Final report

# Gender inequality in the labour market outcomes in times of austerity

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## Abstract

Responding to high fiscal deficit in the country, Serbian Government introduced a set of austerity measures at the beginning of 2015, including a cut in the wages and workforce downsizing in the public sector. Recent literature suggested that female wages and employment are more likely to be hit by the austerity measures as women form a majority of public sector employees, although existing evidence is largely descriptive. Aim of this paper is to estimate whether the wage cut had different effects on female and male employment and wages by using 2014/2015 panel data from Labour Force Survey. The results show that the wage cut has increased the likelihood of younger and older female employees to move to unemployment and inactivity, respectively, while for men we do not observe such effects. On the other hand, female-dominated subsectors within the public sector were hit more by the wage cut due to their higher compliance with the wage cut compared to the subsector of public enterprises where man are the majority of the workforce.



**JEL:** J16, J21, J31, J45, H61.

**Keywords:** gender, labour market transition, wages, austerity, Serbia.


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## List of abbreviations

**LFS** Labour Force Survey

**SORS** Statistical Office of the Republic of Serbia

**CEE** Central and Eastern Europe

**GDP** Gross Domestic Product

**NACE** Statistical classification of economic activities in the European Community

**CPI** Consumer Price Index

**RSD** Serbian dinar

## Executive summary

After the Great Recession austerity policies across European states have been seen as a way to save public finances but since many measures affected women's financial security and social status, there is a concern that fiscal consolidation measures caused a retrenchment of gender equality. Despite political rhetoric on the importance in advancing gender rights, it seems that austerity packages were designed without prior analysis on their impact on gender pay gap and female status in the labour market.

In Serbia, a country that experienced high and rising public debt after the 2008 economic crisis, similar set of austerity measures were designed in order to ensured sound public finances. Two main measures introduced at the beginning of 2015 included reduction of pensions and public wages. For those working in the public sector and the state-owned enterprises, there was a 10% cut, except for those making less than 25,000 dinars (which is 25% higher than the minimum wage).

Our paper investigates whether there is a difference between the genders in a response to the cut in public wages in terms of their decision to change labour market status (i.e. migrating to the private sector, self-employment or inactivity) or to stay at the public sector as a risk protection mechanism. Secondly, we investigate whether the administration of the wage cut was different within the public sector, that consists of state sector, where women form a majority of employees, and public enterprises, in which male workforce dominates, and how that might have impacted wage inequality within the public sector. To calculate the descriptive statistics and perform the econometric analyses we use Labour Force Survey (LFS) data for 2014 as a bench-mark and those for 2015, after the wage cut was introduced, and use the panel structure of the data to estimate the effects of the wage cut directly.

Our results indicate that wage cut had pushed younger women and women close to retirement age from the public sector to unemployment or inactivity while no such effects are observed for men. More detailed analysis suggests that most of the young females (up to 30 years of age) transit to unemployment and majority of them are without children. Older women move to inactivity, i.e. retirement. At the same time, we find no evidence of the wage cut effects on the probability of transition from public to private sector for any of the genders which can be explained by the higher wages in the public sector (even after the wage cut this difference amounted to 11.6%) and/or high transitions costs, which include low match of the public sector workers to private sector jobs.

Looking at the effects of wage cut on wage changes in the public sector, results show that while the state sub-sector fully complied with the wage cut, public enterprises did not follow suit which can be explained by their considerable autonomy in hiring and setting pay. Given that female dominated sectors, such as health, education and social work, account for the largest part of the state sub-sector, female wages were more affected by the measure. For that reason, and despite the fact that women have higher share among workers with low wages, which were protected from the wage reduction, gender pay gap in the public sector has increased though its reduction was expected.

These unexpected outcomes are the consequence of the lack of monitoring of public policies. What is also missing is evaluation of effects of policies before their adoption. Two key and socially most painful measures (pensions and wage cut) have been designed in such a way to preserve living standards of the most vulnerable parts of affected populations (public sector employees and pensioners with low incomes), which can thus be ascribed to certain random circumstances, such as enlightened decision makers (in the first place within the Finance Ministry) or specific political economy considerations (for example anticipation of parliamentary elections), rather than to systematic assessment of their impact on inequality

in general and gender inequality in particular. This certainly should not be the standard practice. Instead, it would be necessary to develop and adopt systematic formal procedures for the evaluation and monitoring of the distributive impact of any future reform measure

# 1 Introduction

While labour economics literature provides extensive evidence of the minimum wage interventions effects on key labour market outcomes, little evidence exists regarding austerity measures effects characterized by wage cuts in the public sector. These effects are particularly important in developing countries' where vulnerable segments of the labour force, such as women, exhibit much lower labour market participation rates and wages than men.

Thus, we study the wage cuts effects that were a part of the Serbian government austerity measures applied in late 2014. Serbia is a developing country characterized by stagnating economic growth rates (less than 1 percent between 2012 and 2017 on average) and a high unemployment rate (15.3% in 2016). Female position on the labour market is further worsened by the large employment gap (of about 15 percentage points) and the gender wage gap of 14% (World bank, 2016), even before the wage cuts were introduced.

The international financial crisis and country specific economic downturns motivated a series of fiscal austerity measures across Europe with important implications on labour market gender gaps (Addabbo et al., 2018). In Italy, the austerity measures were among the major causes of the growth of the gender gap against the female labour force (Piazzalunga & Di Tommaso, 2016) whereas in Spain the economic crisis and subsequent crisis lead to higher female labour participation in order to cope with uncertainty (Addabbo, Rodríguez-Modroño and Gálvez-Muñoz, 2013). A similar result was found by Cerutti (2000) in the Argentinean context where a higher female labour participation was triggered by the government austerity measures.

However, the largest portion of the studies regarding recent austerity measures uses only descriptive or anecdotal evidence of the effects of the recent austerity measures, while the econometric evidence of the effects is still scarce. In the context of Serbia, the wage cut may have led to ambiguous effects in two main fronts. Firstly, the wage cuts could have led to a reduction of the labour supply at the public sector (pushing labour force out to an alternative labour status). Secondly, compliance with the austerity measures might be heterogeneous between the genders, but also between the state sector and the state-owned enterprises, which in turn could have led to heterogeneous effects on the male and female wages.

Hence, our research main objectives seek to answers these questions by using the Labour Force Survey panel data set and performing a rigorous econometric analysis to investigate directly the impact of the proposed wage cuts. Firstly, we investigate whether female and male workers respond differently to the austerity measures by either reducing the labour supply changing their labour market status (i.e. migrating to the private, self-employment or inactivity) or by staying at the public sector as a risk protection mechanism. Secondly, we investigate gender differences in the administration of the wage cut and assess the compliance homogeneity within the public sector in order to identify whether female intensive sectors or occupations may have or not fully complied with the austerity measures.

Beside the contribution to the literature which investigates the effects of the austerity measures on the gender inequalities, our research is important for policy making process in Serbia. It shows that gender sensitive policy making is still not a common practice, as austerity policies have been drafted without any prior analysis about possible impact on existing gender inequalities. Government's main concern is related to the efficiency effects of the reforms while equality aspects are being neglected in majority of cases (Krstić and Žarkovic-Rakić, 2017).

The article is structured in the following way. After this introduction, the next section provides a literature review regarding the available evidence on the possible gender impacts of austerity policies. The third

section discusses data and labour market trends prior and after the introduction of fiscal consolidation measures. Itis followed by the description of the methodology. Section five presents the results, while last section concludes.

## 2 Literature review

When the latest economic crisis in 2008 hit most of the EU economies, governments responded with austerity programs, the largest of which were being implemented in Greece, Hungary, Latvia, Ireland, Spain and Portugal (Theodoropoulou and Watt, 2011). Karamessini and Rubery (2013) recently argued that with austerity measures introduced as a response to the latest economic crisis, the gender equality in the Europe and USA is under attack: "austerity measures undermine women's progress towards equality in paid work and economic independence and may provoke an ideological backlash favouring a return to traditional gender roles and backward-looking gender contracts". In this brief literature review, and with respect to our research questions, we focus on the consequences of the austerity measures, and especially wage cuts, on the gender differences in employment and wages.

*Austerity and women's employment outcomes*

The austerity programmes, among other measures, often include cuts (or freezes)[1] in public sector wages and employment and reduction in the provision of public services. According to Rubery (2015) the effects public sector wage cuts were expected to have a higher impact on women's employment as they make the majority of the workers in the public sector. These effects may include the reduction of the female employment, due to lower work incentives, as well as the increase of the gender wage gaps.

On the other hand, reduction in the provision of public services, some of which primarily used for programmes designed to support women's access to the labour market, have also been frequently reduced. For instance, United Kingdom government reduced the childcare element of tax credits from 80 to 70% (Annesley, 2014) whereas in Greece, reduction of state transfers to budgets of the municipalities caused reduction of staff in social care services and closing down of child care facilities (Karamessini, 2014)[2]. These cuts lead to further constraints on female labour supply (Addabbo et al. 2015), as the cuts in the social services are increasing demand for women's unpaid labour, evidenced by the increased gender gaps in the unpaid home work (Addabbo et al. 2018).

Although care services have not been under attack of austerity measures in Serbia, they have already been in short supply for long period of time, especially when it comes to the availability of child care facilities (Ivić, Pešikan, and Jankov, 2012). For that reason, Serbia is among countries that rely heavily on informal care arrangement in the form of grandparents support (World Bank, 2016). At the same time with the cut in public wages, the austerity measures included the pension cut, as well as penalised access to early retirement and postponement of retirement age. These measures are likely to reduce the reliance on grandparents in taking care of the children and increase the burden on young women in taking care of the household.

[1]According to Rubery (2015) 17 countries in Europe included a public sector wage freeze in their austerity package, with 13 countries additionally applying a wage cut.

[2] Similar cuts were applied in other European countries: Spain (Gonzales Gagoand SegalesKirzner, 2014), Italy (Addabbo et al. 2015), Iceland (Thorsdottir, 2014), Ireland (Barry and Conroy, 2014), etc.

