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Changes in Public and Private Sector Pay Structures in Two Emerging Market Economies during the Crisis

Abstract:
This paper estimates public-private sector wage differentials in two emerging market economies - Croatia and Serbia - between 2008 and 2011 in order to understand changes in the gap resulting from austerity measures undertaken by each sector. The paper focuses on counterfactual decompositions of the wage gap at the mean and at selected quantiles along the wage distribution, performed using an extension to the Oaxaca-Blinder method based on Recentered Influence Function (RIF) regressions and reweighting. The main results indicate that there was a wage premium in the public sector for both countries and in both years. Although the total wage gap decreased in Serbia during the crisis, the wage structure effect, or the returns to workers' characteristics, increased in both countries. The paper shows that the private sector in both countries adjusted wages relative to the public sector more at the bottom than at the top of the wage distribution, which led to an increase in the relative public sector wage compression, especially in Croatia. While in Croatia the wage gaps stemming from differences between the public and private sector in the returns to characteristics for similar workers were within the range usually estimated for EU countries, these gaps were considerably higher in the case of Serbia.

Keywords: public-private wage gap, recession, unconditional quantile regression, recentered influence function, decomposition, Croatia, Serbia
JEL classification: H3, J31, J33, J45, P2, P3

Promjene u strukturi plaća u javnom i privatnom sektoru u dva tržišna gospodarstva u nastajanju tijekom krize

Sažetak:
U radu se analiziraju razlike u plaćama između javnog i privatnog sektora za dva tržišna gospodarstva u nastajanju - Hrvatsku i Srbiju - u 2008. i 2011. godini, s ciljem razumijevanja promjena do kojih je došlo uslijed mjera štednje poduzetih u dva sektora. Rad se usredotočuje na protučinjenične dekompozicije razlika u prosječnim plaćama te na razlike između odabranih kvantila duž distribucije, koristeći ekstenziju metode Oaxace i Blindera koja se temelji na reponderiranju i regresijama za bezuvjetne kvantile (RIF regresije). Glavni rezultati pokazuju da postoji pozitivna premija na plaće u javnom sektoru za obje zemlje i za obje godine. Iako se ukupni jaz smanjio tijekom krize u Srbiji, razlika u graničnim povratima na karakteristike sličnih zaposlenika u obje se zemlje povećala. U radu se pokazuje da je privatni sektor, u odnosu na javni, prilagodio plaće više na donjem nego na gornjem dijelu distribucije u obje zemlje, što je dovelo do relativnog povećanja kompresije plaća u javnom sektoru, posebice u Hrvatskoj. Dok je u Hrvatskoj jaz u plaćama koji proizlazi iz razlika između javnog i privatnog sektora u povratima na karakteristike za radnike usporedive po karakteristikama bio unutar uobičajenog raspona procjena za zemlje EU-a, u Srbiji je on bio znatno veći.

Ključne riječi: jaz plaća između javnog i privatnog sektora, recesija, regresija za bezuvjetne kvantile, recentrirana funkcija utjecaja, dekompozicija, Hrvatska, Srbija
JEL klasifikacija: H3, J31, J33, J45, P2, P3

1 Introduction[1]

The global financial and economic crisis which started in 2007/2008 has brought difficulties in both public and private sectors worldwide. In a situation of output contraction and reduced aggregate demand, many countries have accumulated sizeable stocks of public and private debt. The consequent needs for deleveraging have threatened and continue to threaten the prospects for a successful recovery. In such circumstances, state administrations and both public and private enterprises have pursued, with more or less success, a variety of austerity policies. Given that wage bills constitute a lion's share of public expenditures and business costs, the austerity measures in both sectors have largely been focused on attempts at reducing them. As a result, public as well as private sector wages and employment have been affected by these circumstances, though not always to the same extent.

The importance of employment and compensation issues for successful adjustment in crisis circumstances, especially in the public sector, has been addressed mainly in the macroeconomic literature. For instance, Hernandez de Cos and Moral-Benito (2013) show, by using a panel of OECD countries over the 1980-2007 period, that the public sector wage bill plays a crucial role in achieving growth-promoting budget consolidation requirements and improvements of overall competitiveness of the economy via public-private sector wages causality. Similarly, for 18 OECD countries over the 1970-2006 period, Lamo, Perez and Schuknect (2012) find co-movements between public and private sector wages, while Lamo, Perez and Schuknect (2013) estimate strong positive correlation between public and private sector wages over the business cycle. Another strand of studies examined correlations between public and private sector employment. For example, Behar and Mok (2013), using a large cross-section of developing and advanced countries, find evidence that public employment crowds out private employment, while Algan, Cahuc and Zylberberg (2002) find that public sector crowds out total employment if public sector wages are high and/or when the goods produced by the two sectors are substitutes.

On the other hand, only a few microeconomic studies attempted to explain differences in the public-private pay gap across countries. Research efforts have so far been focused mainly on developed countries. A prominent example is the study by Lucifora and Meurs (2006) who explored the gap for the Great Britain, France and Italy in 1998 and found that institutional differences in wage regulation matter for the observed public-private wage gap. Other, more recent, examples include Giordano et al. (2011), Christofides and Michael (2013), de Castro, Salto and Steiner (2013), and Depalo, Giordano and Papapetrou (2013). However, most of these studies used only pre-crisis micro-data from European Union countries for comparison. Moreover, none of the existing studies considered effects of austerity measures on changes in the sectoral pay gap during the

[1] Supported by a grant from the Open Society Foundations.

financial crisis for emerging economies of Eastern Europe that have recently transitioned from the socialist to the market system.

Hence, the aim of this paper is to analyze how public and private sectors in two emerging market economies, Croatia and Serbia, responded to the crisis and how this altered the wage gap in those countries. This is important given that there was an increasing trend in the public-private sector pay gap before the crisis and governments in both countries were forced to introduce austerity measures. Particularly, Nikolic (2014) has shown that the premium in Serbia increased from close to zero in 2004 to 19 percent for men and to 12 percent for women in 2008 on average after controlling for observables. Similarly, the public sector pay premium after controlling for relevant observable characteristics in Croatia was estimated at around 9 percent in 2003 (Nestić, 2005) as well as in 2008[2] (Rubil, 2013).[3] There are also other reasons for our interest in these two particular countries. Croatia and Serbia were previously parts of the same country, but their paths have diverged after the breakup of the socialist system. In spite of similar institutional backgrounds, these two countries have chosen different paths of adjustment to the crisis. Whereas in Croatia the private sector undertook the major burden of the crisis, in Serbia the adjustments took place through wage declines in the public sector and both wage and employment declines in the private sector. Having the Labor Force Survey micro-data for Croatia and Serbia in years 2008 and 2011 allows us to examine the gap between wages in the public and private sector in a comparative manner - comparing the gaps in two countries with different institutional settings: before and after the start of the recent global economic crisis.

This paper contributes to the standard microeconomic literature by combining the so-called recentered influence function (RIF) regressions developed recently by Firpo, Fortin and Lemieux (2007; 2009) and the semi-parametric reweighting following DiNardo, Fortin and Lemieux (1996) for both the decompositions of the wage gaps at the mean and at quantiles along the distribution. The literature on the public-private wage gap employing these recent methods is still scarce and, to the best of our knowledge, this paper is the first application of this method in studying the gap between public and private-sector wages in (post-)transition environment.

Finally, the paper provides a number of interesting results from the cross-country comparison perspective. First, the private sector undertook the major burden of the crisis in both countries. In the period observed, the crisis hit Serbia more than Croatia in terms of changes in both employment and wages. Second, despite the austerity measures, the public-private differences in the returns to characteristics for workers with similar characteristics increased in both countries. The public-sector premium in Serbia was greater than in most other EU countries, including Croatia. Third, the paper provides evidence that the crisis has had divergent impact on the public-private sector wage gap by

[2] This refers to the returns to characteristics of employees in different sectors.

[3] This was also the case for many other countries (see Lausev, 2014, for a survey of public-private sector pay gap across developed and transitioning economies).

gender in these two countries. Fourth, there was an increase in the public-sector wage compression relative to the private-sector wage distribution.

The paper is organized as follows. Section 2 describes the institutional background in Croatia and Serbia. The next section describes the data used in the empirical analysis, followed by a detailed description of the methodology applied. The following section reports the main empirical results and the final section concludes the paper with some policy implications.

2 Labor Market Trends

Although both Croatia and Serbia share similar heritage that stems from being constituent republics of the former Republic of Yugoslavia, after the breakup and the dual political and economic transition, their paths diverged. Croatia was hit by war in the first part of the 1990s and struggled with the transition to market economy for the remaining part of the decade. Serbia, on the other hand, was more-or-less trapped in the old system under Milošević's ruling during the most part of the 1990s. Only in the 2000s both countries experienced real benefits of the market economy. However, Croatia was well ahead with the necessary changes, including privatization, and despite all of the problems, it became an EU member state in 2013 whereas Serbia became an EU candidate country in 2012. In this context, it should come as no surprise that the impact of the recent crisis, as well as economic policy response to it, were different in these two countries, especially in the case of the labor market. It is these differences that make the cross-country comparison in this paper rewarding. In the following few paragraphs, we briefly summarize recent economic and labor market circumstances for each of the two countries.

Croatian economy in the period before the crisis was considered as stable investor-friendly environment with relatively high FDI when compared to other countries in the region and moderate fiscal consolidation. The average growth rate of real GDP in the pre-recession period (2000-2008) amounted to 4.3 percent, bringing about an increase in both employment and real wages. Due to stronger growth of GDP than wages, the productivity also grew, which was pronounced mainly in the private sector. Yet, the country was also facing low activity rates and high long-term unemployment rates coupled with regional disparities, systemic corruption and low capacity for reform (see Franičević, 2011).

Similarly to Croatia, Serbian economy experienced strong growth in the period before the crisis (2001-2008). Real GDP grew annually on average by 5 percent. However, unlike in Croatia, the same period was characterized by significant growth of real wages above the real GDP, which was caused by a number of factors. One of them was the government's effort to regulate wage growth consistently across certain branches of the public sector such as public education, public health, and public services since these sectors had lagged behind the national average growth during the 1990s. Other factors

included a new method of wage calculation, the inflow of funds from abroad in the form of aid, loans or privatization proceeds and fiscal expansions during the pre-election years. Although the largest privatizations took place during the 2001-2008 period the public sector in Serbia still remained the largest single employer.

The financial and economic crisis in the second half of 2008 changed the growth trends in both countries. The cumulative fall of real GDP in Croatia in the period 2009-2011 amounted to 9.5 percent, with a peak in 2009 of -6.9 percent. Although the economy recorded moderate growth of 2.1 percent in 2008, the average annual growth rate in the period 2008-2011 was negative, -1.8 percent (Table 1). In Serbia, year-on-year real GDP growth rate in 2009 was -3.5 percent, but it slowly recovered to positive until 2011 (1.6 percent), with a positive average growth rate in the observed period (2008-2011) of 0.7 percent. The inflation rate was rather moderate in Croatia (3 percent) and much higher in Serbia (9 percent) in the 2008-2011 period.

Table 1 **Basic Macroeconomic Indicators for Croatia and Serbia, 2008-2011**

	CROATIA				SERBIA			
	2008	2009	2010	2011	2008	2009	2010	2011
Real GDP growth rate	2.1	-6.9	-2.3	-0.2	3.8	-3.5	1.0	1.6
Inflation (CPI)	6.1	2.4	1.1	2.3	12.5	8.2	6.2	11.2
Total no. of employed (000)								
- total	1555	1499	1432	1411	1999	1889	1795	1746
- legal entities	1252	1211	1168	1160	1428	1396	1354	1342
Employment rate*	57.8	56.6	54.0	52.4	53.7	50.4	47.2	45.4
Unemployment rate*	8.6	9.3	12.1	13.9	14.4	16.9	20.0	23.6
Wages								
Nominal								
- gross	7544	7711	7679	7796	45674	44147	47450	52733
- net	5178	5311	5343	5441	32746	31733	34142	37976
Real (chain indices)								
- gross	100.9	99.8	98.5	99.2	n/a	104.1	98.8	102.3
- net	100.8	100.2	99.5	99.6	n/a	103.8	98.9	102.2

*Note: * - based on ILO methodology for the age group 15-64.*
Sources: Eurostat, Croatian Bureau of Statistics, Statistical Office of the Republic of Serbia.

