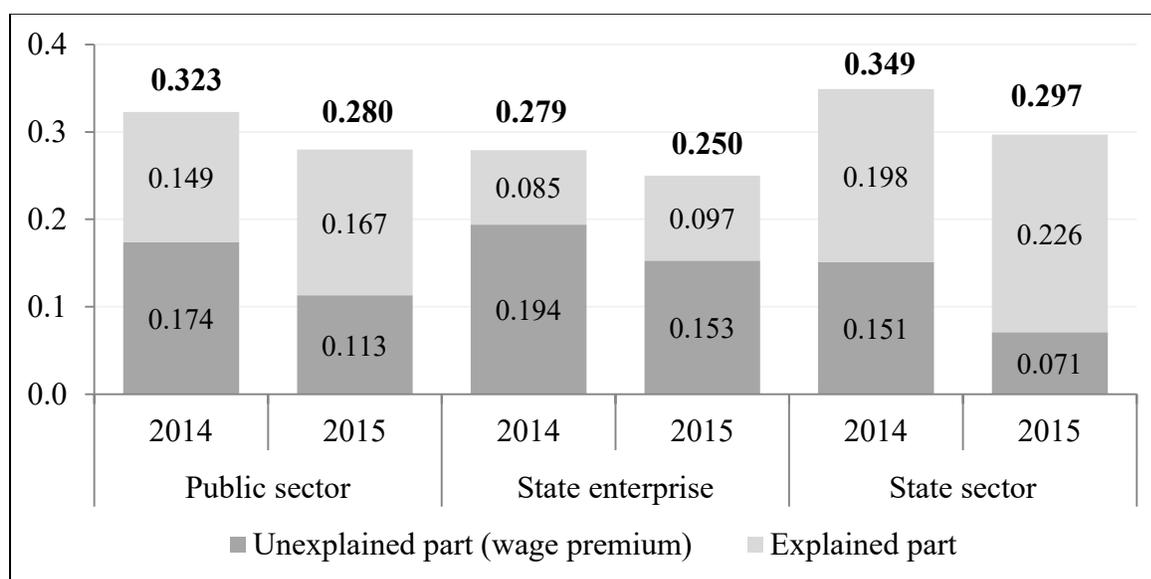
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<sup>10</sup> We check the robustness of the results by firstly limiting the sample of the employees which report the exact amount of the wages, excluding those who reported interval wages and were imputed exact amounts by the procedure described in the footnote 7. Secondly, we test the effects of the sample selection by using the Bourguignon, et al. (2007) procedure to account for the selection bias. The selection effects are significantly correlated with the wages from both years, but have no significant impact on the estimated values of the public sector wage premium. Robustness checks confirm the results and conclusions from analyses presented in this chapter. Results from the robustness checks are available upon request.

<sup>11</sup> The difference in log wages is approximately equal to the percentage difference. Due to this approximation the differences between the log wages show slightly smaller values when compared to values from table A1.

to the differences in characteristics between the workers from the public and private sector. As mentioned before, public sector workers have higher education, longer working experience, work more often in better-paid occupations, and have lower share of temporary contracts than their private sector counterparts (Table A1). As these characteristics are associated with higher wages (Table A2), the part of the difference in average wages can be explained by public sector workers' higher value for employers simply due to their higher skills. When we adjust for these characteristics, we estimate the public sector wage premium at 17.4% in 2014.

**Figure 1: Blinder-Oaxaca decomposition, total and by subsectors in 2014 and 2015**



Source: Author's calculation based on the LFS data.

Notes: Total size of the bar represents the unadjusted gap between the private sector and the public sector, state sector and state enterprises respectively. The unadjusted gap can be split to the *explained part* - part of the gap due to the differences in labour market characteristics between the sectors, and the *unexplained part* which represents the sector wage premium. Full table with estimated standard errors can be found in Table A3 in the Appendix.

In 2015, after the wage cut, both unadjusted and adjusted gap decreased<sup>12</sup> significantly, by 4.3 (from 32.3% to 28.0%) and 6.1 percentage points (from 17.4% to 11.3%). Higher decrease of the adjusted gap is due to the increase of the share of temporary workers in the private sector (Tables A1 and A3). This higher share decreased the average "quality" of the private sector workers, so the differences between the workers in the sectors in 2015 are larger than they were in 2014.

In 2014, the unadjusted wage gap was higher for the state sector (34.9%) then for the state-owned enterprises (27.9%), when the wages from these sectors are compared to the private sector (Figure 1). However, as the workers in the state sector have higher levels of education and work

<sup>12</sup> The tests of statistical significance between the coefficients are performed by comparing the 95% confidence intervals for 2014 and 2015 (Table A4 in appendix). The coefficient has a significant decrease if the lower bound of the confidence interval from 2014 is higher than the upper bound of the confidence interval from 2015.

more frequently in the better-paid occupations (Table A1), the estimated wage premium for working in the state sector of 15.1% is significantly lower than for working in the state-owned enterprises - 19.4%.

The decrease of both unadjusted and adjusted gap in 2015 was stronger for the state sector than for the state-owned enterprises. The unadjusted gap for the state sector dropped by 5.2 percentage points (from 34.9 to 29.7%), while for the state-owned enterprises the decrease of 2.9 percentage points (from 27.9 to 25.0%) was insignificant. The difference was even stronger when we adjusted for the differences in characteristics. The premium for state sector fell by 8 percentage points (from 15.1 to 7.1%), while the decrease for the state-owned enterprises was insignificant at 4.1 percentage points (from 19.4 to 15.3%). Therefore, the difference between the subsector premiums increased from 4.3 percentage points in 2014 to 8.2 percentage points in 2015.

#### *Public sector wage premium at different parts of the wage distribution*

Figure 2 presents the results of the conditional quantile regression (CQR) estimates starting from the 5th to 95th percentile of the wage distribution. In Tables A5 and A6 in Appendix we present coefficients, standard errors and confidence intervals from the CQR<sup>13</sup>. The top panels present conditional wage premiums for the public sector (model 1), while the middle and bottom panel present premiums for state-owned enterprises and state sector respectively (model 1a). Left panels present estimations for 2014, while right panels represent the estimations for 2015.

In 2014 we observe the expected pattern of the public sector wage premiums at different parts of the wage distribution: the estimated premium is the highest at the bottom of the wage distribution (20.9%, at 10th percentile), and the lowest at the bottom of the wage distribution – 12.7% at 90th percentile of the wage distribution. Median premium is estimated at 17.0%, a level marginally ( $p < 0.1$ ) lower than the one at the bottom and significantly higher than on the top of the wage distribution (top left panel in Figure 2 and Table A5)<sup>14</sup>.