Therefore, current literature suggests that the female labour supply is under a stronger impact of the austerity measures from two sides. Firstly, women face wage cuts (or wage freezes) more frequently than men which lowers their incentives to work. On the other hand, the cuts in the public child care services (which did not occur in Serbia) and lower potential reliance on informal (i.e. grandparental) child care support (which did) that are providing alternatives for unpaid female labour are increasing the demand for their home labour, consequently increasing their reservation wage. Both lower incentives for work and increasing demand for home work reduce the probability that the women will continue to work when facing austerity measures, and therefore increase the likelihood of their transition to alternative labour market statuses.

On the other hand, due to austerity measures in Serbia, women near the retirement age (60 years) have been urged to leave the public sector and retire, even though, according to the law, they have a right to retire at the age of 65, similar to men. This effect, together with lower incentives for work due to the wage cuts, could increase their exits to inactivity. Previous research also shows that men have greater flexibility and mobility so they could be more prone to decide to look for better paid jobs in the private sector (Felfe, 2012; Bertrand, 2011).

Current evidence of the effects of recent austerity measures on the employment have been largely descriptive or anecdotal, with inconclusive results. Addabbo et al (2015) found that the crisis and subsequent austerity narrowed gender gaps in employment and unemployment, part-time and temporary work in Italy, Portugal and Ireland. The authors, however, believe that this does not represent an improvement in gender equality but is rather the consequence of the deterioration of male's position in the labour market (i.e. higher incidence of low-quality jobs, part-time work, insecure temporary contracts, low wages, and unemployment). Similar results are found for Spain where the crisis has narrowed the overall gender gap in employment from 5 to 1 percentage point (Gonzales Gago, 2014). Perivier (2016), on the other hand, shows that in Greece female employment has been more affected by the austerity measures than male employment.

*The effects of austerity measures on the gender pay gap*

Rubery argues that the public sector wage cuts "have been introduced without reference to the impact on gender or to the longstanding commitment to close the gender pay gap" (Rubery, 2015, p. 734). As mentioned previously, the higher share of women in the public sector means that their wages are under a greater impact of austerity measures. Furthermore, increasing demand for the female home labour, due to reduction of the social services, could bring less flexibility of female labour supply and reduce their wage bargaining power vis-à-vis the employer and increase the probability of discriminatory practices. However, similarly to the studies of employment gaps, much of the literature on the effects of the wage cuts (or freezes) on the gender wage gaps presents only descriptive evidence, which indicate that the unadjusted gender pay gaps are increasing in a number of European countries (see, for example, Fulton, 2011, for Latvia; EPSU, 2016; for Portugal and Spain).

Perugini et al. (2016) use changes in the cyclically adjusted primary balance (CAPB) to estimate the effects of austerity measures on the gender wage inequality in EU. Their results indicate that the cumulative change in the countries' CAPB increases the gender wage gap and that the effect of expenditures cuts tends to be larger than that of tax hikes. They also show that, due to the austerity measures, women are less likely to be employed in better paid sectors. However, in this study it is impossible to isolate the effects of the wage cuts from the remaining expenditure cuts and investigate them separately.

Piazzalunga & Di Tommaso (2016) observe that wage freeze, implemented in Italy in early 2011, caused a discontinuity in the public sector wage premium and use this discontinuity in attempt to isolate the "policy effect" (authors' quote) of the wage freeze. They suggest that the wage freeze has caused an increase of the gender wage gap by 2 percentage points. They also indicate that this increase is not only due to higher share of women in the public sector, but also due to the sectorial effect - the large wage drop in education, where women make about 75% of the employees. However, the "policy effect" estimated based on the public sector wage premium change is difficult to be attributed only to the wage freeze, as the public sector wage premium change could also be due to the changes in the private sector wages.

Recent evidence for Serbia has suggested that after the 2015 wage cut, the public sector wage premium dropped more in the state sector than in the state owned enterprises[3] (Vladisavljević and Nojković, 2018). The result is explained in the terms of lower compliance to the wage cut of the state-owned enterprises compared to the state sector, due to their lower fiscal discipline and inefficient spending (IMF, 2015) as well as the presence of own revenues at disposal, which can partially be used to finance the wages. As the state sector is dominated by women, while state-owned enterprises are dominated by men, female wages could have been under the greater influence of the wage cut.

# 3 Austerity measures introduced in Serbia in late 2014

Fiscal deficit in Serbia in 2014 stood at 6.6% of GDP, being the single largest in Europe, which is why as of the January 2015 the government imposed the fiscal consolidation program (Republic of Serbia, 2014). The main pillars of the program were cut in pension and public wage bill, since the pension bill was amounting to 13% of GDP (5 percentage point higher than the average in Central and Eastern European, CEE, countries) and the wage bill was exceeding 10% of the GDP (2 percentage points higher than the CEE average). Austerity measures therefore included, a cut of the public sector wages, public sector workforce downsizing, early retirement reform and pension cuts. In this paper we focus on the effects of the public sector wage cut which we now describe in more detail.

The wage cut, defined by the Government, implied a reduction of public wages higher than 25,000 dinars (25% higher than the minimum wage in 2014) by 10%[4]. Exemption of the wages lower than 25,000 RSD was introduced in order to protect the public sector workers with the lowest wages from from the further reduction of their wages. At the same time, the "solidarity tax" which was applied for the public wages higher than 60,000 RSD during 2014 (Republic of Serbia, 2013), ceased to exist. Therefore the cut for the wages above 60,000 amounted to the difference between the ten percent of 2013 wages and the amount of the "solidarity tax". According to fiscal consolidation programme, salaries in the public sector are to be frozen until the beginning of 2018.

The same formula was applied to the entire public sector and the state-owned enterprises employees, however with important differences regarding the way the wage cut was applied. The law (Republic of Serbia, 2014) specified that the wage reduction for direct and indirect budget users and the organizations of compulsory social security (i.e. those employed in the sector of public administration, education and health care) would be direct and include a reduction of the net wage base (Republic of Serbia, 2014). On

[3] Proposed division is based on the NACE classification of the workers who have reported the sector of ownership of their company as public. The state sector is comprised of Public administration (NACE sector O), Education (P) and Health (Q) sector workers, while workers from state-owned enterprises most frequently work in Transport (NACE sector H), Manufacturing (C), Utilities sectors (D and E) and Mining (B). Full division available in the quoted paper.

[4] For the workers earning wages between 25,000 and 27,778 RSD, the cut was the difference between their 2014 wages and 25,000 RSD, as the 10 per cent cut would imply wages lower than 25,000 RSD.

the other hand, for state-owned enterprises, there was no reduction in the net wage base, but a reduction in wages was made by increasing the effective tax rate, which is equivalent to the introduction of an additional tax of 10% on net earnings (Arandarenko et al., 2017). This measure meant that the state-owned enterprises were obliged to pay into the central budget the amount of savings generated through cut in wages every month and that the anticipated effects on employee wages should have been identical. However, different administration of the wage reduction could have caused different between the state sector (i.e. budget users) and the state-owned enterprises as the wages for the former were reduced directly and for the later indirectly, which left more room for lower compliance to the wage reduction.

# 4 Data and labour market trends in 2014 and 2015

To calculate the descriptive statistics and perform the econometric analyses we use Labour Force Survey (LFS) data. The survey, conducted quarterly by the Republic Statistical Office of Serbia (SORS), provides nationally and regionally representative data on the labour market in Serbia (as well as in Europe generally)[5]. We use data for 2014 as a bench-mark and data for 2015 so that we can investigate the impact of the austerity measures implemented at the beginning of 2015.

Table 1 presents the trends of labour market indicators according to LFS data and split by gender. Female employment rate in both years is about 15 percentage points lower than male. At the same time, women are on average employed in more secure jobs, as they have higher share of wage employment, lower informal employment and higher employment in the public sector. Within the public sector, women are more likely to work in the state sector than in the state-owned enterprises, while the share of men working in state sector and state-owned enterprises is approximately equal. Compared to 2014, in 2015 employment rate grew for both genders, mainly due to the increase in the number of employees in the formal and informal private sector employment.

**Table 1: Labour market trends in 2014 and 2015**

| | Male | | Female | |
|---|---|---|---|---|
| | 2014 | 2015 | 2014 | 2015 |
| **Employment rate** | 49.5% | 50.1% | 34.9% | 35.3% |
| **Wage employment share in employment** | 64.8% | 65.8% | 72.9% | 75.3% |
| **Informal employment** | 8.0% | 9.5% | 5.6% | 6.2% |
| **Private sector** | 50.5% | 53.0% | 48.2% | 49.7% |
| **Public sector** | 41.6% | 37.5% | 46.3% | 44.1% |
| **State sector** | 47.6% | 49.7% | 78.2% | 79.2% |
| **State-owned enterprises** | 52.4% | 50.3% | 21.8% | 20.8% |

***Source***: Authors' calculations. Full sample. Weighted data.

The sample for each LFS wave consists of rotating groups which are independent subsamples and each subsample is representative of the whole population (SORS, 2015). 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, than is out of the sample for two waves, and then once again two times selected into the sample[6]. As the LFS is

[5] More details on the survey design and the data collection can be found in SORS (2015).
[6] After being interviewed four times the household is then dropped from the panel. Therefore households which were interviewed in 2014 are no longer present in 2016, which disables us to study the effects of the wage cut over a longer period of time..

conducted quarterly, the respondents included in the rotating groups are present in the same quarters of both years (for example in Q1 2014 and Q1 2015), therefore enabling us to analyze their labour market statuses and wages in consecutive years. In order to reorganize the data for the econometric analysis, we create a panel data set by merging individual data from the same quarter from different years, which allow us to monitor the labour market transitions and wage changes that occurred between 2014 and 2015.

In Table 2 we use the panel database to analyse the workers' transitions from the public sector between 2014 and 2015 by gender and age groups. Among the public sector workers, men were slightly less likely to remain at public sector jobs, as they moved more frequently than women to both formal or informal private sector (3.8 vs. 2.7 percent) while the transfers to inactivity were equal (at 5.4 percent). For both genders the transitions to inactivity were more pronounced for the group of older workers, while the same holds for male transitions to the private sector.