The crisis also had a large impact on the labor market in both countries. As shown in Table 1 the employment fell by a substantial amount, while the unemployment rates increased in both countries. For example, in the period 2008–2011, the average number of employed decreased by more than 140 thousand (almost 10 percent) in Croatia, while the survey-based unemployment rate grew from 8.6 percent to 13.9 percent in the same period, and further to 16.3 percent in 2012. Serbia was even more hit by the crisis. In particular, in 2011 there were more than 250 thousand less employed workers than in 2008. However, number of employed in legal entities in Serbia dropped by around 85 thousand while the most significant decline came from entrepreneurships. The unemployment rate increased from 14.4 percent in 2008 to 23.6 percent in 2011.

Similarly, in Croatia the distribution of employment cuts was also not even across sectors as layoffs were mostly present in the private sector. In contrast, the number of employed in public services (public administration, education, health) increased slightly during the same period. This observation points to high employment protection in the public sector as opposed to the private sector, or, as some would argue (Franičević, 2011), to a "dual" character of the labor market with protected workers from the state sector on one side and workers employed in the private sector without collective agreements, those on temporary contracts, the young and the old on the other side.

The official statistics shows that in Croatia both gross and net nominal wages continued to grow slightly during the crisis (except in 2010 in the case of gross wages), while in Serbia the decrease in nominal wages has been recorded already in 2009. This suggests the presence of downward nominal wage rigidity in Croatian labor market, which should come as no surprise given that maintaining wages was much more important for trade unions than the employment level ever since the beginning of transition (Tomić and Domadenik, 2012). Also, the burden of adjustment in the crisis was much more on the employment than on the wage side in both countries. In Serbia, nominal wages started to increase already in 2010, however; due to a rather strong increase in prices, real wages fell in Serbia in 2010 with an increase back in 2011.

The crisis also caused increased budget deficits which had to be financed either by increasing revenues or by cutting expenditures. Serbian government introduced a series of expenditure cuts, one of which was a nominal wage freeze in the public sector for a period of two years. The freeze was maintained until April 2011 when public sector wages were adjusted for inflation plus one-half of GDP growth over the following twelve months. The public sector pay bill has been further reduced by freeze in recruitment. It was expected that the 2009-2010 freeze[4] would decrease real wages in the public sector significantly below the 2008-level, while indexation based on the rate of inflation in the following years would maintain the purchasing power of public sector workers without increases in the public sector real wage bill (World Bank, 2010). Indeed, the public sector pay bill declined over 2009–2011, by 0.3 percent of GDP. However, this decline was smaller than in most other emerging and advanced European economies (IMF, 2013). Given that public sector employment levels remained roughly constant, most of this decline was due to decreases in real wages. In particular, public sector real wages in public administration, education and health fell by 4.9 percent, 3.7 percent and 3.0 percent, respectively in 2009 (World Bank, 2010); and more than 7 percent from September 2009 until September 2010 in total. In contrast to public sector, private sector employment

[4] The World Bank (2010) points to negligible short-term impact and no long-term impact of some additional measures, introduced by the Serbian Government, such as the decision to temporarily cut average wages in administration, by 10 percent, from January until December 2009. This affected the wages of elected officials and managerial and administrative staff, civil servants and both state and local level public service employees. However, military personnel, police, prison guards, and employees in education, health, culture, and social protection were exempted.

declined in the same period. The average private sector wage also declined in 2011 compared to 2008, but less than in the public sector.[5]

The Croatian government mainly opted to increase the revenue side by further borrowing, but it also increased the VAT and introduced the so-called "crisis tax" levied on the net income of households. However, the expenditure side of the government budget was left more-or-less intact. One of the biggest expenditure items - the compensation of employees, which includes both wages and social security contributions - actually increased its share in total government expenditures from 25.8 percent in 2008 to 26.8 percent in 2011. Nevertheless, there have been some attempts to reduce or at least to stop the rise in both public sector employment and wages as of the start of the crisis. For example, all new hiring in public administration was frozen already in 2009, followed by a "one for two" (two in, one out) system in 2010; public sector wage cuts occurred already in 2009 when 10 percent wage cuts for state officials and 5 percent cuts for managers in public companies were introduced; the base wage in the public sector was cut by 6 percent and temporarily frozen also in 2009, although this happened only few months after the increase of wages by the same amount.[6] However, due to strong bargaining power of public sector trade unions and agreements set for some particular groups of workers before the crisis, wages continued to grow in the public sector during the whole observed period. Combining this with a frozen minimum wage, mainly present in the private sector (see Nestić, 2010), and a moderate inflation there was a stronger growth of wages in the public sector as compared to the private sector which had to undertake stronger adjustments in both employment and wages.[7]

3 Data

The empirical analysis is based on nationally representative cross-sectional data from the Labor Force Survey (LFS) for both Croatia and Serbia for the years 2008 and 2011. The year 2008 represents the pre-crisis period and the year 2011 represents a period in which effects of the crisis could be summarized.[8] In Croatia, the data for both 2008 and 2011 were collected on a quarterly basis as a rotating panel, following the so-called "2-(2)-2" survey design[9] whereas in Serbia the data are collected semi-annually.[10] The working

[5] Smaller decline in average private sector wage potentially resulted from two factors. Firstly, minimum wage increased in January 2009 and the majority of minimum wage earners were in the private sector. Secondly, Arandarenko and Avlijaš (2011) point that the job losses in the private sector were more pronounced for workers on less secured lower wage contracts due to lower hiring and firing costs.

[6] In 2012, additional restrictions on overtime, temporary service contracts and fixed-time contracts were introduced. Non-wage compensations, such as Christmas and holiday bonuses, were cut in 2010, and completely abolished in 2012 and 2013, together with some restrictions on travel allowances, while in March 2013 gross wages in the entire public sector were further reduced by 3 percent.

[7] For detailed overview of the crisis adjustments in the public sector in the period 2009-2012, as well as for the role of trade unions and collective agreements, please refer to Franičević and Matković (2013).

[8] Additionally, the latest available LFS data for Serbia are from 2011.

[9] Precisely, each sampled household is interviewed for two consecutive quarters, then it is left out for the next two consecutive quarters, and then it is interviewed again for two consecutive quarters. Therefore, in a given year, the observations from the first and third quarters do not overlap, and the same holds for the observations from the second

samples are restricted to full-time employees between 15 and 64 years old who reported non-zero monthly wages and non-zero hours of work[11] for their main job only. Applying these restrictions, we are left with 5,863 observations in 2008 and 3,926 observations in 2011 sample in the case of Croatia and with 4,416 and 4,465 observations in 2008 and 2011 samples, respectively for Serbia (Table 2).

We make a distinction between two main sectors: public and private. The public sector is set to include all ownership types other than private.[12] This means that the public sector includes public sector education, health and administration as well as state and socially owned enterprises. According to this classification, public sector workers comprised about 42 percent of the restricted sample in Croatia in both 2008 and 2011,[13] while in Serbia these figures were somewhat higher - about 46 percent for both 2008 and 2011. The earnings measure relates to pay net of taxes, pensions and any payments by the worker into welfare plans divided by the consumer price index. The wage variable used in the empirical analysis is defined as the real net hourly wage computed from monthly wages reported in the survey divided by usual monthly hours of work.[14] It is important to note that the Serbian Labor Force Survey does not provide continuous wage variable in 2011. Particularly, in this survey the individuals are allocated into fourteen wage ranges. Following the approach used in the literature on public-private sector wage differentials (see, for example, Christopoulou and Monasteriotis, 2013) we created a pseudo-continuous wage variable as the mean value of the wage income bands per observation. We acknowledge that this data limitation may affect the results of the analysis and hence, apply several robustness tests to show that the results are not materially altered.

Explanatory variables are divided into two main groups: personal characteristics and job characteristics, as is usual in the literature (see, for instance, Christopoulou and Monasteriotis, 2013). The set of explanatory personal characteristics consists of: gender, age and age squared, marital status, urban vs. rural place of residence, four indicators for

---

and fourth quarters. To ensure that our samples do not contain overlapping observations, for each of the two years, we removed all observations that were being repeated from the previous quarter.

[10] In April and October each year and we use data sets from April 2008 and April 2011.

[11] Actually, we limit ourselves only to those that worked above 30 hours per week and bellow 80 hours a week. Usually, full-time employment is considered to be 40 hours per week. However, there is an assumption that an individual can be employed full-time but still work less than 40 hour per week (see, for instance, Christofides and Michael, 2013).

[12] The same distinction between sectors is used in other studies that measured public-private sector pay differentials in Croatia and Serbia (e.g. Bejaković, Bratić and Vukšić, 2011; Nikolic, 2014; Jovanović and Lokshin, 2003; and Reilly, 2003). Although public sector defined in this way can be perceived as overly heterogeneous, for the sake of comparison we decided to keep this wider definition that is used in most of the other studies. Also, one may argue that due to privatization the structure of the public sector employment may have changed during the observed period, however; the privatization has been significantly slowed during the crisis and, hence, should not have significant impact on our results.

[13] Administrative data from the CBS indicate that state ownership combined with mixed ownership ("public sector") employment comprised of 44.1 percent in both 2008 and 2011. According to those data (situation on 31 March) both the employment in the public sector as well as in the private sector decreased by about seven percent between 2008 and 2011.

[14] Since the survey reference period was a week prior to the interview we multiply the reported usual weekly hours by the average number of weeks in a month (i.e., 4.25) and assume that the number of hours worked was uniform in the month prior to the interview.

the educational level (low, medium, high, and master's and doctor's degrees), experience and experience squared, tenure and tenure squared. Job characteristics comprise the following set of variables: nine occupational groups,[15] whether the person has temporary or permanent contract, whether the person is supervising other employees at their main job, the size of the establishment/firm (small, medium, large),[16] the economic activity of the establishment,[17] and the regional location[18] of the establishment.[19] Summary statistics of these variables by each sector is given in Tables A1 and A2 in the Appendix, for Croatia and Serbia, respectively.

First, we observe that there are significant differences in the means of characteristics between the public and private sectors in each of the two years and in both countries. In both years, the genders are virtually equally represented in the public sector, whereas in the private sector there are notably fewer females, whose share is about 43 percent in Croatia and 42 percent in Serbia. Additionally, workers in the public sector are on average about 6 years older in Croatia and about 5 years in Serbia. Public sector workers are also on average better educated. For example, while the share of highly skilled workers (college and university graduates) in the public sector is about one third, the corresponding share is 15 percent or less in the case of the private sector.

Both the private and the public sector workers mostly work in small establishments, up to 50 employees, with this characteristic being more pronounced in the case of the private sector. However, this information should be taken with caution since the reporting about the size of the establishment depends on the interviewee's perception of the definition of the establishment and its number of employees. As far as occupational structure is concerned, most of the public sector employees are professionals, technicians, or clerks, whereas in the private sector most are craftsmen, plant/machine operators, or deal with services and sales. More workers in the private sector are employed on a temporary contract, 13 to 14 percent in comparison to only 5-6 percent in the public sector in Croatia, while in Serbia this share is about 10 and 12 percent for the private sector and 5 and 7 percent for the public sector in 2008 and 2011, respectively. Public sector workers are correspondingly slightly more represented on supervising positions.

[15] Based on ISCO (International Standard Classification of Occupations). It is important to mention that there are some differences in the definition of these broad occupational groups in 2008 and 2011. In 2008, the definition used was based on ISCO-88 (COM) classification, while the survey from 2011 was based on ISCO-08 classification. For details, please see: http://www.ilo.org/public/english/bureau/stat/isco/isco08/.

[16] These groups are defined according to the number of employees: <50 for small firms; 50-200 (250 for Serbia) for medium firms and >200 (>250 for Serbia) for large firms.

[17] Based on NACE (Statistical classification of economic activities in the European Community) classification. In 2008, NACE Rev 1.1 was applied, while in 2011 NACE Rev 2.1 classification was applied. For details, please refer to: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Statistical_classification_of_economic_activities_in_the_European_Community_(NACE).

[18] According to NUTS2 statistical classification before the change in 2012 in the case of Croatia. Also, no indication of the location of the establishment was available in Serbian LFS, so we assumed that the location of the worker is the same as the location of the firm.

[19] Unfortunately, none of the variables related to household (number of children, relationship between household's members, etc.) could have been used since the data available do not provide the identification of the interviewed household.