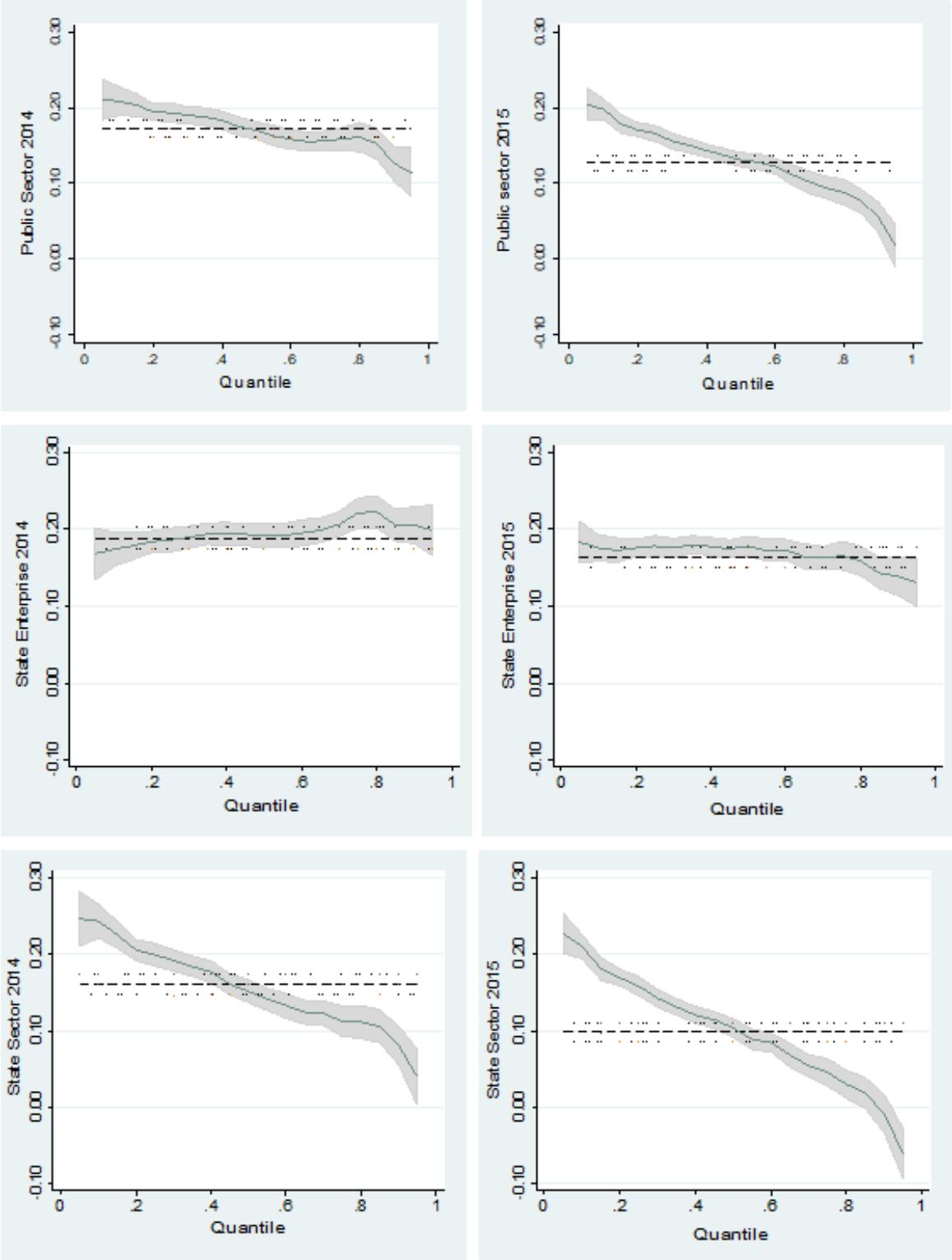
Table A5 indicates that the premium change for the first two deciles of the wage distribution was not significant, due to fact that the lowest wages were protected from the wage cut. From the 30th percentile until the end of the wage distribution, the public sector wage premium decrease was significant. The decrease at middle parts of the wage distribution was between 3 and 4

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<sup>13</sup> Due to limited space, we present the coefficients in Tables A5 and A6 on a ten percentile difference, starting from 10th and finishing at 90th percentile of the wage distribution. Full estimates from the CQR, including all covariates which are also omitted from the Table 5 and Table 6, are available upon request.

<sup>14</sup> The tests of statistical significance between the coefficients are performed by comparing the 95% confidence intervals for 2014 and 2015, or for coefficients at different parts of the wage distribution (Table A5 and A6). The premium has a significant decrease if the lower bound of the confidence interval from 2014 is higher than the upper bound of the confidence interval from 2015. Similarly the coefficients at different parts of the wage distributions are significantly different if their confidence intervals do not overlap.

**Figure 2: Public sector wage premium at different parts of the wage distribution, for public sector (top), state-owned enterprises (middle) and state sector (bottom panels) in 2014 (left panels) and 2015 (right panels)**



Source: Author's calculation based on the LFS data.

percentage points, while at the top of the wage distribution, at 80th and 90th percentile wage premium decreased by more than 7 percentage points (Table A5). These differences in the premium decrease led to more pronounced premium differences between the bottom, median and the top of the distribution (top panels, Figure 2).

Middle and bottom left panels in Figure 2 show striking differences of conditional wage premium patterns in the state sector and state-owned enterprises in 2014. For the state sector, we observe the expected pattern, as the premiums at 10th, 50th and 90th percentile of the wage distribution, estimated at 24.3, 15.1 and 8.1%, respectively, significantly differ one from another (Table A6).

On the other hand, the premium for the state-owned enterprises is constant across the wage distribution, as the premiums at 10th, 50th and 90th percentile, estimated at 17.4, 19.1, and 20.5% respectively, are not significantly different one from another (Table A6). The comparison between the subsectors indicates that the premium in the state-owned enterprises is significantly higher than the one for the state sector from the median to the top of the distribution. The differences range from about 4 percentage points at the median to 12.7 percentage points at the top of the distribution.

For the state sector, premium decrease was significant across the whole wage distribution, the drop being the lowest at the 10th – 3.3 percentage points, and the highest at 90th percentile – 8.9 percentage points (Table A6). Therefore, similarly to the overall results for the public sector, the fiscal consolidation had made the pattern of high premium at the bottom and low premium the top of the wage distribution in state sector even more pronounced. After the fiscal consolidation, state sector wage premium at 90th percentile of the wage distribution became insignificant (Table A6 and Figure 2, bottom right panel) indicating that there are no differences in the wages of top-paid jobs in the private and the state sector in 2015.

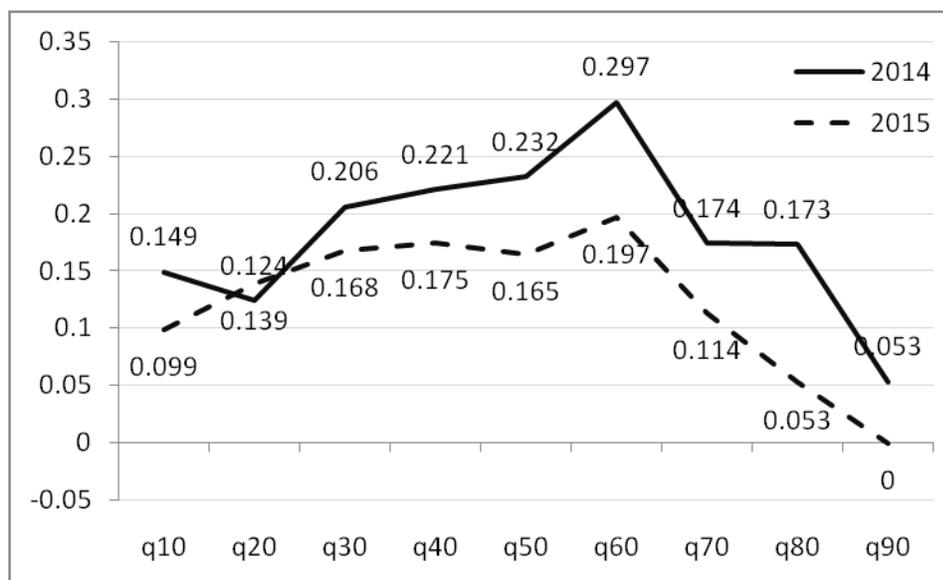
On the other hand, the premium decrease for the state-owned enterprises was insignificant for the low and middle wages, while for the top wages (70th - 90th percentile) the decrease was significant (Table A6), although lower than in the state sector. These changes have not altered the distribution of conditional premium across the wage distribution in state-owned enterprises in 2015. The premium remained constant across the wage distribution, since the differences between the coefficients at different parts of the wage distribution remained insignificant (Table A6 and Figure 2, middle right panel).