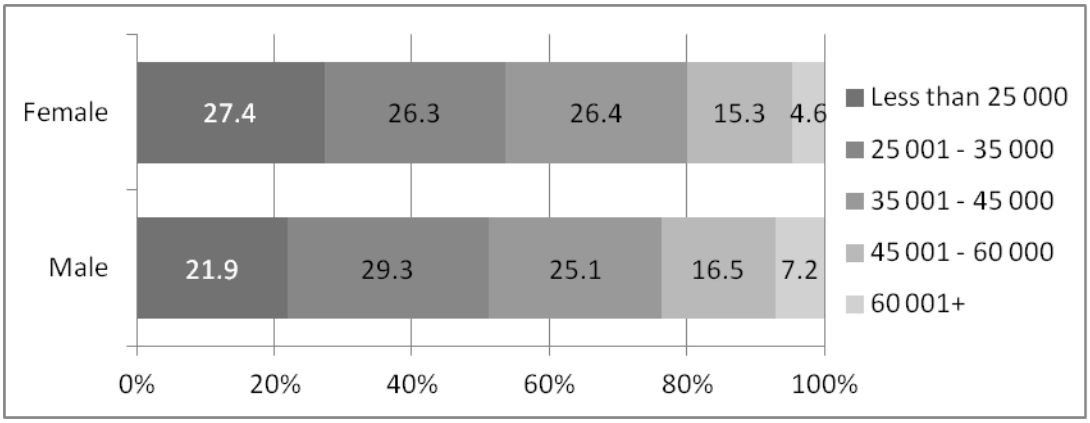
**Table 2: Labour market transition 2014 / 2015 (%)**

| | | Men | | | Women | |
|---|---|---|---|---|---|---|
| **Status in 2015** | **Total** | **Age 20-54** | **Age 55-64** | **Total** | **Age 20-54** | **Age 55-64** |
| **Inactive or unemployed** | 5.4% | 3.3% | 13.9% | 5.4% | 3.2% | 16.7% |
| **Self-employed** | 1.0% | 1.0% | 1.3% | 0.4% | 0.3% | 1.3% |
| **Informal employment** | 0.6% | 0.3% | 1.9% | 0.3% | 0.3% | 0.0% |
| **Private sector** | 2.2% | 2.1% | 2.2% | 2.0% | 2.3% | 0.4% |
| **Public sector** | 90.8% | 93.3% | 80.7% | 92.0% | 94.0% | 81.5% |
| **Sample** | 1,576 | 1,260 | 316 | 1,433 | 1,200 | 233 |

***Source***: Authors' calculations. Sample: People working in public sector in 2014.

The workers who remained in the public sector faced a 10 percent wage cut if their wages were higher than 25,000 RSD. Figure 1 indicates that, in the public sector, women are more likely to receive wages which are 25,000 RSD or lower, while men are more frequently found among those earning between 25,000 and 35,000 RSD and earning 45,000 RSD or more. This wage structure indicates that women should be more protected from the austerity wage cuts.

**Figure 1: Male and female public sector wages by categories, 2014**




Source: Authors' calculations. Sample: People working in public sector in both years.

However, the average wage dropped in approximately same amount for both genders, indicating that the unadjusted gender wage gap in the public sector between has not changed over the years and that it stood about 5.5% in both years[7].

**Table 3: Public sector wages for men and women 2014 / 2015 (%)**

| | wage 2014 | wage 2015 | wage decrease |
|---|---|---|---|
| **Male** | 38,420 | 36,734 | -4.4% |
| **Female** | 36,347 | 34,703 | -4.5% |
| **Unadjusted wage gap** | -5.4% | -5.5% | |

Source: Authors' calculations. Sample: People working in public sector in both years.

# 5 Methodology

The underlying conceptual framework leading our econometric specification and interpretations can be described as a static multi sector labour market model where workers can transition between self-employment, public and private sector jobs. The public sector production function is more intensive on high skilled workers than the private one. Therefore the public-private real wage gap is, ceteris paribus, positive[8]. Workers chose the sector that provides the higher expected real wages as long as it is above the reservation wage. Female workers exhibit higher reservation wages than men, other things been equal (age, occupation, etc.).

A wage cut intervention is applied to the middle and right tail of the wage distribution at the public sector. This would imply a reduction of its hired labour force who may choose to migrate to an alternative status (private sector, self-employment or inactivity). The labour force that switches from the public sector may increase private and/or self-employment labour supply by pushing the real wages down in these sectors. On the other hand, since the reservation wage is higher for women, they are more likely to transition to inactivity than men, although the reservation wage is also potentially lowered under the impact of the wage cut. The elderly labour force decision to retire may also be affected. For one side, the wage cut changes the spread between the reservation wage and earned wages. On the other hand it also reduces the expected savings during the remaining working life which may motivate a late retirement. A parallel intervention to the labour market reduced the retirement allowance which in contrast may discourage early retirement. The wage cut net effect on retirement decision is then ambiguous.

The public sector is composed by state owned enterprises and the state sector[9]. Whilst full compliance with the wage cut is expected at the latter, the former's compliance is uncertain as it has a considerable autonomy in hiring and setting pay (World Bank, 2015). A potential heterogeneous compliance effect between state owned and central government could pose a threat to female labour force if a higher compliance is identified in the subsector with the highest share of female employment.

[7]Previous studies for Serbia show that the unadjusted gap is much lower in the public than in the private sector, although the adjusted gaps are almost the same (Avlijaš et al, 2013; Vladisavljević et al 2015).

[8] The public sector wage premium in Serbia, before the austerity measures were introduced stood at 17.6% in 2014, while after the wage cut in 2015 it stood at 11.6% (Vladisavljević, 2017b)

[9] The state sector is comprised of Public administration (NACE sector O), Education (P) and Health (Q) sector workers, while workers from state-owned enterprises most frequently work in Transport (NACE sector H), Manufacturing (C), Utilities sectors (D and E) and Mining (B).

The next section presents an econometric approach designed to empirically identify the above mentioned short term effects of the austerity measures on the affected labour force. We first seek to identify whether the wage cut increased female's likelihood to transition into inactivity while exploring the empirical evidence of early retirement. Then we estimate the wage cuts compliance heterogeneity within the public sector with a particular focus on subsectors that hire the greatest share of the female labour force.

*The effects of the wage cut on the labour market transitions*

After the introduction of the austerity measures, workers could decide to stay in the public sector, to move to the private sector[10] or to unemployment/inactivity. Hence, we test for the transition effects to the j-th labor status in 2015 given 2014's status and wages. For the sake of simplicity of the notation the following expressions at the individual level omit the i-th's individual index.

Given the population of public sector workers at 2014, let's define their implied random utility of staying at the public sector or transitioning to an alternative status in 2015. The implied random transition utility $U_j$ is a function of the expected wage gain differential, non-pecuniary gains differentials and mobility costs:

$$U_j = \omega_j[w_j^{15} - (w^{14} - \tau D)] + x'\theta_j + \psi_j \;\; ; \;\; j\epsilon\{pub, pri, ina\} \qquad (1)$$

The first term represents the potential monetary gains between the counterfactual j status ($w_j^{15}$) and the expected labour income at the current status (public sector) in 2015. In 2014, public workers were aware of the austerity measures that would hit the sector in 2015, hence their expected 2015's wage equals their latest wage minus the potential wage cut: $(w^{14} - \tau D)$. Here the $\tau$ parameter represents the average wage cut and D is a dummy variable equal to one for public workers affected by the measure. The $\omega_j$ parameter measures the effect of the monetary income differential on the random transition utility. The second term $x'\theta_j + \psi_j$ accounts for mobility and non-pecuniary earnings differentials of transitioning to status j from the public sector. Since the counterfactual $w_j^{15}$ is unobserved, it is endogenized as a function of wage observable and unobservable determinants: $w_j^{15} = x'\alpha_j + u_j$. Then, the structural random transition utility writes $U_j = x'(\alpha_j \omega_j + \theta_j) - \omega_j w^{14} + \omega_j \tau D + \omega_j u_j + \psi_j$. The proper distributional assumptions on the unobserved components ($\omega_j u_j + \psi_j$) imply the following transition probability:

$$Pr[\, s_{15} = j \,|s_{14} = pub, X] = G(\delta_j D + X''\gamma_j) \;\; ; \;\; j\epsilon\{pub, pri, ina\} \qquad (2)$$

where $\delta_j$ determines the impact of the wage cut on the probability to transition to status j in 2015, given the sample of public workers at 2014 ($s_{14} = \text{pub}$) and $X' = [x' \; w^{14}]$, which represents the vector of worker's characteristics. These characteristics include age (and age square), occupation, regional and settlement effects, sector of activity (industry vs. services), the contract type (temporary vs. permanent) and wages from 2014, as well as the time fixed effects[11]. The vector $\gamma_j$ measures the effects of these covariates on the 2015 status, while G() is the cumulative distribution function leading to a particular parametric multinomial specification (logit or probit). The $\delta_j$ parameters are hypothesized to be greater or equal than zero in the presence of wage cut transition effects.

[10] Due to low transitions from the public sector to informal sector and self-employment (Table 2) we merge these transitions to private sector transitions.

[11] Originally the list of covariates also included household variables: marital status, having own children, status of the household head, number of household members and elderly, as well as education. However, these variables were not significant predictors of the transitions and were excluded in order to avoid the irrelevant regressor effects, as well as the effects of multicolinearity.

*Heterogeneous transition effects*

Since the female population is expected to have a higher reservation wage, one would expect their transition to unemployment/inactivity probabilities to be higher than men's. Similarly, the wage cut could affect early retirement decisions. In order to test these effects, $\delta_j$is specified as a worker specific parameter:

$$\delta_j = \delta_{j_0} + \delta_{j_1} fem + \delta_{j_2} age + \delta_{j_3} age^2 + \delta_{j_2} fem * age + \delta_{j_3} fem * age^2 \quad (3)$$

where $\delta_{j_1}$ indicates weather the wage cut had different effects on the male and female choices, $\delta_{j_2}$ and $\delta_{j_3}$ if the effects on the status were stronger for older workers.