Table 2 **Summary of Wages and Working Hours by Countries and Sectors**				
Wages/hours worked	**2008**		**2011**	
	Public	**Private**	**Public**	**Private**
	CROATIA			
Usual hours per week	40.66	41.82	40.58	41.26
Nominal monthly wage	4616.16	3939.40	5082.04	4142.63
Real monthly wage (HRK)	4773.69	4073.83	4967.78	4049.49
Log real hourly wage	3.26	3.04	3.30	3.05
Gini index (rhw)	0.184	0.247	0.187	0.244
No. of observations	**2194**	**3099**	**1640**	**2286**
	SERBIA			
Usual hours per week	41.00	44.17	40.95	43.80
Nominal monthly wage	30222.60	23312.04	33878.39	26356.14
Real monthly wage (RSD)	34648.28	26725.77	29513.36	22960.31
Log real hourly wage	5.16	4.79	5.02	4.69
Gini index (rhw)	0.275	0.324	0.254	0.276
No. of observations	**2015**	**2401**	**2027**	**2438**

Source: Croatian and Serbian LFS, 2008 and 2011.

In our empirical analysis we use only several economic sectors, namely, those that are perceived to be "the most important" for the overall economy. As we can observe from tables A1 and A2, these are mainly "private" sectors, with more than 70 percent in the case of Croatia and more than 80 percent in the case of Serbia of the private sector employment contained in these sectors - manufacturing, construction, wholesale and retail trade, transport and communication and financial intermediation. This is the case for only about 25 percent of employees in the public sector. Also, employees in both sectors are mostly located in the Northwest region (including Zagreb, the capital) in Croatia, while in Serbia this is the case with Šumadija and West Serbia region. Finally, with the exception of characteristics measured in years (age, experience, and tenure), the differences in means over the period considered are quite small for both sectors in both countries. This should not come as a surprise, given that the time span is only four years long, and one can hardly expect any sizeable changes in the distribution of individual characteristics.

The most important part of our analysis - wages, together with hours of work - deserves special attention (Table 2).[20] At first one can observe a higher number of working hours in the private sector, especially in Serbia. The average number of weekly working hours insignificantly decreased in the observed period in both sectors and both countries. As for the wages, they are evidently lower in the private sector. In both countries, nominal wages grew in both sectors in the observed period. In Croatia, real wages grew only in the public sector, but on a much lesser scale due to moderate inflation (Table 1) which suggests that there was no real impact of the introduced measures on wages in the public sector. In contrast to nominal wages, real wages in Serbia decreased in both sectors, but

[20] More detailed information is available in the Appendix.

more so in the public sector confirming some effects from austerity measures. Inequality measures (Gini index) suggest that the inequality of real hourly wages is higher in the private sector in both countries and in both years. However, the inequality decreased in both sectors in Serbia in the observed period, while in Croatia it decreased only slightly in the private sector and increased in the public sector.

4 Methodology

In this section we describe the empirical method used for decompositions of wage gaps at the mean and at quantiles along the distribution. We rely on an extension to the standard Oaxaca-Blinder (OB) decomposition (Blinder, 1973; Oaxaca, 1973), proposed recently by Firpo, Fortin and Lemieux (2007; 2011). This extension, based on a combination of the so-called Recentered Influence Function (RIF) regressions of Firpo, Fortin and Lemieux (2007; 2009) and the semi-parametric reweighting of DiNardo, Fortin and Lemieux (1996) allows one to employ the OB-type decompositions for any distributional statistic that has its influence function, including the mean and any quantile along the distribution.

Let $\theta(F_y)$ denote either the mean, $\theta(F_y)=\mu(F_y)$, or a τ - quantile, $\theta(F_y)=Q_\tau(F_y)$, of a distribution of wages, y, with the cumulative distribution function F_y. The influence function of $\theta(F_y)$, $IF(\theta;y;F)$, is defined as the effect of a small perturbation in the distribution on the value of the distributional statistic, θ. For the mean, the influence function is $IF(\mu;y;F)=y-\mu(F_y)$, while for a τ -quantile the IF has been shown to be $IF(Q_\tau;y;F)=\left(\tau-I\left[y\le Q_\tau(F_y)\right]\right)/f_y(Q_\tau(F_y))$, where $I[.]$ is an indicator function equal to 1 if the condition in brackets holds and zero otherwise, and $f_y(Q_\tau(F_y))$ is the density of wages at $Q_\tau(F_y)$. The recentered influence function (RIF) is defined as the sum of the distributional statistic of interest and its IF, so that the RIFs of the mean and a quantile are given as $RIF(y;\mu;F)=y$ and $RIF(Q_\tau;y;F)=Q_\tau(F_y)+\left(\tau-I\left[y\le Q_\tau(F_y)\right]\right)/f_y(Q_\tau(F_y))$, respectively. Further, since the expected value of the IF of any distributional statistic is by definition equal to zero, the expectation of the corresponding RIF is equal to the distributional statistic itself: $E\left[RIF(\mu;y;F)\right]=\mu(F_y)$, $E\left[RIF(Q_\tau;y;F)\right]=Q_\tau(F_y)$.

Firpo, Fortin and Lemieux (2007; 2009) assume that the RIF can be approximated by the linear function $RIF(\theta;y;F)=X\beta+\varepsilon$ which by the Law of Iterated Expectations and the assumption that $E\left[\varepsilon\,|\,X\right]=0$ imply $E\left[RIF(\theta;y;F)\right]=E\left[X\right]\beta$. Thus, the OLS regression of $RIF(\theta;y;F)$ on X, called RIF-regression, will give parameter estimates with both the conditional and unconditional interpretations. This property is a consequence of using the RIF of a distributional statistic, instead of the outcome variable (wage in our case) itself, as the dependent variable. Obviously, a RIF-regression for the mean is equivalent to the standard OLS regression. However, RIF-regressions for quantiles are not equivalent to the standard quantile regressions of Koenker and Basset (1978). The difference is that while the standard quantile regressions model conditional

quantiles, the RIF-regressions for quantiles model unconditional quantiles (quantiles of the marginal distribution), which is why Firpo, Fortin and Lemieux (2009) call them Unconditional Quantile Regressions. For that reason, the parameters from the two types of quantile regressions do not have the same interpretation: while the standard quantile regression parameters have only conditional interpretation, those from RIF-regressions for quantiles, just like OLS parameters, have both conditional and unconditional interpretations.[21]

Denoting the public (private) sector by the label *PUB* (*PRI*), the overall or raw wage gap, Δ^{θ} - be it at the mean ($\theta = \mu$) or at a τ-quantile of interest ($\theta = Q_{\tau}$) - can be expressed as:

$$\Delta^{\theta} = E\left[RIF_{PUB}(\theta; y; F)\right] - E\left[RIF_{PRI}(\theta; y; F)\right] = \bar{X}_{PUB}\hat{\beta}_{PUB} - \bar{X}_{PRI}\hat{\beta}_{PRI} \ , \qquad (1)$$

where $\bar{X}$ and $\hat{\beta}$ are, respectively, the vector of average characteristics and the vector of RIF-regression parameter estimates for the corresponding sector. If one followed the standard OB decomposition method, one would add and subtract the counterfactual wage $\bar{X}_{PUB}\hat{\beta}_{PRI}$ (or $\bar{X}_{PRI}\hat{\beta}_{PUB}$) to obtain two parts of the overall gap: (i) composition effect which reflects sectoral differences in characteristics, $(\bar{X}_{PUB} - \bar{X}_{PRI})\hat{\beta}_{PRI}$, and (ii) wage structure effect which reflects the effect of sectoral differences in marginal rewards to those characteristics, $\bar{X}_{PUB}(\hat{\beta}_{PUB} - \hat{\beta}_{PRI})$. However, Firpo, Fortin and Lemieux (2007; 2011) argue that when the true conditional RIF is not linear as assumed, a standard OB decomposition of the wage gap, which is based on linear approximations of the true conditional expectation functions, generally yields biased estimates of the wage structure and composition effects. The underlying idea, discussed first in the context of mean decomposition by Barsky et al. (2002), is that when the parameters of a linear conditional expectation functions for two groups (in our case the public and private sectors) are not estimated over the common support of the distribution of characteristics, the wage structure effect from the standard OB decomposition does not identify the wage structure effect. This stems from the fact that in the case of a nonlinear conditional expectation function the marginal rewards to the characteristics (i.e., the corresponding OLS coefficients) generally depend on the support of the distribution of those characteristics.

With this issue in mind, Firpo, Fortin and Lemieux (2007) proposed a hybrid approach which combines reweighting *a la* DiNardo, Fortin and Lemieux (1996) with RIF-regressions. The underlying idea is to first make the distributions of characteristics in the two sectors similar to one another. This is done by reweighting the sample of one sector (private in our case), using inverse probability weighting based on a parametrically estimated reweighting factor, in such a way that its distribution of characteristics resembles, as closely as possible, the one of the other sector. Firpo, Fortin and Lemieux (2007) replace the counterfactual mean wage $\bar{X}_{PUB}\hat{\beta}_{PRI}$ by $\bar{X}_{REW}\hat{\beta}_{REW}$, where *REW*

[21] See Fournier and Koske (2013) and Borah and Basu (2013) for illustrations of differences in interpretation of conditional and unconditional quantile regressions.

denotes the sample of private sector workers reweighted to resemble public sector workers in terms of the distribution of observable characteristics. Thus, $\bar{X}_{REW}$ and $\hat{\beta}_{REW}$ stand for, respectively, the average characteristics in the reweighted private sector sample and the OLS coefficients estimated on this sample. The decomposition reads:

$$\Delta^{\theta} = (\bar{X}_{PUB}\hat{\beta}_{PUB} - \bar{X}_{REW}\hat{\beta}_{REW}) + (\bar{X}_{REW}\hat{\beta}_{REW} - \bar{X}_{PRI}\hat{\beta}_{PRI}) = \Delta^{\theta}_{WS} + \Delta^{\theta}_{C} \ , \tag{2}$$

where the two terms on the right-hand side represent the wage structure (labelled *WS*) and composition (labelled *C*) effects, respectively.

Each of the two terms in (2) can be decomposed further into the true effect accounted for by the linear specification and an error:

$$\Delta^{\theta}_{WS} = \bar{X}_{PUB}(\hat{\beta}_{PUB} - \hat{\beta}_{REW}) + (\bar{X}_{PUB} - \bar{X}_{REW})\hat{\beta}_{REW} = \Delta^{\theta}_{WS,TRUE} + \Delta^{\theta}_{WS,ERROR} \ , \tag{3}$$

$$\Delta^{\theta}_{C} = (\bar{X}_{REW} - \bar{X}_{PRI})\hat{\beta}_{PRI} + \bar{X}_{REW}(\hat{\beta}_{REW} - \hat{\beta}_{PRI}) = \Delta^{\theta}_{C,TRUE} + \Delta^{\theta}_{C,ERROR} \ . \tag{4}$$

In both (3) and (4) the first right-hand side terms are the true wage structure and composition effects ($\Delta^{\theta}_{WS,TRUE}$ and $\Delta^{\theta}_{C,TRUE}$, respectively), while the last terms are errors. The error term in (3) is a reweighting error ($\Delta^{\theta}_{WS,ERROR}$), which should vanish in large samples if the reweighting factor is estimated consistently, while the one in (4) is a misspecification error ($\Delta^{\theta}_{C,ERROR}$) stemming from imposing linearity on the conditional expected wage function when it is non-linear.

This approach entails two identifying assumptions. First is known as ignorability[22] (of the unobservables, i.e., of the error term in the wage equations). By this assumption, the conditional distribution of unobservables, given observables, is the same across the two sectors. It ensures that neither the wage structure nor the composition effect is confounded by differences in the conditional distributions of unobservables between the two sectors. Second assumption is that the distribution of the observables for the two sectors overlap or, in other words, that there is common support. This assumption rules out any observable characteristic, which completely identifies an individual as a member of either sector. The main shortcoming of the method is that it provides only local linear approximations to the effects of (possibly large) actual changes in workers' characteristics and their marginal returns.

Each of the two true effects can be further decomposed into the contributions of each of the explanatory characteristics or groups of characteristics. It should be stressed here that such detailed decompositions suffer from certain identification issues when, as is the case with our and virtually all other empirical exercises, the set of characteristics contains some categorical characteristics such as gender or occupation. As noted by a number of authors (Jones, 1983; Jones and Kelley, 1984; Oaxaca and Ransom, 1999; Horrace and

[22] Also known as selection on observables or unconfoundedness.