As a result of different premium decreases, the premium in 2015 is higher in the state-owned enterprises than in the state-sector from the 30th percentile till the top of the wage distribution, while the differences are even more pronounced.

### *Unconditional quantile regression estimates*

Figures 3 and 4 present the unconditional quantile regression (UQR) estimates of the public sector, state-owned enterprises and state sector wage premiums in 2014 and 2015 at different parts of the wage distribution. In Table A8 in the Appendix we present coefficients, standard errors and confidence intervals, which enable us to compare the estimates between years and across the wage distribution and sectors<sup>15</sup>. As mentioned in the methodology section, unlike the CQR, where the coefficients indicate the conditional wage differences between workers from different sectors, UQR indicates workers' counterfactual wage for switching to different sector, by accounting for the change in the worker's position in the distribution.

**Figure 3: Public sector wage premium at different parts of the wage distribution (UQR)**



Source: Author's calculation based on the LFS data.

Figure 3 indicates that, similarly to the CQR estimates, UQR estimates indicate a higher wage in the public sector, than in the private sector. Therefore, at all parts of the wage distribution switching from private to public sector would bring higher remuneration and vice versa. However, the pattern of the premium according to UQR estimates differs from the one expected and obtained from CQR. The premium in 2014 was the highest at the middle of the wage distribution, at 40th, 50th and 60th percentile, at 22.1%; 23.2% and 29.7% respectively. The premiums at the bottom of the wage distribution, at 10th and 20th percentile, estimated at 14.9% and 12.4%, were significantly lower than at the middle of the wage distribution. At higher parts of the wage distribution, similarly to CQR, the UQR premium declines, being at about 17% at 70th and 80th percentile; while the lowest premium – 5.3% is estimate at 90th percentile of the

<sup>15</sup> Table 8 omits the coefficients for other covariates, due to space limitations. Full estimates of the UQR available upon request.

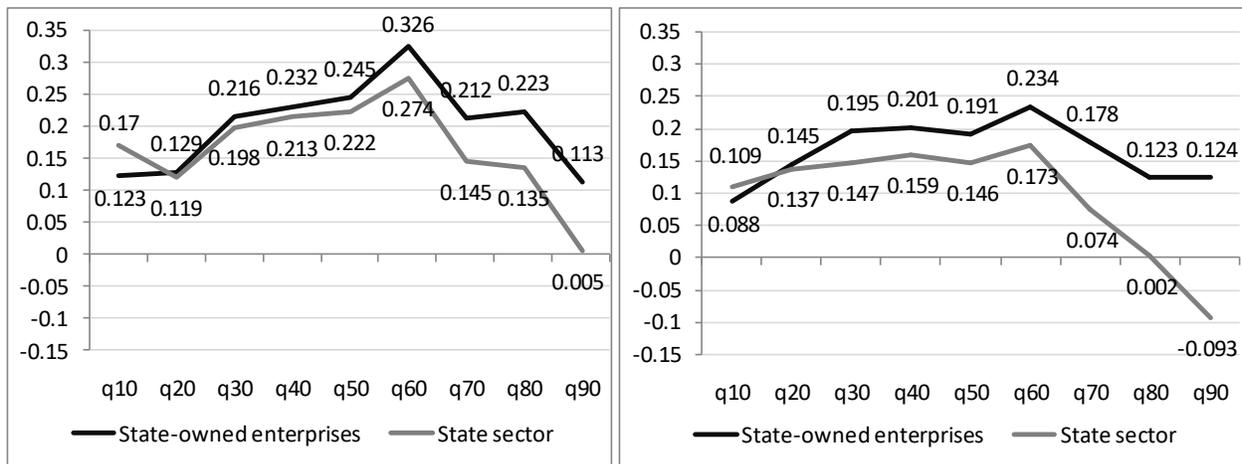
wage distribution. These results are similar to the one presented in Firpo et al., (2009) for the effect of the union membership.

In 2015, after the fiscal consolidation measures were introduced, similarly to conditional estimates, the premium decreases significantly at all parts of the wage distribution except at 20th percentile. The pattern of the premium remains similar to the one from 2014: premiums are the highest at middle parts of the wage distribution and lower at distribution tails. The drop was the strongest between median and 80th percentile of the wage distribution (between 6 and 12 percentage points), while at the top of the wage distribution the drop of 5.3 percentage points reduced the unconditional premium to insignificant level.

Figure 4 presents the UQR premium estimates for state-owned enterprises and state sector in 2014 and 2015. In 2014 the pattern of the wage premium in the subsectors of the public sector is similar (Figure 4, left) at lower parts of the wage distribution, while the confidence intervals from Table A7 suggest that the premium is higher in the state-owned enterprises than in the state sector from the median to 90th percentile (the differences are marginally significant ( $p < 0.1$ ) at median and 60th percentile), similarly to CQR estimates.

After fiscal consolidation measures were introduced in 2015, similarly to the CQR the premium in the state sector dropped at all parts of the wage distribution except at 20th percentile, with the premium drop being the largest at upper parts of the wage distribution. Estimate at the 90th percentile indicates that if workers in the state sector were to seek jobs in the private sector that they would have a 9.3% higher wage.

**Figure 4: State-owned enterprises and state sector wage premium at different parts of the wage distribution (UQR estimates) in 2014 (left) and 2015 (right panel)**



Source: Author's calculation based on the LFS data.

In the state-owned enterprises the premium drop was significant only at median, 60th and 80th percentile of the distribution, although these drops were lower than the ones in the state sector. As a result, premium differences between state-owned enterprises and state sector increased

between the years at all parts of the wage distribution. In 2015 the premium differences between the subsectors are significant at all parts of the wage distribution except at 10th and 20th percentile, while the differences at the top of the wage are more pronounced.

*The effect of the wage cut on the actual wage change*

Finally, we utilise the rotating panel structure of the LFS data to estimate whether the different changes of the public sector wage premium in different sectors can be attributed to differences in compliance to the wage cut. Table 1 presents the estimations of models (5) and (6). The results in column 1 investigate the overall compliance of the public sector. The coefficient for wages between 27,778 and 60,000 dinars is significant and amounts to 0.821. The 95% confidence interval of this estimate is (0.621; 1.021), includes the theoretical value of 1, which indicates a full compliance, i.e. that the wage reduction took place according to the plan. On the other hand, the effect of the variable which denotes a decrease in wages between 25,000 and 27,778 dinars is not statistically significant. This is probably due to a small sample of respondents who have earnings in this interval (only 30).