In order to estimate the model we employ a maximum likelihood approach that allows us to correct account for the effects of the selection into the public sector in 2014 and use cluster standard errors (regional level) to account for the potential autocorrelation[12]. Based on the multinomial probability specified in equation (2), the likelihood function for the i-th observation writes:

$$Pr[\, s_{15} = j\,, s_{14} = pub|\, X, Z] = Pr[\, s_{15} = j | s_{14} = pub, X] Pr[s_{14} = pub \mid Z]] \quad (4)$$

Exclusion restrictions require that some variables included in the selection equation (Z) must not be included in the main equation (Wooldridge, 2009). The choice of the selection variables is based on the research that suggest that public sector in Serbia offers lower working hours and higher job security than the private sector (Arandarenko, 2011; Vladisavljević, 2017a). As having children, higher number of household members and elderly increases the need for predictable working hours and secure job, these characteristics should shift preferences toward work in the public sector. On the other hand, being married increases the likelihood that person's partner already has a stable job, so it decreases the preferences for the public sector job. As the role of marital status and having children could depend on the gender roles we also include interactions of these variables with gender[13].

*The effects of wage cut on the wage change*

The workers that stayed in the public sector faced a 10 percent wage cut. If the wage cut would result in earnings lower than 25,000 RSD, the wages would not be cut by 10 percent, but simply reduced to level of 25,000 RSD. On the other hand, for the wages above 60,000 RSD, the 10 percent wage cut has replaced the so-called "solidarity tax", which amounted to 20% of the difference between the worker's wage in 2013 and 60,000 RSD14. The different regimes of the wage cut are presented in the Figure 2:

- For wages below 25,000 there is no wage cut
- For wages between 25,000 - 27,778 RSD the wage cut is equal to the difference between the 2014 wage and 25,000

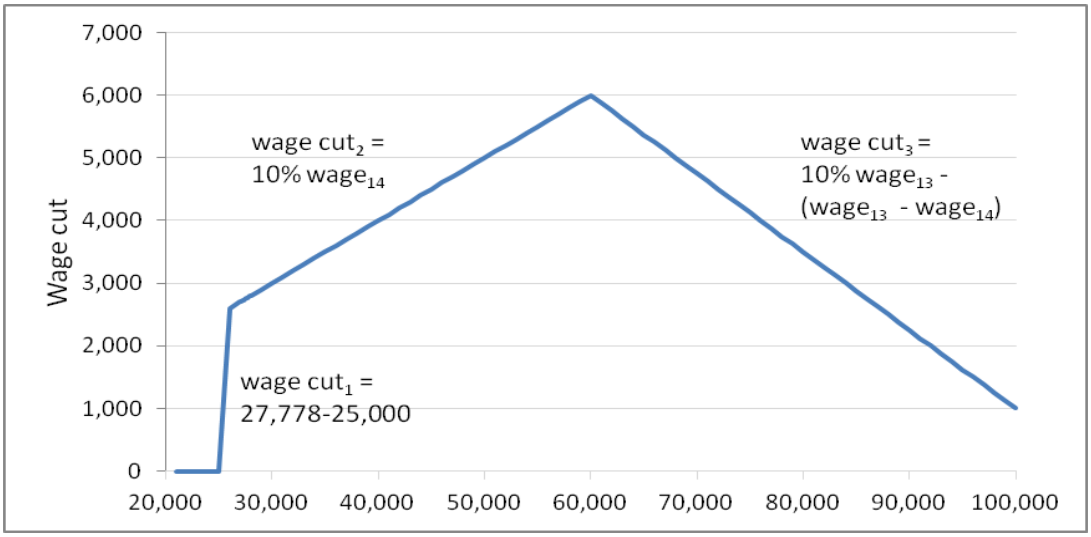
[12] In order to test the robustness of our results we apply the same model but use the household level cluster standard errors. The results, available upon request, do not suggest different conclusions than the one presented in the results section.

[13] Additionally the selection equation includes education, age (and its square), regional and settlement effects.

[14] This rule applies to the workers earning the wages up to 100,000 RSD. For the workers earning more than 100,000 RSD, the solidarity tax amounted to the 20% of the difference between 100,000 RSD and 60,000 RSD (i.e. 4.000 RSD) and 25% of the difference between the worker's wage and 100.000 RSD. However, as the number of persons in our sample who work in the public sector and have wages higher than 100.000 RSD is 2, and as for them we would need to formulate a new cut, we decided to drop them from the analysis.

- For wages between 27,778 and 60,000 RSD the wage cut is equal to 10% of the 2014 wages
- For wages above 60,000 RSD the wage cut is equal to 10% of the 2013 wages (introduction of the wage cut) minus the difference between 2013 and 2014 wages (abolishment of the "solidarity tax")

**Figure 2: Design of the wage cut variable**




Source: Authors' calculations.

We therefore define three wage cut variables, each describing the austerity rule for its part of the wage distribution

$$\text{wage cut}_1 = \text{wage}_{2014} - 25{,}000, \quad \text{if } 25{,}000 < \text{wage}_{2014} < 27{,}788$$
$$= 0 \text{ , otherwise}$$
$$\text{wage cut}_2 = \text{wage}_{2014} * 0.1, \quad \text{if } 25{,}788 \leq \text{wage}_{2014} \leq 60{,}000$$
$$= 0 \text{ , otherwise}$$
$$\text{wage cut}_3 = \text{wage}_{2013} * 0.1 - (\text{wage}_{2013} - \text{wage}_{2014}), \quad \text{if } \text{wage}_{2014} > 60{,}000$$
$$= 0 \text{ , otherwise ,}$$

where the $wage_{2013}$ is calculated as ($wage_{2014}$-60000)/0.8+60000.

We investigate whether the proposed wage cut had an effect on the wage change[15] of the workers who stayed in the public sector and was this effect more pronounced for women. We use the procedure proposed by Bourguignon et al (2007), which allows to control for the multinominal selection effects to estimate the following model.

$$\Delta wages = \alpha + \sum_{j=1}^{3} \tau_j \, wcut_j + \Delta \boldsymbol{X}' \boldsymbol{\varphi} + \boldsymbol{\lambda}' \boldsymbol{m} + \boldsymbol{q}' \boldsymbol{t} + \varepsilon \qquad (5)$$
$$\tau_j = \tau_0 + \sum_k \tau_k{}' Z_k$$

[15] Both the wage cut and the wage change in the model (5) are presented in real values. We correct the wages from 2015 (which are used for the calculation of the wage change) and the wage cut with the average value of consumer price index (CPI) from 2015. CPI in Serbia is calculated for the territory of the whole country, and no regional inflation rates are available.

where **wcut** represents the vector of different wage cut regimes described above, $\tau_j$ represents the effect of different wage cuts. The effects of the wage cut (represented by $\tau_j$ coefficients) could be heterogeneous effects depending on variables such as gender (if the wage cut was administered differently to men and women), sector of activity, due to different compliance between the state sector and state owned enterprises.

Vector of coefficients φ represent the effects of the changes in the covariates ΔX (working experience squared, occupation, sector of activity (industry vs. services) and the contract type (temporary vs. permanent)), $\boldsymbol{q't}$ represents the time fixed effects, while $\boldsymbol{\lambda' m}$ represents the effects of the selection into the public sector in 2014 (similarly to previous model), while ε is the error term.

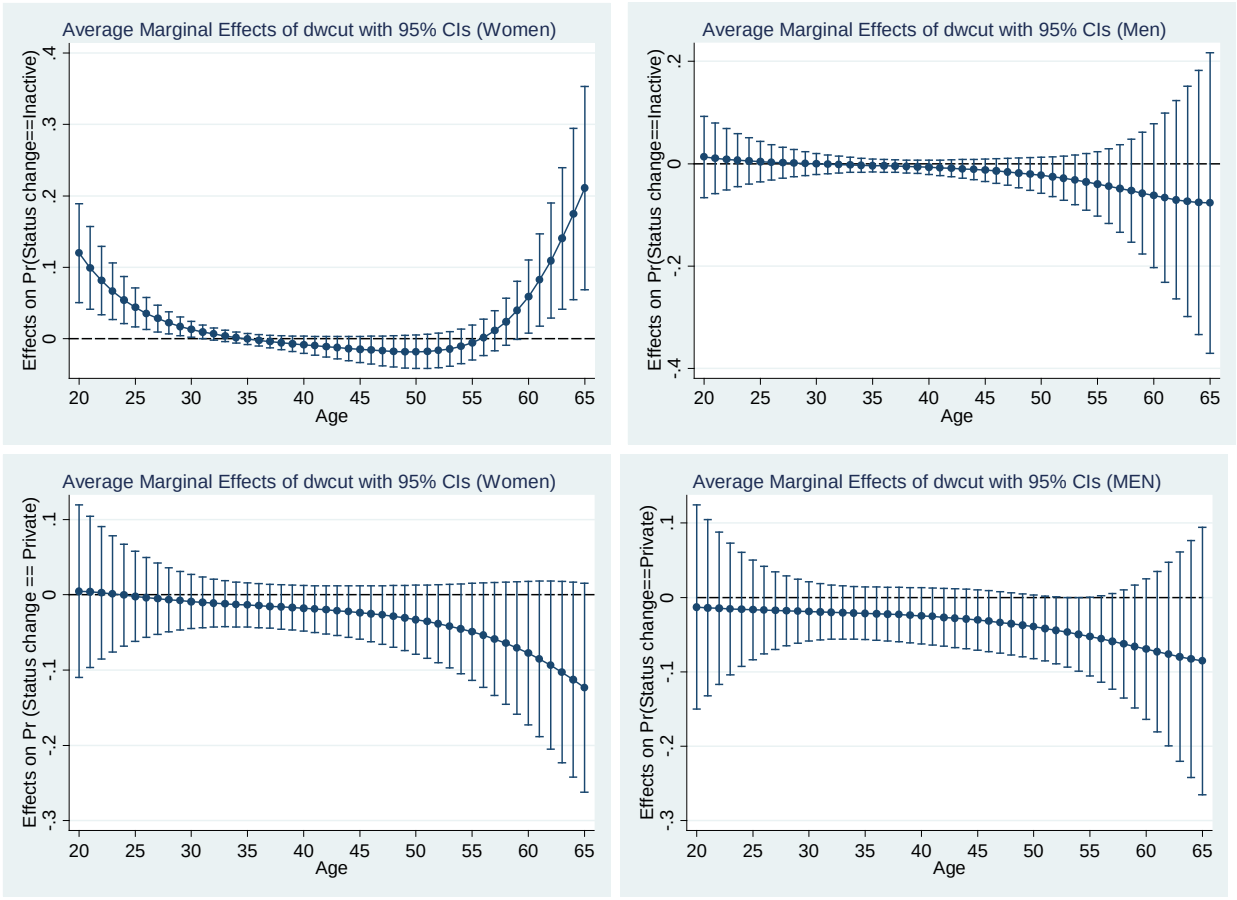
Since the sample for this group includes only the people who work in the public sector in both 2014 and 2015, we control for sample selection via multinominal probit model in which we predict the status of the person in 2014 and 15, depending of the set of household characteristics and personal characteristics described next to the labour market transitions model. For each year, person can be in one of the four statuses: 1) inactivity/unemployment, 2) private sector (including self-employment and informal employment) 3) public sector and 4) other (residual group which includes persons with zero, missing and interval wages). Therefore, potentially, 16 groups are describing person's status on the labour market in these two years. However, as the cross tabulation of labour market statuses for two years indicates low transitions between the years, we simplify the structure and keep only 5 categories. First four categories consists of persons who in 2014 and 2015 had no change in the status, i.e. in both 2014 and 2015 these persons were in 1) inactivity/unemployment, 2) private sector 3) public sector or 4) other, while the fifth category includes all the persons who have transited from one status to another between the years.