Oaxaca, 2001), the contributions of categorical characteristics generally depend on the choice of category to be omitted from the wage regressions.[23] Although a general solution to these issues has not yet appeared, Gardeazabal and Ugidos (2004) and Yun (2005) have proposed an elegant, though to an extent arbitrary "solution", which we employ in the present paper as well. In a nutshell, they proposed a solution which, as shown by Yun (2005), gives results which would be obtained if one were to perform decompositions for all possible choices of the omitted category and averaged the results across all these decompositions.

5 Results

5.1 Overview of Goals

The empirical analysis has five goals. First, we want to test whether there was a public-private sector earnings differential in Croatia and Serbia and how it changed from 2008 to 2011. For this purpose, we initially pool both sectors' data together in an ordinary least squares (OLS) model. In this way we obtain an estimate of the public sector pay gap at the unconditional and conditional mean. The unconditional (or the so called "total") public sector pay gap estimates are raw differences in mean log real hourly wages between public and private sectors. The conditional public sector pay gap estimates are the differences in the mean log real hourly wages between the public and private sectors after controlling for labor market characteristics of the workers. Nevertheless, the differences in rates of payment between public and private sector estimated in this way are limited to an intercept shift, whereas the returns to characteristics are constrained to be equal across sectors. In order to reveal whether the returns to characteristics differ across sectors we estimate OLS regressions for each sector separately at the conditional mean.

Our second goal is to obtain estimates of the public-private pay differential by allowing for different intercepts and returns to characteristics across sectors. For this reason we apply an OB-type of decomposition to decompose the total (or unconditional) pay differential into a component that is due to differences in the mean values of characteristics (the so-called "composition effect" or "explained" part) and a component that is due to differences in the coefficients, i.e., the returns to characteristics (the so-called "wage structure effect" or "unexplained" part). The wage structure effect could be interpreted as conditional public sector pay premium or penalty.

Our third goal is to apply the method of detailed decompositions in order to analyze composition and wage structure effects of the total sectoral pay differential broken down to groups of covariates. Initially, we have been interested in observing the individual contribution of a particular set of average job and personal characteristics to total pay gap assuming equal returns across sectors to the same characteristics. Subsequently, we

[23] For a discussion and illustrative examples of these identification issues, see Fortin, Lemieux and Firpo (2011).

have wanted to know what would be the difference in returns to a particular set of characteristics between the two sectors if public sector workers had the same characteristics as private sector workers. The fourth goal has been to apply the same method but for men and women separately given that the gap usually varies with gender. Finally, our fifth goal has been to test whether the public sector pay effect for workers with similar characteristics varies across the earnings distribution. For this purpose we have decomposed wage gaps at selected percentiles based on unconditional quantile regressions.

5.2 Public-Private Sector Pay Gap at the Mean

Public-private sector earnings differentials may be largely determined by different worker and job characteristics. In order to obtain average public-private sector pay differentials conditional on observed characteristics for each year, for Croatia and Serbia separately, we first pool both sectors' data together and run an OLS wage regression with a public sector dummy. These results are presented in Table A3 in the Appendix and show that there is a public sector premium. In both countries the public sector premium was higher in 2011 than in 2008. While the size of the premium in Croatia was in the range of most other EU countries or even lower, i.e., around 5.5 percent (see de Castro, Salto and Steiner, 2013 for other EU countries which shows that the average premium in the EU was around 4 percent), the premium in Serbia was around three times higher. Furthermore, same regressions show lower returns to higher educational qualifications in Croatia than in Serbia. In addition, there was a decline in returns to education in 2011 relative to 2008 in Croatia for all educational groups. Similar results are confirmed for Serbia, with the exception of returns to the highest educational level which increased during the observed period. Table A3 in the Appendix also shows that female workers were paid less than male workers in both countries. Male-female pay gap was similar across countries before the crisis. In 2011, this gap remained more-or-less the same in Croatia, but declined in Serbia indicating that men were more affected by the crisis than women. Furthermore, we find that the labor force age, experience and tenure effects were poorly determined in the regression specifications for both countries. In our further analysis we obtain OLS regression results for public and private sectors separately using the same set of covariates (presented in Tables A4 and A5 in the Appendix). These results indicate differences in the returns to both personal and job characteristics between the two sectors.

For that reason we proceed with the mean decompositions. The results are presented in Table 3. We first note that, for both countries and for both years, the sum of the true composition and wage structure effects differs very little from the total gap; in other words, the total error is small relative to the total gap.[24] This shows that the wage

[24] Generally, about half of the total error is due to misspecification of the wage equation (the linearity assumption), while the other half is due to imperfect reweighting. The exception is Serbia in 2008, where virtually the whole error is due to misspecification.

equations are not misspecified as linear and that the reweighting balances characteristics between the sectors quite well. Starting from the mean wage by sector, Table 3 shows that the public sector in Croatia experienced a larger rise (4 percent) than the private sector (1 percent) during the observed period. This is consistent with the common perception in Croatia that the private sector was hit by the recession more severely than the public sector. In Serbia, conversely, both public and private sector average wages fell during the observed period. However, the fall in the public sector was greater than in the private sector (13 percent vs. 9 percent).

Table 3 **Mean Decompositions of the Public-Private Wage Gap**

	CROATIA				SERBIA			
	2008		2011		2008		2011	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Aggregate decomposition								
Mean wage: public	3.263	0.007	3.303	0.008	5.157	0.012	5.020	0.012
Mean wage: private	3.036	0.008	3.046	0.009	4.792	0.012	4.694	0.011
True composition effect	0.190	0.015	0.218	0.017	0.246	0.026	0.138	0.024
True wage structure effect	**0.044**	**0.008**	**0.055**	**0.008**	**0.145**	**0.015**	**0.179**	**0.014**
Misspecification error	-0.003	0.015	-0.007	0.016	-0.027	0.027	0.004	0.026
Reweighting error	-0.004	0.008	-0.011	0.009	0.002	0.011	0.005	0.010
True comp. and w. str. effects	0.234		0.273		0.391		0.317	
Total error	-0.007		-0.017		-0.025		0.008	
Total gap	**0.227**		**0.256**		**0.366**		**0.325**	
Detailed decomposition								
True composition effect								
Gender	0.001	0.001	-0.001	0.002	0.002	0.002	-0.011	0.003
Education	0.028	0.004	0.014	0.004	0.051	0.007	0.037	0.006
Experience	0.031	0.011	0.021	0.010	0.025	0.012	0.039	0.012
Occupation	0.084	0.006	0.088	0.008	0.092	0.011	0.044	0.010
Other	0.046	0.018	0.097	0.019	0.076	0.027	0.030	0.026
True wage structure effect								
Gender	0.006	0.002	0.001	0.001	-0.002	0.003	-0.002	0.001
Education	0.098	0.019	-0.054	0.013	0.063	0.045	0.058	0.034
Experience	-0.059	0.065	0.107	0.068	-0.264	0.087	-0.112	0.082
Occupation	-0.019	0.009	-0.012	0.009	-0.058	0.023	-0.023	0.020
Other	0.019	0.068	0.014	0.071	0.406	0.104	0.258	0.092

Notes: Decompositions are based on Firpo, Fortin and Lemieux's (2007) approach (see equations 2 to 4). Yun's (2005) procedure is used to ensure invariance of the results to the choice of the omitted category for categorical characteristics.
Source: Authors' calculations based on Croatian and Serbian LFS, 2008 and 2011.

The OB decompositions determine the contribution of the "explained" differential due to sectoral differences in characteristics (i.e., composition effect) to be around 85 percent in Croatia in both years, while the rest is the contribution of the "unexplained" differential due to sectoral differences in marginal returns to the same characteristics (i.e., wage structure effect). In contrast, in Serbia differences in characteristics explain around

70 percent of the total gap in 2008 and only about 40 percent in 2011. This means that the wage structure effect in 2011 accounted for more than half of the total differential in Serbia. Therefore, in 2011, in terms of personal and labor market characteristics, public and private sector workers became more similar, but disparities in terms of marginal returns to those characteristics increased. In spite of public sector austerity measures, the results from Table 3 suggest that the private sector in Serbia was hit more by the financial crisis. This is indicated by greater changes in employment structure and lower payments for the same characteristics than in the public sector. Comparing the year 2011 with 2008 for Croatia, results show greater increase in the composition effect than increase in the wage structure effect which is slightly unexpected since in such a short period, one can hardly expect the distribution of characteristics to change significantly. However, evidently the changes that happened in the employment structure, especially in the private sector, during the crisis further increased the differences in both personal and job characteristics between the two sectors.[25]

In particular, once we remove the "explained" part of the differential or composition effect, what remains is the "unexplained" part of the differential or wage structure effect. This reveals a public sector pay premium in both 2008 and 2011 for both countries. The public sector wage premium was around 4.4 percent[26] in 2008 and 5.5 percent in 2011 in Croatia and around 14.5 percent in 2008 and 17.9 percent in 2011 in Serbia. These results suggest what the pay gap would be if public sector workers had the same labor market characteristics as private sector workers. The estimated premiums are consistent with our previous OLS results confirming that Croatia had a public pay gap in line with most EU countries whereas Serbia significantly exceeded these differentials.

Moreover, detailed decomposition allows us to observe why the total (i.e., unconditional) gap is greater than the true gap reweighted by job and personal characteristics (usually referred to as conditional pay gap). Table 3 shows that the pay gap in both countries in 2008 was overestimated mostly due to differences in occupations. In particular, Table 3 displays that public sector workers are on average employed in higher-paid occupations than private sector workers. The differences in occupations between public and private sectors accounted for 44 percent and 37 percent of the composition effect in 2008 in Croatia and Serbia, respectively. Moreover, public sector workers also have a higher level of education and more experience than private sector workers. Differences in educational qualifications and experience accounted for around 31 percent of the composition effect in 2008 in both countries. Gender differences in the distribution of public and private sectors had a negligible effect on the pay gap. Yet, differences in other characteristics made the public-private sector pay gap seem higher. In Croatia, these differences became even more important than differences in occupations in 2011, whereas in Serbia their contribution to the composition effect declined and occupational differences remained the most important single factor. On the other hand, differences in educational

[25] This can also be observed from the summary statistics (Table A1 in the Appendix).

[26] For ease of exposition, throughout the text we interpret logarithmic differences as percentages: x log points = x*100 percent.

qualifications and experience accounted for 55 percent of the composition effect in Serbia in 2011 while in Croatia these differences declined to 16 percent of the composition effect of the public-private sector pay gap.

In our further analysis we focus on the wage structure effect. In both countries in 2008 the public sector paid more for the same level of education, but less for the same experience and occupation than the private sector. While in Serbia these differences narrowed but remained in 2011, sectoral differences in returns to these labor market characteristics changed during the financial crisis in Croatia. Particularly, in 2011, the private sector offered greater returns for educational qualifications than the public sector while the public sector valued experience more than the private sector. As explained in Section 2, experience is valued more in the public sector, especially after the start of the crisis when wages in the public sector increased automatically every year based on the years of service due to previously agreed collective agreements with trade unions. In the private sector, market forces are more present, which means that experience is not important as are the skills, i.e., education, when trying to rationalize business in the time of crisis. Additionally, in both countries returns to occupational qualifications were greater in the private than in the public sector in both 2008 and 2011. Finally, differences in the returns to gender and other characteristics were rather small, with the public sector being more generous, in both years in Croatia. In Serbia, differences in returns to gender were small, but differences to other characteristics were the major contributor to the wage structure effect in both years.

5.3 Public-Private Sector Pay Gap at the Mean by Gender

In this section we disaggregate data by gender in order to reveal further effects of the crisis on the public-private wage gap. Splitting the whole sample by gender in Table 4, results for Croatia show that although the total (i.e., unconditional) pay differential is higher for women than for men, this is mostly due to differences in characteristics. In Croatia, women differ more than men between the two sectors in all characteristics. However, when the composition effect of the differential is removed, the results disclose a greater sectoral difference in returns to the same characteristics for men than for women in both years. In Croatia, between 2008 and 2011, the public sector wage premium for an average male worker increased from 6 to 7 percent and for an average female worker from zero to around 4 percent. On the other hand, male workers in Serbia had twice a higher premium than in Croatia, i.e., around 14 percent in both years. The composition effect for this group of workers also remained almost unchanged during the observed period contributing to 60 percent of the total pay gap. The difference in public sector pay premium between Croatia and Serbia was even greater for female workers. Particularly, women employed in the Serbian public sector received a 10 percent premium in 2008 which increased to 22 percent in 2011.