The results in Column 2 indicate that there was a significant difference between the subsectors in the compliance to the wage cut. The coefficient next to interaction term from equation (6), suggests, that for the wages between 27,777 and 60,000 RSD, the reduction of wages in state-owned enterprises was significantly lower than in the state sector ( $b = -0.389$ ;  $p < 0.01$ ), indicating a lower compliance to the wage cut of the state-owned enterprises.

**Table 1: The effects of the proposed wage cut on an actual change in earnings**

	1		2	
Wage cut 1 (25,000 - 27,777 RSD)	-0.398	(0.671)	0.282	(0.538)
* State-owned enterprises			-1.480	(1.283)
Wage cut 2 (27,777 - 60,000 RSD)	0.821***	(0.102)	0.937***	(0.110)
* State-owned enterprises			-0.389***	(0.150)
Constant	-1.361***	(0.284)	-1.332***	(0.283)
Sample size	921		921	
Adjusted R square	0.060		0.07	

Robust standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The coefficient in the wage cut 2 row (Column 2) indicates that the compliance to the wage cut in the state sector was complete, since the confidence interval for the coefficient included 1 (0.722; 1.153). On the other hand, the wages in the state-owned enterprises were reduced by an average of 0,548 ( $=0.937 + -0.389$ ), at the level which does not include 1 in the confidence

interval (0.259; 0.837)<sup>16</sup>. This indicates that, compared to the full compliance to the reform in the state sector, the compliance in the state-owned enterprises was only partial.

## 6. Summary of the results

In 2014 public sector wage premium in Serbia was very high - 17.4%. Conditional quantile regression (CQR) estimates show a premium pattern which is theoretically expected and frequently found in other research (e.g. Bargain and Melly, 2008; Depalo, 2015): conditional premium was the highest at the bottom (20.1%) and the lowest at the top of the wage distribution (12.7%). Results of the unconditional quantile regression (UQR) confirm that working in the public sector indeed increases the wages of the workers, and suggest that workers at the middle of the wage distribution would benefit the most from the transfer from private to public sector.

Results further show that state sector and state-owned enterprises differ significantly in the size and distribution of the wage premiums. In 2014, wage premium for the workers from the state-owned enterprises was significantly higher than the one for state sector workers (19.4 vs. 15.1%). Both CQR and UQR estimates indicate that higher mean premium in state-owned enterprises is due to significantly higher premium at the middle and upper parts of the wage distribution for this subsector, while at lower parts of the wage distribution the differences are not significant.

In 2015, after the fiscal consolidation measures were introduced the premium dropped by 6.1 percentage points on average. The drop was also, in line with expectations, different at different parts of the wage distribution. According to both CQR and UQR estimates the public sector wage premium decrease was significant from the 30th percentile to the top of the wage distribution with the decrease being the strongest at the top of the wage distribution. The drop was not significant (or lower<sup>17</sup>) for the first two deciles of the wage distribution, due to the exemption of the wages lower than 25,000 RSD from the wage cut.

The premium drop was stronger for the state sector (8 percentage points) than for the state-owned enterprises (4.1 percentage points, insignificant) which caused a further increase in the wage differences between the state sector and state-owned enterprises. The analysis of the panel data indicates that this difference in the premium drop can be attributed to the lower compliance of the state-owned enterprises to the wage cut: while the state sector had the full

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<sup>16</sup> In order to calculate the confidence interval of this coefficient, we interact the wage cut variables with the dummy variable for the work in the state sector, instead of interaction with the state-owned enterprises and re-estimate the equations. The results are available upon request.

<sup>17</sup> Although UQR estimates also suggest a significant drop at the 10th percentile, the drop is lower in size than in other parts of the distribution. Lower premium in 2015 can be explained by higher wages in the private sector.

compliance to the wage reform, the compliance in the state-owned enterprises was only partial.

Both CQR and UQR estimates suggest that the patterns of the premium changes across the wage distribution in state sector and state-owned enterprises are similar, however due to the difference in sizes, the wage premium drop in the state sector was significant at all parts of the wage distribution, while for the state-owned enterprises it was significant only at the higher parts of the wage distribution. This led to increased differences between the sectors at all parts of the wage distribution, the difference now being significant from the 30th percentile to the top.

## **7. Discussion and conclusions**

This paper investigated the effects of the fiscal consolidation measures on the size and the distribution of the public sector wage premium in Serbia. The measures included a ten percent cut in the public sector wages, and a subsequent wage freeze until the end of 2017. We investigated the effects of the wage cut by estimating the public sector wage premium for two years: 2014 and 2015, before and after the measures were introduced, as well as the changes in the public sector wages which occurred as a consequence of the reform.

Beside investigating the effects of the austerity measures on the wage inequality and public sector wage premium, in this paper, for the first time to our knowledge, public sector wage premium was estimated separately for two subsectors within the public sector: state sector and state-owned enterprises. While the state sector includes the workers from the public administration, education and health activity sectors, which are largely financed directly from the budget, state-owned enterprises are largely comprised of workers from transport, manufacturing, utilities and mining, whose wages are partially financed by own revenues. In previous papers, public sector wage premium was estimated either for the public sector as a whole, without distinguishing its subsectors, or by dropping one of the two subsectors from the analysis.

This research has shown that, in Serbia, before the fiscal consolidation measures were introduced, there was a large public sector wage premium. Together with higher job security in public sector, the premium created a strong duality between the private and the public sector, and caused the effect of "waiting in line" for jobs in the public sector, while leaving the private sector with workers of lower quality. From that perspective, the public sector wage cut, which reduced the premium, beside its fiscal effects, also had a positive effect on lowering the wage inequality between the sectors, as well as lowering the overall wage inequality.

Research has also shown that the workers in state-owned enterprises enjoy a higher wage premium than their state sector counterparts. This difference is significant at middle and upper parts of the both conditional and unconditional wage distribution. These results indicate an additional inefficiency of the state-owned enterprises which could be due to interplay of different factors. Firstly, as state-owned enterprises have own revenue at disposal, this enables them more discretionary power in wage setting. Additionally, as state-owned enterprises are more market-oriented, they have a greater need to compete with the private sector for the workers, especially at mid- and high-skilled ones. However, having in mind the higher job security in the public sector and significantly higher wages, we can hardly speak of competition for, but rather of monopole on the high quality workers. In the case of Serbia, this higher discretionary power of state-owned enterprises results in a higher level of wage inequality within the public sector and could be one of the causes of relative inefficiency of the state-owned enterprises.

In addition to existing inequality between the subsectors, after the wage cut was introduced, workers in state-owned enterprises faced a lower drop in the premium at all parts of the wage distribution, due to lower compliance to the wage cut. This is probably the effect of the different ways of the wage cut administration in the subsectors: direct reduction of the net wage base in state sector vs. the amount of savings to be paid to the central budget for the state-owned enterprises. Although the anticipated effects were to be the same, the latter method left more room for partial compliance to the wage cut of the state-owned enterprises, while the compliance of the state sector was complete, therefore increasing the wage differences within the public sector.