# 6 Results and discussion

## 6.1 The effects of wage cut on the labour market transitions

Table A2 in the Annex presents the estimates of the transition model presented in the equations 2 and 3. The results of the multinominal probit model without and with controlling for the selection into the public sector in 2014 (conditional mixed process) suggest similar results. The results suggest that the effects of the wage cut (i.e. its interaction term with gender) are significant for transition to unemployment/inactivity, but not for the transition to private sector. However, the probit estimates presented in the Table A2 in the Annex are nonlinear and include several interaction terms with the main variable of interest – wage cut, and therefore the coefficients cannot be directly interpreted. We therefore calculate marginal transition effect of the wage cut as a function of the age, for males and females separately, and present them in Figure 3.

**Figure 3: Marginal effects of wage cut at different age levels**




Notes: Top panels represents the marginal effects of the wage cut on the probability to transition to inactivity for women (left) and men (right), while bottom panels represents the probability to transition from public to private sector for women (left) and men (right).
Source: Authors' calculations. Sample: workers working in public sector in 2014.

The results suggest that, in line with our conceptual framework, the female workers who have received the wage cut are pushed towards the unemployment/inactivity. Figure 3 indicates that this effect applies only for younger women (up to the age of 30) and women close to retirement age (60 and above) from public sector into inactivity. The likelihood of transition to unemployment/inactivity due to wage cut for younger women is increased up to .1, while for older women the likelihood increase can go even up to .2.

Detailed analysis of the transition to unemployment/inactivity for younger women indicates that they majorly (in two-thirds of the cases) transit to unemployment and are majorly (in three-quarters of the cases) without children. This indicates that young women are more likely to be dissatisfied with their changed position after the wage reduction and thus opt out of the public sector jobs in search of the better-paid positions.

Detailed analysis for older women, indicates that their transition is most frequently (in three quarters of the cases) to inactivity, that is retirement. As mentioned in the introduction, older women were additionally pushed towards retirement due to austerity measures (unofficially, as a way of the administration of the workforce downsizing). Therefore older women's decision to retire at the retirement age is further accelerated by the receipt of the wage cut. The wage cut decreases the difference between

the older female workers' wage and their reservation wage and pushes them further towards the inactivity. The results for men do not suggest similar findings.

On the other hand, we find no statistical evidence of the wage cut effects on the probability of transition from public to private sector for any of the genders. Non-significant effect on the transitions to the private sector can be explained by the high public sector wage premium which in 2015, even after the austerity measures were introduced amounted to 11.6% (Vladisavljević, 2017b); and/or high transitions costs, which include low congruence of the public sector workers to private sector jobs.

*The effects of the anticipation of the wage cut*

On the other hand, the wage cut could have been anticipated even before the actual wage cut happened. For that reason, we investigated whether similar effects can be observed when we consider transitions that happened between the consecutive quartiles during the 2014. We estimate the model described in the equations 2 and 3, on the panel data where the period monitored is not the same quartile for two consecutive years (as it was in the previous part of the analysis), but the consecutive quartiles within 2014. The results, presented in the Table A3 and Figure A1 in the Annex, suggest that there are no anticipated effects of the wage cut on the transition from the public sector to inactivity or private sector.

## 6.2 The effects of wage cut on the wage change

Workers that remained in the public sector faced a wage cut. As already described, the workers face three different regimes of the wage change depending on the level of their wages. In the following section we present the main results while the descriptive statistics and full estimates are presented respectively in the Tables A4 and A5 in the Annex.

The results point to a strong effect of the wage cut on the wage change (Table 6, column 1), indicating that the wage cut indeed had an impact on the public sector wages reduction. The effects' size is in line with the expectations, as the confidence intervals for the coefficients suggest that they are not significantly different from the expected value of 1[16]. Next, we extend our basic model by interacting the wage cut variables with gender. The results show that there were no differences in administration of the wage cut for men and women, therefore suggesting that there was no direct gender discrimination in the wage cut procedure (Table 4, column 2).

**Table 4: The effects of the wage cut on wage change in the public sector**

| Wage change (in 000 RSD) | 1 | | 2 | |
|---|---|---|---|---|
| Wage cut 1 - from 25,000 to 27,777 RSD (in 000) | -0.227 | (0.486) | -0.424 | (0.882) |
| Wage cut 2- from 27,778 to 60,000 RSD (in 000) | 0.755*** | (0.139) | 0.762*** | (0.187) |
| Wage cut 3 - from 60,001 RSD (in 000) | 1.390*** | (0.241) | 1.418*** | (0.293) |
| Female * Wage cut 1 | | | 0.406 | (1.107) |
| Female * Wage cut 2 | | | -0.017 | (0.209) |
| Female * Wage cut 3 | | | -0.076 | (0.536) |

Source: Authors' calculations. Sample: workers working in public sector in both 2014 and 2015.

[16] The coefficient for the wage cut for the wages between 25,000 and 27,777 RSD is not statistically significant, probably due to the small number of workers in the sample with these wages (32). The sample for the third wage cut variable is also small (58).

As explained in the literature review and in the methodology section, previous research indicated that the compliance of the wage cut could have been different in the state sector and state-owned enterprises. We test this hypothesis by interacting the wage cut variable with a dummy variable indicating state sector work in 2014[17]. The results suggest that the compliance of state sector workers is significantly higher than for the state-owned enterprises (for the wages between 27,778 to 60,000 RSD; Table 5, Column 3). The size of the coefficient indicates that for the state sector we observe full compliance as the sum of the coefficients for the level and interaction term is approximately equal to 1. On the other hand, state owned enterprises do not fully comply with the reform (the coefficient for them is 0.504 - significantly lower than 1).

Different compliance to the wage reduction in the state sector and state-owned enterprises was likely the consequence of the greater autonomy that enterprises have in setting up wages and employment levels. In this way, although the government intended to cut the wages of all workers by 10 per cent, state-owned enterprises had a higher possibility to preserve their wages, which they used.

As women represent the majority in the state sector, this means that the women, although not directly discriminated in the application of the wage cut, were under the higher impact of the wage cut, due to their higher share in the state sector. To confirm this, we investigate the effects of the wage cut separately for male and female dominated sectors[18]. The results confirm that the female dominated sectors had higher compliance with the wage cut (the sum of the coefficients is approximately equal to 1) than the male dominated sectors.

**Table 5: The effects of the wage cut on wage change in the public sector – continued**

| Wage change (in 000 RSD) | 3 | | 4 | |
|---|---|---|---|---|
| Wage cut 1 - from 25,000 to 27,777 RSD (in 000) | -0.888 | (0.892) | -0.579 | (0.697) |
| Wage cut 2- from 27,778 to 60,000 RSD (in 000) | 0.504*** | (0.178) | 0.636*** | (0.144) |
| Wage cut 3 - from 60,001 RSD (in 000) | 1.290*** | (0.440) | 1.506*** | (0.375) |
| State sector * Wage cut 1 | 1.246 | (0.978) | | |
| State sector * Wage cut 2 | 0.433*** | (0.167) | | |
| State sector * Wage cut 3 | 0.283 | (0.531) | | |
| Female dominated sectors * Wage cut 1 | | | 0.893 | (0.971) |
| Female dominated sectors * Wage cut 2 | | | 0.323** | (0.127) |
| Female dominated sectors * Wage cut 3 | | | -0.278 | (0.513) |

Source: Authors' calculations. Sample: workers working in public sector in both 2014 and 2015.

These results can be better understood if we look at the descriptive statistics, which suggest that a higher percentage of women (compared to men) was working for the wages under 25,000 RSD, which were exempted from the reform. Therefore, the aftermath of the reform should have been a reduction of the gender wage gap in the public sector, as the lower share of female wages should have been under the impact of the cut. Instead, we observe that there was a slight gender wage gap increase. Therefore, the fact that the female dominated sectors were hit more by the austerity measures cancelled the positive effect on the gender wage gap that would have happened if all the public sector subsectors had equal wage cut compliance.

[17]Full division between the state-owned enterprises and the state sector is presented in the Table A7 in the Appendix.
[18] Female dominated sectors include the activity sectors in the public sector in which women have higher share of employees than men. These are: Education, Human health and Social Work, and Wholesale and retail trade sectors,

# 7 Conclusions and policy implications

At the beginning of 2015, facing a high fiscal deficit, Serbian government introduced a package of austerity measures, including a reduction of wages for those employed the public sector. Workforce downsizing was also performed although less ambitious than what was envisaged in the initial plan of the fiscal consolidation measures. Given the large employment in the public sector, almost one third of all formally employed, analyzing the effect of these measures is important for policy making purposes. Interest of this paper lies in the wage inequality within the public sector and we specifically focus on gender effects given that women form a majority of the workforce in the public sector. Previous studies showed that (unjusted) gender pay gap in the public sector in Serbia stands at 5.2%. By looking at the design of the wage cut which protected individuals earning 25,000 dinars and less, and those are mainly females, we expected to see the reduction of the gender pay gap as a result of the austerity episode. We also investigate how the wage cut have impacted transitions to different labour market outcomes, to inactivity or unemployment, or move to a private sector.