Table 4 **Mean Decompositions of the Public-Private Wage Gap by Gender**

	2008				2011			
	Male		Female		Male		Female	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
CROATIA								
Aggregate decomposition								
True composition effect	0.137	0.018	0.269	0.024	0.123	0.020	0.339	0.030
True wage structure effect	**0.061**	**0.012**	**0.001**	**0.010**	**0.070**	**0.012**	**0.043**	**0.012**
Misspecification error	-0.003	0.018	-0.019	0.021	0.016	0.020	-0.028	0.027
Reweighting error	-0.003	0.010	0.036	0.012	0.001	0.011	-0.022	0.016
True comp. and w. str. effects	0.198		0.270		0.193		0.382	
Total error	-0.007		0.016		0.018		-0.050	
Total gap	**0.191**		**0.286**		**0.210**		**0.332**	
Detailed decomposition								
True composition effect								
Education	0.026	0.004	0.035	0.006	0.007	0.003	0.020	0.009
Experience	0.023	0.018	0.015	0.012	-0.003	0.017	0.021	0.012
Occupation	0.057	0.007	0.163	0.014	0.035	0.008	0.166	0.021
Other	0.031	0.025	0.056	0.024	0.084	0.026	0.132	0.028
True wage structure effect								
Education	0.028	0.027	0.143	0.019	-0.110	0.026	-0.036	0.012
Experience	-0.185	0.111	0.100	0.072	0.170	0.116	0.301	0.081
Occupation	-0.008	0.010	-0.052	0.022	-0.008	0.010	-0.011	0.050
Other	0.226	0.114	-0.190	0.076	0.018	0.119	-0.211	0.098
SERBIA								
Aggregate decomposition								
True composition effect	0.201	0.031	0.344	0.042	0.197	0.027	0.056	0.045
True wage structure effect	**0.144**	**0.019**	**0.100**	**0.022**	**0.139**	**0.019**	**0.220**	**0.021**
Misspecification error	-0.010	0.033	-0.062	0.041	-0.022	0.030	0.058	0.047
Reweighting error	-0.020	0.014	0.059	0.018	0.000	0.014	0.015	0.016
True comp. and w. str. effects	0.345		0.444		0.336		0.276	
Total error	-0.030		-0.003		-0.022		0.073	
Total gap	**0.315**		**0.441**		**0.314**		**0.349**	
Detailed decomposition								
True composition effect								
Education	0.048	0.008	0.031	0.011	0.062	0.009	0.008	0.007
Experience	0.032	0.016	-0.040	0.020	0.053	0.013	-0.100	0.030
Occupation	0.066	0.013	0.166	0.026	0.021	0.009	0.096	0.025
Other	0.055	0.034	0.187	0.043	0.061	0.029	0.052	0.052
True wage structure effect								
Education	0.024	0.052	-0.219	0.052	-0.102	0.043	0.132	0.051
Experience	-0.436	0.121	-0.006	0.129	-0.268	0.118	0.304	0.127
Occupation	-0.020	0.025	-0.085	0.066	-0.012	0.020	-0.108	0.071
Other	0.576	0.138	0.409	0.151	0.521	0.126	-0.107	0.155

Notes: Decompositions are based on Firpo, Fortin and Lemieux's (2007) approach (see equations 2 to 4). Yun's (2005) procedure is used to ensure invariance of the results to the choice of the omitted category for categorical characteristics.
Source: Authors' calculations based on Croatian and Serbian LFS, 2008 and 2011.

Our estimated premiums for Serbia are similar to the results obtained for male and female employees by Nikolic (2014) by using the Serbian LFS data for 2008. Particularly, Nikolic (2014) has shown that the premium increased from close to zero in 2004 to 19 percent for men and 12 percent for women in 2008 on average. The results from that study were obtained in an OLS regression after controlling for less observables than in our paper. Moreover, our results show a persistence of the public sector male premium, but considerable increase in the female premium during the financial crisis in Serbia. Additionally, in 2011 Serbian women became much more similar than men in terms of characteristics across sectors.

Table 4 shows a decline in the female compositional effect in Serbia which led to a decline in the total (i.e., unconditional) gap in 2011 compared to 2008, despite the fact that the public sector premium measured by wage structure effect had doubled. These results imply changes in the composition of female jobs in the private sector during the crisis. Also, the results indicate that public sector workers not only enjoyed well-protected but also well-privileged jobs in terms of pay in spite of the introduced austerity measures. In contrast, the most vulnerable group were women employed by the private sector. On the other hand, the results for Croatia indicate an increase in both the composition and wage structure effect for females. This means that both the characteristics as well as returns to the characteristics for public sector female workers increased during the crisis, indicating once again stronger protection of workers in the public sector. However, this also suggests that private sector women were more hit by the crisis than men in terms of wages.

Focusing on the detailed decompositions in Table 4, the results show the greatest importance of occupational differences between the two sectors in the composition effect for both Croatian and Serbian male and female workers, similarly as for the whole-sample gap. In addition to better-paid occupations in the public than in the private sector, public sector workers on average also have higher educational qualifications and better-paid other characteristics than private sector workers. Moreover, even though the public sector has more higher-paid occupations, the returns to the same occupations are higher in the private sector for both Croatian and Serbian male and female workers, as is the case for the total gap. Additionally, public sector men and women in Croatia and public sector men in Serbia earned more in 2008 and less in 2011 for the same level of education than their private sector counterparts. The opposite holds for Serbian women. In particular, private sector women were paid more for the same educational qualification before the crisis, but less after the crisis. The returns to the remaining characteristics presented in Table 4 suggest that Serbian male workers were paid more in the private sector for the same level of experience than in the public sector, but less for other characteristics. More experienced male workers in Croatia had greater returns in the private sector in 2008, but lower returns in 2011. On the other hand, both Croatian and Serbian women were more rewarded for their experience in the public sector during the observed period.

5.4 Public-Private Sector Pay Gap across the Pay Distribution

In the previous section we tested and confirmed that there was an average public-private sector earnings differential in Croatia and Serbia in the period before and after the financial crisis. In this section we obtain the estimates of the public-private sector pay gap at different points of the earnings distribution by estimating unconditional quantile regressions. This method provides a richer understanding of the data due to a more complete picture than OB decompositions at the mean. Obtaining estimates along the wage distribution is especially important when the public sector pay is expected to be more compressed relative to the private sector pay distribution. This means that the public sector tends to reduce pay inequality more than the private sector (see Table 2). Lausev (2014) shows greater public sector pay compression in transition than in developed countries. Moreover, we would also like to test for the changes in relative public-private wage distribution during the financial crisis. For this purpose, we analyze differences in characteristics (i.e., composition effect) and differences in returns to those characteristics (i.e., wage structure effect) between public and private sector workers by splitting the sample according to pay ranges into five quintiles.

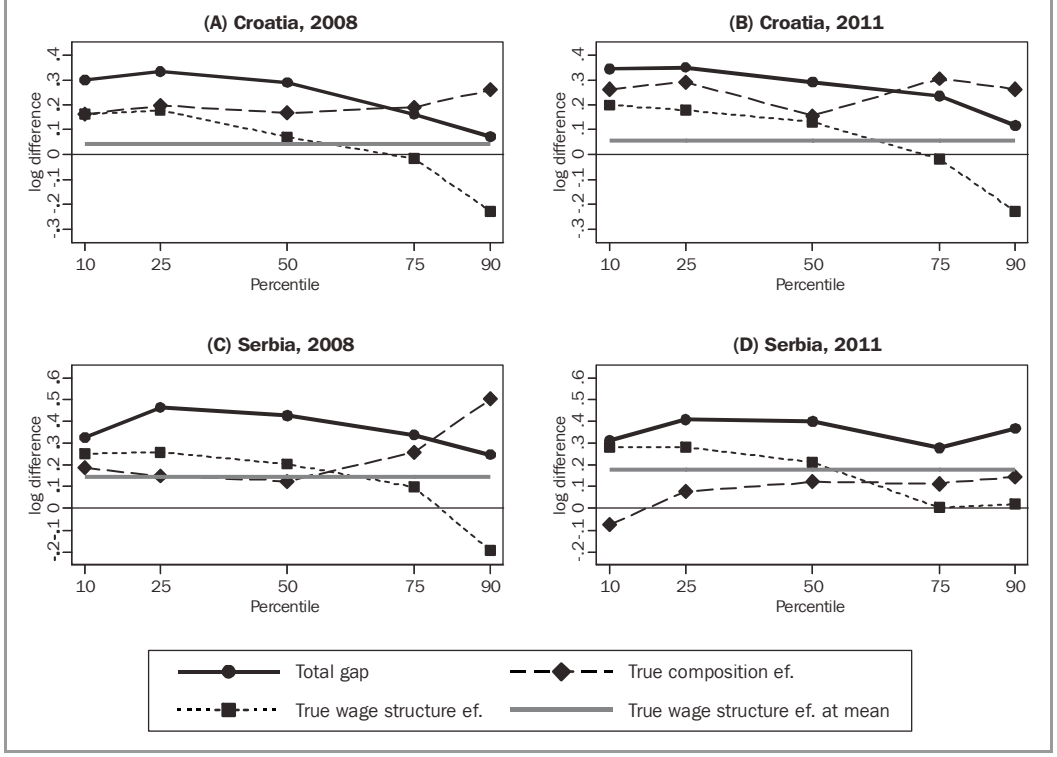
Before reporting the results of quantile decompositions of the total gap into the (true) composition and wage structure effects, we first briefly assess the appropriateness of the linearity assumption and the quality of reweighting (see Figure A1 in the Appendix). We note that the total error is generally larger than it was in the case of mean decompositions (reaching at some quantiles as much as 10 percentage points, both above and below zero) and that it is for all quantiles virtually completely due to misspecification of the wage regressions. This indicates that reweighting is more important for decompositions at quantiles than for those at the mean (Firpo, Fortin and Lemieux, 2007).

We now turn to the results of quantile decompositions, shown in Figure 1. The total (i.e., unconditional) gap mainly declines as one moves towards the top of the pay distribution for both years and countries. Differences in characteristics between the two sectors are lower at the bottom than at the top of the wage distribution. This indicates that public sector workers have "better" job and personal characteristics than the private sector workers and these differences in characteristics are greater at the higher than at the lower end of the pay distribution.

The conditional part of the differential presented in Figure 1 varies along the wage distribution according to the usual pattern observed in most of the countries. In particular, positive differences in returns to the same characteristics between public and private sectors decline with higher quantiles of the wage distribution. The wage-inequality reducing effect is present in both years and countries. This means that the public sector premium is largest below the median of the wage distribution and approaches zero or translates into a penalty at higher percentiles.

Although the previous section showed an average public sector premium in Croatia in the range of most EU countries, Figure 1 discloses a significantly higher premium at and below the median of the wage distribution. At the same time, top-paid workers in the public sector received substantially lower returns to the same characteristics when compared to their private sector counterparts. In particular, Figure 1 shows an increase in the public sector pay premium for workers at the 10th percentile from 16 percent in 2008 to 20 percent in 2011 in Croatia. The public sector premium at the 25th percentile of the wage distribution in Croatia was almost 18 percent and remained unchanged between 2008 and 2011. At the median, the public sector pay premium increased from 7 percent in 2008 to 13 percent in 2011. Workers at the 75th percentile of the wage distribution fared similar across sectors and those at the top (i.e., 90th) percentile incurred a 23 percent pay penalty from having a public sector job during the whole observed period. This indicates a strong, competitive private sector that could pay significantly more than the public sector in Croatia which is not the case in Serbia. Namely, the Serbian public sector rewarded workers at the 10th and 25th percentiles in 2008 with returns that were more than a quarter higher than in the private sector. The same workers saw a small but further increase in their premium in 2011. The public sector premium for Serbian workers at the median remained similar over time at around 20 percent, while those at the 75th percentile lost their premium in 2011. Additionally, public sector workers at the 90th percentile saw a decline in their penalty from 19 percent in 2008 to zero in 2011.

Figure 1 **Quantile Decompositions of the Public-Private Wage Gap**



Notes: Decompositions are based on Firpo, Fortin and Lemieux's (2007) approach (see equations 2 to 4). Yun's (2005) procedure is used to ensure invariance of the results to the choice of the omitted category for categorical characteristics.
Source: Authors' calculations based on Croatian and Serbian LFS, 2008 and 2011.