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## Appendix 1: Additional tables from the analysis

**Table A1 Estimation sample descriptive statistics**

Variables	Private sector	Public sector	sig	Private sector	Public sector	sig	State sector	State Enterp.	sig	State sector	State Enterp.	sig	Sign. of change between the years				
	2014	2014		2015	2015		2014	2014		2015	2015		Private	Public	State Sector	State Enterp.	
In hourly wage	5.005	5.332	***	5.032	5.314	***	5.359	5.289	***	5.329	5.285	***	***	***	***		
Female	0.445	0.485	***	0.459	0.495	***	0.621	0.27	***	0.617	0.282	***	*				
Age	39.747	44.8	***	40.085	45.3	***	44.4	45.3	***	45.1	45.7	***	**	***	***		
Without degree	0.005	0.004		0.004	0.003	*	0	0.011	***	0.001	0.006	***		*		**	
Primary	0.089	0.074	***	0.091	0.083	*	0.063	0.092	***	0.064	0.116	***		**		***	
Secondary (2-3 years)	0.308	0.175	***	0.302	0.153	***	0.103	0.287	***	0.096	0.252	***		***		***	
Secondary (4 years)	0.432	0.396	***	0.431	0.394	***	0.366	0.442	***	0.365	0.445	***					
Tertiary (1-3 years)	0.059	0.086	***	0.06	0.09	***	0.109	0.05	***	0.106	0.061	***					*
Tertiary (BA,MA,PhD)	0.108	0.266	***	0.112	0.277	***	0.359	0.119	***	0.367	0.119	***					
Belgrade	0.199	0.236	***	0.205	0.226	***	0.233	0.241		0.211	0.252	***			**		
Vojvodina	0.295	0.217	***	0.293	0.224	***	0.237	0.184	***	0.24	0.197	***					
West Serbia	0.284	0.274		0.282	0.295	*	0.252	0.309	***	0.293	0.3			***	***		
East Serbia	0.222	0.273	***	0.22	0.255	***	0.277	0.265		0.256	0.252			**	**		
Urban	0.61	0.654	***	0.603	0.654	***	0.701	0.58	***	0.693	0.585	***					
Working experience	14.9	20.1	***	14.9	20.7	***	19.2	21.6	***	19.9	22.0	***		***	***		
Senior officials and managers	0.017	0.027	***	0.016	0.024	***	0.023	0.031	**	0.023	0.026						
Professionals	0.06	0.265	***	0.057	0.272	***	0.381	0.083	***	0.384	0.077	***					
Technicians and ass. profess.	0.121	0.204	***	0.104	0.205	***	0.231	0.163	***	0.234	0.153	***	***				
Clerks	0.088	0.112	***	0.089	0.102	***	0.088	0.148	***	0.075	0.147	***		**	**		
Service and sales workers	0.269	0.11	***	0.281	0.118	***	0.128	0.082	***	0.132	0.093	***	*				
Craft and trades workers	0.208	0.091	***	0.204	0.084	***	0.018	0.206	***	0.017	0.199	***					
Plant and machine operators	0.165	0.08	***	0.173	0.076	***	0.022	0.171	***	0.022	0.171	***					
Elementary occupations	0.072	0.111	***	0.077	0.12	***	0.109	0.116		0.112	0.134	***					**
Part time	0.008	0.018	***	0.014	0.017	*	0.025	0.008	***	0.026	0.003	***	***				**
Temporary contracts	0.154	0.082	***	0.193	0.091	***	0.091	0.069	***	0.093	0.086		***	*			**
<i>Sample</i>	7,642	7,054		9,680	8,322		4,312	2,742		5,291	3,031						

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, Significance test performed on the basis of t-test for independent samples. Standard errors, t-statistics, and exact p values omitted from the table, available upon request from the author.

**Table A2: Ordinary least squares estimates of the model 1 and model 1a**

	Model 1		Model 1a	
	2014	2015	2014	2015
Private sector (omitted)				
Public sector	0.174*** (0.009)	0.113*** (0.008)		
State sector			0.156*** (0.011)	0.078*** (0.009)
State-owned enterprises			0.194*** (0.012)	0.158*** (0.011)
Gender	-0.143*** (0.008)	-0.136*** (0.007)	-0.139*** (0.008)	-0.129*** (0.007)
Age	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Settlement	0.051*** (0.008)	0.041*** (0.007)	0.051*** (0.008)	0.041*** (0.007)
Belgrade (omitted)				
Vojvodina	-0.082*** (0.011)	-0.096*** (0.010)	-0.080*** (0.011)	-0.092*** (0.010)
Zapadna Srbija	-0.134*** (0.011)	-0.128*** (0.010)	-0.134*** (0.011)	-0.125*** (0.009)
Istocna Srbija	-0.145*** (0.012)	-0.161*** (0.010)	-0.144*** (0.012)	-0.156*** (0.010)
Primary or no education (omitted)				
Secondary (2-3 years)	0.037** (0.015)	0.074*** (0.013)	0.037** (0.015)	0.075*** (0.013)
Secondary (4 years)	0.114*** (0.015)	0.149*** (0.013)	0.114*** (0.015)	0.151*** (0.013)
Tertiary (1-3 years)	0.181*** (0.021)	0.223*** (0.018)	0.183*** (0.021)	0.226*** (0.018)
Tertiary (BA,MA,PhD)	0.358*** (0.021)	0.421*** (0.018)	0.360*** (0.021)	0.423*** (0.018)
Working experience	0.013*** (0.002)	0.012*** (0.001)	0.013*** (0.002)	0.012*** (0.001)
Working experience squared	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Senior officials and managers	0.497*** (0.032)	0.376*** (0.031)	0.495*** (0.032)	0.378*** (0.032)
Professionals	0.415*** (0.020)	0.337*** (0.017)	0.422*** (0.020)	0.353*** (0.017)
Technicians and ass. professionals	0.312*** (0.017)	0.263*** (0.014)	0.314*** (0.017)	0.268*** (0.014)
Clerks	0.244*** (0.017)	0.182*** (0.015)	0.242*** (0.017)	0.176*** (0.015)
Service and sales workers	0.040*** (0.015)	-0.013 (0.012)	0.041*** (0.015)	-0.012 (0.012)
Craft and trades workers	0.163*** (0.017)	0.101*** (0.014)	0.158*** (0.017)	0.092*** (0.014)
Plant and machine operators	0.182*** (0.017)	0.143*** (0.014)	0.178*** (0.017)	0.135*** (0.014)
Elementary occupations (omitted)				
Part time	0.174*** (0.045)	0.198*** (0.029)	0.177*** (0.045)	0.205*** (0.029)
Temporary contract	-0.092*** (0.011)	-0.115*** (0.010)	-0.092*** (0.011)	-0.115*** (0.010)
Constant	4.782*** (0.030)	4.837*** (0.026)	4.779*** (0.030)	4.827*** (0.026)
Observations	14,696	18,002	14,696	18,002
Adjusted R-squared	0.480	0.480	0.481	0.483
F	337.0	387.9	326.2	376.3
p	0.000	0.000	0.000	0.000

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table A3: Blinder-Oaxaca decomposition (coefficients grouped by characteristics)**