Besides informing policy making process, this paper contributes to an emerging literature that assesses the impact of austerity measures on gender equality. Although austerity packages differed in the size and structure, most of them included measures on the expenditures side, in the form of cuts in public sector wages and employment, or in public services; while some countries embraced policies on the revenue side, such as value added tax hikes. Available studies so far suggest that the effects of the these measures could have been higher for women, because they work more frequently in the public sector, and because reduction of spending on day care facilities for children and/or elderly put additional pressure on their labour supply and work flexibility. Budgets for care policies were not reduced in Serbia but informal care arrangement in the form of grandparents support, that are very common in the country, could be under attack of the austerity measures that included pensions cut as well as penalised access to early retirement and postponement of retirement age. These policies are likely to reduce the reliance on grandparents in taking care of the children and increase the burden on young women in taking care of the household.

Our results indicate that wage cut had pushed younger women and women close to retirement age from the public sector to unemployment or inactivity while no such effects are observed for men. Move to a private sector is not present among neither man or women. More detailed analysis suggests that most of the young females (up to 30 years of age) transit to unemployment and majority of them are without children. Older women move to inactivity, that is retirement.

Regarding wage effects, it is important to bare in mind that whole public sector is comprised of state sector, where women are majority of the workforce, and public enterprises, where male employment dominates. Public enterprises have larger autonomy in setting up wages and employment levels and there is an indication that they did not fully complied with the wages cut. Our results confirmed this as female-dominated sectors, most of which fall into the state subsector, were hit more by the wage cut compared to public enterprises due to their greater compliance with the administration of the austerity policy. So contrary to the expectation, instead of seeing the decrease of the gender pay gap in the public sector we observe its slight increase.

Despite the political rhetoric about gender rights in Serbia and many initiatives, policies and programs aimed at improving the position of women in the labour market, there is still no practice of conducting gender sensitive analysis before the implementation of new policy measures. Also, monitoring of the implementation of public policies is lacking so instead of reduction of the gender pay gap in the public sector we observe its slight increase after the implementation of the austerity measures. This should not be become the standard practice but, instead, it would be necessary to develop and apply formal procedures for the evaluation and monitoring of the distributive impact of any future reform policy.

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# Annex

**Table A1: Descriptive statistics for the labour market transition model**

| | N | Mean | Standard deviation |
|---|---|---|---|
| *Status change variables* | | | |
| Status change | 2,995 | 0.119 | 0.413 |
| Wage cut (dummy) | 2,995 | 0.779 | 0.415 |
| female | 2,995 | 0.478 | 0.500 |
| Female * wage cut (dummy) | 2,995 | 0.360 | 0.480 |
| Age | 2,995 | 45.11 | 9.72 |
| Senior officials and managers | 2,995 | 0.023 | 0.151 |
| Professionals | 2,995 | 0.269 | 0.443 |
| Technicians and associate professionals | 2,995 | 0.203 | 0.403 |
| Clerks | 2,995 | 0.109 | 0.312 |
| Service and sales workers | 2,995 | 0.112 | 0.316 |
| Craft and trades workers | 2,995 | 0.090 | 0.287 |
| Plant and machine operators | 2,995 | 0.078 | 0.268 |
| Elementary occupations | 2,995 | 0.115 | 0.319 |
| Services | 2,995 | 0.780 | 0.414 |
| Temporary contracts | 2,995 | 0.069 | 0.254 |
| Wage 14 | 2,980 | 38,596 | 15,703 |
| Beograd | 2,995 | 0.205 | 0.404 |
| Vojvodina | 2,995 | 0.221 | 0.415 |
| Zapadna Srbija | 2,995 | 0.292 | 0.455 |
| Istocna Srbija | 2,995 | 0.281 | 0.450 |
| Urban Settlement | 2,995 | 0.647 | 0.478 |
| | | | |
| *Selection equation variables* | | | |
| female | 23,778 | 0.507 | 0.500 |
| Age | 23,778 | 45.03 | 13.28 |
| Has own children | 23,778 | 0.242 | 0.428 |
| Female * Has own children | 23,778 | 0.054 | 0.225 |
| Married | 23,778 | 0.649 | 0.477 |
| Female * Married | 23,778 | 0.341 | 0.474 |
| Household head | 23,778 | 0.367 | 0.482 |
| Number of household members | 23,778 | 3.806 | 1.679 |
| Number of elderly | 23,778 | 0.393 | 0.889 |
| Primary or less | 23,778 | | |
| Secondary (2-3 years) | 23,778 | 0.243 | 0.429 |
| Secondary (4 years) | 23,778 | 0.358 | 0.480 |
| Tertiary (Grad school) | 23,778 | 0.053 | 0.224 |
| Tertiary (University, including MA and PhD) | 23,778 | 0.110 | 0.313 |
| Beograd | 23,778 | | |
| Vojvodina | 23,778 | 0.253 | 0.435 |
| Zapadna Srbija | 23,778 | 0.309 | 0.462 |
| Istocna Srbija | 23,778 | 0.251 | 0.433 |
| Urban Settlement | 23,778 | 0.544 | 0.498 |

**Table A2: The effects of the wage cut on the labour market transitions**

| | Multinominal probit | | | | Conditional Mixed Process | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Transition to inactivity | | Transition to private sector | | Selection to public sector 2014 | | Transition to inactivity | | Transition to private sector | |
| VARIABLES | coef | se | coef | se | coef | se | coef | se | coef | se |
| Wage cut | 1.978 | (2.365) | -0.412 | (1.642) | | | 2.063 | (2.623) | -0.251 | (1.672) |
| Female | -0.015 | (0.291) | -0.040 | (0.201) | -0.094** | (0.043) | -0.016 | (0.243) | -0.051 | (0.201) |
| Female * Wage cut | 6.800*** | (2.564) | 3.204 | (2.252) | | | 6.495*** | (2.467) | 1.603 | (0.000) |
| Age | -0.109 | (0.105) | -0.167** | (0.066) | 0.230*** | (0.009) | -0.076 | (0.118) | -0.039 | (0.092) |
| Age square | 0.002 | (0.001) | 0.002*** | (0.001) | -0.003*** | (0.000) | 0.002 | (0.001) | 0.001 | (0.001) |
| Age * Wage cut | -0.100 | (0.098) | 0.009 | (0.077) | | | -0.100 | (0.123) | 0.001 | (0.095) |
| Age square * Wage cut | 0.001 | (0.001) | -0.000 | (0.001) | | | 0.001 | (0.001) | -0.000 | (0.001) |
| Age * Female * Wage cut | -0.321*** | (0.102) | -0.124 | (0.119) | | | -0.310*** | (0.115) | -0.054 | (0.062) |
| Age square * Female * Wage cut | 0.004*** | (0.001) | 0.001 | (0.001) | | | 0.004*** | (0.001) | 0.000 | (0.001) |
| Managers | 0.244 | (0.274) | 0.471 | (0.718) | | | -0.011* | (0.006) | -0.003 | (0.007) |
| Professionals | 0.162 | (0.405) | 0.462 | (0.475) | | | 0.259 | (0.524) | 0.506 | (1.360) |
| Technicians | 0.088 | (0.368) | 0.583* | (0.353) | | | 0.197 | (0.303) | 0.464 | (1.214) |
| Clerks | 0.540** | (0.267) | 0.313 | (0.356) | | | 0.085 | (0.273) | 0.489 | (1.231) |
| Service and sales workers | 0.321* | (0.193) | 0.699** | (0.321) | | | 0.558** | (0.265) | 0.294 | (0.776) |
| Craft and trades workers | 0.272 | (0.172) | 0.845** | (0.395) | | | 0.278 | (0.269) | 0.503 | (1.227) |
| Plant and machine operators | 0.661* | (0.348) | 0.500 | (0.414) | | | 0.187 | (0.296) | 0.619 | (1.503) |
| Elementary occupations (omitted) | | | | | | | | | | |
| Belgrade (omitted) | | | | | | | | | | |
| Vojvodina | -0.214*** | (0.063) | -0.682*** | (0.124) | | | 0.640** | (0.278) | 0.343 | (0.847) |
| Zapadna Srbija | -0.081 | (0.052) | -0.380*** | (0.091) | 0.014 | (0.035) | -0.156 | (0.187) | -0.477 | (1.116) |
| Istocna Srbija | -0.509*** | (0.063) | -0.487*** | (0.111) | 0.121*** | (0.033) | -0.021 | (0.174) | -0.257 | (0.597) |
| Settlement | -0.159 | (0.167) | -0.173*** | (0.056) | 0.199*** | (0.034) | -0.460** | (0.193) | -0.273 | (0.617) |
| Services | -0.357** | (0.139) | -0.785*** | (0.089) | 0.076*** | (0.025) | -0.141 | (0.132) | -0.079 | (0.208) |
| Temporary contract | 1.226*** | (0.215) | 1.162*** | (0.173) | | | -0.281* | (0.161) | -0.508 | (1.170) |
| Wage 14 | -0.012 | (0.007) | -0.006 | (0.012) | | | 1.142*** | (0.228) | 0.699 | (1.622) |
| Q1 (omitted) | | | | | | | | | | |
| Q2 | 0.097 | (0.084) | 0.223 | (0.250) | | | 0.084 | (0.173) | 0.151 | (0.386) |
| Q3 | -0.181 | (0.316) | 0.155 | (0.324) | | | -0.182 | (0.182) | 0.122 | (0.328) |
| Q4 | 0.186 | (0.231) | 0.323 | (0.235) | | | 0.168 | (0.170) | 0.223 | (0.523) |

Continued on the next page. Cluster robust standard errors (region) in parentheses. *** p<0.01, ** p<0.05, * p<0.1