Significant public sector pay premiums at the lower part, coupled with significant penalties at the higher part of the wage distribution in Croatia, indicate substantial compression of the public sector pay relative to the private sector. Since the premium increased the most at the median in 2011 relative to 2008, the crisis only brought an additional compression of public sector pay between the 50th and 90th percentiles. This may be the result of a decline (or slower increase) in private sector wages at and below the median while wages at higher percentiles remained unchanged or followed the changes in pay in the public sector. On the other hand, quantile regressions reveal that due to introduced austerity measures in the public sector, only workers at the 75th percentile in Serbia lost relative to their private sector counterparts. At lower percentiles, the decline in wage returns was greater in the private than in the public sector. For that reason, there was an increase in the public sector premium at and below the median in 2011 despite the government efforts to hold down public sector pay. Finally, this section also shows that the private sector in both countries competes with the public sector only for workers at the higher end of the wage distribution, while workers at and below the median collect large public sector pay premiums.

6 Conclusions for Policy Implementation

Despite the fact that Croatia and Serbia have chosen different ways to adjust to the crisis, the impact on the public-private sector wage gap in these two countries is similar when measured as a percentage increase between 2008 and 2011. The only major difference between these two countries is larger initial premium at the mean and across the wage distribution in Serbia than in Croatia which consequently causes greater increase in the pay gap in absolute terms.

Given the relatively small average public sector premium, Croatian policy-makers have been more concerned with the revenue than with the expenditure side of the budget (measures such as VAT increase rather than public sector austerity measures). Consequently, the burden of the crisis was more absorbed by the private sector. In contrast, the implemented austerity (wage-freeze) measures in the public sector in Serbia were justified given the significantly higher public sector premium before the start of the crisis. Nevertheless, this paper finds a greater average public sector premium, i.e., returns to similar characteristics, at the end of the crisis than before the crisis in both countries. Moreover, unconditional quantile regressions applied in this paper raise a concern for policy-makers regarding overpaid public sector workers in both countries at lower parts of the pay-distribution.

Particularly for Croatia, our work shows a significant public sector premium at and below the median of the wage distribution. On the other hand, there is a significant penalty for having a public sector job for workers at the top percentiles of the wage distribution. In this context, the public sector in Croatia suffers from pay compression

and may face difficulties in recruiting top-skilled workers while paying above-market returns to workers at the lower end of the wage distribution.

On the other hand, our work on Serbia shows that real wage declines caused by pay-freeze measures in the public sector are coupled with even greater private sector wage cuts. Both public and private sectors seem to opt for a decline in wages rather than a decline in employment. This further widens the average sectoral gap. The same estimates by gender show that private sector women were more hit by the crisis than men. Furthermore, the estimates from unconditional quantile regressions suggest that public sector austerity measures caused a decline in the public sector premium to zero only for workers at the 75th percentile of the wage distribution. The crisis led to further worsening in the living standard conditions especially for private sector workers at and below the median of the wage distribution. These workers were not only faced with greater job insecurity but also saw an increase in pay disadvantage when compared to workers with the same characteristics in the public sector.

What are the policy implications that can be drawn from this paper? Given the explained wage privileges and large share of non-private (public) employment (over 40 percent), both employment and wage structure in the public sector put pressure on the sustainability of public finances. In Serbia, the increasing public sector wage premium presented in this paper sheds a light on workers' flow efficiency between the public and private sectors and ability to finance public sector wages. In Croatia, further fiscal consolidation is also needed although the government has opted not to adjust public sector wages to the overall state of the economy in order to preserve the social dialogue with the trade unions. However, after joining the EU Croatia has to adhere to some supranational rules such as decreasing the budget deficit below 3 percent of the GDP in the next three years. Similar requirements await Serbia, but in a longer time period. This paper reveals a significant venue for policy-makers to explore in order to meet these demands by lowering public sector wages and/or employment.

Appendix

Table A1 **Summary Statistics for Croatia**

CRO	2008				2011			
	Public		Private		Public		Private	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Personal characteristics								
Age	44.51	10.14	38.70	11.14	46.50	10.31	40.43	11.43
$Age^2/1000$	2.08	0.88	1.62	0.87	2.27	0.91	1.77	0.93
Female	0.50	0.50	0.43	0.50	0.51	0.50	0.43	0.49
Married	0.73	0.45	0.63	0.48	0.70	0.46	0.61	0.49
Low-skilled	0.10	0.30	0.14	0.34	0.11	0.31	0.11	0.32
Medium-skilled	0.57	0.50	0.73	0.44	0.54	0.50	0.74	0.44
High-skilled	0.31	0.46	0.13	0.33	0.33	0.47	0.14	0.35
Master's and Doctor's	0.02	0.14	0.00	0.06	0.03	0.17	0.01	0.08
Experience	21.66	10.58	16.10	11.12	23.16	10.98	17.31	11.61
$Experience^2/1000$	0.58	0.45	0.38	0.40	0.66	0.48	0.43	0.44
Tenure	16.85	10.91	9.24	9.80	17.98	11.31	10.21	10.10
$Tenure^2/1000$	0.40	0.42	0.18	0.32	0.45	0.45	0.21	0.35
Urban settlement	0.65	0.48	0.52	0.50	0.63	0.48	0.54	0.50
Job characteristics								
Manager	0.02	0.15	0.01	0.10	0.02	0.12	0.01	0.12
Professional	0.17	0.38	0.06	0.24	0.27	0.44	0.08	0.27
Technician	0.27	0.44	0.14	0.35	0.19	0.40	0.13	0.34
Clerk	0.16	0.36	0.14	0.35	0.15	0.36	0.12	0.33
Service and sales	0.09	0.28	0.19	0.39	0.10	0.30	0.23	0.42
Agriculture	0.01	0.10	0.01	0.08	0.01	0.10	0.00	0.07
Craftsman	0.10	0.31	0.18	0.38	0.08	0.27	0.16	0.37
Plant/machine operator	0.08	0.27	0.19	0.39	0.07	0.26	0.18	0.38
Elementary occupation	0.10	0.30	0.08	0.27	0.10	0.30	0.08	0.27
Temporary contract	0.06	0.23	0.14	0.34	0.05	0.23	0.13	0.34
Supervising	0.14	0.35	0.11	0.31	0.14	0.35	0.13	0.33
Small firm (<50)	0.37	0.48	0.53	0.50	0.40	0.49	0.56	0.50
Medium firm (50-200)	0.28	0.45	0.24	0.43	0.27	0.45	0.21	0.41
Large firm (>200)	0.35	0.48	0.23	0.42	0.33	0.47	0.23	0.42
Manufacturing	0.10	0.30	0.35	0.48	0.08	0.27	0.34	0.47
Construction	0.03	0.17	0.12	0.33	0.02	0.15	0.10	0.30
Wholesale and retail trade...	0.02	0.13	0.25	0.43	0.01	0.12	0.23	0.42
Transport, storage...	0.11	0.31	0.05	0.22	0.11	0.31	0.08	0.28
Financial intermediation...	0.01	0.11	0.03	0.18	0.02	0.12	0.04	0.19
Zagreb	0.23	0.42	0.19	0.39	0.20	0.40	0.17	0.38
Northwest (without Zagreb)	0.16	0.36	0.25	0.43	0.16	0.37	0.24	0.43
Central and Eastern Croatia	0.30	0.46	0.27	0.44	0.28	0.45	0.26	0.44
Adriatic	0.31	0.46	0.28	0.45	0.36	0.48	0.33	0.47
Wages/hours worked								
Usual hours per week	40.66	2.43	41.82	4.09	40.58	2.42	41.26	3.35
Nominal monthly wage	4616.16	1644.79	3939.40	2238.56	5082.04	1862.89	4142.63	2324.61
Real monthly wage (HRK)	4773.69	1700.92	4073.83	2314.96	4967.78	1821.00	4049.49	2272.35
Log hourly wage	3.26	0.34	3.04	0.42	3.30	0.34	3.05	0.41
No. of observations	**2194**		**3099**		**1640**		**2286**	

Source: Croatian LFS, 2008 and 2011.

Table A2 **Summary Statistics for Serbia**

SRB	2008				2011			
	Public		Private		Public		Private	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Personal characteristics								
Age	43.25	9.95	38.50	10.69	44.63	10.07	40.06	10.70
$Age^2/1000$	19.69	8.38	15.97	8.42	20.93	8.79	17.19	8.67
Female	0.48	0.50	0.42	0.49	0.48	0.50	0.42	0.49
Married	0.74	0.44	0.65	0.48	0.72	0.45	0.65	0.48
Low-skilled	0.10	0.30	0.14	0.34	0.10	0.30	0.11	0.31
Medium-skilled	0.56	0.50	0.73	0.45	0.55	0.50	0.74	0.44
High-skilled	0.33	0.47	0.14	0.34	0.33	0.47	0.15	0.36
Master's and Doctor's	0.01	0.10	0.00	0.04	0.02	0.14	0.01	0.08
Experience	19.52	10.31	14.94	10.72	19.88	10.39	15.35	10.88
$Experience^2/1000$	4.87	4.03	3.38	3.77	5.03	4.13	3.54	3.91
Tenure	15.68	10.63	8.67	9.36	16.41	10.67	9.35	9.22
$Tenure^2/1000$	3.59	3.85	1.63	2.95	3.83	3.95	1.72	3.01
Urban settlement	0.69	0.46	0.63	0.48	0.68	0.47	0.64	0.48
Job characteristics								
Manager	0.03	0.18	0.03	0.16	0.04	0.19	0.03	0.17
Professional	0.21	0.41	0.06	0.24	0.21	0.41	0.07	0.25
Technician	0.27	0.45	0.13	0.34	0.26	0.44	0.14	0.34
Clerk	0.10	0.30	0.08	0.27	0.10	0.30	0.09	0.28
Service and sales	0.09	0.28	0.25	0.43	0.10	0.29	0.25	0.43
Agriculture	0.00	0.06	0.01	0.07	0.01	0.07	0.01	0.11
Craftsman	0.10	0.30	0.23	0.42	0.10	0.30	0.20	0.40
Plant/machine operator	0.07	0.26	0.13	0.34	0.09	0.28	0.14	0.35
Elementary occupation	0.12	0.32	0.09	0.28	0.11	0.31	0.07	0.26
Temporary contract	0.05	0.22	0.10	0.29	0.07	0.25	0.12	0.32
Supervising	0.20	0.40	0.16	0.36	0.19	0.39	0.15	0.35
Small firm (<50)	0.65	0.48	0.80	0.40	0.65	0.48	0.81	0.39
Medium firm (50-250)	0.24	0.43	0.14	0.35	0.24	0.43	0.12	0.33
Large firm (>250)	0.11	0.31	0.07	0.25	0.10	0.30	0.06	0.24
Manufacturing	0.11	0.31	0.36	0.48	0.10	0.29	0.36	0.48
Construction	0.02	0.14	0.08	0.28	0.02	0.15	0.06	0.25
Wholesale and retail trade...	0.02	0.15	0.29	0.45	0.02	0.14	0.27	0.44
Transport, storage...	0.10	0.30	0.06	0.23	0.10	0.31	0.08	0.27
Financial intermed. ...	0.02	0.12	0.03	0.17	0.01	0.12	0.04	0.19
Belgrade	0.27	0.44	0.20	0.40	0.27	0.45	0.22	0.42
Vojvodina	0.21	0.41	0.31	0.46	0.20	0.40	0.29	0.45
Sumadija & West Serbia	0.52	0.50	0.49	0.50	0.52	0.50	0.49	0.50
Wages/hours worked								
Usual hours per week	41.00	3.36	44.17	6.74	40.95	3.51	43.80	5.92
Nominal monthly wage	30222.6	23516.2	23312.0	26894.9	33878.4	17143.0	26356.1	17130.8
Real monthly wage (RSD)	34648.3	26959.88	26725.8	30833.3	29513.4	14934.3	22960.3	14923.6
Log hourly wage	5.16	0.54	4.79	0.61	5.02	0.51	4.69	0.53
No. of observations	**2015**		**2401**		**2027**		**2438**	

Source: Serbian LFS, 2008 and 2011.