	Public vs. private sector				Private sector vs. State-owned enterprises				Private sector vs. State sector			
	2014		2015		2014		2015		2014		2015	
<b>Total difference (unadjusted gap)</b>	<b>-0.323***</b>	<b>(0.010)</b>	<b>-0.280***</b>	<b>(0.009)</b>	<b>-0.279***</b>	<b>(0.014)</b>	<b>-0.250***</b>	<b>(0.012)</b>	<b>-0.349***</b>	<b>(0.012)</b>	<b>-0.297***</b>	<b>(0.010)</b>
<b>Explained part</b>	<b>-0.148***</b>	<b>(0.008)</b>	<b>-0.167***</b>	<b>(0.007)</b>	<b>-0.085***</b>	<b>(0.009)</b>	<b>-0.096***</b>	<b>(0.008)</b>	<b>-0.198***</b>	<b>(0.011)</b>	<b>-0.226***</b>	<b>(0.009)</b>
Gender	0.006***	(0.002)	0.005***	(0.002)	-0.021***	(0.003)	-0.021***	(0.002)	0.024***	(0.003)	0.020***	(0.002)
Age	0.016***	(0.004)	0.014***	(0.003)	0.015***	(0.006)	0.014***	(0.005)	0.012***	(0.004)	0.012***	(0.003)
Settlement region	-0.002***	(0.001)	-0.002***	(0.001)	0.001	(0.001)	0.001*	(0.001)	-0.005***	(0.001)	-0.003***	(0.001)
Education	-0.051***	(0.004)	-0.058***	(0.004)	0.001	(0.003)	0.001	(0.003)	-0.081***	(0.006)	-0.089***	(0.005)
Working experience	-0.031***	(0.005)	-0.036***	(0.004)	-0.033***	(0.007)	-0.041***	(0.006)	-0.023***	(0.004)	-0.029***	(0.004)
Occupation	-0.078***	(0.006)	-0.080***	(0.005)	-0.047***	(0.005)	-0.043***	(0.004)	-0.116***	(0.009)	-0.127***	(0.008)
Part time	-0.002***	(0.001)	-0.000	(0.001)	0.000	(0.001)	0.003***	(0.001)	-0.003***	(0.001)	-0.002***	(0.001)
Temporary contract	-0.006***	(0.001)	-0.011***	(0.001)	-0.006***	(0.001)	-0.011***	(0.002)	-0.005***	(0.001)	-0.011***	(0.001)
<b>Unexplained part (adjusted gap)</b>	<b>-0.174***</b>	<b>(0.009)</b>	<b>-0.113***</b>	<b>(0.008)</b>	<b>-0.194***</b>	<b>(0.011)</b>	<b>-0.153***</b>	<b>(0.011)</b>	<b>-0.151***</b>	<b>(0.011)</b>	<b>-0.071***</b>	<b>(0.010)</b>
Gender	0.007	(0.008)	0.006	(0.007)	0.002	(0.008)	0.003	(0.008)	-0.001	(0.010)	-0.010	(0.009)
Age	0.114*	(0.067)	0.050	(0.052)	0.134	(0.104)	0.059	(0.082)	0.039	(0.071)	0.018	(0.054)
Settlement Region	0.026**	(0.011)	-0.001	(0.009)	0.040***	(0.015)	-0.007	(0.012)	0.013	(0.012)	-0.000	(0.009)
Education	-0.097***	(0.027)	-0.088***	(0.025)	-0.094***	(0.035)	-0.137***	(0.034)	-0.093***	(0.029)	-0.045*	(0.025)
Working experience	-0.071**	(0.035)	-0.010	(0.027)	-0.058	(0.059)	-0.048	(0.044)	-0.054	(0.038)	0.007	(0.028)
Occupation	-0.107***	(0.025)	-0.076***	(0.022)	-0.047	(0.034)	-0.003	(0.029)	-0.133***	(0.027)	-0.104***	(0.022)
Part time	0.001	(0.001)	0.000	(0.001)	0.002	(0.001)	-0.000	(0.000)	0.001	(0.002)	0.000	(0.001)
Temporary contract	0.009***	(0.003)	0.007***	(0.002)	0.007**	(0.003)	0.005*	(0.003)	0.008**	(0.003)	0.007***	(0.003)
Constant	-0.072	(0.058)	0.018	(0.050)	-0.221***	(0.083)	-0.049	(0.073)	0.075	(0.062)	0.104**	(0.052)

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A4: Confidence intervals for Blinder-Oaxaca decomposition (coefficients and standard errors in the table A3)**

	Public vs. private sector				Private sector vs. State-owned enterprises				Private sector vs. State sector			
	Unadjusted		Adjusted		Unadjusted		Adjusted		Unadjusted		Adjusted	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Coefficient	0.323	0.280**	0.174	0.113**	0.279	0.250	0.194	0.153	0.349	0.297**	0.151	0.071**
CI Upper	0.343	<b>0.298</b>	0.192	<b>0.129</b>	0.306	<b>0.274</b>	0.216	<b>0.175</b>	0.373	<b>0.317</b>	0.173	<b>0.091</b>
CI Lower	<b>0.303</b>	0.262	<b>0.156</b>	0.097	<b>0.252</b>	0.226	<b>0.172</b>	0.131	<b>0.325</b>	0.277	<b>0.129</b>	0.051

\*\*indicate a significant decrease of the coefficient between the years p<0.05

**Table A5: Public sector wage premium across the wage distribution (CQR estimates) and monthly wages at percentiles**

Quantile regression estimates	q10	q20	q30	q40	q50	q60	q70	q80	q90
<b>Public sector 2014</b>	<b>0.209***</b>	<b>0.195***</b>	<b>0.190***</b>	<b>0.184***</b>	<b>0.170***</b>	<b>0.159***</b>	<b>0.157***</b>	<b>0.162***</b>	<b>0.127***</b>
se	(0.012)	(0.008)	(0.007)	(0.008)	(0.008)	(0.009)	(0.010)	(0.011)	(0.010)
CI Upper	0.233	0.211	0.204	0.200	0.186	0.177	0.177	0.184	0.147
CI Lower	0.185	0.179	0.176	0.168	0.154	0.141	0.137	0.140	0.107
<b>Public sector 2015</b>	<b>0.198***</b>	<b>0.171***</b>	<b>0.156***</b>	<b>0.144***</b>	<b>0.131***</b>	<b>0.123***</b>	<b>0.102***</b>	<b>0.088***</b>	<b>0.055***</b>
se	(0.009)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.008)	(0.010)	(0.009)
CI Upper	0.216	0.183	0.170	0.156	0.143	0.137	0.118	0.108	0.073
CI Lower	0.180	0.159	0.142	0.132	0.119	0.109	0.086	0.068	0.037
<b>Public sector wage premium decrease (significance) <sup>1</sup></b>	<b>0.011</b>	<b>0.024</b>	<b>0.034</b>	<b>0.04</b>	<b>0.039</b>	<b>0.036</b>	<b>0.055</b>	<b>0.074</b>	<b>0.072</b>
			(p<0.05)						
<b>Monthly wages</b>	<b>q10</b>	<b>q20</b>	<b>q30</b>	<b>q40</b>	<b>q50</b>	<b>q60</b>	<b>q70</b>	<b>q80</b>	<b>q90</b>
Public sector 2014	20,048	25,000	30,000	32,000	36,000	40,000	42,000	50,000	60,000
Public sector 2015	21,700	25,000	30,000	32,000	35,000	40,000	41,000	48,000	55,000
Private sector 2014	20,000	21,000	22,000	24,000	25,000	30,000	30,000	36,000	44,000
Private sector 2015	20,000	22,000	22,560	25,000	26,000	30,000	30,000	37,000	45,000

Note: \*\*\* p<0.01, \*\* (p<0.05), \* p<0.1, <sup>1</sup> Significance of the decrease based on the comparison of confidence intervals of the coefficients for 2014 and 2015.