**Table A2: The effects of the wage cut on the labour market transitions -** continued from the previous page

| | Multinominal probit | | | | Conditional Mixed Process | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Transition to inactivity | | Transition to private sector | | Selection to public sector 2014 | | Transition to inactivity | | Transition to private sector | |
| VARIABLES | coef | se | coef | se | coef | se | coef | se | coef | se |
| Has own children | | | | | -0.086*** | (0.033) | | | | |
| Female * Has own children | | | | | -0.060 | (0.057) | | | | |
| Married | | | | | 0.120*** | (0.042) | | | | |
| Female * Married | | | | | 0.006 | (0.055) | | | | |
| Household head | | | | | 0.106*** | (0.032) | | | | |
| Number of household members | | | | | 0.016* | (0.009) | | | | |
| Number of elderly (age>69) | | | | | -0.000 | (0.013) | | | | |
| Primary (omitted) | | | | | | | | | | |
| Secondary (2-3 years) | | | | | 0.311*** | (0.040) | | | | |
| Secondary (4 years) | | | | | 0.642*** | (0.037) | | | | |
| Tertiary (Grad school) | | | | | 0.932*** | (0.053) | | | | |
| Tertiary (University) | | | | | 1.224*** | (0.043) | | | | |
| lnsig_4 | | | | | -0.051 | (2.375) | | | | |
| atanhrho_13 | | | | | 0.106 | (0.224) | | | | |
| atanhrho_14 | | | | | 0.255 | (0.293) | | | | |
| atanhrho_34 | | | | | -0.173 | (0.774) | | | | |
| Constant | -0.737 | (1.911) | 1.192 | (1.062) | -6.639*** | (0.190) | -1.906 | (2.828) | -1.103 | (4.124) |
| Observations | 2,980 | | 2,980 | | 23,772 | | 23,772 | | 23,772 | |

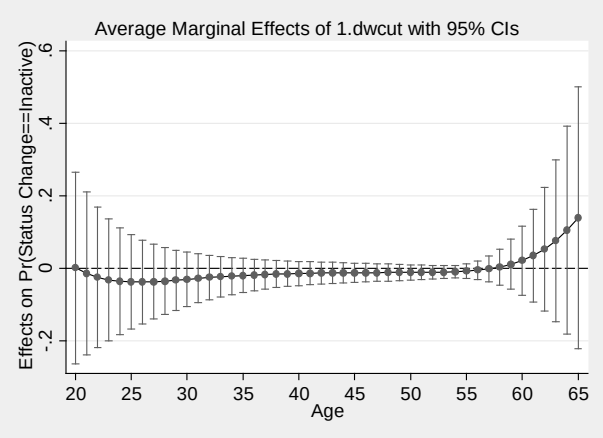
Cluster robust standard errors (region) in parentheses. *** p<0.01, ** p<0.05, * p<0.1

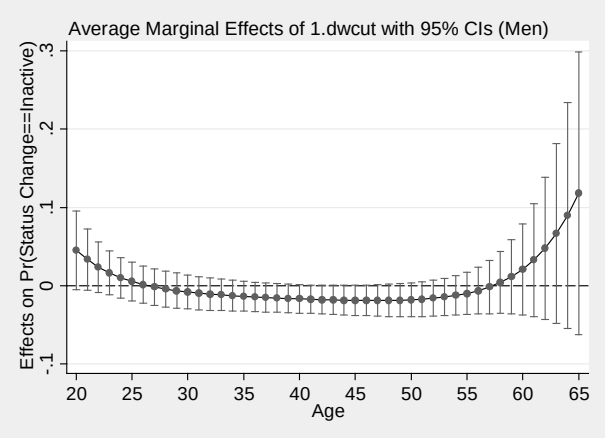
**Table A3: The effects of the anticipation of the wage cut on the labour market transitions**

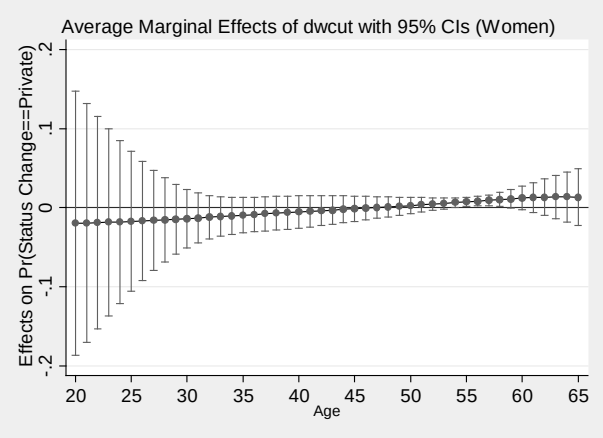
| | Multinominal probit | | | |
|---|---|---|---|---|
| | Transition to inactivity | | Transition to private sector | |
| VARIABLES | coef | se | coef | se |
| Wage cut | 3.294** | (1.508) | 2.524 | (3.491) |
| Female | 0.465** | (0.236) | -0.172 | (0.258) |
| Female * Wage cut | 3.209* | (1.894) | 1.146 | (4.596) |
| Age | -0.131*** | (0.047) | 0.103 | (0.150) |
| Age * Wage cut | 0.001*** | (0.000) | -0.002 | (0.002) |
| Age square * Wage cut | -0.216*** | (0.064) | -0.193 | (0.156) |
| Age * Female * Wage cut | 0.003*** | (0.001) | 0.003 | (0.002) |
| Age square * Female * Wage cut | -0.148 | (0.121) | -0.048 | (0.207) |
| Managers | 0.002 | (0.002) | 0.001 | (0.002) |
| Professionals | -0.000 | (0.000) | -0.000 | (0.000) |
| Technicians | 0.382 | (0.495) | 1.096** | (0.485) |
| Clerks | 0.462 | (0.413) | 0.684 | (0.487) |
| Service and sales workers | -0.055 | (0.305) | 0.409 | (0.399) |
| Craft and trades workers | -0.099 | (0.541) | 0.006 | (0.379) |
| Plant and machine operators | 0.028 | (0.362) | 0.448 | (0.627) |
| Elementary occupations (omitted) | 0.473 | (0.292) | 0.116 | (0.417) |
| Belgrade (omitted) | 0.116 | (0.539) | 0.285 | (0.468) |
| Vojvodina | | | | |
| Zapadna Srbija | | | | |
| Istocna Srbija | -0.239*** | (0.020) | -0.456*** | (0.068) |
| Settlement | -0.576*** | (0.116) | -0.342*** | (0.110) |
| Services | -0.117* | (0.068) | -0.484*** | (0.138) |
| Temporary contract | -0.043 | (0.281) | -0.257 | (0.162) |
| Wage 14 | -0.768*** | (0.293) | -1.034*** | (0.214) |
| Q1 (omitted) | 0.995** | (0.408) | 0.516*** | (0.145) |
| Q2 | 0.413*** | (0.148) | -0.023 | (0.235) |
| Q3 | 0.219 | (0.139) | -0.189 | (0.216) |
| Constant | 0.057 | (1.775) | -2.653 | (2.644) |
| Observations | 2,730 | | 2,730 | |

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

## Figure A1: Marginal effects of the wage cut for men and women



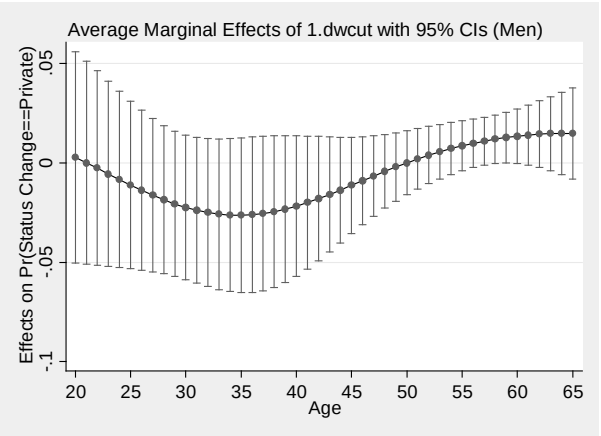



**Table A4: Descriptive statistics for the wage change model**

| | N | Mean | Standard deviation |
|---|---|---|---|
| Wage change equation | | | |
| Wage change | 1,015 | 1.664 | 6.299 |
| Wage cut 1 \| ≠ 0 | 32 | 1.458 | 0.535 |
| Wage cut 2 \| ≠ 0 | 672 | 3.977 | 0.818 |
| Wage cut 3 \| ≠ 0 | 59 | 3.924 | 1.355 |
| Female | 1,015 | 0.533 | 0.499 |
| d_Working Experience square | 1,015 | 41.2 | 19.8 |
| d_Senior officials and managers | 1,015 | -0.002 | 0.077 |
| d_Professionals | 1,015 | 0.000 | 0.089 |
| d_Technicians and associate professionals | 1,015 | -0.001 | 0.104 |
| d_Clerks | 1,015 | -0.002 | 0.099 |
| d_Service and sales workers | 1,015 | -0.001 | 0.094 |
| d_Craft and trades workers | 1,015 | 0.003 | 0.104 |
| d_Plant and machine operators | 1,015 | 0.001 | 0.094 |
| d_Elementary occupations | 1,015 | 0.002 | 0.089 |
| d_Services | 1,015 | -0.006 | 0.089 |
| d_Temporary contracts | 1,015 | 0.005 | 0.151 |
| | | | |
| Selection equation variables | | | |
| Female | 23,770 | 0.507 | 0.500 |
| Age | 23,770 | 45.03 | 13.28 |
| Has own children | 23,770 | 0.242 | 0.428 |
| Female * Has own children | 23,770 | 0.054 | 0.225 |
| Married | 23,770 | 0.649 | 0.477 |
| Female * Married | 23,770 | 0.341 | 0.474 |
| Household head | 23,770 | 0.367 | 0.482 |
| Number of household members | 23,770 | 3.806 | 1.679 |
| Number of elderly | 23,770 | 0.393 | 0.889 |
| Primary or less | 23,770 | 0.002 | 0.089 |
| Secondary (2-3 years) | 23,770 | 0.243 | 0.429 |
| Secondary (4 years) | 23,770 | 0.358 | 0.480 |
| Tertiary (Grad school) | 23,770 | 0.053 | 0.224 |
| Tertiary (University, including MA and PhD) | 23,770 | 0.110 | 0.313 |
| Beograd | 23,770 | 0.187 | 0.390 |
| Vojvodina | 23,770 | 0.253 | 0.435 |
| Zapadna Srbija | 23,770 | 0.309 | 0.462 |
| Istocna Srbija | 23,770 | 0.251 | 0.433 |
| Urban Settlement | 23,770 | 0.544 | 0.498 |