Table A3 **Pooled Regression Results**

Pooled	CROATIA				SERBIA			
	2008		2011		2008		2011	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Public sector	0.046***	0.011	0.071***	0.012	0.136***	0.020	0.145***	0.018
Personal characteristics								
Age	0.004	0.004	0.002	0.005	0.004	0.008	0.010	0.007
$Age^2/1000$	-0.050	0.051	-0.039	0.056	-0.009	0.009	-0.014	0.008
Female	-0.149***	0.009	-0.166***	0.010	-0.151***	0.016	-0.107***	0.015
Married	0.015	0.010	0.0271*	0.011	0.011	0.018	-0.001	0.016
Medium-skilled – ref.								
Low-skilled	-0.105***	0.014	-0.090***	0.016	-0.133***	0.025	-0.104***	0.024
High-skilled	0.153***	0.015	0.108***	0.017	0.218***	0.026	0.177***	0.022
Master's and Doctor's	0.333***	0.042	0.266***	0.039	0.483***	0.101	0.538***	0.063
Experience	0.008**	0.003	0.004	0.003	0.006	0.004	0.004	0.004
$Experience^2/1000$	-0.102	0.060	-0.014	0.063	0.002	0.011	-0.004	0.009
Tenure	0.002	0.002	0.005**	0.002	0.002	0.003	0.001	0.003
$Tenure^2/1000$	-0.070	0.044	-0.103*	0.047	-0.010	0.009	0.000	0.008
Urban settlement	0.049***	0.009	0.025*	0.010	0.037*	0.016	0.029*	0.014
Job characteristics								
Technician – ref.								
Manager	0.357***	0.034	0.352***	0.039	0.186***	0.048	0.126**	0.042
Professional	0.130***	0.017	0.189***	0.020	0.174***	0.031	0.102***	0.027
Clerk	-0.142***	0.015	-0.097***	0.017	-0.096**	0.030	-0.158***	0.027
Service & sales	-0.271***	0.015	-0.223***	0.017	-0.286***	0.027	-0.285***	0.024
Agriculture	-0.345***	0.044	-0.218***	0.053	-0.110	0.106	-0.408***	0.071
Craftsman	-0.209***	0.016	-0.152***	0.019	-0.202***	0.028	-0.210***	0.026
Plant/machine operator	-0.267***	0.017	-0.205***	0.018	-0.157***	0.031	-0.162***	0.027
Elementary	-0.369***	0.019	-0.292***	0.021	-0.283***	0.031	-0.347***	0.030
Temporary contract	-0.074***	0.014	-0.097***	0.016	-0.173***	0.029	-0.212***	0.025
Supervising	0.077***	0.014	0.149***	0.014	0.128***	0.021	0.144***	0.019
Small firm – ref.								
Medium firm	0.031**	0.010	0.015	0.011	0.042*	0.019	0.036*	0.018
Large firm	0.069***	0.010	0.061***	0.011	0.117***	0.027	0.119***	0.025
Manufacturing	-0.059***	0.013	-0.075***	0.015	-0.074**	0.024	-0.055*	0.021
Construction	0.005	0.017	-0.020	0.020	-0.042	0.036	-0.077*	0.034
Wholesale and retail...	-0.033*	0.014	-0.060***	0.016	-0.078**	0.026	-0.034	0.024
Transport, storage...	0.110***	0.016	0.073***	0.016	-0.021	0.029	-0.012	0.025
Financial intermed. ...	0.150***	0.026	0.166***	0.028	0.284***	0.050	0.188***	0.043
Zagreb – ref.								
Northwest Cro.	-0.048***	0.013	-0.074***	0.015				
Central and Eastern Cro.	-0.122***	0.012	-0.147***	0.014				
Adriatic Cro.	-0.023*	0.012	-0.062***	0.013				
Sumad. & W. Serb – ref.								
Belgrade					0.323***	0.019	0.192***	0.016
Vojvodina					0.091***	0.018	0.070***	0.016
Constant	3.133***	0.075	3.182***	0.085	4.773***	0.136	4.593***	0.120
Adjusted R-squared	0.529		0.560		0.379		0.372	
F	181.4		152.4		85.3		83.7	
Observations	5293		3926		4416		4465	

*Notes: * p<0.05, ** p<0.01, *** p<0.001.*
Source: Authors' calculations based on Croatian and Serbian LFS, 2008 and 2011.

Table A4 **Wage Regressions for Croatia**

CRO	2008				2011			
	Public		Private		Public		Private	
Personal characteristics	**Estimate**	**SE**	**Estimate**	**SE**	**Estimate**	**SE**	**Estimate**	**SE**
Age	0.008	0.006	0.001	0.006	-0.017*	0.007	0.007	0.007
$Age^2/1000$	-0.085	0.070	-0.017	0.075	0.148	0.077	-0.088	0.082
Female	-0.107***	0.012	-0.169***	0.012	-0.131***	0.013	-0.178***	0.014
Married	0.043***	0.012	-0.001	0.014	0.024	0.013	0.026	0.015
Medium skilled – ref.								
Low-skilled	-0.133***	0.020	-0.079***	0.018	-0.069**	0.022	-0.098***	0.022
High-skilled	0.151***	0.016	0.142***	0.024	0.100***	0.021	0.118***	0.025
Master's and Doctor's	0.320***	0.040	0.441***	0.092	0.361***	0.041	0.082	0.080
Experience	0.001	0.004	0.009*	0.003	0.017***	0.004	0.000	0.004
$Experience^2/1000$	0.005	0.079	-0.126	0.087	-0.266**	0.085	0.095	0.091
Tenure	0.008***	0.002	0.000	0.002	0.002	0.002	0.006*	0.003
$Tenure^2/1000$	-0.151**	0.057	-0.044	0.068	-0.016	0.060	-0.142	0.073
Urban	0.032**	0.012	0.058***	0.013	0.026*	0.013	0.022	0.014
Job characteristics								
Technician – ref.								
Manager	0.294***	0.037	0.466***	0.057	0.234***	0.048	0.474***	0.058
Professional	0.099***	0.018	0.215***	0.030	0.182***	0.022	0.215***	0.033
Clerk	-0.146***	0.018	-0.115***	0.023	-0.085***	0.020	-0.088***	0.026
Service & sales	-0.192***	0.021	-0.278***	0.022	-0.188***	0.023	-0.227***	0.024
Agriculture	-0.222***	0.049	-0.433***	0.072	-0.193***	0.057	-0.266**	0.094
Craftsman	-0.158***	0.021	-0.214***	0.023	-0.133***	0.027	-0.141***	0.026
Plant/machine operator	-0.176***	0.023	-0.282***	0.023	-0.133***	0.027	-0.210***	0.025
Elementary	-0.363***	0.023	-0.358***	0.028	-0.326***	0.026	-0.259***	0.031
Temporary contract	-0.114***	0.024	-0.057**	0.017	-0.179***	0.027	-0.066**	0.020
Supervising	0.065***	0.016	0.100***	0.021	0.114***	0.018	0.178***	0.021
Small firm – ref.								
Medium firm	0.013	0.013	0.038**	0.014	0.009	0.014	0.008	0.016
Large firm	0.064***	0.013	0.084***	0.015	0.060***	0.014	0.066***	0.016
Manufacturing	-0.090***	0.019	-0.015	0.018	-0.082***	0.023	-0.051**	0.020
Construction	-0.032	0.031	0.036	0.022	-0.015	0.037	-0.012	0.026
Wholesale and retail...	0.037	0.038	-0.011	0.017	0.039	0.048	-0.049*	0.019
Transport, storage...	0.052**	0.018	0.185***	0.028	0.029	0.020	0.101***	0.026
Financial intermed. ...	0.113**	0.044	0.163***	0.034	0.097*	0.046	0.179***	0.036
Zagreb – ref.								
Northwest Cro.	0.013	0.018	-0.086***	0.019	-0.006	0.020	-0.116***	0.022
Central and East. Cro.	-0.045**	0.015	-0.186***	0.018	-0.054**	0.017	-0.213***	0.021
Adriatic Cro.	-0.019	0.014	-0.0235	0.017	-0.038*	0.017	-0.073***	0.019
Constant	3.047***	0.115	3.176***	0.103	3.558***	0.131	3.112***	0.117
Adjusted R-squared	0.554		0.488		0.581		0.498	
F	86.03		93.41		72.08		71.80	
Observations	2194		3099		1640		2286	

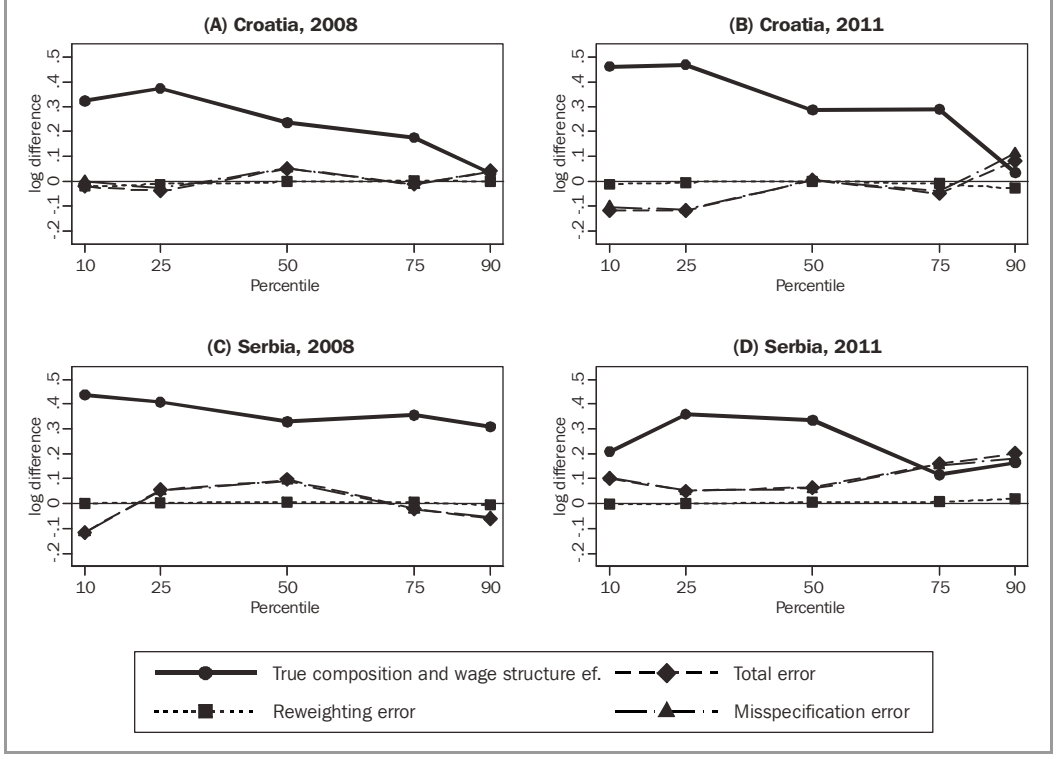
*Notes: * p<0.05, ** p<0.01, *** p<0.001.*
Source: Authors' calculations based on Croatian LFS, 2008 and 2011.