**Table A6: State sector and state-owned enterprises wage premium across the wage distribution (CQR estimates) and monthly wages at percentiles**

Quantile regression estimates	q10	q20	q30	q40	q50	q60	q70	q80	q90
<b>State-owned enterprises 2014</b>	<b>0.174***</b> (0.011)	<b>0.184***</b> (0.009)	<b>0.190***</b> (0.009)	<b>0.194***</b> (0.010)	<b>0.191***</b> (0.009)	<b>0.195***</b> (0.012)	<b>0.207***</b> (0.012)	<b>0.223***</b> (0.013)	<b>0.205***</b> (0.016)
CI Upper	0.196	0.202	0.208	0.214	0.209	0.219	0.231	0.248	0.236
CI Lower	0.152	0.166	0.172	0.174	0.173	0.171	0.183	0.198	0.174
<b>State-owned enterprises 2015</b>	<b>0.176***</b> (0.011)	<b>0.175***</b> (0.008)	<b>0.176***</b> (0.008)	<b>0.177***</b> (0.008)	<b>0.178***</b> (0.009)	<b>0.174***</b> (0.010)	<b>0.163***</b> (0.009)	<b>0.159***</b> (0.011)	<b>0.139***</b> (0.015)
CI Upper	0.198	0.191	0.192	0.193	0.196	0.194	0.181	0.181	0.168
CI Lower	0.154	0.159	0.160	0.161	0.160	0.154	0.145	0.137	0.110
<b>State Enterprise wage premium decrease (significance)<sup>1</sup></b>	<b>-0.002</b>	<b>0.009</b>	<b>0.014</b>	<b>0.017</b>	<b>0.013</b>	<b>0.021</b>	<b>0.044</b> (p<0.05)	<b>0.064</b> (p<0.05)	<b>0.066</b> (p<0.05)
<b>Quantile regression estimates</b>	<b>q10</b>	<b>q20</b>	<b>q30</b>	<b>q40</b>	<b>q50</b>	<b>q60</b>	<b>q70</b>	<b>q80</b>	<b>q90</b>
<b>State Sector 2014</b>	<b>0.243***</b> (0.013)	<b>0.205***</b> (0.009)	<b>0.192***</b> (0.006)	<b>0.177***</b> (0.006)	<b>0.151***</b> (0.006)	<b>0.133***</b> (0.007)	<b>0.123***</b> (0.007)	<b>0.112***</b> (0.010)	<b>0.081***</b> (0.011)
CI Upper	0.268	0.223	0.204	0.189	0.163	0.147	0.137	0.132	0.103
CI Lower	0.218	0.187	0.180	0.165	0.139	0.119	0.109	0.092	0.059
<b>State Sector 2015</b>	<b>0.210***</b> (0.009)	<b>0.169***</b> (0.007)	<b>0.142***</b> (0.007)	<b>0.121***</b> (0.006)	<b>0.104***</b> (0.007)	<b>0.085***</b> (0.009)	<b>0.055***</b> (0.009)	<b>0.030***</b> (0.012)	<b>-0.008</b> (0.012)
CI Upper	0.228	0.183	0.156	0.133	0.118	0.103	0.073	0.054	0.016
CI Lower	0.192	0.155	0.128	0.109	0.090	0.067	0.037	0.006	-0.032
<b>State Sector wage premium decrease (significance)<sup>1</sup></b>	<b>0.033</b> (p<0.05)	<b>0.036</b> (p<0.05)	<b>0.05</b> (p<0.05)	<b>0.056</b> (p<0.05)	<b>0.047</b> (p<0.05)	<b>0.048</b> (p<0.05)	<b>0.068</b> (p<0.05)	<b>0.082</b> (p<0.05)	<b>0.089</b> (p<0.05)
<b>Monthly wages</b>	<b>q10</b>	<b>q20</b>	<b>q30</b>	<b>q40</b>	<b>q50</b>	<b>q60</b>	<b>q70</b>	<b>q80</b>	<b>q90</b>
Private sector 2014	20,000	21,000	22,000	24,000	25,000	30,000	30,000	36,000	44,000
Private sector 2015	20,000	22,000	22,560	25,000	26,000	30,000	30,000	37,000	45,000
State-owned enterprises 2014	21,000	25,000	30,000	30,000	33,000	40,000	40,000	50,000	60,000
State-owned enterprises 2015	22,000	25,000	30,000	30,000	34,000	40,000	40,000	50,000	57,000
State sector 14	20,000	25,000	30,000	33,500	39,000	40,000	44,000	50,000	58,500
State sector 15	21,000	25,000	30,000	33,000	37,000	40,000	41,000	46,000	55,000

Note: \*\*\* p<0.01, \*\* (p<0.05), \* p<0.1, <sup>1</sup> Significance of the decrease based on the comparison of confidence intervals of the coefficients for 2014 and 2015.