**Table A5: The effects of wage cut on the wage change**

Continued on the next page

| Model | 0 | | 1 | | 2 | | 3 | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | coef | se | coef | se | coef | se | coef | se | coef | se |
| Gender | -0.971* | (0.534) | -0.256 | (0.516) | -0.229 | (0.732) | -0.606 | (0.511) | -0.523 | (0.529) |
| Wage cut 1 - from 25,000 to 27,777 RSD | | | -0.227 | (0.486) | -0.424 | (0.882) | -0.888 | (0.892) | -0.579 | (0.697) |
| Wage cut 2 - from 27,778 to 60,000 RSD | | | 0.755*** | (0.139) | 0.762*** | (0.187) | 0.504*** | (0.178) | 0.636*** | (0.144) |
| Wage cut 3 - from 60,001 RSD | | | 1.390*** | (0.241) | 1.418*** | (0.293) | 1.290*** | (0.440) | 1.506*** | (0.375) |
| Female * Wage cut 1 | | | | | 0.406 | (1.107) | | | | |
| Female * Wage cut 2 | | | | | -0.017 | (0.209) | | | | |
| Female * Wage cut 3 | | | | | -0.076 | (0.536) | | | | |
| State sector * Wage cut 1 | | | | | | | 1.246 | (0.978) | | |
| State sector * Wage cut 2 | | | | | | | 0.433*** | (0.167) | | |
| State sector * Wage cut 3 | | | | | | | 0.283 | (0.531) | | |
| Female dom. sectors * Wage cut 1 | | | | | | | | | 0.893 | (0.971) |
| Female dom. sectors * Wage cut 2 | | | | | | | | | 0.323** | (0.127) |
| Female dom. sectors * Wage cut 3 | | | | | | | | | -0.278 | (0.513) |
| d_Working Experience square | 0.016 | (0.012) | -0.002 | (0.011) | -0.002 | (0.013) | 0.000 | (0.012) | -0.004 | (0.012) |
| d_Senior officials and managers | -9.628 | (8.169) | -9.915 | (7.688) | -9.905 | (6.914) | -9.808* | (5.536) | -9.825 | (6.780) |
| d_Professionals | -5.403 | (8.413) | -5.642 | (7.717) | -5.547 | (7.878) | -4.985 | (6.875) | -5.087 | (8.157) |
| d_Technicians and associate professionals | 0.155 | (7.555) | -0.957 | (7.041) | -0.916 | (7.090) | -0.706 | (5.994) | -0.663 | (7.199) |
| d_Clerks | 0.123 | (7.770) | -0.937 | (7.768) | -0.897 | (7.347) | -0.933 | (6.735) | -0.846 | (7.689) |
| d_Service and sales workers | -1.007 | (7.329) | -1.287 | (7.438) | -1.264 | (6.978) | -1.092 | (6.004) | -1.180 | (7.185) |
| d_Craft and trades workers | -10.234 | (7.449) | -10.700 | (7.715) | -10.641 | (6.526) | -10.349 | (6.372) | -10.458 | (7.148) |
| d_Plant and machine operators | -2.485 | (7.669) | -3.587 | (7.482) | -3.561 | (6.829) | -3.310 | (6.530) | -3.378 | (7.362) |
| d_Elementary occupations | 0.000 | (7.768) | 0.000 | (7.629) | 0.000 | (7.205) | 0.000 | (6.206) | 0.000 | (7.425) |
| d_Services | -4.008 | (2.783) | -3.775 | (2.421) | -3.774 | (2.349) | -4.252* | (2.385) | -3.772 | (2.473) |
| d_Temporary contracts | 2.521 | (1.669) | 2.296 | (1.599) | 2.306 | (1.530) | 2.288 | (1.421) | 2.273 | (1.596) |
| quartal== 2.0000 | -0.944 | (0.735) | -0.757 | (0.716) | -0.764 | (0.709) | -0.694 | (0.740) | -0.705 | (0.655) |
| quartal== 3.0000 | -0.315 | (0.538) | -0.165 | (0.584) | -0.174 | (0.603) | -0.130 | (0.612) | -0.209 | (0.559) |
| quartal== 4.0000 | 0.062 | (0.568) | 0.094 | (0.580) | 0.087 | (0.586) | 0.119 | (0.548) | 0.111 | (0.532) |
| _m1 | 30.440*** | (6.549) | 22.966*** | (6.251) | 23.009*** | (6.342) | 20.257*** | (6.464) | 21.154*** | (6.262) |
| _m2 | 34.913*** | (6.492) | 23.576*** | (6.429) | 23.708*** | (6.323) | 20.434*** | (6.626) | 21.480*** | (6.592) |
| _m3 | -1.407 | (1.697) | -1.077 | (1.518) | -1.123 | (1.636) | -1.159 | (1.490) | -1.080 | (1.582) |
| _m4 | 31.985*** | (8.481) | 28.519*** | (8.047) | 28.676*** | (7.852) | 27.681*** | (7.635) | 27.464*** | (8.249) |
| _m5 | 11.627* | (6.698) | 15.193** | (6.384) | 15.110** | (6.046) | 13.038** | (6.499) | 15.220** | (6.497) |
| Constant | 36.462*** | (8.519) | 28.274*** | (8.226) | 28.411*** | (8.049) | 25.457*** | (8.582) | 26.935*** | (8.290) |

Continued on the next page . Cluster robust standard errors (region) in parentheses. *** p<0.01, ** p<0.05, * p<0.1

**Table A5: The effects of wage cut on the wage change - continued from the previous page**

| Model | 0 | | 1 | | 2 | | 3 | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | coef | se | coef | se | coef | se | coef | se | coef | se |
| Selection diagnostics | | | | | | | | | | |
| Sigma2 | 817.625*** | (315.486) | 534.288** | (249.089) | 537.612** | (227.218) | 444.707** | (221.106) | 478.942** | (205.348) |
| rho1 | 1.065*** | (0.076) | 0.994*** | (0.101) | 0.992*** | (0.137) | 0.961*** | (0.175) | 0.967*** | (0.158) |
| rho2 | 1.221*** | (0.077) | 1.020*** | (0.123) | 1.022*** | (0.133) | 0.969*** | (0.188) | 0.982*** | (0.170) |
| rho3 | -0.049 | (0.069) | -0.047 | (0.078) | -0.048 | (0.087) | -0.055 | (0.086) | -0.049 | (0.090) |
| rho4 | 1.119*** | (0.162) | 1.234*** | (0.218) | 1.237*** | (0.202) | 1.313*** | (0.180) | 1.255*** | (0.251) |
| rho5 | 0.407* | (0.228) | 0.657*** | (0.242) | 0.652** | (0.256) | 0.618** | (0.277) | 0.695** | (0.308) |
| Observations - conditional on observing wages | 1,015 | | 1,015 | | 1,015 | | 1,015 | | 1,015 | |
| Observations - total | 23,770 | | 23,770 | | 23,770 | | 23,770 | | 23,770 | |

Cluster robust standard errors (region) in parentheses*** p<0.01, ** p<0.05, * p<0.1

**Table A7: Division of workers to state-owned enterprises (SOE) and state sector (SS) according to NACE codes**

| NACE code | Sector / subsector | SOE/SS |
|---|---|---|
| **B** | **Mining and quarrying** | SOE |
| **C** | **Manufacturing** | SOE |
| **D** | **Electricity, gas, steam and air conditioning supply** | SOE |
| **E** | **Water supply; sewerage, waste management and remediation activities** | SOE |
| **F** | **Construction** | SOE |
| **G** | **Wholesale and retail trade; repair of motor vehicles and motorcycles** | SOE |
| **H** | **Transportation and storage** | SOE |
| **I** | **Accommodation and food service activities** | SOE |
| **J** | **Information and communication** | SOE |
| **K** | **Financial and insurance activities** | SS |
| **L** | **Real estate activities** | SOE |
| **M** | **Professional, scientific and technical activities** | |
| M 69.1 | Legal activities | SS |
| M 69.2 | Accounting, bookkeeping and auditing activities; tax consultancy | SS |
| M 70.1 | Activities of head offices | SS |
| M 70.2 | Management consultancy activities | SS |
| M 71.1 | Architectural and engineering activities and related technical consultancy | SOE |
| M 71.2 | Technical testing and analysis | SOE |
| M 72.1 | Research and experimental development on natural sciences and engineering | SS |
| M 72.2 | Research and experimental development on social sciences and humanities | SS |
| M 73.1 | Advertising | SS |
| M 73.2 | Market research and public opinion polling | SS |
| M 74.9 | Other professional, scientific and technical activities n.e.c. | SS |
| M 75.0 | Veterinary activities | SS |
| **N** | **Administrative and support service activities** | |
| N 78.1 | Activities of employment placement agencies | SOE |
| N 78.3 | Other human resources provision | SOE |
| N 79.1 | Travel agency and tour operator activities | SOE |
| N 80.1 | Private security activities | SOE |
| N 80.2 | Security systems service activities | SOE |
| N 81.1 | Combined facilities support activities | SOE |
| N 81.2 | Cleaning activities | SOE |
| N 81.3 | Landscape service activities | SOE |
| N 82.1 | Office administrative and support activities | SS |
| N 82.3 | Organisation of conventions and trade shows | SS |
| N 82.9 | Business support service activities n.e.c | SS |
| **O** | **Public administration and defence; compulsory social security** | **SS** |
| **P** | **Education** | SS |
| **Q** | **Human health and social work activities** | SS |
| **R** | **Arts, entertainment and recreation** | |
| R 90.0 | Creative, arts and entertainment activities | SS |
| R 91.0 | Libraries, archives, museums and other cultural activities | SS |
| R 92.0 | Gambling and betting activities | SOE |
| R 93.1 | Sports activities | SOE |
| R 93.2 | Amusement and recreation activities | SOE |
| **S** | **Other service activities** | |
| S 94.1 | Activities of business, employers and professional membership organisations | SS |
| S 94.2 | Activities of trade unions | SS |

| | | |
|---|---|---|
| S 94.9 | Activities of other membership organisations | SS |
| S 95.2 | Repair of personal and household goods | SOE |
| S 96.0 | Other personal service activities | SOE |
| **U** | **Activities of extraterritorial organisations and bodies** | SS |