Table A5 **Wage Regressions for Serbia**

SRB	2008				2011			
	Public		Private		Public		Private	
Personal characteristics	**Estimate**	**SE**	**Estimate**	**SE**	**Estimate**	**SE**	**Estimate**	**SE**
Age	-0.001	0.012	0.001	0.010	0.001	0.010	0.017	0.009
$Age^2/1000$	-0.002	0.014	-0.005	0.013	-0.001	0.012	-0.024*	0.011
Female	-0.135***	0.023	-0.153***	0.024	-0.095***	0.021	-0.100***	0.021
Married	0.034	0.025	-0.006	0.025	-0.024	0.022	0.015	0.023
Medium skilled – ref.								
Low-skilled	-0.166***	0.038	-0.101**	0.032	-0.166***	0.036	-0.051	0.032
High-skilled	0.281***	0.032	0.109**	0.040	0.179***	0.029	0.150***	0.035
Master's and Doctor's	0.532***	0.102	0.355	0.290	0.542***	0.072	0.517***	0.123
Experience	-0.006	0.007	0.0115*	0.005	0.004	0.005	0.006	0.005
$Experience^2/1000$	0.019	0.016	-0.004	0.015	-0.005	0.013	-0.006	0.013
Tenure	0.009*	0.004	-0.001	0.004	-0.002	0.004	0.002	0.004
$Tenure^2/1000$	-0.017	0.012	-0.005	0.014	0.005	0.012	-0.001	0.012
Urban	0.038	0.023	0.0464*	0.022	0.035	0.020	0.024	0.020
Job characteristics								
Technician – ref.								
Manager	0.186**	0.062	0.266***	0.071	0.147**	0.056	0.108	0.063
Professional	0.0760*	0.035	0.364***	0.057	0.107***	0.033	0.079	0.048
Clerk	-0.112**	0.038	-0.059	0.047	-0.120***	0.035	-0.191***	0.041
Service & sales	-0.234***	0.040	-0.277***	0.039	-0.202***	0.037	-0.328***	0.034
Agriculture	0.032	0.159	-0.154	0.142	-0.285*	0.126	-0.437***	0.090
Craftsman	-0.101*	0.041	-0.234***	0.040	-0.170***	0.039	-0.225***	0.035
Plant/machine operator	-0.177***	0.045	-0.151***	0.044	-0.107**	0.040	-0.188***	0.038
Elementary	-0.319***	0.040	-0.236***	0.047	-0.367***	0.040	-0.291***	0.045
Temporary contract	-0.185***	0.049	-0.177***	0.037	-0.223***	0.042	-0.205***	0.031
Supervising	0.115***	0.027	0.132***	0.031	0.165***	0.025	0.121***	0.029
Small firm – ref.								
Medium firm	0.020	0.024	0.0744*	0.031	0.032	0.022	0.037	0.029
Large firm	0.091**	0.034	0.161***	0.043	0.136***	0.031	0.094*	0.040
Manufacturing	-0.264***	0.035	0.040	0.034	-0.176***	0.035	0.009	0.030
Construction	0.011	0.072	0.001	0.045	-0.023	0.063	-0.058	0.044
Wholesale and retail...	0.003	0.067	-0.008	0.032	-0.223***	0.066	0.030	0.029
Transport, storage...	-0.024	0.035	0.024	0.051	-0.007	0.031	0.020	0.041
Financial intermed. ...	0.246**	0.082	0.357***	0.065	0.254***	0.076	0.212***	0.054
Sumad. & W. Serb – ref.								
Belgrade	0.221***	0.024	0.430***	0.028	0.110***	0.022	0.282***	0.024
Vojvodina	0.042	0.026	0.122***	0.024	0.067**	0.024	0.071**	0.022
Constant	5.127***	0.223	4.686***	0.179	4.915***	0.194	4.439***	0.162
Adjusted R-squared	0.341		0.331		0.376		0.278	
F	34.65		39.23		40.37		31.32	
Observations	2015		2401		2027		2438	

*Notes: * p<0.05, ** p<0.01, *** p<0.001.*
Source: Authors' calculations based on Serbian LFS, 2008 and 2011.

Figure A1 **True Composition and Wage Structure Effects and the Decomposition of the Total Error into the Reweighting and Misspecification Errors**



Notes: Decompositions are based on Firpo, Fortin and Lemieux's (2007) approach (see equations 2 to 4). Yun's (2005) procedure is used to ensure invariance of the results to the choice of the omitted category for categorical characteristics.
Source: Authors' calculations based on Croatian and Serbian LFS, 2008 and 2011.

References

Algan, Yann, Pierre Cahuc and André Zylberberg, 2002, "Public Employment and Labor Market Performance", *Economic Policy*, 17(34), pp. 7-66.

Arandarenko, Mihail and Sonja Avlijaš, 2011, "Behind the Veil of Statistics: Bringing to Light Structural Weaknesses in Serbia" in Verena Schmidt and Daniel Vaughan-Whitehead, eds., *The Impact of the Crisis on Wages in South-East Europe*, pp. 123-158, Geneva: International Labour Organization (ILO).

Barsky Robert, John Bound, Kerwin Kofi Charles and Joseph P. Lupton, 2002, "Accounting for the Black-White Wealth Gap: A Nonparametric Approach", *Journal of the American Statistical Association*, 97(459), pp. 663-673.

Behar, Alberto and Junghwan Mok, 2013, "Does Public-Sector Employment Fully Crowd Out Private-Sector Employment?", IMF Working Paper, WP/13/146, Washington: International Monetary Fund (IMF).

Bejaković, Predrag, Vjekoslav Bratić and Goran Vukšić, 2011, "Komparativna analiza zaposlenosti i naknada za zaposlene u javnom sektoru u Hrvatskoj i Europskoj uniji", *Društvena istraživanja: Journal for General Social Issues*, 21(1), pp. 101-119. http://dx.doi.org/10.5559/di.21.1.06

Blinder, Alan S., 1973, "Wage Discrimination: Reduced Form and Structural Estimates", *The Journal of Human Resources*, 8(4), pp. 436-455.

Borah, Bijan J. and Anirban Basu, 2013, "Highlighting Differences between Conditional and Unconditional Quantile Regression Approaches through an Application to Assess Medication Adherence", *Health Economics*, 22(9), pp. 1052-1070.

Christofides, Louis N. and Maria Michael, 2013, "Exploring the Public-Private Sector Wage Gap in European Countries", *IZA Journal of European Labor Studies*, online. http://dx.doi.org/10.1186/2193-9012-2-15

Christopoulou, Rebekka and Vassilis Monastiriotis, 2013, "The Greek Public Sector Wage Premium before the Crisis: Size, Selection and Relative Valuation of Characteristics", *British Journal of Industrial Relations*, 2(15), pp. 1-53. http://dx.doi.org/10.1111/bjir.12023

de Castro, Francisco, Matteo Salto and Hugo Steiner, 2013, "The Gap between Public and Private Wages: New Evidence for the EU", European Commission, Directorate-General for Economic and Financial Affairs Economic Papers, No. 508, Brussels: European Commission.

Depalo, Domenico, Raffaela Giordano and Evangelia Papapetrou, 2013, "Public-Private Wage Differentials in Euro Area Countries: Evidence from Quantile Decomposition

Analysis", Bank of Italy, Economic Research and International Relations Area, Temi di discussione (Economic working papers), No. 907, Rome: Bank of Italy.

DiNardo, John, Nicole Fortin and Thomas Lemieux, 1996, "Labor Market Institutions and the Distribution of Wages, 1973-1992: A semiparametric approach", *Econometrica*, 64(5), pp. 1001-1044.

Firpo, Sergio, Nicole Fortin, and Thomas Lemieux, 2007, "Decomposing Wage Distributions Using Recentered Influence Function Regressions", unpublished paper.

Firpo, Sergio, Nicole Fortin, and Thomas Lemieux, 2009, "Unconditional Quantile Regressions", *Econometrica*, 77(3), pp .953-973. http://dx.doi.org/10.3982/ECTA6822

Fortin, Nicole, Thomas Lemieux and Sergio Firpo, 2011, "Decomposition Methods in Economics" in Orley Ashenfelter and David Card, eds., *Handbook of Labor Economics*, Edition 1, Volume 4, No. 4, pp. 1-102, Amsterdam: Elsevier.

Fournier, Jean-Marc and Isabell Koske, 2012, "Less Income Inequality and More Growth – Are They Compatible?", OECD Economics Department Working Papers, No. 930, Paris: OECD Publishing.

Franičević, Vojmir, 2011, "Croatia: Prolonged Crisis with an Uncertain Ending" in Daniel Vaughan-Whitehead, ed., *Inequalities in the World of Work: The Effects of the Crisis*, pp. 139-208, Geneva: International Labour Organization (ILO).

Franičević, Vojmir and Teo Matković, 2013, "Croatia: Public Sector Adaptation and Its Impact on Working Conditions" in Daniel Vaughan-Whitehead, ed., *Public Sector Shock: The Impact of Policy Retrenchment in Europe*, pp. 134-173, Cheltenham and Geneva: Edward Elgar and International Labour Office (ILO).

Gardeazabal, Javier and Arantza Ugidos, 2004, "More on Identification in Detailed Wage Decompositions", *The Review of Economics and Statistics*, 86(4), pp. 1034-1036.

Giordano, Raffaela, Domenico Depalo, Manuel Coutinho Pereira, Bruno Eugène, Evangelia Papapetrou, Javier J. Perez, Lukas Reiss and Mojca Roter, 2011, "The Public Sector Pay Gap in a Selection of Euro Area Countries", European Central Bank Working Paper Series, No. 1406, Frankfurt: European Central Bank.

Hernandez de Cos, Pablo and Enrique Moral-Benito, 2013, "The Role of Public Wages in Fiscal Consolidation Processes", European Commission, Directorate-General for Economic and Financial Affairs workshop paper, Brussels: European Commission, http://ec.europa.eu/economy_finance/events/2013/20131211_ecfin_workshop/pdf/the_role_of_public_wages_in_fiscal_consolidation_processes_en.pdf (accessed April 20, 2014).

Horrace, William C. and Ronald L. Oaxaca, 2001, "Inter-Industry Wage Differentials and the Gender Wage Gap: An Identification Problem", *Industrial and Labor Relations Review*, 54(3), pp. 611-618.

IMF, 2013, *Country Report - Republic of Serbia*, No. 13/206, Washington, DC: International Monetary Fund (IMF).

Jones, F. L., 1983, "On Decomposing the Wage Gap: A Critical Comment on Blinder's Method", *The Journal of Human Resources*, 18(1), pp. 126-130.

Jones, F. L. and Jonathan Kelley, 1984, "Decomposing Differences Between Groups: A Cautionary Note on Measuring Discrimination", *Sociological Methods and Research*, 12(3), pp. 323-343.

Jovanović, Branko and Michael M. Lokshin, 2003, "Wage Differentials and State-Private Sector Employment Choice in Yugoslavia", *Economics of Transition*, 11(3), pp. 463-491.

Koenker, Roger and Gilbert Bassett, 1978, "Regression Quantiles", *Econometrica*, 46(1), pp. 33-50.

Lamo, Ana, Javier J. Perez and Ludger Schuknect, 2012, "Public or Private Sector Wage Leadership? An International Perspective", *Scandinavian Journal of Economics*, 114(1), pp. 228-244.

Lamo, Ana, Javier J. Perez and Ludger Schuknecht, 2013, "Are Government Wages Interlinked with Private Sector Wages?", *Journal of Policy Modeling*, forthcoming.

Lausev, Jelena, 2014, "What Has Twenty Years of Public-Private Pay Gap Literature Told Us? Eastern European Transitioning vs. Developed Economies", *Journal of Economic Surveys*, 28(3), pp. 516-550. http://dx.doi.org/10.1111/joes.12039

Lucifora, Claudio and Dominique Meurs, 2006, "The Public Sector Pay Gap in France, Great Britain and Italy", *Review of Income and Wealth*, 52(1), pp. 43-59. http://dx.doi.org/10.1111/j.1475-4991.2006.00175.x

Nestić, Danijel, 2005, "The Determinants of Wages in Croatia: Evidence from Earnings Regressions" in Željko Lovrinčević, Andrea Mervar, Dubravko Mihaljek, Mustafa Nušinović, Sonja Radas, Nenad Starc, Sandra Švaljek and Ivan Teodorović, eds., *65th Anniversary Conference of the Institute of Economics, Zagreb - Proceedings*, pp. 131-162, Zagreb: The Institute of Economics, Zagreb.

Nestić, Danijel, 2010, "Croatia: Moving towards a More Active Minimum Wage Policy" in Daniel Vaughan-Whitehead, ed., *The Minimum Wage Revisited in the Enlarged EU*, pp. 85-112, Cheltenham and Geneva: Edward Elgar and International Labour Office (ILO).

Nikolic, Jelena, 2014, "Effect of Large-scale Privatisation on Public Sector Pay Gap in a Transition Economy", *Economics of Transition*, forthcoming.

Oaxaca, Ronald L., 1973, "Male-Female Wage Differentials in Urban Labor Markets", *International Economic Review*, 14(3), pp. 693-709.

Oaxaca, Ronald L. and Michael R. Ransom, 1999, "Identification in Detailed Wage Decompositions", *The Review of Economics and Statistics*, 81(1), pp. 154-157.

Reilly, Barry, 2003, "The Private Sector Wage Premium in Serbia (1995-2000): A Quantile Regression Approach", University of Sussex, Discussion Papers in Economics, No. 98, Brighton: University of Sussex.

Rubil, Ivica, 2013, "The Great Recession and the Public-Private Wage Gap: Distributional Decomposition Evidence from Croatia 2008-2011", Zagreb: The Institute of Economics, Zagreb, unpublished paper.

Tomić, Iva and Polona Domadenik, 2012, "Matching, Adverse Selection and Labour Market Flows in a (Post)Transition Setting: The Case of Croatia", *Post-Communist Economies*, 24(1), pp. 39-72. http://dx.doi.org/10.1080/14631377.2012.647969

World Bank, 2010, *Serbia: Right-Sizing the Government Wage Bill*, Report No. 54056-YF.

Yun, Myeong-Su, 2005, "A Simple Solution to the Identification Problem in Detailed Wage Decompositions", *Economic Inquiry*, 43(4), pp. 766–772.

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