**Table A7: Unconditional quantile regression estimates**

Quantile regression estimates	q10	q20	q30	q40	q50	q60	q70	q80	q90
<b>Public sector 2014</b>	0.149*** (0.010)	0.124*** (0.008)	0.206*** (0.010)	0.221*** (0.010)	0.232*** (0.009)	0.297*** (0.014)	0.174*** (0.011)	0.173*** (0.016)	0.053*** (0.014)
CI Upper	0.169	0.140	0.226	0.241	0.250	0.324	0.196	0.204	0.079
CI Lower	0.129	0.108	0.186	0.201	0.214	0.270	0.152	0.142	0.027
<b>Public sector 2015</b>	0.099*** (0.008)	0.139*** (0.007)	0.168*** (0.008)	0.175*** (0.008)	0.165*** (0.008)	0.197*** (0.011)	0.114*** (0.009)	0.053*** (0.009)	0.000 (0.014)
CI Upper	0.115	0.153	0.184	0.191	0.181	0.219	0.132	0.071	0.026
CI Lower	0.083	0.125	0.152	0.159	0.149	0.175	0.096	0.035	-0.026
<b>Public sector wage premium decrease (significance)<sup>1</sup></b>	<b>0.050</b> (p<0.05)	<b>-0.015</b>	<b>0.038</b> (p<0.05)	<b>0.046</b> (p<0.05)	<b>0.067</b> (p<0.05)	<b>0.100</b> (p<0.05)	<b>0.060</b> (p<0.05)	<b>0.120</b> (p<0.05)	<b>0.053</b> (p<0.05)
	<b>q10</b>	<b>q20</b>	<b>q30</b>	<b>q40</b>	<b>q50</b>	<b>q60</b>	<b>q70</b>	<b>q80</b>	<b>q90</b>
<b>State-owned enterprises 2014</b>	0.123*** (0.012)	0.129*** (0.010)	0.216*** (0.013)	0.232*** (0.013)	0.245*** (0.012)	0.326*** (0.018)	0.212*** (0.013)	0.223*** (0.020)	0.113*** (0.018)
CI Upper	0.147	0.149	0.241	0.257	0.269	0.361	0.237	0.262	0.148
CI Lower	0.099	0.109	0.191	0.207	0.221	0.291	0.187	0.184	0.078
<b>State-owned enterprises 2015</b>	0.088*** (0.010)	0.145*** (0.009)	0.195*** (0.011)	0.201*** (0.011)	0.191*** (0.010)	0.234*** (0.014)	0.178*** (0.013)	0.123*** (0.012)	0.124*** (0.019)
CI Upper	0.108	0.163	0.217	0.223	0.211	0.261	0.203	0.147	0.161
CI Lower	0.068	0.127	0.173	0.179	0.171	0.207	0.153	0.099	0.087
<b>State Enterprise wage premium decrease (significance)<sup>1</sup></b>	<b>0.035</b>	<b>-0.016</b>	<b>0.021</b>	<b>0.031</b>	<b>0.054</b> (p<0.05)	<b>0.092</b> (p<0.05)	<b>0.034</b>	<b>0.100</b> (p<0.05)	<b>-0.011</b>
	<b>q10</b>	<b>q20</b>	<b>q30</b>	<b>q40</b>	<b>q50</b>	<b>q60</b>	<b>q70</b>	<b>q80</b>	<b>q90</b>
<b>State Sector 2014</b>	0.170*** (0.011)	0.119*** (0.009)	0.198*** (0.012)	0.213*** (0.011)	0.222*** (0.011)	0.274*** (0.017)	0.145*** (0.013)	0.135*** (0.019)	0.005 (0.017)
CI Upper	0.192	0.137	0.222	0.235	0.244	0.307	0.170	0.172	0.038
CI Lower	0.148	0.101	0.174	0.191	0.200	0.241	0.120	0.098	-0.028
<b>State Sector 2015</b>	0.109*** (0.009)	0.137*** (0.008)	0.147*** (0.009)	0.159*** (0.009)	0.146*** (0.009)	0.173*** (0.012)	0.074*** (0.011)	0.002 (0.011)	-0.093*** (0.016)
CI Upper	0.127	0.153	0.165	0.177	0.164	0.197	0.096	0.024	-0.062
CI Lower	0.091	0.121	0.129	0.141	0.128	0.149	0.052	-0.020	-0.124
<b>State Sector wage premium decrease (significance)<sup>1</sup></b>	<b>0.061</b> (p<0.05)	<b>-0.018</b>	<b>0.051</b> (p<0.05)	<b>0.054</b> (p<0.05)	<b>0.076</b> (p<0.05)	<b>0.101</b> (p<0.05)	<b>0.071</b> (p<0.05)	<b>0.133</b> (p<0.05)	<b>0.098</b> (p<0.05)

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 <sup>1</sup> Significance of the decrease based on the comparison of confidence intervals of the coefficients for 2014 and 2015.

## Appendix 2: The definition of the state sector and state-owned enterprises

The division between the state sector and state-owned enterprises within the public sector is based on the NACE activity classification. From the total of 18 sectors, workers from 13 sectors are directly classified as state sector or state-owned enterprises. State-owned enterprises includes activity sectors B to J and L as they are typically performed by publicly owned enterprises, while state sector includes activity sectors K, O, P, Q and U.

Remaining 5 sectors are divided based on the three-digit NACE classification and the division is verified based on direct report of the respondents on the enterprise they work in (also available in LFS database).

Table A2-1 represents the sectors and subsectors, their classification to state sector (SS) or state-owned enterprises (SOE), and the sample size within the public sector for both years analyzed.

**Table A2-1: Classification of sectors and subsectors to state sector (SS) or state-owned enterprises (SOE)**

NACE code	Sector / subsector	SOE/SS	Sample size	
			2014	2015
<b>B</b>	<b>Mining and quarrying</b>	SOE	233	241
<b>C</b>	<b>Manufacturing</b>	SOE	532	559
<b>D</b>	<b>Electricity, gas, steam and air conditioning supply</b>	SOE	323	321
<b>E</b>	<b>Water supply; sewerage, waste management and remediation activities</b>	SOE	306	365
<b>F</b>	<b>Construction</b>	SOE	138	155
<b>G</b>	<b>Wholesale and retail trade; repair of motor vehicles and motorcycles</b>	SOE	84	96
<b>H</b>	<b>Transportation and storage</b>	SOE	622	698
<b>I</b>	<b>Accommodation and food service activities</b>	SOE	76	100
<b>J</b>	<b>Information and communication</b>	SOE	147	161
<b>K</b>	<b>Financial and insurance activities</b>	SS	74	80
<b>L</b>	<b>Real estate activities</b>	SOE	4	11
<b>M</b>	<b>Professional, scientific and technical activities</b>		101	119
M 69.1	Legal activities	SS	5	4
M 69.2	Accounting, bookkeeping and auditing activities; tax consultancy	SS	3	8
M 70.1	Activities of head offices	SS	1	0
M 70.2	Management consultancy activities	SS	1	1
M 71.1	Architectural and engineering activities and related technical consultancy	SOE	27	30
M 71.2	Technical testing and analysis	SOE	3	13
M 72.1	Research and experimental development on natural sciences and	SS	27	37

	engineering			
M 72.2	Research and experimental development on social sciences and humanities	SS	0	5
M 73.1	Advertising	SS	5	0
M 73.2	Market research and public opinion polling	SS	1	0
M 74.9	Other professional, scientific and technical activities n.e.c.	SS	12	2
M 75.0	Veterinary activities	SS	16	19
<b>N</b>	<b>Administrative and support service activities</b>		155	200
N 78.1	Activities of employment placement agencies	SOE	10	16
N 78.3	Other human resources provision	SOE	2	0
N 79.1	Travel agency and tour operator activities	SOE	2	0
N 80.1	Private security activities	SOE	11	12
N 80.2	Security systems service activities	SOE	10	9
N 81.1	Combined facilities support activities	SOE	29	24
N 81.2	Cleaning activities	SOE	30	24
N 81.3	Landscape service activities	SOE	44	108
N 82.1	Office administrative and support activities	SS	7	3
N 82.3	Organisation of conventions and trade shows	SS	1	3
N 82.9	Business support service activities n.e.c	SS	9	1
<b>O</b>	<b>Public administration and defence; compulsory social security</b>	<b>SS</b>	1,324	1,603
<b>P</b>	<b>Education</b>	SS	1,427	1,751
<b>Q</b>	<b>Human health and social work activities</b>	SS	1,289	1,635
<b>R</b>	<b>Arts, entertainment and recreation</b>		170	187
R 90.0	Creative, arts and entertainment activities	SS	48	55
R 91.0	Libraries, archives, museums and other cultural activities	SS	64	73
R 92.0	Gambling and betting activities	SOE	0	2
R 93.1	Sports activities	SOE	50	52
R 93.2	Amusement and recreation activities	SOE	8	5
<b>S</b>	<b>Other service activities</b>		49	40
S 94.1	Activities of business, employers and professional membership organisations	SS	5	4
S 94.2	Activities of trade unions	SS	5	2
S 94.9	Activities of other membership organisations	SS	16	9
S 95.2	Repair of personal and household goods	SOE	2	0
S 96.0	Other personal service activities	SOE	19	24
<b>U</b>	<b>Activities of extraterritorial organisations and bodies</b>	SS	2	1